

# The Metaphysics of Resemblance

Ghislain GUIGON

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Université de Genève

Président du Jury:

Professeur Pascal ENGEL, Université de Genève

Directeurs de thèse:

Professeur Kevin MULLIGAN, Université de Genève

Professeur Gonzalo RODRIGUEZ-PEREYRA, Oriel College,  
University of Oxford



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# Introduction

The literature on this topic [resemblance] (and there is an interesting and important literature) generally maintains, quite correctly I believe, that there are two main sorts of resemblance. First, there is *the resemblance of particulars*. This is not a particularly taxing topic [...]. But, second, there is *the resemblance of universals*. (Armstrong 1978b, 95)

The topic of this study is the resemblance of particulars, or as I prefer to call them, individuals. The underlying contention of this dissertation is, *contra* Armstrong, that the resemblance of individuals is a taxing and challenging philosophical topic.

There are two main claims that are defended in this study which should suffice to show that resemblance demands some efforts from philosophers. The first of these claims is that resemblance is not a binary relation but a monadic multigrade property. The second of these claims is that the metaphysics of resemblance and the metaphysics of properties are distinct, although not independent, philosophical issues.

That resemblance is not binary but a monadic multigrade property makes resemblance taxing in at least two ways. First, resemblance is traditionally conceived of as a binary relation and on my account this traditional view is wrong. Second, a metaphysical account of multigrade properties is in itself a challenging issue.

That the metaphysics of resemblance and the metaphysics of properties are distinct is motivated by the fact that an answer to the central question of the metaphysics of resemblance, which I identify as the question of whether the resemblance facts are context-relative, is not determined by any positioning on the central debate in the metaphysics of properties: the debate between the realist and the nominalist. Authors engaged in the realist/nominalist debate often address the central question of the metaphysics of resemblance in few words as their interest in resemblance is usually no more than an *epiphenomenon* of their interest in properties. It is one goal of this study to convince the reader that the central question of the metaphysics of resemblance needs to be addressed with more depth, and that addressing this question is challenging.

The layout of the dissertation is as follows. Chapter 1 is an introductory chapter which provides a surface analysis of resemblance. I discriminate different notions of resemblance and difference that I call *minimal*, *overall*, and *exact*. I next distinguish two big pictures of resemblance that I call *Egalitarianism* and *Inegalitarianism*. According to Egalitarianism, the sharing of any *abundant property* is sufficient for minimal resemblance, where abundant properties of individuals are thought of as sets of  $n$ -tuples of individuals. According to Inegalitarianism, only a selected minority of properties, which I call *elected properties*, is linked with resemblance, and while the sharing of an elected property is sufficient for minimal resemblance, the sharing of a merely abundant property is not sufficient for minimal resemblance. I argue that Egalitarianism is a non-starter. Once we assume Inegalitarianism, two families of views about elected properties can be distinguished. According to the first family of views, that I call *vegetarian*, which properties are elected is a mind-dependent matter. According to the second family of views, that I call *carnivorous*, which properties are elected is an objective, mind-independent matter. I do not commit myself in favour of either family of views of elected properties at the end of this chapter.

The topic of chapter 2 is the *arity* of resemblance properties. I first distinguish the arity from the *adicity* of properties. The arity of a property is determined by the number of entities of or between which the property can hold. The adicity of a property is determined by the groupings the property imposes on the entities of or between which it can hold. The traditional view of resemblance, that I call *the binarist view*, is that resemblance is binary, and more precisely that resemblance can hold of either one or two individuals, but no more than two. I shall argue that the view is ill-grounded and defend the opposite view of resemblance, called *the collectivist view*, according to which resemblance can hold between more than two individuals.

The argument runs as follows. I argue in section 2.3 that since resemblance can truly be ascribed to more than two individuals, binarists about resemblance must provide an account of ascriptions of resemblance to more than two individuals, which I call *collective ascriptions of resemblance*. In section 2.4 I discuss a proposed analysis of collective ascriptions of resemblance in terms of a binary resemblance property and argue that imperfect communities show that the proposed analysis fails. The discussion of the in-

determinacy of plural predications of resemblance in section 2.5 establishes why it fails.

I then discuss, in section 2.6, a satisfactory account of ascriptions of resemblance to more than two individuals in terms of resemblance between at most two individuals and resemblance in some respect. I argue that instead of legitimating the binarist view of resemblance the latter account of collective ascriptions of resemblance legitimates the collectivist view. In the process of the argument I examine how metaphysics of properties account for resemblance and resemblance in some respect. Section 2.7 focuses on the debate between the collectivist and the binarist within Resemblance Nominalism. Resemblance can hold between indeterminately many individuals. If so, resemblance is multigrade. In the last section of the chapter I undermine strategies to avoid the consequence that resemblance is multigrade.

Chapter 3 deals with the adicity of non-comparative and comparative resemblance. In section 3.1 I argue that non-comparative resemblance is *monadic*. Since my argument relies on the assumption that the transitive form of the resemblance verb is symmetrical, I shall undermine objections against this assumption in section 3.2. In section 3.3 I consider comparative resemblance. The standard logic for comparative resemblance suggests that comparative resemblance is a tetradic relation holding between at most four entities. I argue that comparative resemblance is not a tetradic property but a *dyadic* and multigrade property. In the final section of chapter 3 I account for monadic and dyadic multigrade properties in a set-theoretic framework.

Chapter 4 comes back to the relationship between resemblance and resemblance in some respect introduced in chapter 2. I first argue that resemblance in some respect is a disjunctive notion: we can resemble with respect to properties, parts, or possessions. From the consideration of the disjunctiveness of resemblance in some respect I argue that respects of resemblance are not determinable properties but similarity orderings of properties, parts, or possessions. Leaving aside resemblances with respect to parts or possessions I use the preceding results to refine the surface analyses of resemblance proposed in chapter 1. I distinguish *strong minimal resemblance* from *weak minimal resemblance*. Having a common elected property is necessary and sufficient for individuals to strongly minimally resemble each other. Having resembling elected properties is necessary and sufficient for individuals to weakly minimally resemble each other. Likewise, I distinguish *strong*

*minimal difference* from *weak minimal difference*. I then argue that exact difference is the dual of weak minimal resemblance and exact resemblance is the dual of weak minimal difference.

In chapter 5 I introduce a formal language for resemblance which allows me to restate formally definitions and principles about resemblance and difference that I introduced and defended in previous chapters. This formal language is a plural language. Further principles about non-comparative resemblance and difference are also introduced in this formal chapter.

The context-relativity of our resemblance judgements is the topic of chapter 6. The characteristic of context-relative judgements is that subjects can disagree in their judgements without committing any fault. The aim of the chapter is to account for the conditions under which a disagreement between resemblance judgements is faultless.

In section 6.1 I review the various ways in which our resemblance judgements can vary with the context. In section 6.2 I appeal to entities that I call *representational perspectives* and that are designed to comprise all the contextual features that can make resemblance judgements vary with the context. I then interpret the claim that our resemblance judgements are context-relative as the claim that they are relative to the representational perspective of agents when comparing objects relative to their resemblance. In section 6.3 I state the conditions under which a disagreement between resemblance judgements would be faultless. Roughly, subjects disagree in their resemblance judgements without committing any fault when they are warranted, relative to their representational perspective and true beliefs for which there is no defeater, in judging as they do about the resemblance of objects. If subjects can disagree in this way, their disagreement must be explained by a difference in their representational perspectives, and so resemblance judgements are relative to a representational perspective.

Whether the resemblance facts are also relative to a representational perspective is the topic of chapter 7. There I call *Anti-Resemblism* the view according to which the resemblance of individuals is relative to a representational perspective. *Resemblism* on the other hand is the view according to which the resemblance of individuals is a mind-independent matter. I think of the resemblist vs. anti-resemblist debate as the central debate of the metaphysics of resemblance. I show in chapter 7 that a positioning in this debate is not determined by any positioning in the realist vs. nominalist debate. If

the latter debate is the central debate in the metaphysics of properties, the main issue of the metaphysics of resemblance is not the main issue of the metaphysics of properties.

Section 7.1 introduces the debate. Anti-Resemblism is presented in section 7.2. Anti-Resemblism can take at least three forms that I call *contextualist*, *propositional*, and *factual*: according to Contextualist Anti-Resemblism, it is the content of resemblance judgements that is relative to a representational perspective; according to Propositional Anti-Resemblism, it is the truth of the content of resemblance judgements that is relative to a representational perspective; according to Factual Anti-Resemblism, it is the world at which we evaluate the truth of ascriptions of resemblance that can vary with the representational perspective. I argue for the superiority of Factual Anti-Resemblism. Then I introduce candidate anti-resemblist truthmaker analyses for ascriptions of resemblance. The candidate truthmaker analyses all entail a vegetarian conception of elected properties, and I argue that the anti-resemblist truthmaker analyses can be nominalist as well as realist.

Section 7.3 is concerned with the presentation of Resemblism. Resemblism follows from the carnivorous interpretation of ‘elected properties’ as being sparse properties. Understood in this way elected properties constitute an elite class of properties objectively designed to be the properties that are linked with resemblance. I offer resemblist truth conditions for ascriptions of resemblance and then say what the candidate resemblist truthmaker analyses for ascriptions of resemblance are.

In chapter 8, I argue in favour of Anti-Resemblism. There are three main reasons why I defend Anti-Resemblism. First, I think that a metaphysics of resemblance should provide an explanation of the context-sensitivity of our resemblance judgements and I argue that Anti-Resemblism is the only metaphysics of resemblance that succeeds in doing so. Second, Anti-Resemblism allied with Nominalism is the most powerful project of metaphysics of resemblance in terms of explanatory power and avoidance of *ad hoc* ontology. Finally, I argue against an objective realm of sparse properties and rebut objections against Anti-Resemblism.

Do anti-resemblists have to solve the *Problem of Universals*? In the first section of chapter 9 I argue that they do if the Problem of Universals is the demand for a truthmaker analysis of ascriptions of elected properties to individuals. The difference between the resemblist and the anti-

resemblist on this issue is that the resemblist truthmakers are all part of the mind-independent world, while the anti-resemblist ones are partly mind-dependent. The rest of the chapter is therefore devoted to the discussion of an anti-resemblist solution to the Problem of Universals which is a form of Resemblance Nominalism and that I call *Vegetarian Resemblance Nominalism*. As I explain at the beginning of the chapter, I neither endorse nor reject the view. What I endorse is Anti-Resemblist Nominalism and the reason why I focus on the vegetarian resemblance nominalist solution to the Problem of Universals is only that resemblance is part of the solution.

The discussed anti-resemblist version of Resemblance Nominalism is inspired by a resemblist version of the view that has been proposed and dismissed by Lewis. I shall argue that Lewis's worries fall down in the anti-resemblist context. I next discuss the classical difficulties to Resemblance Nominalism and show how the proposal allows us to solve these difficulties. The final section of the chapter is devoted to the *Coextension Difficulty*. I argue there that the nominalist need not commit herself to Lewis's Modal Realism – thus to the concrete existence of non-actual *possibilia* – to solve the difficulty. The nominalist can, or so I argue, maintain that coextensive properties are identical and explain why we falsely believe them to be distinct. Resemblance, again, is part of the explanation.

Beyond the metaphysical issue, there is also the logic of resemblance. The appendix of this dissertation introduces a plural logic for comparative resemblance which represents comparative resemblance statements by means of a primitive dyadic comparative resemblance predicate. This logic is more expressive than the standard logic for comparative similarity for the reasons exposed in chapter 3. The content of the last section of the appendix together with the content of chapter 5 provide, for the first time, a logic for non-comparative resemblance.

On the next page a tree represents the main positions that are discussed in this dissertation. Labels of defended views are in bold type.

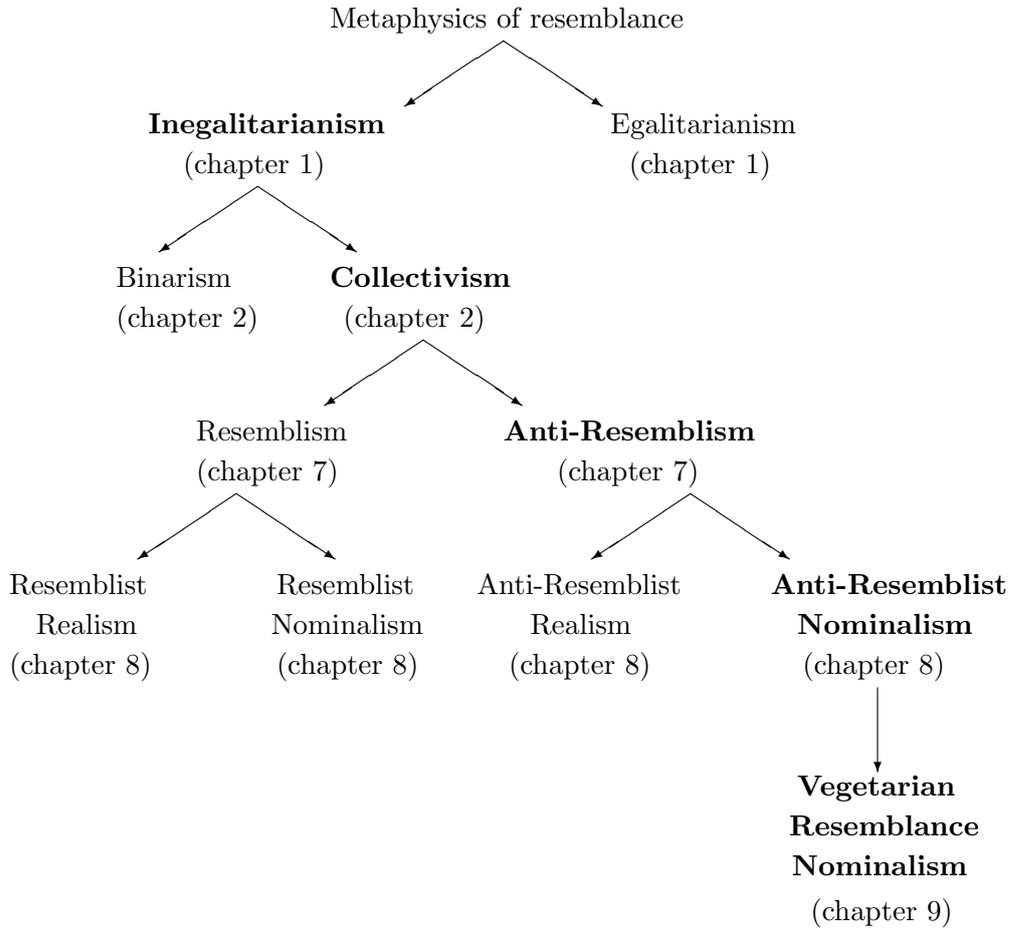


Figure 1: Metaphysics of resemblance.



# Chapter 1

## Superficial Analyses

### 1.1 Notions of resemblance

Analyses of resemblance typically take the form of an analysis of a relation holding between at most two things. However, this is a simplification. Resemblance can be truly ascribed to more than two things and this triviality, when taken seriously, leads to the result that resemblance is not a binary relation, as I will argue in chapter 2. Since I do not believe that resemblance is a relation between at most two things, the left-hand sides of the proposed conceptual analyses will all have a similar, perhaps unusual, form: “the *As* resemble each other iff ...”; where ‘the *As*’ is an arbitrary plural name denoting one or more individuals (if it denotes anything). Thus, the way ‘the *As*’ refers is the same as expressions like ‘the Beatles’, ‘the Montagues’, ‘the Capulets’, etc. However, the proposed analyses do not incur commitment to the view that resemblance is not binary. The reader who believes that resemblance holds between at most two individuals can simply take ‘the *As*’ as denoting at most two individuals.

I will distinguish between three kinds of resemblance and difference in this section. The proposed analyses are intended as the least substantive, least informative, and least controversial analyses of resemblance. I shall commit myself to each of the proposed analyses. Also, it should be noticed that despite the fact that some authors distinguish between resemblance on

the one hand, and similarity on the other hand, for some *ad hoc* reason,<sup>1</sup> I will use the two expressions as synonyms.

There exist various notions of resemblance in the literature. The most central one, the notion of resemblance I will mainly focus on, is what I call, following Taylor (2004, 246), minimal resemblance:

**(MR)** The *As* minimally resemble each other iff there is some resemblance between the *As*.

(MR) of course is not intended as providing a reductive definition of minimal resemblance but only as providing an understanding of what minimal resemblance is. But which understanding? (MR) is not very informative as it analyses a class of predications of resemblance in terms of resemblance. Moreover, (MR) is actually ambiguous for there are distinct notions of minimal resemblance.<sup>2</sup> Though it is uninteresting and ambiguous, (MR) gives enough information regarding my present purposes since (MR) is not an account of any notion of resemblance but of a specific kind of resemblance: that kind of resemblance such that a minimal amount of resemblance between some objects is necessary and sufficient to satisfy it.

Parallel to the notion of minimal resemblance, there is the notion of minimal difference:<sup>3</sup>

**(MD)** The *As* are minimally different from each other iff there is some difference between them.

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<sup>1</sup>See e.g. (Buras 2006). In Buras's paper resemblance and similarity are more or less the same thing. The only difference is that resemblance is primitive and similarity defined in terms of natural properties which are themselves defined in terms of resemblance.

<sup>2</sup>Cf. chapter 4.

<sup>3</sup>'Difference' is an ambiguous term. Sometimes it is used to mean distinctness, sometimes it is used to mean dissimilarity. Philosophers are used to distinguish between these two meanings by making use of the expressions 'numerical difference' and 'qualitative difference'. Here are some examples from *The Oxford Advanced Learner's Dictionary*, where 'difference' clearly does not mean distinctness: "She noticed a marked difference in the children on her second visit"; "I can never tell the difference between the twins". In these examples, the distinctness is marked by the use of the plural, not by the use of the word 'difference'. The way I use 'difference' in this study is the way it is used in these examples. 'Difference' in this sense is to 'resemblance' what 'dissimilarity' is to 'similarity'. Therefore, I will mean by 'difference' what I mean by 'dissimilarity' and will only use 'distinctness' to mean distinctness.

“The *As* minimally resemble each other” and “the *As* minimally differ from each other” are *subcontraries* that are not *contraries*, and thus not *contradictories*. For the proposition that there is a resemblance between some things does not entail that there is no difference between these things, but if there is no difference between some things, then there is a resemblance between them. Likewise, that there is a difference between some things does not imply that there is no resemblance between them, but if there is no resemblance between some things, then there is a difference between them. Some things can, and this is actually the usual case, be both minimally similar and minimally dissimilar from each other.

As I understand it, it is not minimal resemblance which is expressed by the resemblance predicate in Grandma’s judgement that “Your son resembles you.” Grandma certainly does not intend to say that there is some resemblance between my child and I because I take Grandma as intending to transmit some information by performing her judgement. Yet it is trivially the case that there is some resemblance between a child and his father. Perhaps, the conversational implicature of Grandma’s judgement is that my son resembles me more than he resembles his mother. But Grandma may sincerely judge that the child resembles me even if she is not acquainted with his mother. What, according to me, Grandma literally means in this case is that the child and I resemble each other saliently more than is typical.

Typical for what? The expression ‘saliently more than is typical’ is vague. What I mean when saying that some individuals resemble each other saliently more than is typical is that they resemble each other saliently, remarkably, more than the relevant standard for resemblance. What is the relevant standard in Grandma’s judgement? Presumably, it is a standard inductively derived from Grandma’s long experience of resemblances between children and parents.

Let me reserve the label *overall resemblance* for the kind of resemblance involved in Grandma’s judgement and call *overall difference* the parallel notion of difference.

**(OR)** The *As* resemble overall iff there is saliently more resemblance between them than is typical.

**(OD)** The *As* differ overall iff there is saliently more difference between them than is typical.

Overall resemblance has the following features: (i) *relative to a fixed standard for typicality*, if some things resemble overall, then these things do not differ overall and *vice versa*;<sup>4</sup> overall resemblance and difference are thus contrary notions. (ii) The *analysans* of overall resemblance contains a notion of comparative resemblance we will have to account for. (iii) It is possible for some things to be neither similar nor dissimilar overall; *i.e.* to be such that they are neither saliently more similar than is typical nor saliently more dissimilar than is typical. Overall resemblance and overall difference, therefore, are not subcontrary notions and thus not contradictory notions. (iv) Intuitively, for there to be saliently more resemblance between some things than is typical, it is required that there is a resemblance between these things; that is, overall resemblance entails minimal resemblance. Likewise, for there to be saliently more difference between some things than is typical, there must be a difference between these things; that is, overall difference entails minimal difference.

It shall be noted that ‘overall resemblance’ does not have a determinate meaning in the literature. For instance, Rodriguez-Pereyra (2002) uses the expression ‘overall resemblance’ to refer to his primitive resemblance relation which, according to my terminology, is more akin to minimal resemblance than to what I call ‘overall resemblance’. In Rodriguez-Pereyra’s work ‘overall resemblance’ is primarily used to emphasise that his primitive is not a relation of resemblance *in some respect*; *i.e.* ‘overall’ is opposed to ‘in some respect’. Buras (2006, 36) uses the expression ‘overall perfectly natural similarity’ to refer to the maximal degree of resemblance in perfectly natural respects. In the psychological literature ‘overall similarity’ is often used to mean similarity with respect to holistic properties, or superficial properties (e.g. in Medin et al. 1993).

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<sup>4</sup>In other words, the standard for typicality being fixed, if some things resemble each other saliently more than is typical, they do not differ saliently more from each other than is typical, and *vice versa*. If the standard for typicality is not kept fixed, then some things can resemble overall and differ overall on one occasion. Gonzalo Rodriguez-Pereyra gave me the following example. Imagine that two identical twins are such that one acts like Mother Teresa and the other like Bernie Madoff. Somehow they resemble saliently more than is typical and somehow they differ saliently more than is typical. But the standard for typicality is not the same in both judgements. We agree that the twins resemble overall relative to a standard for typicality of physical resemblance between human beings. And we agree that the twins differ overall relative to a standard for typicality of moral resemblance between moral agents.

These various uses of ‘overall resemblance’ are valuable technical uses but my intention when using the phrase ‘overall resemblance’ is precisely not to mean anything technical but what we in general, and Grandma in particular, mean when we make resemblance judgements such as “the baby resembles you”, “the plot of *The 6th Sense* resembles that of *The Carnival of Souls*”, “dogs and wolves resemble each other”. And I am inclined to think that the application of the resemblance predicate in such judgements parallels the application of predicates such as ‘tall’ and ‘rich’ in natural language: ‘tall’ is correctly applied to something when this thing is saliently taller than typical relative to the relevant standard; ‘rich’ is correctly applied to someone when this person is saliently richer than typical relative to the relevant standard (Fara 2000).

There is a third important notion of resemblance, called *exact resemblance*, which is to be distinguished from minimal and overall resemblance, and that I superficially analyse as:

**(ER)** The As resemble exactly iff there is no difference between them.

Parallel to the notion of exact resemblance, there is the notion of exact difference:

**(ED)** The As are exactly different iff there is no resemblance between them.

If (ER) is correct, exact resemblance and minimal difference are contradictory notions; and if (ED) is right, then exact difference and minimal resemblance are contradictory notions.

Therefore, minimal resemblance is some amount of resemblance, overall resemblance is a saliently greater amount of resemblance than is typical and exact resemblance is the maximal amount of resemblance in that it is absence of difference. Likewise, minimal difference is some amount of difference, overall difference is a saliently greater amount of difference than is typical and exact difference is the maximal amount of difference.

Overall resemblance and exact resemblance both entail minimal resemblance and we can think of minimal resemblance as the primitive notion of resemblance in this sense that every amount of resemblance requires a minimal amount of it. This is the reason why I will pay most attention to minimal resemblance. Likewise, overall difference and exact difference both entail minimal difference and we may think of minimal difference as

the primitive notion of difference in that every amount of difference requires a minimal amount of difference.

In this work I will often use the term ‘resemblance’ as a generic and umbrella term subsuming the notions of minimal, overall, exact resemblance and other notions of resemblance, and will use the term ‘difference’ as a generic term for the many notions of difference. Likewise, I will mainly use the term ‘resemblance property’ to refer indeterminately to properties of minimal, overall, and exact resemblance. Strictly speaking, there is no single resemblance property but many different ones standing in some logical relations with each other<sup>5</sup>. The same remark applies for the phrases ‘difference property’, ‘resemblance predicate’, and ‘difference predicate’.

Importantly, there are more notions of resemblance and difference than those analysed here in natural language. I could have provided an analysis of what it means for some things to be *very similar*, *fairly similar*, *somewhat similar*, etc. My focus on the notions of minimal, overall and exact resemblance, and also comparative resemblance which will be introduced in chapter 3, is merely methodological. Introducing more notions of resemblance would have made this study more confusing. Restricting my attention to the above notions of resemblance is also motivated by the fact that these are the notions which are central in the philosophical literature and in particular in philosophical applications of resemblance.

If it is true that there is no controversy regarding the correctness of the proposed surface analyses, with the possible exception of overall resemblance, this absence of controversy is due to the lack of information transmitted by these accounts. Resemblance becomes of philosophical interest when we begin to wonder about the following:

1. What are the conditions for there to be a resemblance between individuals?
2. What is it for some individuals to resemble each other more than is typical?
3. What makes it true that some individuals resemble each other, if they do?

This study provides answers to these questions. In the following section I discuss a superficial and incomplete answer to the first of them.

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<sup>5</sup>These logical relations are exhibited in chapter 5.

## 1.2 Egalitarianism

Let us begin with what resemblance certainly is not. Any competent speaker of English can notice that resemblance has to do with having something in common; that if Sam says “There is a resemblance between Jack and Jim” and Mary asks him “What do you mean?”, Sam is likely to reformulate his claim as “I mean they have something in common”. Traditionally, properties are the entities which play the role of these things individuals can have in common and such that commonality of them can justify a resemblance judgement between individuals. Assume then that for there to be a resemblance between individuals it is necessary and sufficient that these individuals share a property.

There is a venerable account of properties following which, (i) any set of individuals is a property, and (ii) what it means for some individuals to have a property in common is for them to be co-members of a set.<sup>6</sup>

If one agrees with (MR), agrees that commonality of property is necessary and sufficient for there to be a resemblance between some individuals, and that commonality of property is co-membership in some set, then we get the following analysis of minimal resemblance:

**Egalitarianism:** The *As* minimally resemble each other iff there is a set of which all the *As* are members.<sup>7</sup>

Since no matter which individuals we take, and no matter how many they are, there is a set of which all these individuals are members, it follows from the latter analysis that no matter what some individuals, the *As*, are, the *As* minimally resemble each other.<sup>8</sup>

Egalitarianism makes minimal resemblance universal and trivial as it results from the view that no individuals can fail to resemble minimally. We do not need to look at the world, given Egalitarianism, to determine whether

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<sup>6</sup>See e.g. (Goodman 1970).

<sup>7</sup>The terminology ‘Egalitarianism’ and ‘Inegalitarianism’ used in this and the following section is the one used by Lewis in (Lewis 1986d, 53-4). Rodriguez-Pereyra (2002, 124-41) uses the term ‘Egalitarianism’ in another way to refer to a view about the structure of property classes, and Hirsch (1993) uses the distinction between ‘Egalitarianism’ and ‘Inegalitarianism’ to refer to two views about properties, Inegalitarianism being the view that some properties are natural.

<sup>8</sup>The expression ‘no matter what some individuals are’ is the natural language translation of universal quantification over plurals proposed by Boolos (1998a).

things resemble or not, we can do it from our armchair, since we know *a priori* that they all do. Also, Egalitarianism makes exact resemblance and exact difference between distinct individuals trivially impossible.

A further source of dissatisfaction with Egalitarianism concerns comparative resemblance. Let us focus on resemblances holding between at most two things, for the sake of simplicity. Given set theory and the premises leading to Egalitarianism, it is clear that the number of properties shared by any two individuals is exactly the same as the number of properties shared by any two other individuals, and that the number of properties unshared by two individual is exactly the same as the number of properties unshared by any two other individuals.<sup>9</sup> Any two things, be they two cats or a mountain and a screwdriver, are alike and unlike in equally many respects. “If so”, as Lewis contends, “then there’s little to be said about comparative similarity” (Lewis 1986d, 53). And so there is little to be said about overall resemblance, which involves a comparison to a standard for similarity. If a minimal resemblance is an amount of resemblance, there seems to be no way in which the amount of resemblance between some individuals can exceed that of other individuals given Egalitarianism.

Egalitarianism contradicts the way we think and judge about the resemblance of individuals. We undeniably make judgements of comparative resemblance and these judgements certainly play an important role in our classificatory and inductive practices. When judging that some individuals resemble each other more than some other individuals do, we aim to transmit some information. Such a judgement may be false of course, but not trivially false.

Moreover, if Egalitarianism were true, resemblance could not be used in philosophy as it is actually used. Resemblance is the basis of the Stalnaker-Lewis resemblance-based semantics for counterfactuals (Lewis 1973), it gives to counterpart theory its flexibility (Lewis 1968), and is the most primitive and fundamental tie between individuals according to Resemblance Nominalism (Rodriguez-Pereyra 2002). Resemblance has many virtues that make it useful in philosophy, but it wouldn’t have these virtues, if Egalitarianism were true.

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<sup>9</sup>Cf. the seventh stricture of (Goodman 1970).

As a matter of fact, some individuals resemble each other and other individuals do not. If resemblance is to be taken seriously, we have to acknowledge that Egalitarianism is false, that resemblance is inegalitarian.

### 1.3 Inegalitarianism

An approach to resemblance which is not egalitarian is inegalitarian. Inegalitarianism is a common-sense view of resemblance. It is the view that there are individuals that do resemble each other and individuals that do not resemble each other. The lesson of the previous section is that, on the assumption that the proposed surface analyses are correct, one cannot maintain this common-sense truth about resemblance if co-instantiation of a property is both necessary and sufficient for there to be a minimal resemblance between individuals and if any set of individuals is a property.

In this study I shall admit that there is a legitimate sense of ‘property’ according to which properties are abundant, and I will always use the word ‘property’ without qualification in this sense. The motivation for my admission of abundant properties is to be found in the view of resemblance that is defended in chapter 8.

I will follow Lewis’s lead (1986b) in identifying *properties* in the abundant sense with sets of  $n$ -tuples of individuals.<sup>10</sup> Any set of  $n$ -tuples of actual and possible individuals is a property, if you think that possible individuals exist and properties are not worldbound. Only sets of  $n$ -tuples of actual individuals are properties, if you think that actual individuals are all the individuals there are. Finally, only sets of  $n$ -tuples of individuals all of

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<sup>10</sup>We can then use the methods proposed in (Lewis 1991) to deflate our set-theoretic talk and reduce it to mereological talk. It shall be noticed that, following Lewis (Lewis 1991, 81-91), composition is some sort of identity relation. So ultimately, an abundant property is identical to the many individuals that have it. A monadic property on this account is thus understood as many individuals, a plurality of individuals. Difficulties arise with polyadic properties. But we might follow the proposal of Burgess and Hazen in (Lewis 1991, Appendix) to account for such properties. If we follow this account, commitment to abundant properties commits us to no more than concrete individuals. But the proposal of Burgess and Hazen also has its ontological cost, as it commits us to the view that there are infinitely many atomic individuals. As a nominalist, my sympathy goes for the reductive account of abundant properties as being identical to many individuals; where identity does not distribute (that is, if  $\mathbf{P}$  is identical to  $a$ ,  $b$ ,  $c$ , and  $d$ , then  $\mathbf{P}$  is not identical to  $a$ ). But in order to avoid complications, I will follow Lewis in talking of abundant properties as set-theoretic entities.

which inhabit the same world are properties, if you think that properties are worldbound and that there are other worlds like ours.

We may, if we dislike set-theoretical entities, also conceive of abundant properties as *abundant* universals, in the most inclusive possible sense of that word. Many philosophers, among which we find Armstrong, Mellor, and Lewis, have argued against such an abundant conception of universals and I think that there are good reasons for preferring a conception of abundant properties as set-theoretic entities, that I will expose in chapter 8. Nevertheless, the view of universals as abundant has not proved inconsistent, and the defence of a particular account of abundant properties is beyond the scope of the present study.

Given the assumption that there are abundant properties and the proposed surface analyses, it appears that I must deny that commonality of properties is sufficient for there to be a resemblance between individuals if I want to maintain this common-sense truth: some individuals resemble each other and other individuals don't. For I agree that no matter what the *As* are, the *As* share an abundant property, and thus share a property.

Inegalitarianism is the view that resemblance has to do with commonality of properties, but not with commonality of any abundant, more or less gerrymandered property. Resemblance has to do with commonality of a very small minority of properties and this is the reason why it is at least possible that some individuals resemble and other individuals do not.

Let us call the properties belonging to this very small minority of properties having to do with resemblance, the *elected properties*. The basic claim of Inegalitarianism is thus the following:

**Inegalitarianism:** The sharing of any non-elected property is not sufficient for there to be a resemblance between individuals, whereas the sharing of an *elected* property is sufficient for minimal resemblance.

In what follows, I will reserve the label '*merely abundant*' for those abundant properties that are not elected. Various inegalitarian views of resemblance differ with respect to their interpretation of the expression 'elected property' and with respect to whether the sharing of an elected property is also necessary for minimal resemblance. Whether or not the sharing of an elected property is necessary is an issue I will not deal with before chapter 4; the interpretation of 'elected property' is the topic of the next section.

## 1.4 Elected properties

The core intuition behind the distinction between an elected and a merely abundant property is that an elected property is a property such that the sharing of it makes individuals *have something genuinely in common*. In some sense, of course, the sharing of a merely abundant property makes individuals have something in common, namely the merely abundant property. But, nevertheless, confronted with the fact that some individuals share a merely abundant property, we are intuitively reluctant to accept the view that their sharing such a merely abundant property is sufficient for their having something genuinely in common.

Take the property *gricular* which is to be analysed as *being green or circular*.<sup>11</sup> A white plate in front of me and the grass in front of me are both gricular. Yet I am intuitively reluctant to accept the view that their sharing the property gricular makes the white plate and the grass have something genuinely in common. Since gricular provokes such an intuitive reaction, I call it a merely abundant property.<sup>12</sup> If my reaction to the claim that the plate and the grass are both gricular had been that, if true, the claim justifies the judgement that the plate and the grass are somehow identical in nature, then I would have judged, truly or wrongly, that gricular is an elected property.

Some reader may think that this characterisation of elected properties as the properties such that the sharing of them makes individuals have something genuinely in common, be partly identical in nature, is somewhat metaphorical and is actually just another way to say that elected properties are these properties that are linked with resemblance. I could not agree more. There is some circularity in our pre-theoretical understanding of the notions of elected property and minimal resemblance. Despite this pre-theoretic circularity some more information can be given regarding the nature of elected properties.

There are two available views regarding what it is for a property to be an elected one.

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<sup>11</sup>'Gricular' is an example from (Hirsch 1993).

<sup>12</sup>I *call* it merely abundant because it provokes such a reaction. Whether gricular *is* merely abundant because it provokes such a reaction or whether it provokes such a reaction because it is merely abundant is another issue.

(i) Whether or not a property is elected depends on the way we, or any other cognizer, represent individuals. If we focus on mind-independent, objective reality, properties are all on a par: given that properties are sets – or abundant universals –, reality privileges no property over any other.<sup>13</sup> But as a result of evolution, entrenchment or simply contextual relevance, some properties turn out to play a more central role in our classification practices than others do. These properties which play a role in our classification and comparison practices are the elected properties. Have our classification practices being different, other properties would have been linked with resemblance; that is, the election of a property may vary with classification practices.<sup>14</sup>

(ii) An elected property genuinely differs in nature from other properties, it has some characteristic intrinsic features that makes it an *elite* property; whether a property is elected or not has nothing to do with inductive practices, entrenchment or contextual relevance but is grounded in its real, objective nature. Whether some individuals are identical in nature is an absolute truth because whether a property is an elected one is an objective fact, a fact that is independent of the way we, or any other cognizer, represent individuals. Whenever ‘elected property’ is interpreted in this way, I shall talk of *sparse properties*.

The first view is the view I will call *vegetarian* about elected properties, and I will call the second, *carnivorous* about elected properties. I follow Taylor (1993) in using these labels because the vegetarian seems to be happy with a psychological *tofu* ersatz of the objective distinction embraced by the carnivorous. These two interpretations of ‘an elected property’ give rise to two views of resemblance and difference that will be the topic of chapter 7. More pressing is the discussion of the arity of resemblance. For so long as we do not know what the arity of resemblance is, we do not know what kind of property the *analysandum* of the analysis of resemblance is.

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<sup>13</sup>George McClure (1964) has endorsed this view of elected properties and conceives of abundant properties as abundant universals.

<sup>14</sup>Medin and Ortony (1989, 182) call elected properties, understood as in (i), ‘represented properties’.

## Chapter 2

# The Arity of Resemblance

### 2.1 Introduction: arity and adicity

For technical purposes I shall distinguish between the *arity* and the *adicity* of a property, though these two terms are used as synonyms in the literature. The arity of a property is determined by the number of individuals the property is instantiated by,<sup>1</sup> whereas the adicity of a property is determined by the *groupings* the property imposes on the individuals that instantiate it.

If a property is necessarily such that on every occasion it is instantiated by exactly one individual, the arity of the property is one; in other terms, it is unary. If a property necessarily holds between exactly two individuals on every occasion, the arity of the property is two and the property is called binary. But a property can be binary and fail to hold between exactly two individuals on every occasion, if it is *reflexive*. Therefore, a property is binary if and only if it can hold between two individuals, and cannot hold between more than two individuals. A property is then ternary if and only if it can hold between three individuals and cannot hold between more than three individuals; and so on and so forth.

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<sup>1</sup>‘Property’ here is as usual to be understood as ‘abundant property’. Since properties are conceived of as sets of individuals, the instantiation relation is understood in terms of the membership relation: to instantiate a property is to be a member of the set that is identical to this property.

Following MacBride (2006), a property is *multigrade* if and only if it holds between different numbers of individuals in different circumstances.<sup>2</sup> In that sense, reflexive binary relations are all multigrade in that they hold of one individual on some occasion and between two individuals on other occasions. Nevertheless, the multigradicity of reflexive binary relations is restricted by the definition of such a property: no binary property can hold between more than two individuals. By contrast, genuine multigrade properties are such that the number of individuals between which they can hold is not so restricted; they can hold between an indeterminate number of individuals.

MacBride acknowledges that there is a clear sense in which apparent multigrade properties may still have a fixed adicity (MacBride 2006, 487). In this sense, the adicity of a property is determined by the groupings the property imposes on the objects it is ascribed to. I reserve the word ‘adicity’ to the latter sense.

If a property imposes no groupings on the individuals instantiating it, then the adicity of the property is one; in other words, the property is *monadic*. Of course, every unary property is *ipso facto* monadic, but some monadic properties are not unary. For instance, the property of forming a circle is a monadic property in my sense but is clearly not unary in that we usually need more than one individual to form a circle. A property which distinguishes the individuals between which it holds into two groups is dyadic. Thus causation is clearly a dyadic property in that it groups the objects it is ascribed to as causes and effects. Likewise, the part-whole property is clearly a dyadic property. Yet these dyadic properties need not be binary. There are causal relations standing between many causes and many effects, or between one cause and many effects, or between many causes and one effect. Also, the most interesting part-whole relations, those of composition, hold between many parts and a whole. Whenever the adicity of a property is greater than one, we say that it is a relation; whenever a property is monadic, then we say that the property is a property in the narrow sense which excludes relations. Whenever the adicity – in my sense – of a property is unfixed, the property is properly labelled ‘*variably polyadic*’. Hence, the

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<sup>2</sup>MacBride’s concern is universals rather than properties: “Let be granted that there are universals that are ‘multigrade’ in the sense defined: they enter into instantiation on different occasions with different numbers of individuals.” (MacBride 2006, 487).

two phrases ‘multigrade property’ and ‘variably polyadic property’ are not synonymous in the present study.<sup>3</sup>

Resemblance is traditionally conceived of as a relation which is both binary and dyadic. This traditional view, I shall argue, doubly misconceives resemblance: resemblance is neither binary nor dyadic. In this chapter I focus on the arity of resemblance, the adicity of resemblance will be the topic of the next chapter.

## 2.2 The Imperfect Community Difficulty I

The *Imperfect Community Difficulty* is familiar. There might be some individuals, the *As*, such that any two of the *As* resemble in some respect, or share an elected property, but such that there is no single respect in which all the *As* resemble. Such individuals are said to form an imperfect community. Then if resemblance is assumed to hold between at most two individuals, the further assumption that, for all  $x$  and  $y$ ,  $x$  and  $y$  resemble each other if and only if they resemble in some respect leads to the result that the resemblance of every  $x$  and  $y$  such that  $x$  and  $y$  are among the *As* is insufficient for there to be a common respect in which the *As* resemble. Individuals which resemble in a common respect form a so-called *perfect community*. A necessary condition for some individuals to form a *property class*<sup>4</sup> is for them to form a perfect community. It follows that the resemblance of any two of some individuals is insufficient for the latter individuals to form a property class, and the nominalist who attempts to analyse property classes in terms of a resemblance relation holding between at most two individuals fails.

Obviously, the plausibility of the difficulty also requires that we acknowledge an inequalitarian distinction between merely abundant and elected properties or resemblance respects. For if there is no such difference, no matter what the *As* are, the resemblance of any two of the *As* is sufficient for there

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<sup>3</sup>What I call variably polyadic properties are those properties that MacBride calls ‘varigrade’. Cf. (MacBride 2006, 487-495).

<sup>4</sup>Where a property class is a class whose members are all and only individuals sharing a certain elected property. Resemblance nominalists traditionally identify elected properties with property classes and aim to characterise property classes in terms of the resemblance of their members; see e.g. (Price 1969, 21), (Hausman 1979), and (Rodriguez-Pereyra 2002, 56).

to be an abundant respect in which the *As* resemble; since individuals, no matter what they are, resemble in some abundant respect. The difficulty makes sense only if there is an inequalitarian notion of resemblance respects such that some individuals fail, or at least may fail, to resemble in some elected respect. I will always use the phrases ‘resemblance respect’ and ‘resemble in some respect’ to mean respectively ‘elected resemblance respect’ and ‘resemble in some elected respect’.

Is resemblance interpreted as minimal, overall or exact in the difficulty presented? The plausibility of the difficulty requires that resemblance is not interpreted as exact if exact resemblance is assumed, as usual, as entailing exact resemblance in every resemblance respect. For if any two of the *As* are exactly similar and thus exactly resemble in every respect, then the *As* cannot fail to resemble in every respect as well. The nominalist theories that are threatened by the difficulty may however interpret resemblance as minimal or overall.<sup>5</sup> For it may be true that there is a minimal resemblance between every two *As* and yet that there is no respect in which the *As* resemble. Likewise, it may be true that every two *As* resemble each other saliently more than is typical given a certain standard, while the *As* resemble in no respect.

The lesson Hausman (1979) draws from the difficulty is that the *resemblance nominalist* should allow resemblance, her primitive, to hold between more than two individuals. For as the following appears constitutive of resemblance, no matter whether we interpret resemblance as minimal, overall or exact,

**(Nec)** if the *As* resemble each other, then the *As* resemble in some respect<sup>6</sup>

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<sup>5</sup>As mentioned in the previous chapter, Rodriguez-Pereyra’s resemblance primitive is akin to a minimal property of resemblance, for it is a minimal value of resemblance: in his theory, resembling to a degree  $> 0$  is sufficient for resemblance. However, Price’s resemblance primitive is more akin to overall resemblance in that it involves some comparative feature: “What is required is only that every other member of the class should resemble the class-exemplars *as* closely as they resemble each other” (Price 1969, 21). Following Price, we may thus think of the resemblance of class-exemplars as our standard for typicality in a property class, and what it means for the members of a property class to resemble each other is for them to resemble each other as much as is typical; the latter is some overall notion of resemblance though not the strict notion of resemblance that I analysed in the previous chapter.

<sup>6</sup>On the constitutivity of (Nec) see e.g. (Searle 1959, 151), (Goodman 1970, 27-8), (Lewis 1973, 91), (Armstrong 1989, 15), and (Heil 2003, 152).

(where ‘the As’ is an arbitrary plural constant ranging over individuals) it cannot happen that the As resemble and fail to resemble in some respect. So if we analyse property classes in terms of the resemblance of all their members rather than in terms of the resemblance of any two of them, the Imperfect Community Difficulty no more threatens the nominalist. Despite its ingenious simplicity, Hausman’s proposed solution to the Imperfect Community has met with little or no enthusiasm.

Lewis (1999a, 14-5) also suggested a nominalist account of elected properties – where ‘elected’ is interpreted as *natural* – which makes use of a primitive multigrade and contrastive resemblance that can hold between any number of individuals. But Lewis was unsatisfied with his own proposal on the grounds that such a resemblance primitive is artificial. For Lewis’s conviction was that the familiar resemblance property we ascribe to individuals in the pub and elsewhere is a binary relation: a relation holding between at most two individuals. Lewis’s conviction is shared by most contemporary metaphysicians who always account for resemblance as a relation linking at most two individuals.<sup>7</sup> But what grounds the conviction that resemblance is a binary relation?

Let us call *Binarism* the view according to which resemblance is a property linking at most two individuals. And let us call *Collectivism* the view of resemblance according to which resemblance can hold between more than two individuals.<sup>8</sup> In this chapter, I undermine the binarist view of resemblance and provide reasons to believe that the collectivist view is true.

### 2.3 The binarist vs. collectivist debate

Before I begin, let me make clear the terms of the debate between Binarism and Collectivism about resemblance. Of course this is not a linguistic debate about whether our resemblance predicates can be correctly predicated to more than two individuals, since they obviously can. Consider the following statements, for instance:

**(2.1)** John, Jack, and Jim, who are identical triplets, resemble each other.

**(2.2)** Red individuals resemble each other.

<sup>7</sup>Here is a non-exhaustive list of such accounts: (Armstrong 1978b, 96), (Buras 2006, 31), (Eddon 2007, 385), (Oliver 1996, 52-4), (Rodriguez-Pereyra 2002).

<sup>8</sup>This is the terminology used by Rodriguez-Pereyra (2002, 81).

(2.3)  $a$ , which is red, resembles red individuals.

(2.4) Red individuals resemble  $a$ , which is red.

(2.5) Wildcats resemble cats.

All these statements are grammatically correct and meaningful. Statements (2.1)-(2.5) suggest that (i) sometimes, resemblance statements – like (2.1) and (2.2) – have a subject-predicate form where the subject is a plural expression and where a monadic resemblance predicate applies to the many objects denoted by the plural expression, yielding sentences of the following scheme:

(2.6)  $X$  resemble each other

(where ‘ $X$ ’ is a *plural* variable<sup>9</sup> occurring freely). (ii) Sometimes resemblance statements – like (2.3)-(2.5) – have a subject-predicate form where the subject is either a plural or a singular expression and where it is predicated of (the many things denoted by) the subject that they/it resemble(s) some other object(s), yielding sentences of the schema:

(2.7)  $X$  resemble  $y$

(2.8)  $x$  resembles  $Y$

(2.9)  $X$  resemble  $Y$

(where ‘ $x$ ’ and ‘ $y$ ’ are singular variables occurring freely and where ‘ $X$ ’, and ‘ $Y$ ’ are plural variables occurring freely). Let us call statements that assert the resemblance of more than two individuals *collective resemblance statements* and let us call resemblances obtaining between more than two individuals *collective resemblances*. By contrast, let us call *pairwise* those resemblances that obtain between at most two individuals. In this chapter, I focus on collective resemblances expressed by statements of the form of (2.6), and will consider statements of the forms (2.7)-(2.9) when discussing the adicity of resemblance in chapter 3.

Clearly, each of (2.1)-(2.5) is grammatically correct. So if Binarism were a linguistic view according to which resemblance predicates cannot be predicated to more than two individuals, while Collectivism were the view that

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<sup>9</sup>See chapter 5 on the syntax of the plural language I make use of.

resemblance predicates can be predicated to more than two individuals, Collectivism would be the clear winner. But the debate is not a linguistic one.

Nor is the debate between Binarism and Collectivism about resemblance a debate about whether there can be true statements of resemblance between more than two individuals. For some such statements are clearly true given some usual interpretation of the resemblance predicate. Identical twins, triplets, etc, are paradigm cases of resembling individuals in everyday life. Thus (2.1) is true, according to common-sense. Statements (2.2)-(2.4) are akin to metaphysical platitudes. (2.5) is true according to common-sense.

It should be noted that these statements assert distinct resemblance properties to individuals. The natural reading of (2.1) is either as a statement of overall resemblance or as exact resemblance, while (2.2)-(2.4) are correctly interpreted as statements of minimal resemblance: they can be true even if red individuals may resemble less than our standard for typicality for coloured individuals. Anyway, as exact resemblance and overall resemblance entail minimal resemblance, there corresponds a plausibly true statement of minimal resemblance to each of (2.1)-(2.5) that asserts the minimal resemblance of more than two individuals.

A binarist who would deny that any such collective resemblance statement can be true will impose a revision both of our common-sense beliefs and of our philosophical practice. Such a binarist position is conceivable, but I can think of no good reason to maintain such a revisionary view.<sup>10</sup> Even if

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<sup>10</sup>Here are three bad reasons to maintain the revision, however: (a) the notion of a plural term is incoherent; (b) plural terms are not part of classical predicate logic; (c) the traditional view that all relations are binary. None of these reasons seems good to me. First, regarding (a) and (b), instead of using plural terms we may use series of singular terms and say that the resemblance predicate is bound to such series. Singular terms are part of classical predicate logic and the notion of a series of singular terms is coherent if that of singular term is. My preference for using plural terms is that difficulties arise with series of indefinitely many singular terms; on this linguistic issue, see (McKay 2006, 19-22).

Regarding (c), it must first be shown that resemblance is a relation in order to appeal to this 'traditional' view. And if relationality requires polyadicity then, according to the argument of chapter 3, resemblance is not a relation. Moreover, the view that every relation is binary, though tradition, seems self-refuting. For if the latter view is the claim that, for every  $\mathbf{R}$ , if  $\mathbf{R}$  is a relation, then  $\mathbf{R}$  holds between at most two entities, then the view appeals to a ternary predicate: ' $x$  holds between  $y$  and  $z$ '; the latter is ternary in that  $x$ ,  $y$ , and  $z$  can all be distinct. On my abundant view of properties, to every predicate there corresponds a property, and thus to the ternary predicate ' $x$  holds between  $y$  and

the view is conceivable, existing binarists, those that I aim to challenge, do not deny that there can be true statements of collective resemblance, and do not deny that at least some of (2.1)-(2.5) is true.

If so, what do binarists and collectivists disagree about? They disagree about the resemblance facts that are represented by the propositional content of statements of collective resemblance. The collectivist typically maintains that the content of true collective resemblance statements represent resemblance facts wherein resemblance holds between more than two individuals. Thus “John, Jack, and Jim resemble each other” asserts that resemblance holds between John, Jack, and Jim, who are three. So that if the resemblance statement is true, it is a fact that John, Jack, and Jim resemble each other, and this resemblance fact involves a resemblance property holding between three individuals.

However, according to the binarists that I shall consider in the following section, the content of statements of collective resemblance, despite the appearance, does not represent resemblance facts wherein resemblance holds between more than two individuals. Resemblance facts involve only pairwise resemblances between individuals. So if it is a fact that John, Jack, and Jim resemble each other, this fact, despite the appearance, involves no more than a binary resemblance property.

I shall argue that the latter binarist view is false. If I am right, then we must acknowledge that resemblance can hold between more than two individuals. Yet this does not suffice to establish that Collectivism is true. For the binarist can still argue that analysis reveals that resemblances holding between more than two individuals are supervenient, second-class, resemblances. By appealing to the further assumption that supervenient entities are no ontological addition,<sup>11</sup> the binarist can maintain that resemblances between more than two individuals are no addition to the realm of resemblances. The latter is denied by the collectivist who maintains that collective resemblances are ontologically as important, as genuine, as pairwise

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*z'* there corresponds a ternary property, or if you prefer, relation. The only way to make the view that every relation is binary not self-refuting is by assuming a sparse view of relations. But if so, advocates of the traditional view must argue that resemblance is a sparse relation in order to threaten the claim that resemblance is not binary.

<sup>11</sup>Campbell (1990, 35-6), Simons (1994, 556), Mellor (1995, 207), and Armstrong (1989, 55-7) have endorsed the claim that supervenient entities are no addition to the ontology.

resemblances. I shall argue that the claim that collective resemblances are supervenient resemblances is unjustified.

## 2.4 Defining collective resemblance in terms of pairwise resemblance

Rodriguez-Pereyra (2002, 80-1) has argued that the resemblance nominalist should maintain that resemblance is a binary relation on the grounds that the resemblance nominalist can explain the following basic fact about resemblance only if she maintains that resemblance holds between at most two individuals (where ‘the *As*’ is an arbitrary plural constant ranging over individuals):

**(Rdistributivity)** If the *As* resemble each other, then, for any  $x$  and  $y$  such that  $x$  and  $y$  are among the *As*,  $x$  resembles  $y$ .

That (Rdistributivity) is true is, Rodriguez-Pereyra (2002, 81) says, “in the nature of resemblance: if Socrate, Plato, and Aristotle resemble, then so do Socrates and Plato, Socrates and Aristotle, and Plato and Aristotle.”

If ascriptions of elected properties to individuals (no matter what an elected property is) is what explains ascriptions of resemblance, it is easy to explain why (Rdistributivity) is a necessary truth: (Rdistributivity) is necessary because, necessarily, if some individuals share some elected property, then any two of them do. However, no such explanation is available to the resemblance nominalist who attempts to explain ascriptions of elected properties in terms of resemblance.

If the resemblance nominalist takes the collective resemblance of the *As* as primitive, then, Rodriguez-Pereyra claims, (Rdistributivity) turns out to be a brute necessity.<sup>12</sup> However, Rodriguez-Pereyra argues, if we maintain that resemblance is a binary relation, then we get an easy explanation of the distributivity of resemblance: some individuals, no matter what they are, resemble because, for any  $x$  and  $y$  that are among the latter,  $x$  and  $y$  resemble each other (Rodriguez-Pereyra 2002, 81).

If the resemblance of any  $x$  and  $y$  among the *As* is what explains the resemblance of the *As*, then the resemblance of any  $x$  and  $y$  among the *As*

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<sup>12</sup>As I shall argue in section 2.7, I think Rodriguez-Pereyra is wrong on this point.

is sufficient for the resemblance of the *As*, and the following is valid (where ‘the *As*’ is an arbitrary plural constant ranging over individuals):

**(Rcumulativity)** If any  $x$  and  $y$  such that  $x$  and  $y$  are among the *As* resemble each other, the *As* resemble each other.

(Rdistributivity) and (Rcumulativity) together give rise to the following analysis of collective resemblance:

**(C1)** The *As* (for more than two *As*) resemble each other if, and only if, any  $x$  and  $y$  that are among the *As* resemble each other.

If (C1) is true, then a collective resemblance is a mere conjunction of pairwise resemblances as Butchvarov maintains:

Of course there are singular resemblance statements which assert the resemblance of more than two objects, such as statements of the forms “ $x$ ,  $y$ , and  $z$  resemble each other” and “ $x$  resembles  $y$  and  $z$ .” The relation of resemblance in such statements, however, still appears to be dyadic, each statement being readily analyzable as a conjunction of several statements of the primary form “ $x$  resembles  $y$ ”. For instance, “ $a$  resembles  $b$  and  $c$ ” is equivalent to “ $a$  resembles  $b$ , and  $a$  resembles  $c$ ”, and “ $a$ ,  $b$ , and  $c$  resemble each other” is equivalent to “ $a$  resembles  $b$ ,  $a$  resembles  $c$ , and  $b$  resembles  $c$ ”. (Butchvarov 1966, 111-112)

If (C1) is true, then it is true that statements of collective resemblance do not assert the resemblance of more than two individuals, and it seems true that the content of such statements represent no resemblance fact involving a resemblance property holding between more than two individuals. Statements of collective resemblance assert no more than a conjunction of pairwise resemblances and apparent facts of resemblance between more than two individuals, given (C1), turn out to be conjunctive facts of resemblance with resemblance holding between at most two individuals. If this is so, the binarist view is justified.

But this is not so because the Imperfect Community Difficulty does not only raise a difficulty to the nominalist but also to advocates of (C1). Any two members of an imperfect community resemble each other, so that by (Rcumulativity) the members of an imperfect community resemble each

other. However, the members of an imperfect community fail to resemble in some respect. If so, (Nec) fails. But (Nec) is usually assumed as a constitutive claim about resemblance. It seems deeply wrong to ascribe resemblance to some individuals, if there is no common respect in which they resemble.

Since (Rcumulativity) conflicts with (Nec), the upholder of (C1) must contend that (Nec) is not a basic claim about resemblance and may fail. Ordinary speech about resemblance actually displays plausible failures of (Nec). If these failures are genuine, we are justified in rejecting (Nec).

Consider the following situation, where  $a$ ,  $b$ ,  $c$ , and  $d$  are four individuals. Let us assume that  $r_1$ ,  $r_2$ ,  $r_3$ , and  $r_4$  are the only (elected) respects in which they resemble. Let us also assume that resemblance with respect to one of  $r_1$ ,  $r_2$ ,  $r_3$ , and  $r_4$  is sufficient for resemblance *tout court*. In other words, if some of the considered individuals resemble in one of the respects assumed, then they resemble each other.

	$r_1$	$r_2$	$r_3$	$r_4$
$a \& b$	0	0	0	0
$a \& c$	1	0	0	0
$a \& d$	0	0	1	0
$b \& c$	0	1	0	0
$b \& d$	0	0	0	1
$c \& d$	0	0	0	0

(where ‘1’ means that the two individuals at hand resemble in the relevant respect, and 0 means that they do not). Now let  $a$  and  $b$  be called ‘the  $F$ s’, and let  $c$  and  $d$  be called ‘the  $G$ s’. It is correct to assert that the  $F$ s resemble the  $G$ s since  $a$  resembles  $c$  and  $d$ , and  $b$  resembles  $c$  and  $d$ . It is also true that the  $G$ s resemble the  $F$ s, since  $c$  resembles  $a$  and  $b$ , and so does  $d$ . Now if the  $F$ s resemble the  $G$ s and the  $G$ s resemble the  $F$ s, then the following follows by symmetry of the transitive form of the resemblance verb:<sup>13</sup>

**(2.10)** the  $F$ s and the  $G$ s resemble each other.

Yet the  $F$ s and the  $G$ s are  $a$ ,  $b$ ,  $c$ , and  $d$ , and  $a$ ,  $b$ ,  $c$ , and  $d$  fail to resemble in some common respect. So, apparently, (Nec) fails in this situation.

<sup>13</sup>The symmetry of the transitive form of the resemblance verb is discussed in the following chapter.

Yes, but so does (Rdistributivity). For it seems true that the  $F$ s and the  $G$ s resemble each other but false that, for any  $x$  and  $y$  such that  $x$  and  $y$  are among the  $F$ s and the  $G$ s,  $x$  resembles  $y$ . For  $a$  and  $b$  are among the  $F$ s and the  $G$ s and  $a$  and  $b$ , by assumption, fail to resemble each other. This apparently contradicts (Rdistributivity).

Our analysis of collective resemblance is going from bad to worse. Because it conflicts with (Nec), we tried to ground the view that (Nec) is not constitutive about resemblance by giving a plausible failure of (Nec). But in doing so, we exhibited an apparent failure of (Rdistributivity). So that if the situation displayed is a genuine counterexample to (Nec), it falsifies (C1) as well.

It should not be surprising that if we deny the constitutivity of (Nec), then the resemblance of individuals may fail to distribute over every pair of the latter individuals. For our belief in (Rdistributivity) seems to be grounded in the fact that if some individuals resemble, then they resemble in some respect, and if they resemble in some respect, then any two of them do; so that any two of them resemble, provided resemblance in some respect is assumed as sufficient for resemblance *tout court*. Deny (Nec), and our belief in (Rdistributivity) seems to lose its warrant.

Because (C1) requires the validity of (Rdistributivity) and because (Rdistributivity) can fail if (Nec), with which (Rcumulativity) conflicts, does, we must conclude that accounting for collective resemblances in terms of (Rdistributivity) and (Rcumulativity) alone is hopelessly wrong. Statements of collective resemblance are not conjunctions of statements of pairwise resemblance, and resemblance facts between more than two individuals are not mere conjunctive facts of pairwise resemblances. (C1) fails and the binarist view of resemblance is still ill-grounded. Moreover, Rodriguez-Pereyra's explanation of why (Rdistributivity) is a necessary truth, which is intended to ground the superiority of his resemblance nominalist's proposal over resemblance nominalist's proposals that make use of collective resemblances, cannot be true.

In order to ground the view that resemblance is a binary relation, we thus need an alternative account of collective ascriptions of resemblance. However, we should not attempt to propose such an account if we do not understand what is wrong with (C1). And we still do not understand what is wrong with (C1) because we still do not know whether it is (Nec) and

(Rdistributivity) which fail or whether it is (Rcumulativity) which fails. I think the latter, and thus I need to explain why apparent failures of (Nec) and (Rdistributivity) are not genuine.

## 2.5 The indeterminacy of plural predications of resemblance

The lesson of the previous section is the following. A collective resemblance, a resemblance holding between more than two individuals, is not a mere conjunction of pairwise resemblances because either (Rdistributivity) or (Rcumulativity) can fail. How do we express ascriptions of collective resemblances in English? We do so by predicating the predicate ‘resemble each other’ to a plural subject; that is, we do so by means of statements of the form (2.6). How do we express conjunctions of pairwise resemblances in English? We do so either by predicating ‘resemble each other’ to a plural subject, and thus by means of statements of the form (2.6), or by means of statements of either of the forms (2.7)-(2.9). So that sentences like “the *As* resemble each other” (where there are more than two *As*) are ambiguous. In some contexts, “the *As* resemble each other” expresses the proposition that there is a resemblance holding between the *As*; *i.e.*, expresses an ascription of collective resemblance to the *As*. Yet in other contexts, “the *As* resemble each other” can express the proposition that some, or all,  $x$  and  $y$  such that  $x$  and  $y$  are among the *As* resemble. My suggestion in this section is that apparent failures of (Nec) and (Rdistributivity) are due to the ambiguity of plural predications of resemblance.

In order to develop this suggestion I shall make use of some metalinguistic device. Plural terms sometimes denote collectively, sometimes denote distributively. Distributive and collective denotation are defined thus (Oliver & Smiley 2008, 24):

- (a) ‘ $a$ ’ denotes <sub>$d$</sub>   $b$  iff  $b$  are among  $a$ .
- and
- (b) ‘ $a$ ’ denotes <sub>$c$</sub>   $b$  iff  $b$  are  $a$ .

(Where ‘are among’ is constructed so as to include ‘are’ as a limit case). Consider an example. Suppose that John and Mary danced with each other only once at  $t_1$ ; that John and Jack danced with each other only once at  $t_2$ ;

and that Jack and Mary danced with each other only once at  $t_3$ . In some sense, it is true that John, Jack, and Mary danced with each other; but in some other sense, it is false that they did. There is some ambiguity here. English, sometimes, has some linguistic device to account for this ambiguity. “John, Jack, and Mary danced with each other” is true if interpreted as the proposition that John, Jack, and Mary danced with one another. And “John, Jack, and Mary danced with each other” is false, if interpreted as the proposition that John, Jack, and Mary danced together.

Using Oliver and Smiley’s apparatus, we can say that the true interpretation of “John, Jack, and Mary danced with each other” is such that ‘John, Jack, and Mary’ denotes<sub>d</sub> every two individuals among John, Jack, and Mary. The false interpretation of the sentence however is such that ‘John, Jack, and Mary’ denotes<sub>c</sub> John, Jack, and Mary.

Now let us agree with Wittgenstein (1958, 32) that what games exhibit is just “a complicated network of similarities overlapping and criss-crossing”. And consider the sentence “games resemble in some respect”. This sentence is ambiguous too and we can clearly understand the way it is ambiguous. According to one reading of the sentence, it expresses the plausibly true proposition that every  $x$  and  $y$  that are among the games resemble in some respect. According to the second reading of the sentence, it expresses the false proposition, according to our assumption at least, that all games resemble in some common respect.

A well-known trick allows us to represent these two readings by quantifying only over every pair of games and a resemblance respect. The reading according to which “games resemble in some respect” is true can be represented as

$$\forall x, y(Gx \& Gy \rightarrow \exists r R(x, y, r))$$

The reading according to which “games resemble in some respect” is false can be represented as

$$\exists r \forall x, y(Gx \& Gy \rightarrow R(x, y, r))$$

This traditional formal representation however misrepresents the way the two readings were introduced. For the way I introduced the first reading was such that resemblance in some respect is ascribed to every  $x$  and  $y$  that are among the games, and the way I introduced the second reading was such

that resemblance in some respect is ascribed to all games. Yet the formal representation of the false reading, even if extensionally correct, is not about all games but still about every  $x$  and  $y$  such that  $x$  and  $y$  are among the games and makes the trick by a change of scope of the existential quantifier.

Using the metalinguistic apparatus of Oliver and Smiley, we can disambiguate “games resemble in some respect” in a way that better matches the two intended readings: (i) according to the true reading of “games resemble in some respect”, ‘games’ denotes <sub>$d$</sub>  every  $x$  and  $y$  such that  $x$  and  $y$  are among the games; (ii) according to the false reading of “games resemble in some respect”, ‘games’ denotes <sub>$c$</sub>  the games.

Obviously, when ‘games’ is intended as denoting every  $x$  and  $y$  that are among the games, “games resemble in some respect” does not express the proposition that there is a resemblance in some respect holding between the many games; *i.e.*, does not express a collective ascription of resemblance in some respect. What the sentence expresses in this case is a mere conjunction of ascriptions of pairwise resemblances in some respect to every pair of games. It is only when the intended denotation of ‘games’ is collective that “games resemble in some respect” genuinely expresses a collective ascription of resemblance in some respect to the many games.

What is true of games is true of the  $F$ s and the  $G$ s, which display the apparent failure of (Nec). In some sense, it is true that the  $F$ s and the  $G$ s resemble in some respect, and in another sense it is false that they do. We can again use the trick that consists in a variation of scope of the existential quantifier to represent these two readings as with games.<sup>14</sup> But the trick does not reflect the fact that the difference between the two readings is one of denotation of the plural subject and it would be better to use Oliver and Smiley’s metalinguistic tool. According to the true interpretation of “the  $F$ s and the  $G$ s resemble in some respect”, ‘the  $F$ s and the  $G$ s’ denotes <sub>$d$</sub>  every  $x$  and  $y$  such that  $x$  is one of the  $F$ s and  $y$  is one of the  $G$ s. According to the false reading of “the  $F$ s and the  $G$ s resemble in some respect”, ‘the  $F$ s and the  $G$ s’ denotes <sub>$c$</sub>  the  $F$ s and the  $G$ s; *i.e.*,  $a$ ,  $b$ ,  $c$  and  $d$ .

Again it is only when ‘the  $F$ s and the  $G$ s’ denotes collectively that “the  $F$ s and the  $G$ s resemble in some respect” counts as a genuine collective ascription of resemblance in some respect to the  $F$ s and the  $G$ s. When ‘the

<sup>14</sup>Let ‘A’ be the among predicate. Then the true reading of “the  $F$ s and the  $G$ s resemble each other” can be represented thus:  $\forall x, y(xAFs \ \& \ yAGs \rightarrow \exists r R(x, y, r))$ . The false reading can be represented thus:  $\exists r \forall x, y(xAFs \ \& \ yAGs) \rightarrow R(x, y, r)$ .

*F*s and the *G*s' denotes<sub>*d*</sub> every *x* and *y* such that *x* is one of the *F*s and *y* is one of the *G*s, the sentence only expresses a mere conjunction of pairwise ascriptions of resemblance in some respect.

Now what is true about resemblance in some respect is true about resemblance. If "games resemble in some respect" is ambiguous, then so is "games resemble each other". According to one reading of the latter sentence, it expresses a true proposition; according to a second reading of the sentence, and if Wittgenstein is right, it expresses a false proposition.

But plural predications of resemblance are not only ambiguous, but also capricious. For we cannot use the trick that consists in a change of scope of the existential quantifier to disambiguate "games resemble each other", since there is nothing, no respect or property, to existentially quantify over. This does not mean that the sentence is not ambiguous, it only means that we have no means to account for its ambiguity if we do not acknowledge the indeterminacy of plural denotation. If we do, however, we can disambiguate "games resemble each other" as follows: according to the true reading of the latter sentence, 'games' denotes<sub>*d*</sub> every *x* and *y* among the games; according to its false reading, 'games' denotes<sub>*c*</sub> the games.

Likewise, there is a true and a false reading of (2.10) – "the *F*s and the *G*s resemble each other" – corresponding to the true and the false readings of "the *F*s and the *G*s resemble in some respect". According to the true reading of (2.10), 'the *F*s and the *G*s' denotes<sub>*d*</sub> every *x* and *y* such that *x* is one of the *F*s and *y* is one of the *G*s; according to the false reading of (2.10), 'the *F*s and the *G*s' denotes<sub>*c*</sub> the *F*s and the *G*s, that is *a*, *b*, *c*, and *d*.

And again it is only when the plural expression denotes collectively that (2.10) asserts a collective resemblance holding between the *F*s and the *G*s; that is, between *a*, *b*, *c*, and *d*. When 'the *F*s and the *G*s' denotes<sub>*d*</sub> every *x* and *y* such that *x* is one of the *F*s and *y* is one of the *G*s, then "the *F*s and the *G*s resemble each other" expresses a mere conjunction of pairwise resemblances between every *x* and *y* such that *x* is one of the *F*s and *y* is one of the *G*s.

Now we inferred (2.10) from the claim that each of the *F*s resembles each of the *G*s and each of the *G*s resembles each of the *F*s. So that "the *F*s and the *G*s resemble each other" is true in this context because it asserts the resemblance of every *x* and *y* such that *x* is one of the *F*s and *y* is one of the *G*s; in other words, it is true because 'the *F*s and the *G*s' in this

context denotes<sub>*d*</sub> every  $x$  and  $y$  such that  $x$  is one of the  $F$ s and  $y$  is one of the  $G$ s. (Rdistributivity) apparently fails here because we are not asserting that there is a resemblance between the  $F$ s and the  $G$ s. And no reason has been given to deny that from a statement that asserts that there is a resemblance between some individuals (e.g. between the  $F$ s and the  $G$ s) we can infer that any  $x$  and  $y$  among the latter individuals resemble. We can thus follow Rodriguez-Pereyra in assuming that (Rdistributivity) is a basic truth about resemblance provided “the  $A$ s resemble each other” asserts the resemblance of the  $A$ s; that is, is such that ‘the  $A$ s’ denotes collectively. If (Rdistributivity) is such a basic claim about the resemblance of individuals, then so is (Nec).

Consider again the situation represented in the table. From our assumptions about the  $F$ s and the  $G$ s, what follows is that (2.10) is true for ‘the  $F$ s and the  $G$ s’ denoting<sub>*d*</sub> every  $x$  and  $y$  such that  $x$  is one of the  $F$ s and  $y$  one of the  $G$ s. If so, the only thing (Nec) allows us to conclude is that “the  $F$ s and the  $G$ s resemble in some respect” is true for ‘the  $F$ s and the  $G$ s’ denoting<sub>*d*</sub> every  $x$  and  $y$  such that  $x$  is one of the  $F$ s and  $y$  one of the  $G$ s. And this is the case since  $a$  and  $c$  resemble in some respect,  $a$  and  $d$  resemble in some respect,  $b$  and  $c$  resemble in some respect, and so do  $b$  and  $d$ . So there is no failure of (Nec) here.

(Nec) seemed to fail because we intended the interpretation of “the  $F$ s and the  $G$ s resemble in some respect” according to which ‘the  $F$ s and the  $G$ s’ denotes<sub>*c*</sub>  $a$ ,  $b$ ,  $c$ , and  $d$ . Clearly “the  $F$ s and the  $G$ s resemble in some respect” is false for the collective denotation of the plural subject. But, since (Rdistributivity) is valid for resemblance statements asserting the (collective) resemblance of individuals, “the  $F$ s and the  $G$ s resemble each other” is false for the very same denotation of ‘the  $F$ s and the  $G$ s’. For, given the intended denotation of ‘the  $F$ s and the  $G$ s’, it is not the case that every  $x$  and  $y$  such that  $x$  and  $y$  are among the  $F$ s and the  $G$ s resemble each other. There is no failure of (Nec) here.

However, if (Nec) does not fail, (Rcumulativity) does. Let the  $A$ s be the members of an arbitrary imperfect community. Then if ‘the  $A$ s’ denotes<sub>*c*</sub> the  $A$ s, the  $A$ s fail to resemble in some respect. And so by (Nec), it is false that the  $A$ s resemble each other for the collective denotation of ‘the  $A$ s’. What contradicts (Rcumulativity).

Therefore, (Rdistributivity) and (Nec) do not fail. Apparent failures of (Rdistributivity) and (Nec) are only due to the indeterminacy of plural denotation. If so, (C1) fails to correctly account for collective resemblances because (Rcumulativity) is invalid. Alternative accounts of collective resemblances can however exploit the validity of (Rdistributivity) and (Nec).

## 2.6 Do collective resemblances supervene on pairwise resemblances?

To my mind, that (C1) is false suffices to show that resemblance can hold between more than two individuals. For it is sufficient to show that “John, Jack, and Jim resemble each other” asserts that resemblance holds between these three individuals. But some may argue that collective resemblance may still be supervenient on pairwise resemblances and some extra ingredient. If the latter is true, it does not amount to the rejection of the claim that resemblance can hold between more than two individuals. However, if one assumes that supervenient entities are no addition to the ontology, that collective resemblances supervene on pairwise resemblances and some extra ingredient seems to justify the view that collective resemblances are no ontological addition to pairwise resemblances and this extra ingredient. By this course of reasoning, the binarist can maintain that collective resemblances are somewhat superfluous, are second-class resemblances. The fundamental resemblances, the only resemblances we need to be committed to, are pairwise resemblances. So that, regarding the fundamental realm of resemblances, we can affirm that resemblance is binary.

In order to evaluate this binarist strategy, I shall make use of a plausibly true account of collective resemblances. (Rdistributivity) and (Nec) give rise to the following account of collective ascriptions of resemblance in the presence of a further ancillary assumption (where ‘the *As*’ is as usual arbitrary):

**(C2)** The *As* (for more than two *As*) resemble each other iff for any  $x$  and  $y$  such that  $x$  and  $y$  are some of the *As*,  $x$  resembles  $y$ , and the *As* resemble in some respect.

The left-to-right direction of (C2) follows from (Rdistributivity) and (Nec). The right-to-left direction requires a further assumption: that resemblance

in some respect is sufficient for resemblance. (C2) is certainly false if the resemblance predicate it involves is interpreted as an overall or an exact resemblance predicate. For resemblance in some respect is clearly not sufficient for exact resemblance and is, for every standard of resemblance such that resemblance in one respect is not saliently more resemblance than typical, insufficient for overall resemblance. But (C2) is a true account of those ascriptions of resemblance such that resemblance in some (elected) respect suffices for there to be a resemblance between some individuals. The latter resemblances are minimal resemblances. I shall thus admit the truth of (C2) understood as an analysis of collective ascriptions of minimal resemblance.<sup>15</sup>

*Prima facie*, (C2) justifies the view that resemblance can hold between more than two individuals instead of the contrary. For it is legitimate to agree with (C2) and maintain that if “the *As* resemble each other” is true, then resemblance holds between the *As*. Now suppose that the *As* are more than two and that the right hand side of (C2) is satisfied by them. Then (C2) gives us the result that resemblance holds between the *As*, which are more than two, and thus that resemblance can hold between more than two individuals. (C2) provides necessary and sufficient conditions for resemblance to hold between more than two individuals. Then, since these conditions can be satisfied, resemblance can hold between more than two individuals.

But on the assumption that supervenient entities are no addition to the ontology, (C2) can be used by the binarist, provided (C2) can be used to justify the view that collective resemblances, resemblances between more than two individuals, somehow supervene on pairwise resemblances and resemblance in some respect. If the latter is the case, resemblances between

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<sup>15</sup>It shall be emphasized that (C2) being true we need no predicate of resemblance ranging over  $n$ -tuples of individuals, for  $n > 2$ , once we dispose of a binary predicate of resemblance and a predicate of resemblance in some respect. For (C2) provides a paraphrase of our talk of collective resemblances which allows us to avoid the use of such a predicate.

But the issue here is not the arity of the resemblance predicate, it is the arity of the resemblance property; or better, of resemblance properties, one of which is the property of minimal resemblance analysed by (C2). And the fact that we dispose of such a paraphrase to avoid the use of a resemblance predicate ranging over  $n$ -tuples of individuals, for  $n > 2$ , is not by itself a sufficient reason to believe that resemblance properties do not hold between more than two individuals. The absence of such a paraphrase would be a clear argument in favour of the collectivist view of resemblance. But the presence of such a paraphrase is not by itself an argument to the opposite binarist view.

more than two individuals are no addition to the ontology, they are just *second-class resemblances*.

Before I enter the argument, let me emphasize that the latter course of reasoning helps the binarist only if it is assumed that if  $a$  supervenes on  $b$  and  $c$ , then each of  $b$  and  $c$  is more fundamental than, is ontologically prior to,  $a$ . For if the latter is not assumed, it may be the case that collective resemblances supervene on pairwise resemblances and resemblance in some respect and that pairwise resemblances are not ontologically prior to collective resemblances. Yet in such a case collective resemblances are no second-class resemblances, and Binarism is unjustified. Therefore, in what follows I will assume that if  $a$  supervenes on  $b$  and  $c$ , then each of  $b$  and  $c$  is more fundamental than, is ontologically prior to,  $a$ . I shall argue on the assumption that (C2) is true that there are good reasons to maintain that collective resemblances are not less fundamental than pairwise resemblances. If so, collective resemblances cannot be supervenient on pairwise resemblances and resemblance in some respect in a sense that suits the binarist, and the assumption that supervenient entities are no addition to the ontology cannot come into play to justify Binarism.

What is remarkable about (C2) is that the first conjunct of its analysans, which states the pairwise resemblance of every pair among the  $A$ s, is superfluous. The reason why this is so is that (C2) is a correct account of collective resemblance only if resemblance in some respect is not only necessary but also sufficient for the collective resemblance of individuals. Thus (C2) reduces to the following:

**(C3)** The  $A$ s (for more than two  $A$ s) resemble each other iff the  $A$ s resemble in some respect.

If resemblance in some respect is assumed to be both necessary and sufficient for resemblance, then we also obtain the following account of pairwise resemblance:

**(Pairwise)** The  $A$ s (for at most two  $A$ s) resemble each other iff the  $A$ s resemble in some respect.

Yet either (C3) and (Pairwise) are both true or neither is provided the resemblance predicate has the same interpretation in both. They are both true if resemblance in some respect is both necessary and sufficient for (minimal) resemblance. Otherwise, they are both false.

That (C3) and (Pairwise) are either both true or both false suggests that collective resemblances are not second-class resemblances. Pairwise resemblances have no peculiar ontological status that allows us to claim that pairwise resemblances are more fundamental than collective resemblances are, and thus that collective resemblances supervene on pairwise resemblances. Just as pairwise resemblances either supervene on resemblances in some respect or not, collective resemblances supervene on resemblances in some respect or not. If they supervene on resemblances in some respect, then neither of pairwise and collective resemblances are an ontological addition to reality on the assumption that supervenient entities are no addition to reality. If they do not supervene on resemblances in some respect, then either they supervene on something else or they are both ontological additions to reality. In every case, that (C3) and (Pairwise) are both true suggests that pairwise and collective resemblances are on a par regarding their degree of ontological priority and regarding whether they are or not addition to the ontology.

But the latter suggestion is misleading if we can motivate the view that pairwise resemblances in some respect are more fundamental than collective resemblances in some respect. For if resemblances in some respect between at most two individuals are more fundamental than resemblances in some respect between more than two individuals, then by (C3) and (Pairwise) it seems to follow that pairwise resemblances are more fundamental than collectively resemblances.

Can we motivate the view that collective resemblances in some respect are less fundamental than pairwise resemblances in some respect? In order to address this question I need to consider opposite solutions to the Problem of Universals. In doing so, I will assume for ease of presentation that, according to each of the considered solutions to the Problem of Universals, individuals resemble in some respect if and only if they share an elected property.<sup>16</sup> I shall argue that no opponent of Resemblance Nominalism can

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<sup>16</sup>This assumption is a simplification, as I will argue in chapter 4. Resemblance in some respect is a somewhat disjunctive notion and the sharing of an elected property is sufficient but not necessary for resemblance in some respect; the resemblance of elected properties, the resemblance of (significant) parts, and of possessions can each be sufficient for resemblance in some respect too. As the reader should see by considering them, taking into account the others disjuncts of the *analysans* of resemblance in some respect would not help the binarist but only make my demonstration longer and redundant. This is the

motivate the view that pairwise resemblances in some respect are ontologically prior to collective resemblances in some respect. Then I shall argue that the resemblance nominalist can motivate the latter view but only on the assumption that resemblance is a binary relation.

Consider first Realism about Universals. Realists about universals typically explain the resemblance of individuals in terms of instantiation of a common universal.<sup>17</sup> Thus *a* and *b* resemble each other because there is a universal had by *a* which is identical to some universal had by *b*. Therefore by (Pairwise), Realism about Universals is such that *a* and *b* resemble in some respect because there is a universal had by *a* which is identical to some universal had by *b*.

Likewise, what, according to the realist about universals, explains that *a*, *b*, and *c*, which are three individuals, resemble in some respect is that some universal had by *a* is identical to some universal had by *b* and had by *c*. But the fact that there is a universal had by *a* which is identical to some universal had by *b* is no more fundamental than the fact that there is a universal had by *a* which is identical to some universal had by *b* and by *c*.

Therefore, by (Pairwise) and (C3), if Realism about Universals is true, the resemblance of more than two individuals is no less fundamental than the resemblance of at most two individuals. For what grounds the resemblance of at most two individuals – their sharing some identical universal – is not more fundamental than what grounds the resemblance of more than two individuals – their sharing some identical universal. And the conclusion follows that if Realism about Universals is true then resemblance is not a binary relation, because pairwise resemblances are no more fundamental than collective resemblances are and collective resemblances are no second-class resemblances.

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reason why I allow myself to work here with a simplified notion of resemblance in some respect for the ease of presentation.

<sup>17</sup>Armstrong accounts for the resemblance of individuals by means of a disjunction: individuals resemble either if they share some identical universal or instantiate resembling universals (Armstrong 1978b, 96). I avoid this complication for the reason offered in the last footnote.

Likewise, realists about tropes<sup>18</sup> and *elected* class nominalists<sup>19</sup> are not justified in affirming the binarist view of resemblance. According to the realist about tropes, *a* and *b* resemble in some respect because there is a trope had by *a* which is exactly similar to some trope had by *b*. And *a*, *b*, and *c* resemble each other because there is a trope had by *a* which is exactly similar to some trope had by *b* and some trope had by *c*. The fact that there is a trope had by *a* which is exactly similar to some trope had by *b* is no more fundamental than the fact that there is a trope had by *a* which is exactly similar to some trope had by *b* and some trope had by *c*. Therefore, by (C3) and (Pairwise), the realist about tropes has no right to affirm that pairwise resemblances are more fundamental than collective resemblances are, and thus no right to affirm the binarist view of resemblance.

According to the elected class nominalist, *a* and *b* resemble in some respect in virtue of being co-members of a set which is an elected set, an elected property; and *a*, *b*, and *c* resemble in some respect in virtue of being all co-members of a same set which is an elected property. Obviously, the fact that two individuals are co-members of a set, which is an elected property, is no more fundamental than the fact that three individuals are co-members of a set, which is an elected property. And so by (C3) and (Pairwise), if Elected Class Nominalism is true, pairwise resemblances are no more fundamental than collective resemblances are, and resemblance is not a binary relation.

Therefore, assuming that opponents of Resemblance Nominalism agree with (C2) and thus with (C3) and (Pairwise), none of them is justified in affirming that collective resemblances supervene on pairwise resemblances and resemblance in some respect. They can be justified in affirming that collective resemblances supervene on resemblance in some respect just as they can be justified in affirming that pairwise resemblances supervene on resemblance in some respect. But as their analysis of resemblance in some respect is such that resemblance in some respect between more than two

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<sup>18</sup>On Realism about Tropes, see e.g. (Williams 1997), (Campbell 1990), and (Nef 2004, 748-71; 2006).

<sup>19</sup>Elected class nominalists are better known under the label ‘natural class nominalists’. Elected class nominalists are natural class nominalists when they interpret ‘elected property’ according to Lewis’s notion of a *natural class* (Lewis 1999a), which is a carnivorous interpretation of ‘elected property’. But elected class nominalists can also be vegetarian about elected properties.

individuals is no less fundamental than resemblance in some respect between at most two individuals (both being equally grounded in the instantiation of a universal, or of similar tropes, etc.), their analysis of resemblance in some respect is such that collective resemblances are no less fundamental than pairwise resemblances are. So, if (C3) and (Pairwise) are both true, and provided they agree that there can be true statements of collective resemblance as I assumed, Binarism is false according to each opponent of Resemblance Nominalism.

Things are different for the binarist resemblance nominalist because the binarist resemblance nominalist has a peculiar stance regarding the relationship between resemblance and resemblance in some respect. Rodriguez-Pereyra's version of Resemblance Nominalism is the most accomplished binarist resemblance nominalist proposal and I will thus concentrate my attention on his view. The binarist resemblance nominalist maintains that  $a$  and  $b$ 's resemblance in some respect, or their sharing an elected property,<sup>20</sup> is grounded in their resemblance. Roughly,  $a$  and  $b$  resemble in some respect because  $a$  and  $b$  resemble each other.

The binarist and the collectivist resemblance nominalists agree that resemblance explains ascriptions of resemblance in some respect to at most two individuals. But they disagree regarding the explanation of ascriptions of resemblance in some respect to more than two individuals. Suppose that  $a$ ,  $b$ , and  $c$  resemble in some respect. Then, according to the collectivist resemblance nominalist, it is the resemblance of  $a$ ,  $b$ , and  $c$  which explains that they resemble in some respect, just as it is the resemblance of  $a$  and  $b$  which explains that  $a$  and  $b$  resemble in some respect. However, according to the binarist resemblance nominalist, it cannot be the resemblance of  $a$ ,  $b$ , and  $c$  which explains their resemblance in some respect, since resemblance holds between at most two individuals. The binarist resemblance nominalist's explanation of collective ascriptions of resemblance in some respect must be distinct from his explanation of pairwise ascriptions of resemblance in some respect.

Rodriguez-Pereyra (2002, 156-74) explains resemblance in some respect between more than two individuals in terms of an *ad hoc* binary relation of resemblance, called  $R^*$ , which can hold not only between individuals but

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<sup>20</sup>Where 'elected' is specifically understood as 'sparse' in Rodriguez-Pereyra's theory.

also between ordered pairs called hereditary pairs.<sup>21</sup> Thus roughly,  $R^*$  is such that the  $As$  (for more than two  $As$ ) resemble in some respect iff  $R^*$  holds between every two  $As$  and between every two hereditary pairs of the same order which are made out of the individuals  $As$ . There is a hierarchy of ordered pairs that are pairs of individuals, pairs of pairs of individuals, pairs of pairs of pairs of individuals, etc., and the resemblance in some respect of more than two individuals is explained by the pairwise resemblances between these individuals and all the hereditary ordered pairs of the same order that we can construct out of these individuals.

Now, following Rodriguez-Pereyra's account of collective ascriptions of resemblance in some respect, it is true that pairwise ascriptions of resemblance in some respect to individuals are more fundamental than collective ascriptions of resemblance in some respect to individuals. For facts of pairwise resemblance between two individuals are brute primitive facts which alone suffice to explain ascriptions of resemblance in some respect to at most two individuals:  $a$  and  $b$  resemble in some respect because they resemble. On the other hand, the primitive facts of pairwise resemblance ground, and are more fundamental than, the pairwise resemblance facts between hereditary pairs of individuals. Pairwise resemblance facts between individuals and their hereditary pairs together ground, and are more fundamental than, collective ascriptions of resemblance in some respect to individuals. Finally, we can explain ascriptions of resemblance to more than two individuals in terms of the resemblance in some respect of the latter individuals using (C3). The result is that pairwise resemblance facts are brute primitive facts, while collective resemblance facts are derived facts: the latter ultimately supervene on pairwise resemblances between individuals and hereditary pairs of individuals. Then, if supervenient entities are no ontological addition, collective resemblances are no addition to the realm of resemblances.

In contrast to its rivals, Rodriguez-Pereyra can account for collective ascriptions of resemblance in a way that justifies the view that collective ascriptions of resemblance are less fundamental than pairwise ascriptions of resemblance and supervene on pairwise ascriptions of resemblance. However,

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<sup>21</sup>I call  $R^*$  *ad hoc* because  $R^*$  is introduced by Rodriguez-Pereyra only for the purpose of solving the Imperfect Community Difficulty. So '*ad hoc*' in this sense only means that what is qualified as such is a purely theoretical device, and I shall insist that there is nothing deeply wrong in a theory which makes use of such *ad hoc* devices. The theory is just more *convincing* if we can do without such devices.

the described account of collective ascriptions of resemblance<sup>22</sup> assumes that the primitive of the resemblance nominalist, namely resemblance, cannot hold between more than two individuals. This is so because we get the result that collective resemblances are supervenient from the assumption that the brute facts of resemblance are facts of resemblance between no more than two individuals. However, our demand for an account of collective resemblances that justifies the claim that collective resemblances are less fundamental than pairwise resemblances was a demand for a justification of the binarist view. Yet Rodriguez-Pereyra satisfies our demand of such an account of collective resemblance by assuming the binarist view. Unless the binarist resemblance nominalist provides an independent argument for the view that resemblance is a binary relation, the latter account is question-begging and does not justify the view that the resemblance nominalist's primitive should be a binary relation.

## 2.7 Collective resemblance and Resemblance Nominalism

In the last section, I have shown that opponents of Resemblance Nominalism are not justified in maintaining the binarist view of resemblance. On the other hand, the resemblance nominalist should provide an independent argument to the conclusion that the resemblance nominalist's primitive should link no more than two individuals, if he aims to justify the described account of collective resemblances.

As I emphasized at the beginning of section 4 of the present chapter, Rodriguez-Pereyra provides such an argument, which is that the collectivist resemblance nominalist cannot explain why (Rdistributivity) necessarily holds, whereas the binarist can. If so, one can maintain that the resemblance nominalist's primitive should link no more than two individuals for matters of explanatory power. However, Rodriguez-Pereyra's explanation of the validity of (Rdistributivity), which requires the validity of (Rcumulativity), fails.

But that Rodriguez-Pereyra's explanation of the validity of (Rdistributivity) fails does not mean that he cannot explain it, he can. He can explain the validity of (Rdistributivity) in terms of his account of collective ascrip-

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<sup>22</sup>Which, I insist, is not Rodriguez-Pereyra's one, but one we can draw from his theory.

tions of resemblance in some respect if he maintains (Nec). For if (Nec) is valid, then if the *As* (for more than two *As*) resemble each other, they resemble in some respect. And given his account of resemblances in some respect between more than two individuals, if the *As* resemble in some respect, any *x* and *y* such that *x* and *y* are among the *As* resemble each other. So that he can maintain that (Rdistributivity) is valid because (Nec) is valid and the proposed account of collective ascriptions of resemblance in some respect is correct.

The binarist resemblance nominalist can explain the validity of (Rdistributivity) in terms of (Nec). But the collectivist resemblance nominalist can also explain (Rdistributivity) in terms of (Nec) in the presence of the assumption that resemblance in some respect is also sufficient for (minimal) resemblance as follows. (Rdistributivity) is valid because (a) if the *As* resemble each other, they resemble in some respect, (b) if the *As* resemble in some respect, any *x* and *y* that are among the *As* resemble in some respect, and (c) if any *x* and *y* that are among the *As* resemble in some respect, then any *x* and *y* that are among the *As* resemble each other.

Since (Rdistributivity) is explained in terms of (a), (b), and (c), (Rdistributivity) is not a brute necessity in Collectivist Resemblance Nominalism. Some may reply that given this explanation it is (a), (b), and (c) which turn out to be brute necessities.<sup>23</sup> But (a), (b), and (c) are not brute necessities, if the collectivist can explain what he purports to explain, namely why individuals resemble in some respect and instantiate elected properties.

(a), that is (Nec), and (c) are both explained by the fact that within Resemblance Nominalism it is the resemblance of individuals that explains, and *uniquely* explains their resemblance in some respect. In Collectivist Resemblance Nominalism, the resemblance of the *As* explains their resemblance in some respect, their sharing an elected property. If *x* explains *y*, then *x* is sufficient for *y*.<sup>24</sup> Therefore, if the resemblance of the *As* explains their resemblance in some respect, the resemblance of the *As* is sufficient for their resemblance in some respect, *i.e.* (Nec). Then, in both versions of Resemblance Nominalism, resemblance is what *uniquely* explains resemblance in some respect. If so, it may not happen that some individuals resemble

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<sup>23</sup>Where brute necessities are necessary truths having no explanation. In modern metaphysics, and in particular in Spinoza and Leibniz, it is the Principle of Sufficient Reason that prevents us from admitting such necessities.

<sup>24</sup>Cf. (Correia 2005) on explanation relations.

in some respect while they fail to resemble because if it were the case, their resemblance in some respect would not be grounded in their resemblance. But the latter cannot be according to Resemblance Nominalism. Therefore, that resemblance in some respect is sufficient for resemblance, *i.e.* (c), is explained in Resemblance Nominalism.

Now (b) is explained, if the collectivist resemblance nominalist can explain what he purports to explain, *i.e.* why an individual instantiates an elected property.<sup>25</sup> Once the instantiation of an elected property is explained in terms of resemblance, that some individuals, *a*, *b*, and *c* resemble in some respect can be explained in terms of a conjunction of the following form: *a* instantiates the elected property **P**, *b* instantiates the elected property **P**, and *c* instantiates the elected property **P**.<sup>26</sup> And (b) can finally be explained by the truth-functionality of conjunction.

Therefore, the binarist and the collectivist resemblance nominalists are on a par regarding the explanation of (Rdistributivity). Rodriguez-Pereyra cannot explain more than the collectivist resemblance nominalist does and the collectivist's explanation of (Rdistributivity) does not assume more than the binarist's explanation of it. If I am right, Rodriguez-Pereyra is not justified in maintaining that resemblance, the primitive of the resemblance nominalist, cannot link more than two individuals.

On the other hand, there is a good reason to maintain that the primitive of the resemblance nominalist should be a resemblance property that can link more than two individuals. Let us come back to our starting point: the Imperfect Community Difficulty. If we follow Hausman's suggestion and allow resemblance to hold between more than two individuals, then we have available an easy and elegant solution to the Difficulty. Members of an imperfect community do not resemble each other, since they resemble in no common respect. Members of a perfect community resemble each other, on the assumption that resemblance in some respect is sufficient for the relevant ascriptions of minimal resemblance. The resemblance property the collectivist appeals to in order to solve the difficulty here is the familiar property that is instantiated by individuals when and only when they resemble in some respect, and this is the resemblance property opponents of Resemblance Nominalism purport to analyse in terms of their favourite

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<sup>25</sup>Cf. chapter 9.

<sup>26</sup>Provided we assume as I did in the previous section that the sharing of an elected property is sufficient and necessary for resemblance in some respect.

primitive. Moreover, this solution commits us to no entities besides concrete individuals.

By contrast, consider Rodriguez-Pereyra's solution to the difficulty. First  $R^*$  is taken as a primitive. Then an imperfect community of individuals is such that every two of its members stand in the relation  $R^*$ , but such that some hereditary  $n$ -ordered pairs constructed out of the latter individuals do not stand in the relation  $R^*$ ; a perfect community of individuals is such that every two of its members stand in the relation  $R^*$  and such that every two hereditary  $n$ -ordered pairs constructed out of the latter individuals stand in the relation  $R^*$ . By making use of  $R^*$ , Rodriguez-Pereyra solves the Imperfect Community Difficulty<sup>27</sup> but at a daunting price of technical complexity, lack of familiarity, and ontological commitment.

$R^*$  is a less familiar resemblance property than the resemblance property used by the collectivist to solve the difficulty. All the rest being equal, it is of course better to assume as primitive a resemblance property we are familiar with instead of a resemblance property we are not familiar with; for it makes the proposal more convincing. Second, it seems also preferable to solve the difficulty without too much technical tools because, again, it makes the proposal more convincing. Finally, a solution that incurs no commitment to extra entities is clearly better than a solution that incurs commitment to an extra kind of entities. And Rodriguez-Pereyra's solution incurs commitment to hereditary ordered pairs that are set-like entities.<sup>28</sup>

The latter provide a good, and I think sufficient, reason to maintain that the resemblance nominalist should, like his opponents, agree that resemblance can link more than two individuals.

I have argued that resemblances between more than two individuals are not mere conjunctions of resemblances between at most two individuals. I have argued, on the basis of a plausibly true account of ascriptions of min-

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<sup>27</sup>However, his solution has been found objectionable; see e.g. (Dorr 2005) and (MacBride 2004).

<sup>28</sup>It is true that I also commit myself to set-like entities by following Lewis in assuming that abundant properties are set. But I do so only because I need some account of abundant properties and that the set-theoretic account of them is presently the best available account (but we may hope for better days when we look at developments in plural logics and semantics for these logics that make use of no set-like entities (McKay 2006, 55-77)). I do not commit myself to sets in order to solve the Imperfect Community Difficulty. So someone who rejects sets can endorse the collectivist solution to this difficulty but cannot endorse Rodriguez-Pereyra's solution.

imal resemblance to more than two individuals, (C2), that no metaphysics of properties can justify the claim that collective resemblances are less fundamental than pairwise resemblances. If there can be true ascriptions of collective resemblance and if collective resemblances are no less fundamental than pairwise resemblances, then Collectivism is true.

Resemblance can hold between two individuals and between more than two individuals. If so, resemblance seems to be a multigrade property: a property that can hold on different occasions between different numbers of individuals. Yet some may endorse the collectivist view of resemblance and deny that resemblance is a multigrade property as I shall discuss in the last section of the present chapter.

## 2.8 Fixing the arity of resemblance

Nothing in the nature of resemblance seems to constrain the number of individuals between which it can hold. Therefore, resemblance is, at least *prima facie*, a multigrade property. Yet one may agree that resemblance can be truly asserted of more than two individuals and deny that resemblance is a multigrade property on the grounds that there are no multigrade properties.<sup>29</sup>

In order to avoid the conclusion that resemblance is a multigrade property of individuals, two strategies are available. We might think of resemblance as a property of sets of individuals, or we can think of it as a property of mereological fusions of individuals. According to the former strategy, what we do in fact by ascribing resemblance to John, Jack, and Jim is ascribing it to the set  $\{John, Jack, Jim\}$ ; according to the latter view, when we ascribe resemblance to John, Jack, and Jim, what we do is ascribing resemblance to the mereological fusion John+Jack+Jim. Both strategies have the welcome consequence that they fix both the arity and the adicity of resemblance, but in a surprising way: these two strategies make resemblance unary and monadic. According to the former, resemblance is a unary and monadic property of sets. According to the latter, resemblance is a unary and monadic property of mereological fusions. I shall say that these two views have been defended by no philosopher, plausibly because, with Haus-

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<sup>29</sup>This tradition goes back at least to (Russell & Whitehead 1925, xix) and has been promoted over three decades by Armstrong. For a detailed discussion of this tradition see (MacBride 2006, 568-95).

man's exception, they all endorse the binarist view. But the mereological strategy is inspired by the so-called compound object strategy discussed in (MacBride 2006, 580-4). My aim in this section is to argue against these two possible strategies.

### 2.8.1 The set-theoretic strategy

According to the set-theoretic approach, resemblance is a *property of sets of individuals*, such that the number of members of the sets to which resemblance applies varies on different occasions. If resemblance is understood as such, then given Inegalitarianism there are sets instantiating resemblance and sets that do not instantiate it.

The strategy makes resemblance something wholly different from what we think it is. It is not only that, according to this view, resemblance is a property of abstract entities, and only of abstract entities, it is also that what it is for something to instantiate the resemblance property is very different from what we think it is. If we say of something that it resembles itself, it seems that what we mean is that this thing instantiates the resemblance property. But, according to the set-theoretic approach, that something resembles itself and that something instantiates the resemblance property are two different things. For, according to the strategy, that an individual  $a$  resembles itself means that the singleton  $\{a\}$  instantiates the resemblance property, and that  $\{a\}$  resembles itself means that the singleton  $\{\{a\}\}$  instantiates the resemblance property, and so on. Thus according to this strategy, to say that something resembles itself is not to ascribe a property to this thing, but to its singleton.

A deeper worry with the view is that it seems to get the order of explanation wrong. Sets supervene on their members. So it seems that the fact that a set instantiates the property of resemblance should be explained by what its members are. But according to the set-theoretic strategy, it seems that individuals resemble each other because their set has the resemblance property and not the other way round.

The friend of the set-theoretic strategy cannot maintain that the set instantiates the resemblance property because its members resemble each other. For if she does so she reintroduces a property of resemblance instantiated by the members of the set which would not be unary. The advocate of the set-theoretic strategy might reply that the set has the property of

resemblance in virtue of the fact that its members resemble in some respect. If so, resemblance *tout court* and resemblance in some respect come totally apart. Resemblance in some respect is a property of the members of the set. If the members of a set resemble in colour, their resemblance in colour is certainly not a property of the set since sets have no colour. So resemblance in some respect is a property of individuals but resemblance *tout court* is a property of sets. This makes resemblance and resemblance in some respect come totally apart, and we should be reluctant to such a result.

Also I cannot make sense of the strategy unless it implies a conception of properties which is not as abundant as mine. I conceive of resemblance as an abundant property. On the other hand, the set-theoretic strategy incurs commitment to sets. Yet if sets exist and if there are individuals that resemble each other, there certainly is a set of resembling individuals. I say that this set is the resemblance property holding between individuals. But according to the set-theoretic strategy, the resemblance property cannot be the set of resembling individuals, since resemblance is not a property of individuals.

Yet there is the set of resembling individuals. So suppose that the friend of the set-theoretic strategy agrees with my conception of abundant properties according to which any set of individuals is a property of individuals. On this assumption there is a property that is the set of resembling individuals, however, this property is not the resemblance property. Nevertheless, the property that is the set of resembling individuals is a multigrade property if I am right that resemblance can hold between indeterminately many individuals. It follows from the latter that if the friend of the set-theoretic strategy agrees with my conception of abundant properties, she fails to avoid multigrade properties. In this case, the strategy is pointless.

If the friend of the strategy aims to avoid multigrade properties, then she must have a conception of properties which is different from mine, and less abundant than mine. If so the friend of the set-theoretic strategy and I are just talking past each other: we have the same ontology of individuals and sets, but the friend of the set-theoretic strategy simply refuses to call a property what I call a property.

Or perhaps the ontology of the friend of the set-theoretic strategy is qualitatively richer than mine. Perhaps her ontology is made of individuals, sets, and universals (or tropes), and she thinks of the resemblance property

as a universal instantiated by sets of resembling individuals. If so, then her universals are neither abundant, in the most inclusive sense, nor sparse. They are not abundant in the most inclusive sense because if they were, there would be a universal common to all resembling individuals: a universal of resemblance instantiated by individuals and which is multigrade. But her universals are not sparse either because sparse universals are properties of individuals, not properties of their sets.

If the rejection of the view that resemblance is a multigrade property of individuals is at this cost – an important revision of our conception of resemblance, the conclusion that resemblance and resemblance in some respect are properties instantiated by different kinds of entities, and the admission of an unorthodox conception of universals (or tropes) –, then the game is not worth the candle.

### 2.8.2 The mereological approach

The mereological strategy also conceives of resemblance as a unary and monadic property but of mereological fusions of individuals. The mereological strategy is also a revisionary view of resemblance. For, according to it, mereological atoms cannot instantiate the resemblance property, and what it means to say that some mereological fusion instantiates the resemblance property is not that the fusion resembles itself but that some of its proper parts resemble each other.

But the mereological approach faces a more decisive difficulty that neither the multigrade nor the set-theoretic approach faces. Suppose that John, Jack, and Jim resemble each other. The latter, according to the mereological approach, is to be analysed as the fact that the mereological fusion of John, Jack, and Jim, for short (John+Jack+Jim), has the property of resemblance. Suppose then that the mereological fusion of John and Jack, (John+Jack), and Jim resemble each other. That (John+Jack) and Jim resemble each other is according to the mereological approach to be analysed as the fact that the mereological fusion of (John+Jack) and Jim, that is ((John+Jack)+Jim), has the resemblance property.

But the mereological fusion (John+Jack+Jim) is identical to the mereological fusion ((John+Jack)+Jim) by associativity of mereological summation. If so, by Leibniz's Law, it is not possible that resemblance is a property of (John+Jack+Jim) without being a property of ((John+Jack)+Jim).

However, it is intuitively possible that John, Jack, and Jim resemble each other without it being the case that the mereological fusion of John and Jack resembles Jim. I conclude that the mereological approach fails to distinguish distinct resemblance facts.

Once we admit that resemblance can hold between more than two individuals, the set-theoretic and the mereological approaches appear to be the only available strategies to fix the arity of resemblance. The mereological view encounters a decisive objection and, because of its high theoretical cost, the set-theoretic strategy does not constitute an appealing alternative to the view that resemblance is multigrade. Therefore, I endorse the view that the resemblance of individuals is a multigrade property of individuals.

## Chapter 3

# The Adicity of Resemblance

Resemblance properties are multigrade properties; they can hold between an indeterminate number of individuals. But what is their *adicity*? In this chapter I first argue that non-comparative resemblance properties are monadic. Since my argument relies on the symmetry of the transitive form of the resemblance verb I discuss objections to the assumption that the transitive form of the verb is symmetrical in section 3.2. In section 3.3 I consider whether comparative resemblance is a four-termed relation, and argue that it is not. Comparative resemblance is a dyadic multigrade property. Finally, I shall briefly account for such monadic and dyadic multigrade properties in the set-theoretic framework.

### 3.1 From dyadic to monadic

Non-comparative resemblance has traditionally been thought of as a dyadic relation. Why is it so? I think the only reasons for this traditional view are linguistic. The main reason is that statements of resemblance can be, and often are, expressed using a transitive resemblance verb that can be saturated by plural or singular expressions. These statements are of the following forms:

(3.1)  $x$  resembles  $y$

(2.7)  $X$  resemble  $y$

(2.8)  $x$  resembles  $Y$

(2.9)  $X$  resemble  $Y$

(where ‘ $X$ ’ and ‘ $Y$ ’ are as usual free occurrences of plural variables). In such statements resemblance apparently groups the individuals between which it holds between subjects of resemblance and objects to which the subject(s) resemble(s). We usually think that to transitive verbs there correspond dyadic properties *because* these verbs contain two places that are to be saturated each by a term. Thus since there is a transitive form of the resemblance verb that is to be saturated by two terms, we think that to this verb there corresponds a dyadic relation.

A second linguistic use which may have helped forming the belief that resemblance is dyadic is that we say that resemblance holds *between* individuals; and betweenness is often taken as the mark of relationality and thus polyadicity. But the reason why we use the word ‘between’ in “resemblance holds between  $X$ ” need be no more than the fact that we use transitive resemblance verbs to express resemblance statements. For there does not seem to be any order, for instance, in “resemblance holds between John, Jack, and Jim” given that a collective ascription of resemblance is not a mere conjunction of pairwise resemblances.<sup>1</sup>

Last but not least, a further reason why we believe resemblance to be dyadic is that classical first-order singular logic, the logic we learn as a first year student in philosophy, conflates the adicity and the arity of predicates: if a predicate is binary, *i.e.* is predicated to one or two entities, first-order singular logic represents it as a dyadic predicate; and, in general, if a predicate is  $n$ -ary, first-order singular logic represents it as  $n$ -adic. So first-order singular logic leads to the result that resemblance is dyadic only if resemblance is binary. But resemblance is not binary and there is no necessity that if a predicate is  $n$ -ary, it is then  $n$ -adic.<sup>2</sup> Besides these linguistic reasons I can think of no other reason to believe that resemblance is dyadic.

Regarding our linguistic use, there also are statements of resemblance that are expressed using the predicate ‘ $X$  resemble each other’ which is to be saturated by one, and no more than one, term. These are the statements of the form (2.6) I focused on in the previous chapter. The form of “the students resemble each other” is not different from that of “the students

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<sup>1</sup>Consider: “Hesperus is identical to Phosphorus; therefore, identity holds between Hesperus and Phosphorus”. We can use ‘between’ here, but there is no order as there is not even distinctness.

<sup>2</sup>This is one of the consequences of plural logics: in plural logics a monadic predicate can be saturated by a single term denoting many, sometimes infinitely many, entities.

form a circle”, and *forming a circle* is a clear monadic, given my usage of the term, though multigrade property.<sup>3</sup> Regarding statements of the form of (2.6), resemblance is a property that individuals together have or fail to have, just as forming a circle is a property that individuals, students, points or whatever, together have or fail to have.

So if the central motivation for the belief that resemblance is dyadic is that the transitive form of the resemblance verb requires to be saturated by two terms, it seems that statements involving ‘*X* resemble each other’, which is to be saturated by only one term, equally suggest that resemblance is, at least sometimes, monadic. Is it then that resemblance is variably polyadic, sometimes monadic and sometimes dyadic? I do not think so. I shall argue that resemblance is monadic. Since I think that the reason for believing that resemblance is dyadic is purely linguistic my argument will be purely linguistic.

I will argue that every transitive predicate of resemblance which is to be saturated by two terms can be defined in terms of ‘*X* resemble each other’ which is to be saturated by only one term and whose semantic value seems to be a monadic multigrade resemblance property. This provides a necessary but no sufficient condition for resemblance to be monadic. My motivation for thinking that resemblance is monadic is that, given the discussion of (C1) in chapter 2, the converse definition is not possible. We cannot define the predicate ‘*X* resemble each other’ in terms of a transitive predicate of resemblance that is to be saturated by two terms. So every resemblance fact can be reported using a resemblance verb which is to be saturated by only one term, while not every resemblance fact can be reported using (only) a resemblance verb that is to be saturated by two terms.

Therefore, if the adicity of a property has anything to do with the number of terms that are needed to saturate the predicate we use to represent this property in a language with sufficient expressive power, then the latter are sufficient reasons to think that resemblance is monadic. If the adicity of a property has nothing to do with the number of terms that saturate the predicate which represents this property, then there is no good reason to think that resemblance is dyadic.

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<sup>3</sup>Some may thought that *forming a circle* is a relational property of constitution. But it can be relational and monadic. The view that *forming a circle* is a monadic property, in my sense of the term, is defended by MacBride; cf. (MacBride 2006, 587).

First consider statements of the form (3.1). Assuming that the transitive form of the resemblance verb ‘ $x$  resembles  $y$ ’ is symmetrical, it is obvious that from “Dee resembles Dum”, it follows that Dee and Dum resemble each other and *vice versa*. Hence the following is a valid translation scheme assuming that resemblance is symmetrical:

**(Def1)**  $x$  resembles  $y$  iff  $x$  and  $y$  resemble each other.

Therefore, assuming the symmetry of the transitive form of the resemblance verb I can define the predicate ‘ $x$  resembles  $y$ ’ in terms of ‘ $X$  resemble each other’ and thus translate every statement of the form (3.1) into a statement of the form (2.6). The converse, however, is not true given that (Rcumulativity) fails. We cannot define the predicate ‘ $X$  resemble each other’ in terms of ‘ $x$  resembles  $y$ ’ alone. Given this result, every resemblance statement of the form (3.1) which seems to assert a resemblance between a subject of the resemblance relation and an object of the resemblance relation can be understood as a resemblance statement that asserts the resemblance of some individuals without imposing any groupings between them, but not *vice versa*.

It remains to argue that resemblances between more than two individuals that are expressed by means of statements of the forms (2.7)-(2.9) do not impose any groupings between the individuals of which resemblance is asserted. Statements of the form (2.7) –  $X$  resemble  $y$  – involve a resemblance predicate that takes a plural term in its first argument position and a singular term in its second argument position; in statements of the form (2.8) –  $x$  resembles  $Y$  –, the resemblance predicate takes a singular term in its first place and a plural term in its second place; in statements of the form (2.9) –  $X$  resemble  $Y$  – the resemblance predicate takes a plural term in both positions.

If it can be shown that (2.7)-(2.9) are analysable in terms of (3.1) – *i.e.* in terms of “ $x$  resembles  $y$ ” –, then (2.7)-(2.9) can be analysed in terms of statements of the form (2.6) “ $X$  resemble each other”, since (Def1) is intuitively valid.

We can follow Butchvarov’s suggestion that “ $x$  resembles  $y$  and  $z$ ” is analysable as “ $x$  resembles  $y$  and  $x$  resembles  $z$ ”. In a similar vein, we

would like “ $x$  and  $y$  resemble  $z$ ” to be equivalent to “ $x$  resembles  $z$  and  $y$  resembles  $z$ ”.<sup>4</sup> Thus:

**(Def2)**  $X$  resemble  $y$  iff for any  $z$  such that  $z$  is one of  $X$ ,  $z$  resembles  $y$ .

**(Def3)**  $x$  resembles  $Y$  iff for any  $z$  such that  $z$  is one of  $Y$ ,  $x$  resembles  $z$ .

**(Def4)**  $X$  resemble  $Y$  iff for any  $w$  and for any  $z$  such that  $w$  is one of  $X$  and  $z$  is one of  $Y$ ,  $w$  resembles  $z$ .

Whenever the free occurrences of plural variables ‘ $X$ ’ and ‘ $Y$ ’ are replaced by plural designators which denote each distributively every  $x$  that is among the plurality, (Def2)-(Def4) are trivially valid. But what if they denote otherwise? Consider the following instance of (2.9):

**(3.2)** The Rolling Stones resemble The Beatles.

It is not inconsistent to assert (3.2) and to deny at the same time that Keith Richards resembles Paul McCartney. But if (Def4) were correct, it would follow from (3.2) that Keith Richards resembles Paul McCartney. So (Def4) can fail, and it is plausible that (Def2) and (Def3) can be violated in a similar vein.

Some may think that (3.2) yields a violation of (Def4) because in (3.2) we are not referring to the members of The Rolling Stones and the members of The Beatles but to two individuals: the band called ‘The Rolling Stones’, and the band called ‘The Beatles’. But we need not appeal to the controversial claim that bands are distinct from the individuals that compose them to explain why (3.2) is not incompatible with the judgement that Keith Richards does not resemble Paul McCartney. For we can explain the compatibility of these judgements in terms of collective denotation: in (3.2), ‘The Rolling Stones’ denotes<sub>c</sub> The Rolling Stones, and ‘The Beatles’ denotes<sub>c</sub> The Beatles; *i.e.* they do not refer distributively to each member of the band.

On the other hand, the resemblance verb ‘ $X$  resemble  $Y$ ’ is symmetrical just as its singular counterpart (3.1) is. Given the symmetry of ‘ $X$  resemble  $Y$ ’, the following follows from (3.2):

**(3.3)** The Rolling Stones and the Beatles resemble each other.

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<sup>4</sup>see section 4 of chapter 2.

The inference from (3.2) to (3.3) parallels the inference from “the  $F$ s resemble the  $G$ s” to (2.10) – “the  $F$ s and the  $G$ s resemble each other” – that we considered in sections 4 and 5 of the preceding chapter. There I have concluded that, given the latter inference, ‘the  $F$ s and the  $G$ s’ does not denote collectively in (2.10). So we should also conclude that ‘The Rolling Stones and The Beatles’ does not denote collectively in (3.3).<sup>5</sup> Therefore, ‘The Rolling Stones and the Beatles’ denotes distributively in (3.3). But ‘The Rolling Stones and the Beatles’ cannot denote distributively every  $x$  and  $y$  such that  $x$  is among the Rolling Stones and  $y$  is among the Beatles. For otherwise it would be the case that Richards resembles McCartney, what we denied. So ‘The Rolling Stones and the Beatles’ in (3.3) denotes distributively the bands, but not the members of the bands. Thus using Oliver and Smiley’s apparatus, ‘The Rolling Stones and The Beatles’ denotes<sub>d</sub> The Rolling Stones and The Beatles where ‘The Rolling stones’ denote<sub>c</sub> The Rolling Stones and ‘The Beatles’ denotes<sub>c</sub> the Beatles.

(Def2)-(Def4) can fail. However, since (3.2) is clearly equivalent to (3.3), the following translation schemes for (2.7)-(2.9) appear more promising provided we correctly fix the denotation of the plural terms:

**(Def2’)**  $X$  resemble  $y$  if and only if  $X$  and  $y$  resemble each other.

**(Def3’)**  $x$  resembles  $Y$  if and only if  $x$  and  $Y$  resemble each other.

**(Def4’)**  $X$  resemble  $Y$  if and only if  $X$  and  $Y$  resemble each other.

Let a *compound plural variable* be a plural variable obtained by connecting variables with the word ‘and’. So ‘ $X$  and  $y$ ’, ‘ $x$  and  $Y$ ’, and ‘ $X$  and  $Y$ ’ are such compound plural variables. And let a *substitution instance* of a variable be any term we substitute for this variable to saturate a predicate. First, we should fix the denotation of plural terms in such a way that, in the right-hand side of any instantiation of either of (Def2’)-(Def4’), the substitution instance for the most complex compound plural variable – which is either ‘ $X$  and  $y$ ’, ‘ $x$  and  $Y$ ’, or ‘ $X$  and  $Y$ ’ – refers distributively. Thus if we substitute ‘the  $A$ s and  $b$ ’ for ‘ $X$  and  $y$ ’ in (Def2’), ‘the  $A$ s and  $b$ ’ denotes<sub>d</sub> the  $A$ s and  $b$ ; if we substitute ‘ $a$  and the  $B$ s’ for ‘ $x$  and  $Y$ ’ in (Def3’), ‘ $a$

<sup>5</sup>For if it did denote collectively, we could use (Rdistributivity) to deduce from (3.3) that Keith Richards resembles Paul McCartney; which, we assumed, does not follow from (3.2).

and the *Bs*' denotes<sub>d</sub> *a* and the *Bs*; and if we substitute 'the *As* and the *Bs*' for 'X and Y' in (Def4'), 'the *As* and the *Bs*' denotes<sub>d</sub> the *As* and the *Bs*. Second, in any instantiation of either of (Def2')-(Def4'), we should fix the denotation of the substitution instance for 'X' and 'Y' in such a way that the substitution instance refers in the same way in the left- and right-hand sides of the equivalence.

If we keep fixed the denotation of substitution instances for plural variables according to these conventions, (Def2')-(Def4') are valid on the assumption that the transitive form of the resemblance verb is symmetrical. If so, each non-comparative resemblance statement can be understood as a statement of the form (2.6), since the right-hand side of each of (Def2')-(Def4') is of this form. Every resemblance facts can be reported using the monadic predicate 'X resemble each other', whereas, given the failure of (Rcumulativity), it is not the case that every resemblance fact can be reported using (only) a transitive resemblance verb that is to be saturated by two terms. Since statements of the form (2.6) assert the resemblance of individuals without imposing any groupings between these individuals, this result provides a good reason to affirm that non-comparative resemblance properties are not dyadic but monadic properties. So I endorse the view that non-comparative resemblance is monadic and multigrade.

### 3.2 Are there asymmetrical resemblances?

Whether (Def1) is valid depends on the assumption that the transitive form of the resemblance verb, '*x* resembles *y*', is symmetrical. Is it?

An empirical study by Amos Tversky seems to provide a reason for thinking that it should not be assumed that '*x* resembles *y*' is symmetrical (Tversky & Gati 1978). The hypothesis tested has three parts: (i) statements like "*a* resembles *b*" are directional: in such statements, *a* occupies the *subject position* (*i.e.* is the subject) and *b* occupies the *referent position* (*i.e.* is the referent). (ii) In such directional statements, we tend to select the most familiar object as the referent and the least familiar object as the subject. (iii) Let *a* be the most familiar object and *b* be the least familiar one. Then observers tend to ascribe a greater degree of resemblance to *a* and *b* when *a* appears in the referent position than to *a* and *b* when *a* appears in the subject position.

To test the hypothesis, two groups of 77 subjects were instructed to ascribe a degree of resemblance (between 1 (no similarity) to 20 (maximal similarity)) to pairs of countries. Pairs of countries are such that the first element  $a$  is conceived of as considerably more familiar than the second element of the pair  $b$ . One group is asked to ascribe a degree of resemblance to the pair  $(a,b)$  while the other group is asked to ascribe a degree of resemblance to the pair  $(b,a)$ . The data confirm that the average degree of resemblance ascribed by members of the former group is in general sensibly greater than the average degree of resemblance ascribed by members of the latter group. Tversky concludes from these results that the assumption of symmetry of the transitive form of the resemblance verb is not to be maintained.<sup>6</sup>

Lewis (1973, 51-2) provides a further argument against the assumption of symmetry. Lewis's argument is restricted to possible worlds but, if sound, it would still show that the symmetry of resemblance is not universally valid. Lewis suggests that the similarity of  $w_1$  to  $w_2$  may differ from the similarity between  $w_2$  and  $w_1$  because, when the former is evaluated, the contextually relevant properties are those properties which play a role in the classification practices of inhabitants of  $w_2$ , whereas when the latter is evaluated, the contextually relevant properties are those which play a role in the classification practices of the inhabitants of  $w_1$  (Lewis 1973, 51). Since classification practices can vary from a world to another, whether a property is contextually relevant may vary as well. Then if we assume that resemblance is a matter of contextually relevant properties – that is, if we interpret 'elected property' as meaning contextually relevant property –, it can happen that  $w_1$  resembles  $w_2$  from the perspective of  $w_2$ , while  $w_2$  does not resemble  $w_1$  from the perspective of  $w_1$ .

Lewis's argument assumes the two first parts of Tversky's hypothesis: that statements of resemblance are directional, and that the most familiar item, the most familiar world, is in general at the referent position. The new element in Lewis's argument is that the apparent failure of the symmetry assumption is explicitly attributed to the *context-relativity of resemblance*, which will be the main topic of chapter 6.

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<sup>6</sup>Of course, what Tversky's argument at best shows is that it is not the case that, for all  $x$  and  $y$ , if  $x$  resembles  $y$  to degree  $d$  then  $y$  resembles  $x$  to degree  $d$ . Yet the latter claim is consistent with the claim that, for any  $x$  and  $y$ , if  $x$  resembles  $y$ , then  $y$  resemble  $x$ ; which is the symmetry assumption for 'x resembles y'.

What generates apparent failures of the symmetry assumption is a shift of context. When making a directional comparison, what we usually do is electing the salient properties of the most familiar item. Considering Lewis's argument, the most familiar world at  $w_1$  is  $w_1$  itself, whereas the most familiar world at  $w_2$  is  $w_2$ . Thus when comparing  $w_1$  with  $w_2$  in  $w_1$ , we select the salient properties of  $w_1$  and consider whether  $w_2$  is similar to  $w_1$  in these respects. Whilst when comparing world  $w_1$  with  $w_2$  in  $w_2$ , we select the salient properties of  $w_2$  and consider whether  $w_1$  is similar to  $w_2$  in these respects. Of course, the salient properties of  $w_1$  in  $w_1$  need not be the salient properties of  $w_2$  in  $w_2$ . This explains why in one world the two worlds may be judged similar and in the other world dissimilar.

But if shifts of context explain apparent failures of the symmetry assumption, then it should be concluded that the symmetry assumption does not fail. For the symmetry assumption is an assumption about the validity of inferences of the following form:

$x$  resembles  $y$ .

Therefore,  $y$  resembles  $x$ .

Apparent failures of the symmetry assumption are due to the fact that the context of evaluation of the premise is not the same as the context of evaluation of the conclusion. Yet standard semantics teaches us to keep the context fixed when we evaluate an argument for validity.<sup>7</sup> If we follow standard semantics on this point, then a genuine failure of the symmetry assumption would be such that there is a context  $C$  within which it is both true that " $a$  resembles  $b$ " and false that " $b$  resembles  $a$ ". Yet neither Tversky's nor Lewis's argument supports the belief that there is such a genuine failure of the symmetry assumption.<sup>8</sup> Therefore, no good reason has been given to drop the assumption that the transitive form of the resemblance verb is symmetrical, and I was justified in maintaining this assumption when arguing that resemblance is monadic.

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<sup>7</sup>A point vigorously held by Kaplan (1989).

<sup>8</sup>Some may also argue that the truth of the content of resemblance judgements is independent of the context; cf. chapter 7. If the latter are right, then no failure of the symmetry of the transitive form of the resemblance verb has been offered by Tversky and Lewis.

### 3.3 The adicity of comparative resemblance

So far I have restricted my attention to non-comparative resemblance, but we also make judgements of comparative resemblance between individuals. What is the adicity of comparative resemblance? In comparative resemblance judgements we compare the resemblance of some things with the resemblance of some things. So if I am right that the resemblance of some things is a monadic multigrade property of these things, it seems that comparative resemblance is multigrade and that its adicity is two. In other words, comparative resemblance is dyadic and multigrade.

Here are illustrations of comparative resemblance statements:

(3.4) Cats resemble each other more than dogs do;

(3.5) Human beings resemble each other more than mammals do;

(3.6) French speaking cantons of Switzerland are more similar to each other with respect to their unemployment rates than German speaking cantons are.

(3.4) and (3.5) are statements of overall comparative resemblance, while (3.6) is a statement of comparative resemblance in some respect. I focus here on statements of overall comparative resemblance. Such sentences comparing the homogeneity of a population with the homogeneity of another are quite common in our ordinary as well as in scientific discourse. At least some initial plausibility is attached to the view that acts of comparing individuals in the way expressed by sentences (3.4)-(3.6) are constitutive of our classification practices.

Sentences (3.4) and (3.5) explicitly involve a comparative resemblance predicate which is a dyadic multigrade predicate of comparative resemblance. These statements have the following form:

(3.7)  $X$  resemble each other more than  $Y$  do.

The comparative predicate ‘resemble more than’ is called *strict resemblance*. Here is the *weak* counterpart of (3.7):

(3.8)  $X$  resemble each other at least as much as  $Y$  do.

The standard logic for comparative resemblance is that proposed by Tim Williamson in (Williamson 1988). In Williamson's notation, the primitive comparative resemblance or similarity predicate is  $T(w, x, y, z)$  which is to be read ' $w$  is at least as similar to  $x$  as  $y$  is to  $z$ '. The strict counterpart of  $T$  is noted  $\hat{T}(w, x, y, z)$ <sup>9</sup> and is to be read ' $w$  is more similar to  $x$  than  $y$  is to  $z$ '. The latter predicate is defined as follows:

$$\hat{T}(w, x, y, z) \leftrightarrow T(w, x, y, z) \ \& \ \neg T(y, z, w, x)$$

Statements of overall comparative resemblance between individuals clearly compare the resemblance of some individuals with the resemblance of some individuals. So if the resemblance of individuals is a binary and dyadic relation, it is doubtless that comparative resemblance is a tetradic relation holding between at most four individuals; and we may think of Williamson's predicate  $T$  as representing such a relation. But if the resemblance of individuals is not a binary and dyadic relation, as I have argued, but a monadic multigrade property, then it seems that comparative resemblance is a dyadic multigrade relation: it compares the resemblance of variably many things with the resemblance of variably many things.

Nevertheless, if every statement of overall comparative resemblance is representable in terms of Williamson's primitive comparative resemblance predicate, one might still prefer to conceive of weak comparative resemblance as the semantic value of  $T$ , *i.e.* as a tetradic relation, on the grounds that we should avoid commitment to multigrade relations if possible. I shall argue that it is not the case that every comparative resemblance statement of the form of (3.7) or (3.8) is representable in terms of  $T$ .

Consider (3.4), "Cats resemble each other more than dogs do". (3.4) expresses a generality, therefore, we might think that (3.4) can be represented by means of the universal quantifier and  $T$  as follows:

$$(3.4') \ \forall w, x, y, z (Cw \ \& \ Cx \ \& \ Dy \ \& \ Dz \ \rightarrow \ \hat{T}(w, x, y, z)).$$

But (3.4') cannot be a correct representation of (3.4) since (3.4) does not imply (3.4'). For instance, suppose that two bulldogs, two twins, are more similar to each other than some cats are. (3.4) is not inconsistent with this hypothesis but (3.4') is.

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<sup>9</sup>This is the notation for strict similarity used by Hansson in (Hansson 1992).

We might then try to represent (3.4) by combining universal and existential quantifiers as follows:

$$(3.4'') \forall w, x(Cw \& Cx \rightarrow \exists y, z(Dy \& Dz \& \hat{T}(w, x, y, z))).$$

But (3.4'') is not equivalent to (3.4) either. For it is possible that every cat is more similar to every other cat than some dog is similar to some other dog and yet dogs resemble each other more than cats do. Thus (3.4'') is consistent with the contradictory of (3.4). So (3.4'') is not a correct representation of (3.4) and any other combination of the universal and the existential quantifiers won't work, since any such combination of these quantifiers would fail to express the generality intended in (3.4).

Some may suggest that the worry lies in the weak expressive power of our existential and universal quantifiers and that if we help ourselves with a generalised quantifier we could represent (3.4) in terms of  $T$ .<sup>10</sup> For it may seem that what "Cats resemble each other" means is that in general, every two cats resemble each other more than every two dogs do.

But this does not seem right. In many contexts, it is correct to interpret "the  $A$ s resemble each other more than the  $B$ s do" as "the average degree of resemblance between every two  $A$ s is greater than the average degree of resemblance between every two  $B$ s". And in many contexts it is correct to interpret "in general, every two  $A$ s resemble each other more than every two  $B$ s do" as "in general, the degree of resemblance between every two  $A$ s is greater than the degree of resemblance between every two  $B$ s". Yet it is clearly possible that, for some  $A$ s and some  $B$ s, it is true that in general, the degree of resemblance between every two  $A$ s is greater than the degree of resemblance between every two  $B$ s, while it is false that the average degree of resemblance between every two  $A$ s is greater than the average degree of resemblance between every two  $B$ s.

Suppose there are one hundred pairs of  $A$ s and one hundred pairs of  $B$ s. Suppose that a degree of 0,99 is ascribed to ninety-nine pairs of  $A$ s, while a degree of resemblance of 0,01 is ascribed to the remaining pair of  $A$ s; suppose that a degree of 0,98 is ascribed to ninety nine pairs of  $B$ s, while a degree of resemblance of 1 is ascribed to the remaining pair of  $B$ s. Then it is true that in general, the degree of resemblance of every two  $A$ s is greater than

<sup>10</sup>This is the strategy Williamson suggested to me at the Graduate Session of the Joint Sessions of The Aristotelian Society and Mind Association 2006 (Southampton).

the degree of resemblance of every two *Bs* but it is false that the average degree of resemblance between every two *As* is greater than the average degree of resemblance of every two *Bs*; the average degree of every two *As* is equal to that of every two *Bs*. Therefore, given plausible interpretations of statements of the form “the *As* resemble each other more than the *Bs*” and “in general, every two *As* resemble each other more than every two *Bs*”, we get the result that these two statements are not equivalent. Generalised quantifiers are no more helpful than the usual quantifiers are.

Yet one may reply as follows to the last argument. It seems that statements of the form “the *As* resemble each other more than the *Bs* do” are correctly interpreted as “the average degree of resemblance between every two *As* is greater than the average degree of resemblance between every two *Bs*”. If so, if we can define a function of degree of resemblance in terms of Williamson’s *T*,<sup>11</sup> then we get an *indirect* way to understand statements of the form (3.8) in terms of a four-termed relation of comparative resemblance, which is *T*.

But the general worry with this line of reply is that nothing grounds the belief that statements of the form “the *As* resemble each other more than the *Bs* do” are *always* interpreted in the same way. The interpretation “the average degree of resemblance between every two *As* is greater than the average degree of resemblance between every two *Bs*” seems to be the intended one in some contexts, but there might be other contexts where “the *As* resemble each other more than the *Bs* do” shall not be interpreted in this way. For instance, there might be contexts where the latter is to be interpreted as “the average degree of resemblance between every three *As* is greater than the average degree of resemblance between every three *Bs*”. Or consider “The Sex Pistols and The Clash resemble each other more than The Rolling Stones and The Beatles do”. The latter usually is not to be interpreted as “the average degree of resemblance between every two of The Sex Pistols and The Clash is greater than the average degree of resemblance between every two of The Rolling Stones and The Beatles”.

This worry has again to do with the fact that the denotation of plural expressions can vary with the context. Once we try to represent statements of the form (3.8) which involve plurals into a statement involving a four-termed predicate of comparative resemblance ranging only over singu-

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<sup>11</sup>As Williamson does in (Williamson 1988).

lar terms, we irremediably *impose* a denotation to the plural terms these statements involve. And if we do impose a denotation to their plural terms when representing statements of the form (3.8), we run the risk that the imposed denotation is not the right one in some context, and we conflate the semantic and the syntactic. However, if we represent statements of the form (3.8) as they are, that is as statements involving a two-termed comparative resemblance predicate ranging over plurals, then we impose no interpretation on these statements and no denotation to their terms so that we do not conflate the semantic and the syntactic.

Moreover, as Williamson (1988, 458-9) insists, whether we can construct a function of degree of resemblance depends on the cardinality of our comparative resemblance ordering, *i.e.* on the number of distinct places on the ordering. If the cardinality of a comparative resemblance ordering is not a countable subset of the set of the reals, then we cannot define a function of degree of resemblance ranging over this resemblance ordering. As Williamson shows, no function of degree of resemblance under the usual ordering of the reals can give the similarity ordering of all possible worlds. So let us quantify unrestrictedly over possible worlds and assert the plausible

**(3.9)** Some worlds, the  $\phi$ -worlds, resemble each other more than other worlds, the  $\psi$ -worlds, do.

(3.9) cannot be interpreted as

**(3.9')** There are some worlds, the  $\phi$ -worlds, and some worlds, the the  $\psi$ -worlds, such that the average degree of resemblance between every two  $\phi$ -worlds is greater than the average degree of resemblance between every two  $\psi$ -worlds.

Moreover, given the above discussion about the degrees of resemblance of the  $A$ s and the  $B$ s, it is conceivable that there are  $\phi$ -worlds and  $\psi$ -worlds (where quantification is unrestricted) such that (i) “the  $\phi$ -worlds resemble each other more than the  $\psi$ -worlds do” is true of them, (ii) “for every  $w$ ,  $x$ ,  $y$ ,  $z$ , such that  $w$  and  $x$  are among the  $\phi$ -worlds and  $y$  and  $z$  are among the  $\psi$ -worlds,  $w$  resembles  $x$  more than  $y$  resembles  $z$ ” is false of them, and (iii) “in general, every two  $\phi$ -worlds resemble each other more than every two  $\psi$ -worlds” is false of them. If there are such worlds, then (i) cannot be represented in terms of Williamson’s  $T$ . If one denies that there are such worlds, then one gets the modal facts wrong.

A logic for comparative resemblance which assumes as primitive a dyadic multigrade comparative resemblance predicate of the form (3.8) would have no such difficulties. For every statement of the form (3.8) would be representable in this logic. Moreover in this logic we could represent any statement we can represent by means of Williamson's logic, since we can easily define the primitive  $T$  in terms of the dyadic multigrade comparative resemblance predicate (3.8) as follows:

**(DefT)**  $T(w, x, y, z) =_{df}$   $w$  and  $x$  resemble each other at least as much as  $y$  and  $z$  do.

Therefore, we are justified in conceiving of comparative resemblance as a dyadic multigrade property for the following reasons. First, comparative resemblance compares the resemblance of objects with the resemblance of objects and the resemblance of objects is a monadic property of these objects. Second, we do not seem to be able to represent every statement of the form (3.8) into a statement involving a four-termed predicate of comparative resemblance saturated only by singular terms while the converse representation is easily performed.

In the long appendix to this thesis, I offer a logic for comparative resemblance that takes this result into account and assumes as primitive a dyadic multigrade predicate of comparative resemblance.

### 3.4 Resemblance as a monadic multigrade property

Non-comparative resemblance properties are monadic multigrade properties. They impose no groupings on the individuals instantiating them, and the number of individuals between which these properties hold varies on different occasions. In other words, non-comparative resemblance properties are satisfied by 1-tuples of one or more individuals. Likewise, comparative resemblance relations are dyadic multigrade relations in that they always relate one group of individuals with one group of individuals, where the number of individuals in each group varies on different occasions. In other words, comparative resemblance properties are satisfied by ordered pairs of a variable number of individuals.

As I said when introducing Inegalitarianism in chapter 1, I follow Lewis's lead in conceiving abundant properties as sets of  $n$ -tuples of individuals, though we may conceive of them otherwise, and my aim in this section is to account for such multigrade properties in this general framework. Once we conceive of properties as sets of  $n$ -tuples of individuals, no difficulty is attached to the understanding of properties having a fixed arity. I said that monadic and unary properties of individuals are sets of individuals. But strictly speaking, since properties are sets of  $n$ -tuples of individuals, monadic and unary properties are sets of singletons. Thus let  $\mathbf{P}_1$  be an ordinary monadic and unary property of individuals which is, for simplicity, had by only four individuals:  $a$ ,  $b$ ,  $c$ , and  $d$ . Then,  $\mathbf{P}_1$  is the set  $\{\{a\}, \{b\}, \{c\}, \{d\}\}$ . Likewise, let  $\mathbf{P}_2$  be a usual dyadic and binary relation which, for simplicity, holds only between  $a$  and  $b$ ,  $a$  and  $c$ , and  $b$  and  $d$ . Then  $\mathbf{P}_2$  is the set  $\langle a, b \rangle, \langle a, c \rangle, \langle b, d \rangle$ .<sup>12</sup>

But how are we to understand multigrade properties in the set-theoretic framework? I propose the following. For instance, let  $\mathbf{P}_3$  be a monadic multigrade property such that the following are its instances:  $a$ ;  $a$  and  $b$ ;  $c$ ,  $d$ ,  $e$ ; and  $b$  and  $e$ .  $\mathbf{P}_3$  is identical to the following set:  $\{\{a\}, \{a\} \cup \{b\}, \{c\} \cup \{d\} \cup \{e\}, \{b\} \cup \{e\}\}$ .

The form of non-comparative resemblance properties is the same as that of  $\mathbf{P}_3$ . Suppose that “ $a$ ,  $b$ , and  $c$  resemble each other” is true for ‘ $a$ ,  $b$ , and  $c$ ’ denoting <sub>$c$</sub>   $a$ ,  $b$ , and  $c$ . Then, using the union operation and given that resemblance is distributive, this means that a subset of the relevant resemblance property is the following:  $\{\{a\} \cup \{b\} \cup \{c\}, \{a\} \cup \{b\}, \{a\} \cup \{c\}, \{b\} \cup \{c\}, \{a\}, \{b\}, \{c\}\}$ .

The form of a dyadic multigrade property like comparative resemblance properties can then be understood in an analogous way. Such a property is a set of pairs of union sets. For instance, one of these dyadic multigrade properties is the following:  $\langle \{a\} \cup \{b\}, \{c\} \cup \{d\} \rangle, \langle a, \{b\} \cup \{c\} \cup \{d\} \rangle, \langle \{a\} \cup \{b\} \cup \{c\}, \{b\} \cup \{c\} \cup \{d\} \rangle$ .

I would like to end this section by introducing a possible drawback of this proposal. Suppose that I assert “sets that are not members of themselves

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<sup>12</sup>Armstrong (1997b, 163) has argued that the notion of order is still a relational notion, and so by taking relations to be sets of ordered  $n$ -tuples one has not eliminated all relations. See (Rodriguez-Pereyra 2002, 57-60) for a reply, with which I agree, to Armstrong's argument.

resemble each other". This assertion seems meaningful and yet, according to my proposal, it expresses no proposition.

For suppose that resemblance holds between the sets that are not members of themselves. According to the proposal, this means that the union set of the sets that are not members of themselves is a member of the set with which I identify the resemblance property. But there is no union set of the sets that are not members of themselves, given Russell's paradox. If I say that the sets that are not members of themselves do not resemble each other and thus that the property of *not being similar* holds between them, then it is the latter property which contains as a member the union set of the sets that are not members of themselves. So "sets that are not members of themselves resemble each other" has no truth-value and expresses no proposition.<sup>13</sup>

If we admit that sets can resemble each other, then we can undermine this difficulty by having a hierarchy of resemblance and difference properties. There is a first-order resemblance property which is the set of the resembling individuals. The members of this resemblance property are either singletons whose member is an individual or unions of such singletons. There is a second-order resemblance property which is the set of resembling sets of individuals. Then there is a third-order resemblance property which is the set of resembling sets of sets of individuals, and so on and so forth. According to this strategy, resemblance can hold between all  $n$ -tuples of individuals, between all  $n$ -tuples of  $n$ -tuples of individuals that are not members of themselves, between all  $n$ -tuples of  $n$ -tuples of  $n$ -tuples of individuals that are not members of themselves, and so on and so forth. But the resemblance property will be different each time.<sup>14</sup>

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<sup>13</sup>It should be noticed that "sets that are not members of themselves resemble each other" also fails to express a proposition according to Tarskian semantics for plural languages. For in Tarskian semantics the interpretation of the plural term "sets that are not members of themselves", where this term denotes collectively, is the union of these sets (McKay 2006, 112).

<sup>14</sup>I am grateful to Gonzalo Rodriguez-Pereyra for having suggested to me this line of reply.



## Chapter 4

# Resemblance, Resemblance in Some Respect, and Elected Properties

In the present chapter I attempt to put more flesh on the conceptual analysis of the various notions of resemblance introduced in chapter 1. In section 1 I come back to the analysis of resemblance in terms of resemblance in some respect introduced in chapter 2 and argue that resemblance in some respect is a disjunctive matter. Given the disjunctive character of resemblance in some respect I argue in section 2 that resemblance respects are not properties but similarity orderings. In section 3 I distinguish two notions of minimal resemblance. In section 4 I use the development of sections 1-3 to refine the analysis of the other notions of resemblance.

### 4.1 Resemblance in some respect

In chapter 2 I endorsed the following analyses of collective resemblance and pairwise resemblance:

**(C3)** the *As* (for more than two *As*) resemble each other iff the *As* resemble in some respect.

**(Pairwise)** *a* and *b* resemble each other iff *a* and *b* resemble in some respect.

(C3) and (Pairwise) together yield the following analysis of resemblance:

(MR') the *As* (no matter how many they are) resemble each other iff they resemble in some respect.

(MR') is a correct and traditional analysis of resemblance. As I emphasised in chapter 2, (C3) is a correct account of collective ascriptions of minimal resemblance<sup>1</sup> so that (MR') is an analysis of minimal resemblance. Resemblance in some respect is necessary for there to be a resemblance between individuals. And resemblance in some respect, provided it is resemblance in some *elected* respect, is also sufficient for there to be a resemblance between individuals, if anything is.<sup>2</sup> Then by (MR) – the *As* minimally resemble each other iff there is some resemblance between the *As* –, we get the result that the *As* minimally resemble each other if and only if they resemble in some respect.

In section 6 of chapter 2 I assumed that individuals resemble in some respect if and only if they share an elected property. Yet as I said in footnote 16 of chapter 2, this assumption is a simplification. For resemblance in some respect is disjunctive and the sharing of an elected property is sufficient though not necessary for resemblance in some respect. If so, (MR') gives rise to a disjunctive account of minimal resemblance.

Many things can make individuals resemble in some respect. Given Inegalitarianism and (MR'), the sharing of an elected property is sufficient for resemblance in some respect, while the sharing of a merely abundant property is not. The sharing of an elected property is both necessary and sufficient for exact resemblance in some respect. However, in ordinary speech inexact though close resemblance of elected properties appears sufficient for resemblance in some respect (Searle 1959). We may sometimes, for instance, agree that an orange individual resembles a red individual with respect to colour, though they have distinct colours. They resemble in some respect, but imperfectly. And their imperfect resemblance in some respect is a resemblance in some elected respect if colours are elected properties.

Hence, individuals resemble in a common respect at least if they share an elected property or have resembling elected properties. Is that all? No. Statements like “Sam and Mary resemble with respect to their noses” are

<sup>1</sup>Where minimal resemblance is the kind of resemblance such that individuals resemble each other if and only if there is some resemblance between them; cf. chapter 1.

<sup>2</sup>Here, as always, I assume an inegalitarian notion of resemblance respects such that only an elected minority of respects – ways of comparing individuals – are genuine resemblance respects.

well-formed, meaningful, and can be true or false. Yet noses are not properties, they are material parts of material individuals. Likewise, statements like “Sam and Mary resemble with respect to their shoes” are well-formed, meaningful, and can be true or false. Yet Sam’s shoes are neither properties of Sam nor parts of Sam, but things he possesses. Once we consider such statements it seems that parts and possessions of individuals can be elected, just as properties can, in such a way that comparing individuals relative to the relevant parts or possessions can motivate a judgement of resemblance in some respect. Sam and Mary have more or less gerrymandered parts, and we do not want gerrymandered parts to make for resemblance in some respect between them. Likewise, Sam and Mary have gerrymandered possessions (e.g. a gerrymandered part of their shoes), and we do not want such gerrymandered possessions to make for resemblances in some respect between them.

Thus we get the following disjunctive analysis of resemblance in some respect:

**(RR)** The *As* resemble in some respect iff (i) they share an elected property, or (ii) they have resembling elected properties, or (iii) they have resembling (elected) parts, or (iv) they have resembling (elected) possessions.<sup>3</sup>

Resemblances with respect to parts or possessions are labelled *transferred similarities* by Husserl (1973, 192).<sup>4</sup> Transferred similarities are opposed to *direct similarities*. Direct similarities are resemblances in some respect according to conditions (i) and (ii) of (RR). It is clear why transferred similarities are said to be transferred. Sam and Mary resemble each other in virtue of having parts or possessions (e.g. noses, shoes, etc.) which resemble each other. We ascribe resemblance with respect to their noses to Sam and Mary on the grounds that their noses have resembling or common proper-

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<sup>3</sup>Of course, when we say that Sam and Mary resemble with respect to their noses (or their shoes) we do not mean that they share an identical nose (or shoe), but only that they have resembling noses (or shoes). It seems to me doubtful that we will say of two individuals that they resemble in some respect because they have a common part or common possession. Consider: “I and my arm resemble each in some respect by having my hand in common.”

<sup>4</sup>Transferred similarities with respect to parts are also called *partial similarities* by D. C. Williams (1997, 113).

ties, or that they themselves have resembling parts. Then the resemblance of the parts or possessions of Sam and Mary is transferred to Sam and Mary.

According to (RR), resemblance in some respect is a disjunctive notion. And by (MR') minimal resemblance is a disjunctive notion.

## 4.2 Respects of resemblance

On the basis of (RR) we can investigate what a resemblance respect is. Resemblance respects are traditionally conceived of as properties. Prior and Searle have maintained that resemblance respects are determinable properties:

Determinates under the same determinable have the common relational property, [...], of characterising whatever they do characterise in a certain *respect*. Redness, blueness, etc., all characterise objects, as we say, “in respect of their colour”; triangularity, squareness, etc., “in respect of their shape”. [...] What this suggests is that the “respects in which objects are to be characterised”, to which determinable adjectives refer, are related to the objects not less but more intimately than the determinate qualities which “characterise” them in the strict and proper sense of the term. (Prior 1949, 13)

*If* to say of any two objects  $x$  and  $y$  that they have a property  $A$  entails that they resemble each other (are alike, are exactly alike) with respect to (in respect of)  $B$ , then  $A$  is a determinate of  $B$ . (Searle 1959, 152)

Contrary to this tradition I think that resemblance respects are not properties, neither determinable nor determinate properties. Transferred similarities are what shows that resemblance respects cannot be properties.

Statements like “ $a$  and  $b$  resemble with respect to colour”, “Sam and Paul resemble with respect to their age” at first glance suggest that respects of resemblance and difference are determinable properties. But statements like “Sam and Mary resemble with respect to their noses” or “Sam and Mary resemble with respect to their shoes” may thus equally suggest that respects of resemblance are not always properties of the compared individuals.

If we consider transferred similarities, one may suggest that what it means for some things to resemble with respect to their noses is for them to resemble with respect to *shape of nose*; yet the shape of a nose is a property. But resemblance with respect to noses is indeterminate in a way that resemblance with respect to shape of nose is not, and, depending on the context, resemblance with respect to noses may include more than resemblance with respect to shape of nose. In some contexts it may happen that in order to resemble with respect to their noses individuals should not only have noses having similar shapes but also noses having similar colours, similar sizes, or similar parts. That is, the nose respect is multidimensional in a way that the shape of nose respect is not, and the multidimensionality of the nose respect can vary depending on the context.

It also seems wrong to identify the nose respect with the determinable property of having a nose. This is so because for individuals to resemble with respect to their noses is not the same thing as for them to resemble with respect to their having a nose. In order to resemble with respect to their noses, individuals must have similar noses, while in order to resemble with respect to their having a nose, individuals only need to have a nose. On the other hand, the nose respect, obviously, is not a nose, and thus is not a part of individuals. Therefore, the nose respect, the respect in which individuals resemble when we say that they resemble with respect to their noses, is neither a determinable property of individuals nor a part of individuals. But what can it be then?

My suggestion is that respects of resemblance are neither properties nor parts nor possessions; they are resemblance orderings between elected properties, elected parts, or elected possessions. To say that Sam and Mary resemble with respect to their noses is to say that they are close on the nose similarity ordering. To say that *a* and *b* resemble with respect to colour is to say that they are close on the colour similarity ordering. But the nose similarity ordering is neither a part nor a property of people having a nose and the colour similarity ordering is not a property of individuals having colours, whereas the determinable property of being coloured is a property of individuals having colours.

Of course, the property of being situated on the colour similarity ordering is a property of individuals having colours, and to my mind the determinable property of being coloured is rightly understood as the property of being lo-

cated on the colour similarity ordering. But the property of being located on the colour similarity ordering is not identical to the colour similarity ordering, and resembling with respect to being located on the colour similarity ordering is not the same, *i.e.* does not have the same satisfaction conditions, as resembling with respect to colour. This is the reason why I think that ‘colour’ in ‘resemble with respect to colour’ cannot be the designator for the determinable property but must be the designator for the colour similarity ordering.

If this is right, then the general terms that can follow the ‘in respect of’-clause (like ‘colour’, ‘redness’, ‘age’, ‘shape’, ‘gender’, etc.) are general terms for similarity orderings. What creates the misleading belief that resemblance respects are determinable properties is that these general terms are also used as nominalisations of the determinable properties being coloured, being red, having an age. Yet, since the colour respect is the colour similarity ordering, and since the determinable being coloured is not the similarity ordering but the determinable property of being located on the similarity ordering, what I contend is that general terms like ‘colour’ are ambiguous. They denote different things depending on whether they are used in nominal position or following the ‘in respect of’- or ‘with respect to’-clause; in nominal position, they denote the determinable property, but following the ‘with respect to’-clause they denote a similarity ordering.

Now what are similarity orderings? Similarity orderings can be conceived of in two different ways. We can conceive of them as abstract entities akin to abstract *structure*, or we can conceive of them as cognitive constructs, conceptual maps that we use to classify objects and to perform induction. I think that the second alternative is the right one, that similarity orderings, resemblance and difference respects, are what Peter Gärdenfors (2000) calls *conceptual spaces*. These are cognitive maps used in various cognitive processes. I will say more about these similarity orderings and, in particular on the resemblance measure which grounds them, in chapter 6.

Phenomena of transferred similarity are interesting and usually ignored by philosophers. But since transferred similarities are ultimately explained in terms of direct similarities of elected parts or possessions of the compared individuals I will focus on direct similarities which I call resemblances.

### 4.3 Strong and weak minimal resemblance

Once we leave aside transferred similarities, (MR') and (RR) give rise to two notions of minimal resemblance, a strong one and a weak one:

**(SMR)** The *As* strongly minimally resemble each other iff the *As* share some elected property.

**(WMR)** The *As* weakly minimally resemble each other iff (i) the *As* share some elected property or (ii) the *As* have resembling elected properties; where the *As* have resembling properties iff there is a series of elected properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that each of the *As* has exactly one of  $\mathbf{P}_1, \dots, \mathbf{P}_n$ , and  $\mathbf{P}_1, \dots, \mathbf{P}_n$  resemble each other.

Strong minimal resemblance entails weak minimal resemblance. Minimal resemblance can be interpreted as weak or strong, and this is part of the reason why both (MR) and (MR') are ambiguous. It is the strong notion of minimal resemblance I made use of to undermine the binarist view of resemblance. But it should now be clear that if I had focused on the weak instead of the strong notion of minimal resemblance, it would still have followed that the binarist view of resemblance is illegitimate given the various ways metaphysicians of properties can interpret the expression 'elected property'.

Strong and weak minimal resemblance are both discussed in the philosophical literature on resemblance. Armstrong (1978b, 96) analyses the resemblance of individuals as identity or resemblance of instantiated (sparse) universals. Armstrong's analysis is thus an analysis of weak minimal resemblance. On the other hand, Lewis (1986b, 60) describes qualitative similarity as the kind of resemblance such that "sharing of them [the sparse properties] makes for qualitative similarity [...]." And any kind of minimal resemblance such that the sharing of elected properties is not only sufficient but also necessary for instantiating it is a kind of strong minimal resemblance. Rodriguez-Pereyra's primitive resemblance relation also is a strong minimal resemblance relation, since he admits that there is a necessary connection between resemblance and commonality of sparse properties (Rodriguez-Pereyra 2002, 64).

Strong and weak minimal resemblance are both genuine kinds of minimal resemblance and have their distinctive virtues. Weak minimal resemblance is plausibly closer to the property of minimal resemblance we ascribe to individuals in everyday life than strong minimal resemblance is. But strong

minimal resemblance is useful in metaphysical applications of resemblance. In my opinion, strong minimal resemblance is the notion of minimal resemblance the resemblance nominalist needs in order to explain the sharing of an elected property.<sup>5</sup> Lewis uses qualitative similarity to define duplication; duplication itself being very helpful within his philosophy to solve various difficulties that I will consider in chapter 8.

If your interest in resemblance consists in the analysis of our everyday ascriptions of resemblance, then your focus should be on weak minimal resemblance. If your interest in resemblance consists in some of the mentioned metaphysical applications of resemblance, then your focus should be on strong minimal resemblance. My interest in resemblance consists in both, and so I will pay attention to both kinds of minimal resemblance.

#### 4.4 Resemblance in some respect and other kinds of resemblance

Minimal resemblance is of course not the only kind of resemblance that can be understood in terms of resemblance in some respect. Minimal difference can be analysed thus:

**(MD')** The *As* are minimally different from each other iff the *As* differ in some respect.

(MD') is as disjunctive as (MR') is, since there are both direct and transferred minimal differences and since we can also conceive of direct minimal differences as weak or strong. Understood as weak, minimal difference is analysed thus:

**(WMD)** The *As* are weakly minimally different from each other iff there is some *x* and some *y* such that *x* and *y* are among the *As* and *x* has an elected property that *y* fails to have.

Understood strongly, minimal difference is as follows:

**(SMD)** The *As* are strongly minimally different from each other iff there is a series of elected properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that (i) each of the *As* has exactly one of  $\mathbf{P}_1, \dots, \mathbf{P}_n$ , (ii)  $\mathbf{P}_1, \dots, \mathbf{P}_n$  are ordered on a

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<sup>5</sup>Cf. chapter 9 of this study.

same similarity ordering, and (iii) some properties among  $\mathbf{P}_1, \dots, \mathbf{P}_n$  do not resemble each other, *i.e.* do not occupy close positions on the relevant similarity ordering.

Obviously, if  $a$  has some property  $\mathbf{P}_1$  and  $b$  has some property  $\mathbf{P}_2$  such that  $\mathbf{P}_1$  and  $\mathbf{P}_2$  do not resemble each other, then each of  $a$  and  $b$  has a property that the other fails to have. Therefore, strong minimal difference entails weak minimal difference. On the other hand, it can be the case that there is some elected property had by one of  $a$  and  $b$  that the other fails to have, while every elected property of each of  $a$  and  $b$  resembles some elected property of the other. Hence, weak minimal difference does not entail strong minimal difference.

Let me turn to exact resemblance and difference now. Exact difference is the dual of some minimal resemblance: individuals are exactly different if and only if there is no resemblance between them. But the dual of which minimal resemblance? Suppose that  $a$  and  $b$  share no elected property – and thus fail to strongly minimally resemble – but are such that they resemble very closely, though imperfectly, in every respect. In such a case we will agree that  $a$  and  $b$  are closely similar to one another and therefore fail to be exactly different. Since individuals can both fail to be strongly minimally similar and fail to be exactly different, exact difference is not the dual of strong minimal resemblance.

On the other hand, if some individuals have no resembling properties, they are exactly different, and if they have some resembling properties, then they are not exactly different. Therefore, exact difference seems to be rightly conceived of as the dual of weak minimal resemblance rather than that of strong minimal resemblance:

**(ED')** The  $A$ s are exactly different from each other iff the  $A$ s do not weakly minimally resemble each other; *i.e.* iff neither is it the case that the  $A$ s share an elected property nor is it the case that there is a series of elected properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$ , such that each of the  $A$ s has exactly one of  $\mathbf{P}_1, \dots, \mathbf{P}_n$ , and  $\mathbf{P}_1, \dots, \mathbf{P}_n$  resemble each other.

Likewise, exact resemblance is defined as the dual of some notion of minimal difference, but which notion of minimal difference? Suppose that  $a$  and  $b$  share all their elected properties with the exception of  $\mathbf{P}_1$  that is had by  $a$ , and  $\mathbf{P}_2$  that is had by  $b$ . And suppose that  $\mathbf{P}_1$  and  $\mathbf{P}_2$  resemble each

other, but imperfectly. In that case,  $a$  and  $b$  are weakly minimally different but they are not strongly minimally different. Do they resemble exactly? Intuitively, the answer should be negative. For inexact resemblance in only one respect, no matter how tiny this inexact resemblance may be, is enough difference for denying that  $a$  and  $b$  are exactly similar. So individuals can both fail to strongly minimally differ from each other and fail to resemble exactly, from which it follows that strong minimal difference is not the dual of exact resemblance. In order to resemble exactly, individuals must share all their elected properties. Exact resemblance is to be analysed as the dual of the weak notion of minimal difference thus:

(ER') The  $A$ s are exactly similar iff the  $A$ s are not weakly different from each other; *i.e.* share all their elected properties.

Finally, overall resemblance and overall difference also have to do with resemblance and difference in some respect in that overall resemblance implies minimal resemblance and overall difference implies minimal difference. Overall resemblance and difference are the result of some computation of resemblances and/or differences in some respect and the comparison to a relevant standard for typicality. This description of the relationship between overall resemblance and resemblance in some respect is fairly vague and indeterminate but we cannot provide a determinate analysis of overall resemblance and difference in terms of resemblance in some respect. There is no determinate account of overall resemblance and overall difference in terms of resemblance and difference in some respect. For which computation of resemblances and/or differences in some respect gives rise to overall resemblance is a matter of context. I will say more on this issue in chapters 6 and 7.

## Chapter 5

# Extended Formal Summary of Preceding Results

In this chapter I propose to state formally the translation schemes of the various forms of predications of resemblance and then to state formally the properties of non-comparative resemblance that I have accepted so far: the entailment relations between the various forms of non-comparative resemblance and difference statements, and the distributivity and cumulativity properties. This will make things clearer. I will restrict my attention to the properties of non-comparative resemblance because an extended logic of comparative resemblance is provided in the appendix of this study.

### 5.1 The language

I will use two kinds of variables: singular variables,  $x, y, z, \dots$  each denote one object; plural variables  $X, Y, Z, \dots$  each denote many (at least one) objects. Since the plural variables denote each at least one object, I could have used only plural variables and let the context determine whether the plural variable denotes exactly one object or more than one. Singular variables are introduced only to add clarity.

The plural language I make use of is the one proposed by McKay (2006, 59-60):

- *Basic elements*

- Relations (including predicate) symbols:  $B^n, B_1^n, B_2^n, \dots, C^n \dots$ , for each  $n \leq 1$ . ‘A’ is reserved for the designated logical relation *is/are among the*;
  - a countable infinity of singular constants:  $a, b, c, \dots$ ;<sup>1</sup>
  - a countable infinity of singular variables:  $x, y, z, \dots$ ;
  - a countable infinity of plural variables:  $X, Y, Z, X_1, X_2, \dots$ ;
  - unary sentential operator:  $\neg$ ;
  - binary sentential operator:  $\&$ ;
  - basic quantifier:  $\exists$ .
- *terms*
    - quantified variables are terms;
    - constants are terms;
    - if  $T_1, \dots, T_n$  are terms, then  $[T_1, \dots, T_n]$  is a term.
  - *Clauses*
    - $B^n T_1, \dots, T_n$  is a clause (where  $B^n$  is an arbitrary  $n$ -place relation symbol, and  $T_1, \dots, T_n$  are arbitrary  $n$ -terms);
    - $T_1 A T_2$  is a clause;
    - if  $G$  is a clause, then  $\neg G$  is a clause;
    - if  $G$  and  $H$  are clauses, then  $G \& H$  is a clause;
    - if  $Q$  is a quantifier,  $v$  is a variable and  $G$  is a clause, then  $QvG$  is a clause;
    - a sentence is a clause without free variables.

Additional connectives and quantifiers are defined in the usual way. In particular, the universal quantifier  $\forall$  is defined as the dual of the existential

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<sup>1</sup>It should be noticed that the syntax proposed by McKay contains only singular constants. His explanation for this is given in footnote 6, page 59 of (McKay 2006). We might follow Oliver and Smiley (2006) in treating ‘a’, ‘b’, ‘c’ as able to denote more than one object, and thus as plural constants. The addition of plural constants to McKay’s syntax would demand an enrichment of his semantics as well. Here the semantics proposed by Oliver and Smiley (2006) would be helpful. However, I will not make use of plural constants in formal discourse.

quantifier  $\exists$ :  $\forall XF(X) \leftrightarrow \neg\exists X\neg F(X)$ , where “ $\forall XF(X)$ ” is to be read “no matter what some things, the  $x$ s, are, the  $x$ s are  $F$ ”.<sup>2</sup> Brackets ‘(’ and ‘)’ will be used to make the reading more comfortable, but when they aren’t necessary for this purpose – for instance, around a term of the form ‘[...]’ –, they will be suppressed.

McKay (2006) proposes two semantics, a plural semantics and a set-theoretic semantics, to interpret this language. I let the reader consult (McKay 2006) for details on the semantics.

I add the following axioms concerning plural terms and the binary logical predicate ‘A’ (Correia (2005)):

**(Non-Emptiness)**  $\forall X\exists x(xAX)$ ;

**(Extensionality)**  $\forall X, Y(XAY \leftrightarrow \forall x(xAX \rightarrow xAY))$ ;

**(Identity)**  $\forall X, Y(X = Y \leftrightarrow (XAY \ \& \ YAX))$ ;

**(Comprehension)**  $\exists x\phi(x) \rightarrow \exists X\forall x(xAX \rightarrow \phi(x))$ .

## 5.2 Definitions

I use symbol  $R$  to represent the ambiguous non-comparative predicate ‘ $X$  resemble each other’ so that the primitive scheme for predications of non-comparative resemblance (2.6) can be represented thus:<sup>3</sup>

$$R(X)$$

Just as the predicate ‘ $X$  resemble each other’ can be interpreted as minimal, exact, or overall, I take the predicate ‘ $R$ ’ to be ambiguous for minimal, exact, or overall resemblance. Different predicates corresponding each to an interpretation of ‘ $X$  resemble each other’ will be offered in the following section.

Here is the semi-formal restatement of definition (Def1)<sup>4</sup> that defines the singular and dyadic predicate ‘ $x$  resembles  $y$ ’ in terms of ‘ $X$  resemble each other’:

<sup>2</sup>This is the reading proposed by Boolos (1998a).

<sup>3</sup>(2.6) is the primitive scheme for predications of non-comparative resemblance because the other forms of predications of non-comparative resemblance can be defined in terms of (2.6); cf. section 1 of chapter 3.

<sup>4</sup>Cf. section 1 of chapter 3.

**(Def1\*)**  $x$  resembles  $y =_{df} R[x, y]$

The following definitions are the semi-formal restatements of translation schemes (Def2')-(Def4'):

**(Def2\*)**  $x$  resembles  $Y =_{df} R[x, Y]$

**(Def3\*)**  $X$  resemble  $y =_{df} R[X, y]$

**(Def4\*)**  $X$  resemble  $Y =_{df} R[X, Y]$

Resemblance may also be comparative. I focus on weak resemblance here, since strict (“ $X$  resemble each other more than  $Y$  do”) and equal (“ $X$  resemble each other as much as  $Y$  do”) resemblance are definable in terms of weak resemblance (“ $X$  resemble each other at least as much as  $Y$  do”). These definitions are offered in the appendix. Comparative resemblance statements can be of the form “ $w$  resembles  $x$  at least as much as  $y$  resembles  $z$ ”. But they can also be of the following forms:

**(5.1a)**  $x$  resembles  $y$  at least as much as  $Z$  resemble each other;

**(5.1b)**  $x$  resembles  $Y$  at least as much as  $Z$  resemble each other;

**(5.1c)**  $X$  resemble  $y$  at least as much as  $Z$  resemble each other;

**(5.1d)**  $X$  resemble  $Y$  at least as much as  $Z$  resemble each other;

**(5.1e)**  $X$  resemble each other at least as much as  $y$  resembles  $z$ ;

**(5.1f)**  $X$  resemble each other at least as much as  $y$  resembles  $Z$ ;

**(5.1g)**  $X$  resemble each other at least as much as  $Y$  resemble  $z$ ;

**(5.1h)**  $X$  resemble each other at least as much as  $Y$  resemble  $Z$ .

And they can be of the following forms:

**(5.2a)**  $w$  resembles  $X$  at least as much as  $y$  resembles  $Z$ ;

**(5.2b)**  $W$  resemble  $x$  at least as much as  $Y$  resemble  $z$ ;

**(5.2c)**  $W$  resemble  $X$  at least as much as  $Y$  resemble  $Z$ ;

**(5.2d)**  $W$  resemble  $X$  at least as much as  $y$  resembles  $z$ ;

(5.2e)  $w$  resembles  $x$  at least as much as  $Y$  resemble  $Z$ ;

(5.2f)  $W$  resemble  $X$  at least as much as  $Y$  resemble  $z$ ;

(5.2g)  $W$  resemble  $X$  at least as much as  $y$  resembles  $Z$ ;

and so on and so forth until we reach all the possible combinations of plural and singular variables. There are 14 possible combinations involving four variables, so the list will stop at (5.2n).

Because we cannot rephrase any statement of the form of (3.8) – “ $X$  resemble each other at least as much as  $Y$  do” – in terms of Williamson’s relation  $T$ , I propose to represent weak resemblance as a dyadic multigrade predicate symbolized

$$\text{WR}(X, Y)$$

and to be read “ $X$  resemble each other at least as much as  $Y$  resemble each other”. Williamson’s primitive relation of comparative similarity  $T$  can thus be defined in terms of  $\text{WR}$  as follows:

**(DefT\*)**  $T(w, x, y, z) =_{df} \text{WR}(\lfloor w, x \rfloor, \lfloor y, z \rfloor)$

Then it is easy to see how to define the predicates (5.1a)-(5.1h) and (5.2a)-(5.2n). The strategy used will be the same as the strategy used to define the predicates (2.7)-(2.9). For simplicity I only give the definition of (5.1a), (5.1e), (5.2a), (5.2c), (5.2d), and (5.2f):

**(Def5)**  $x$  resembles  $y$  at least as much as  $Z$  resemble each other  $=_{df} \text{WR}(\lfloor x, y \rfloor, Z)$

**(Def6)**  $X$  resemble each other at least as much as  $y$  resembles  $z =_{df} \text{WR}(X, \lfloor y, z \rfloor)$

**(Def7)**  $w$  resembles  $X$  at least as much as  $y$  resembles  $Z =_{df} \text{WR}(\lfloor w, X \rfloor, \lfloor y, Z \rfloor)$

**(Def8)**  $W$  resemble  $X$  at least as much as  $Y$  resemble  $Z =_{df} \text{WR}(\lfloor W, X \rfloor, \lfloor Y, Z \rfloor)$

**(Def9)**  $W$  resemble  $X$  at least as much as  $y$  resembles  $z =_{df} \text{WR}(\lfloor W, X \rfloor, \lfloor y, z \rfloor)$

**(Def10)**  $W$  resemble  $X$  at least as much as  $Y$  resemble  $z =_{df} \text{WR}(\lfloor W, X \rfloor, \lfloor Y, z \rfloor)$

Such definitions are all valid provided we follow the conventions regarding the way the denotation of plural terms should be fixed that I introduced in section 1 of chapter 3. If we follow them, then we see that the proposed

plural logic for comparative resemblance which uses my primitive ‘WR’ can represent absolutely every comparative resemblance statement.

This ends the statement of the definitions of the main ordinary language resemblance predicates I focus on in this study.

### 5.3 Properties of resemblance and difference

Here I focus on the properties of the non-comparative resemblance and difference properties that were introduced in chapters 1 and 4.

#### 5.3.1 Properties of resemblance

##### 5.3.1.1 Reflexivity and transitivity for resemblance

Let ‘ $R_{SM}$ ’, ‘ $R_{WM}$ ’, ‘ $R_O$ ’, and ‘ $R_E$ ’ be respectively our predicates for strong minimal resemblance, weak minimal resemblance, overall resemblance, and exact resemblance. Reflexivity and transitivity are, first, properties of dyadic relations but we can make sense of the claim that resemblance properties have, or fail to have, these formal properties even if resemblance properties are monadic and multigrade. Anything resembles itself exactly. Therefore, exact resemblance is reflexive. Then since exact resemblance entails strong minimal resemblance<sup>5</sup>, and since strong minimal resemblance entails weak minimal resemblance<sup>6</sup>, strong minimal resemblance and weak minimal resemblance are reflexive. So we can assume the following:

$$(R1) \vdash \forall x R_{SM}[x, x]$$

$$(R2) \vdash \forall x R_{WM}[x, x]$$

$$(R3) \vdash \forall x R_E[x, x]$$

Overall resemblance, however, is non-reflexive. In other words, there may be a context wherein individuals do not resemble themselves saliently more than is typical. In these contexts, which are fairly extraordinary but not inconceivable, exact resemblance is the typical amount of resemblance. Since individuals exactly resemble themselves, individuals do not resemble themselves more than is typical if exact resemblance is the typical amount of resemblance. Thus, I shall maintain

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<sup>5</sup>See principle (R23) below.

<sup>6</sup>See principle (R17) below.

(R4)  $\not\vdash \forall x R_O[x, x]$ <sup>7</sup>

Transitivity for resemblance, in plural terms, is the following property: no matter what the *x*s, the *y*s, and the *z*s are, if the *x*s resemble the *y*s and the *y*s resemble the *z*s, then the *x*s resemble the *z*s. Exact resemblance is the only non-comparative property of resemblance that is transitive in this sense. For if the *x*s share all their elected properties with the *y*s, and the *y*s share all their elected properties with the *z*s, then the *x*s share all their elected properties with the *z*s. Therefore:

(R5)  $\not\vdash \forall X, Y, Z (R_{SM}[X, Y] \ \& \ R_{SM}[Y, Z] \rightarrow R_{SM}[X, Z])$

(R6)  $\not\vdash \forall X, Y, Z (R_{WM}[X, Y] \ \& \ R_{WM}[Y, Z] \rightarrow R_{WM}[X, Z])$

(R7)  $\not\vdash \forall X, Y, Z (R_O[X, Y] \ \& \ R_O[Y, Z] \rightarrow R_O[X, Z])$

(R8)  $\vdash \forall X, Y, Z (R_E[X, Y] \ \& \ R_E[Y, Z] \rightarrow R_E[X, Z])$

### 5.3.1.2 Distributivity of resemblance

I agree that (Rdistributivity) is to be maintained as a basic principle about resemblance. (Rdistributivity) seems to me valid for minimal resemblance and overall resemblance, but also for exact resemblance. I state formally the distributivity of the various properties of resemblance as follows (where *X* denotes collectively and where ‘*x, yAX*’ means that *x* is one of the *x*s and *y* is one of the *xs*):

(R9)  $\vdash \forall X (R_{SM}(X) \rightarrow \forall x, y (x, yAX \rightarrow R_{SM}[x, y]))$

(R10)  $\vdash \forall X (R_{WM}(X) \rightarrow \forall x, y (x, yAX \rightarrow R_{WM}[x, y]))$

(R11)  $\vdash \forall X (R_O(X) \rightarrow \forall x, y (x, yAX \rightarrow R_O[x, y]))$

(R12)  $\vdash \forall X (R_E(X) \rightarrow \forall x, y (x, yAX \rightarrow R_E[x, y]))$

<sup>7</sup>Notice that a consequence of (R3) and (R4) is that exact resemblance does not entail overall resemblance. Some may argue that if my account of overall resemblance yields the denial that exact resemblance entails overall resemblance, then my account of overall resemblance must be rejected, since it is counterintuitive. But this is a terminological issue, my objector meaning simply something different from what I do by the expression ‘overall resemblance’. What I mean by this phrase is a resemblance property we very often ascribe to individuals in everyday discourse, and that behaves itself just like tallness and richness properties do. Now suppose that everybody is three feet tall. Then there is no tall nor short person even if everyone is tall to the highest degree (for persons).

### 5.3.1.3 Non-cumulativity of resemblance

In chapter 2 I have shown that (Rcumulativity)<sup>8</sup> conflicts with (Nec)<sup>9</sup> without specifying how the resemblance predicate in both (Rcumulativity) and (Nec) is to be interpreted. My rejection of (Rcumulativity) is not due to the fact that resemblance in (Nec) and (Rcumulativity) were interpreted differently, however. But this does not show that every non-comparative resemblance property fails to be cumulative.

According to the analyses introduced in sections 3 and 4 of chapter 4, it is clear that (Nec) is valid no matter whether we interpret the resemblance predicate involved in its antecedent as minimal, overall, or exact. So whether a property of resemblance is cumulative or not depends on whether we can construct an imperfect community such that any two members of the community have this resemblance property but such that all the members of the community do not have this resemblance property.

We can obviously construct an imperfect community with strong minimal resemblance, since it is possible that every two members of a community share an elected property though there is no elected property shared by all of them. We can also construct an imperfect community with weak minimal resemblance. For it is possible that every two members of a community weakly minimally resemble each other though there is no respect in which all the members of the community (exactly or inexactly) resemble.<sup>10</sup> And we can construct an imperfect community with overall resemblance: it is possible that any two members of a community resemble each other saliently more than is typical while it is not the case that all of them resemble each other saliently more than is typical.<sup>11</sup>

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<sup>8</sup>Where (Rcumulativity) is the claim that if any  $x$  and  $y$  such that  $x$  and  $y$  are among the  $As$  (for arbitrary  $As$ ) resemble each other, the  $As$  resemble each other.

<sup>9</sup>Where (Nec) is the claim that if the  $As$  (for arbitrary  $As$ ) resemble each other, then the  $As$  resemble in some respect.

<sup>10</sup>Suppose (i) that  $a$  and  $b$  (imperfectly) resemble with respect to shape and in no other respect, (ii) that  $a$  and  $c$  (imperfectly) resemble with respect to colour and in no other respect, and (iii) that  $b$  and  $c$  (imperfectly) resemble in size and in no other respect; where each of these respects are similarity orderings of elected properties. Then  $a$ ,  $b$ , and  $c$  form such an imperfect community: any two of them are weakly minimally similar, but  $a$ ,  $b$ , and  $c$  are not.

<sup>11</sup>Suppose that resemblance in one respect is saliently more resemblance than is typical, *i.e.* that the standard for typicality is exact difference. Then any imperfect community

But we cannot construct an imperfect community for exact resemblance. If any two members of a community exactly resemble each other, all the members of the community exactly resemble each other. Exact resemblance is thus cumulative. We shall thus accept the following:

$$\text{(R13)} \not\vdash \forall X, x, y ((x, y)AX \rightarrow R_{SM}[x, y]) \rightarrow R_{SM}(X)$$

$$\text{(R14)} \not\vdash \forall X, x, y ((x, y)AX \rightarrow R_{WM}[x, y]) \rightarrow R_{WM}(X)$$

$$\text{(R15)} \not\vdash \forall X, x, y ((x, y)AX \rightarrow R_O[x, y]) \rightarrow R_O(X)$$

$$\text{(R16)} \vdash \forall X, x, y ((x, y)AX \rightarrow R_E[x, y]) \rightarrow R_E(X)$$

Some may suggest that if exact resemblance is both distributive and cumulative, then exact resemblance can be understood as a binary relation. You can represent exact resemblance as a binary relation, but still it is not a binary relation. For, as I said in chapter 4, exact resemblance is the dual of weak minimal difference. And we have a good reason to uphold that weak minimal difference is not a binary relation: weak minimal difference is not distributive (see below the non-distributivity of difference). If weak minimal difference is not a binary relation neither is its dual.

### 5.3.2 Relations between resemblance properties

First, there is the relationship between weak minimal resemblance and strong minimal resemblance. As emphasised in the previous chapter strong minimal resemblance entails weak minimal resemblance but not *vice versa*.

$$\text{(R17)} \vdash \forall X (R_{SM}(X) \rightarrow R_{WM}(X))$$

$$\text{(R18)} \not\vdash \forall X (R_{WM}(X) \rightarrow R_{SM}(X))$$

It is, of course, impossible for some things to resemble each other significantly more than is typical if there is no resemblance between them. Overall resemblance entails some kind of minimal resemblance, but it does not entail both. Suppose that two individuals resemble very closely but inexactly in every respect and that our standard for typicality is such that very close resemblance in every respect is saliently more resemblance than is typical.

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for weak minimal resemblance is an imperfect community for overall resemblance given this standard.

It follows that these two individuals resemble overall without being strongly minimally similar. Therefore, overall resemblance does not entail strong minimal resemblance, but entails weak minimal resemblance.

On the other hand, there can be a resemblance – be it strong or weak – between some individuals without it being the case that these individuals resemble each other saliently more than is typical. Thus we get:

$$(R19) \vdash \forall X (R_O(X) \rightarrow R_{WM}(X))$$

$$(R20) \not\vdash \forall X (R_O(X) \rightarrow R_{SM}(X))$$

$$(R21) \not\vdash \forall X (R_{WM}(X) \rightarrow R_O(X))$$

$$(R22) \not\vdash \forall X (R_{SM}(X) \rightarrow R_O(X))$$

Obviously, individuals cannot share all their elected properties without sharing some of them but can share some elected properties without sharing all of them. Thus we get:

$$(R23) \vdash \forall X (R_E(X) \rightarrow R_{SM}(X))$$

$$(R24) \not\vdash \forall X (R_{SM}(X) \rightarrow R_E(X))$$

And by (R17) we get:

$$(R25) \vdash \forall X (R_E(X) \rightarrow R_{WM}(X))$$

$$(R26) \not\vdash \forall X (R_{WM}(X) \rightarrow R_E(X))$$

As I outlined when discussing the reflexivity of overall resemblance, exact resemblance does not entail overall resemblance. It is clear also that overall resemblance does not entail exact resemblance. Thus:

$$(R27) \not\vdash \forall X (R_E(X) \rightarrow R_O(X))$$

$$(R28) \not\vdash \forall X (R_O(X) \rightarrow R_E(X))$$

### 5.3.3 Properties of difference

#### 5.3.3.1 Reflexivity and transitivity for difference

Let ‘ $D_{SM}$ ’, ‘ $D_{WM}$ ’, ‘ $D_O$ ’, and ‘ $D_E$ ’ respectively stand for our predicates of strong minimal difference, weak minimal difference, overall difference,

and exact difference. Every property of difference is irreflexive. This is so because anything is exactly similar to itself. So we can admit the following principles:

$$(D1) \vdash \forall x \neg D_{SM}[x, x]$$

$$(D2) \vdash \forall x \neg D_{WM}[x, x]$$

$$(D3) \vdash \forall x \neg D_O[x, x]$$

$$(D4) \vdash \forall x \neg D_E[x, x]$$

No property of difference is transitive. Thus:

$$(D5) \not\vdash \forall X, Y, Z (D_{SM}[X, Y] \ \& \ D_{SM}[Y, Z] \rightarrow D_{SM}[X, Z])$$

$$(D6) \not\vdash \forall X, Y, Z (D_{WM}[X, Y] \ \& \ D_{WM}[Y, Z] \rightarrow D_{WM}[X, Z])$$

$$(D7) \not\vdash \forall X, Y, Z (D_O[X, Y] \ \& \ D_O[Y, Z] \rightarrow D_O[X, Z])$$

$$(D8) \not\vdash \forall X, Y, Z (D_E[X, Y] \ \& \ D_E[Y, Z] \rightarrow D_E[X, Z])^{12}$$

### 5.3.3.2 The non-distributivity of difference

Is it the case that if some individuals differ minimally, then any two of them do? First, since difference is irreflexive, when stating the distributivity or non-distributivity of difference properties, we shall pay attention to consider whether or not difference distributes over every two *distinct* individuals and only over them.

Minimal difference is trivially distributive if we deny that numerically distinct entities can be exactly similar, *i.e.* if we maintain that numerical distinctness entails minimal difference. For no matter what  $a$ ,  $b$ , and  $c$  are, if  $a \neq b \neq c$  and  $a$ ,  $b$ , and  $c$  minimally differ from each other, then  $a$  and  $b$  differ from each other,  $a$  and  $c$  do, and  $b$  and  $c$  do.

Once we allow numerically distinct entities to fail to differ minimally, however, we can show that minimal difference fails to be distributive. Black's spheres<sup>13</sup> have been thought of as exhibiting a plausible case of numerically distinct entities that are exactly similar. Suppose (i) that Black's spheres

<sup>12</sup>In order to see that (D5)-(D8) should be admitted, it suffices to suppose each time that  $X = Z$ .

<sup>13</sup>Cf. (Black 1952).

differ only with respect to their location, (ii) that having the same location is a necessary condition for identity, and (iii) that the location of an individual is not an elected property of this individual. Then we get the desired result: they are numerically distinct, yet not minimally dissimilar, and thus exactly similar.

Now let us call Black's spheres '*a*' and '*b*'. It is clearly true that *a*, *b*, and The Eiffel Tower fail to resemble exactly. If so *a*, *b*, and The Eiffel Tower weakly minimally differ from each other. On the other hand, *a* and *b* fail to be weakly minimally dissimilar since they are exactly similar. Therefore, weak minimal resemblance is not distributive. It is also plausible that *a*, *b*, and The Eiffel Tower strongly minimally differ from each other – *i.e.* there is a respect in which The Eiffel Tower and *a*, *b* fail to resemble – even if *a* and *b* fail to strongly minimally differ from each other given that *a* and *b* are exactly similar.

I will admit that minimal difference is not distributive because I admit that numerically distinct entities can be truly judged exactly similar. That numerically distinct entities can be truly judged exactly similar actually derives from the anti-resemblist view introduced in chapter 7 and defended in chapter 8. Notice, however, that the claim that numerically distinct entities can be exactly similar is not equivalent to, and does not entail, that there are indiscernible though numerically distinct entities. In order to obtain the negation of the principle of identity of indiscernibles, some further assumptions about the nature of properties are required, and it shall also be specified whether indiscernibility is a matter of elected or abundant properties. If indiscernibility is a matter of abundant properties, then the identity of indiscernibles is trivially valid.<sup>14</sup>

Overall difference is not distributive either. One can reasonably maintain both that a painting of Picasso, a painting of Kandinsky, and a painting of Miro differ significantly more than is typical (in modern art) and that the painting of Kandinsky and the painting of Miro are significantly more similar than is typical (in modern art). Likewise, we can agree that John, Jim, and the empty set are exactly different – that John, Jim, and the empty set resemble in no common respect – but deny that John and Jim exactly differ.

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<sup>14</sup>For if *a* and *b* are numerically distinct, there necessarily is a set of which *a* is a member and of which *b* is not a member; namely  $\{a\}$ . Therefore, non-identity entails discernibility, if discernibility is a matter of abundant properties, and indiscernibility entails identity.

It thus seems that while every kind of non-comparative resemblance is distributive, no kind of difference is:

$$(D9) \not\vdash \forall X(D_{SM}(X) \rightarrow \forall x, y ((x, y)AX \ \& \ x \neq y) \rightarrow D_{SM}[x, y]))$$

$$(D10) \not\vdash \forall X(D_{WM}(X) \rightarrow \forall x, y ((x, y)AX \ \& \ x \neq y) \rightarrow D_{WM}[x, y]))$$

$$(D11) \not\vdash \forall X(D_O(X) \rightarrow \forall x, y ((x, y)AX \ \& \ x \neq y) \rightarrow D_O[x, y]))$$

$$(D12) \not\vdash \forall X(D_E(X) \rightarrow \forall x, y ((x, y)AX \ \& \ x \neq y) \rightarrow D_E[x, y]))^{15}$$

### 5.3.3.3 The cumulativity of difference

No matter how we interpret minimal difference, it is clear that if there is some difference between every two of  $a$ ,  $b$ , and  $c$ , then  $a$ ,  $b$ , and  $c$  cannot be exactly similar, and, therefore, there is a difference between  $a$ ,  $b$ , and  $c$ . The same holds for exact difference: if every two of some individuals are exactly dissimilar, then these individuals are exactly dissimilar.

Failures of the cumulativity of overall difference are, however, conceivable given standards for typicality in which a number of objects is specified. Suppose that our standard for typicality is a standard for typicality of resemblance for pairs of objects. And Suppose that, in a given context, every two individuals among  $a$ ,  $b$ , and  $c$  differ saliently more than is typical for pairs of objects of their kind. It does not make sense of course to say that  $a$ ,  $b$ , and  $c$  differ or not saliently more than is typical for pairs of objects of their kinds since  $a$ ,  $b$ , and  $c$  are three. So that in this context, when we move from the comparison of every two individuals among  $a$ ,  $b$ , and  $c$  to the comparison of  $a$ ,  $b$ , and  $c$ , we also move from a standard of typicality for pairs of objects to a standard for typicality for groups of three objects. This being stated, our assumption may be true, while it is false that  $a$ ,  $b$ , and  $c$  differ saliently more than is typical for groups of three objects of their kind.

Therefore, we should not commit ourselves to the cumulativity of overall difference. Hence:

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<sup>15</sup>It should be noticed that that difference properties are not distributive provides a further argument to the view that resemblance properties are not binary properties. For difference and resemblance properties must be of the same kind of properties. If difference properties do not distribute, then we cannot define collective ascriptions of difference in terms of pairwise ascriptions of difference alone which suggests that difference is not a binary property. If difference is not a binary property, then why should we admit that resemblance is?

$$(D13) \vdash \forall X, x, y ((x, y)AX \ \& \ x \neq y \rightarrow D_{WM}[x, y]) \rightarrow D_{WM}(X)$$

$$(D14) \vdash \forall X, x, y ((x, y)AX \ \& \ x \neq y \rightarrow D_{SM}[x, y]) \rightarrow D_{SM}(X)$$

$$(D15) \not\vdash \forall X, x, y ((x, y)AX \ \& \ x \neq y \rightarrow D_O[x, y]) \rightarrow D_O(X)$$

$$(D16) \vdash \forall X, x, y ((x, y)AX \ \& \ x \neq y \rightarrow D_E[x, y]) \rightarrow D_E(X)$$

### 5.3.4 Relations between difference properties

I admit the following principles about the properties of weak and strong minimal difference, overall difference, and exact difference.

$$(D17) \vdash \forall X (D_{SM}(X) \rightarrow D_{WM}(X))$$

$$(D18) \not\vdash \forall X (D_{WM}(X) \rightarrow D_{SM}(X))$$

$$(D19) \vdash \forall X (D_O(X) \rightarrow D_{WM}(X))$$

$$(D20) \not\vdash \forall X (D_O(X) \rightarrow D_{SM}(X))$$

$$(D21) \not\vdash \forall X (D_{SM}(X) \rightarrow D_O(X))$$

$$(D22) \not\vdash \forall X (D_{WM}(X) \rightarrow D_O(X))$$

$$(D23) \vdash \forall X (D_E(X) \rightarrow D_{SM}(X))$$

$$(D24) \not\vdash \forall X (D_{SM}(X) \rightarrow D_E(X))$$

$$(D25) \vdash \forall X (D_E(X) \rightarrow D_{WM}(X))$$

$$(D26) \not\vdash \forall X (D_{WM}(X) \rightarrow D_E(X))$$

$$(D27) \not\vdash \forall X (D_E(X) \rightarrow D_O(X))$$

$$(D28) \not\vdash \forall X (D_O(X) \rightarrow D_E(X))$$

Among these principles for difference, the controversial ones are (D20) and (D27).

(D20) somewhat contradicts the intuition. For suppose again that  $a$  and  $b$  share no property, but are such that they are closely similar in every respect. In this case they fail to strongly minimally differ from each other (though they weakly minimally differ from each other). I think that in this case, the intuition is that we should deny that  $a$  and  $b$  are dissimilar overall,

*i.e.* that they differ saliently more than is typical. And so, according to this intuition, if things do not strongly minimally differ, they do not differ overall; and thus if they differ overall, they strongly minimally differ. Yet there might be an extravagant standard for typicality such that imperfect match in at least one respect is sufficient for differing saliently more than is typical. That such extravagant contexts are conceivable is the reason why I endorse (D20). The reason why I accept (D27) is analogous.

### 5.3.5 Relations between resemblance and difference properties

There are interesting relationships between properties of resemblance and properties of difference to be outlined. First, the following principles say that weak minimal resemblance is the dual of exact difference and that weak minimal difference is the dual of exact resemblance:

$$\text{(RD1)} \vdash \forall X (\mathbf{R}_{WM}(X) \leftrightarrow \neg \mathbf{D}_E(X))$$

$$\text{(RD2)} \vdash \forall X (\mathbf{D}_{WM}(X) \leftrightarrow \neg \mathbf{R}_E(X))$$

From (R17), (R18) and (RD1), we obtain the following:

$$\text{(RD3)} \vdash \forall X (\mathbf{R}_{SM}(X) \rightarrow \neg \mathbf{D}_E(X))$$

$$\text{(RD4)} \not\vdash \forall X (\neg \mathbf{D}_E(X) \rightarrow \mathbf{R}_{SM}(X))$$

And from (D17), (D18) and (RD2), we get the following:

$$\text{(RD5)} \vdash \forall X (\mathbf{D}_{SM}(X) \rightarrow \neg \mathbf{R}_E(X))$$

$$\text{(RD6)} \not\vdash \forall X (\neg \mathbf{R}_E(X) \rightarrow \mathbf{D}_{SM}(X))$$

From (D26) and (RD1) it follows that weak minimally similarity and minimally difference are compatible, that is:

$$\text{(RD7)} \not\vdash \forall X (\mathbf{D}_{WM}(X) \rightarrow \neg \mathbf{R}_{WM}(X))$$

From (RD7), (RD1) and (RD2), the following follows:

$$\text{(RD8)} \vdash \forall X (\mathbf{R}_{WM}(X) \ \& \ \mathbf{D}_{WM}(X) \leftrightarrow \neg \mathbf{R}_E(X) \ \& \ \neg \mathbf{D}_E(X))$$

Hence, there are individuals that neither resemble exactly nor differ exactly, and these are the individuals that both weakly minimally resemble each other and weakly minimally differ from each other. The following are interesting principles about the relationship between exact and overall resemblance:

$$\text{(RD9)} \vdash \forall X (\mathbf{R}_E(X) \rightarrow \neg \mathbf{D}_O(X))$$

$$\text{(RD10)} \vdash \forall X (\mathbf{D}_E(X) \rightarrow \neg \mathbf{R}_O(X))$$

The validity of (RD9) and (RD10) is easily grasped. By (RD2) and double negation, if some things resemble exactly, they fail to differ minimally. Things that do not differ at all cannot conceivably differ significantly more than is typical. Likewise, things which differ exactly do not resemble at all and cannot resemble significantly more than is typical. The converses of (RD9) and (RD10) are, however, invalid. Here are other principles concerning overall resemblance:

$$\text{(RD11)} \vdash \forall X (\mathbf{R}_O(X) \rightarrow \neg \mathbf{D}_O(X))$$

$$\text{(RD12)} \vdash \forall X (\mathbf{D}_O(X) \rightarrow \neg \mathbf{R}_O(X))$$

$$\text{(RD13)} \not\vdash \forall X (\neg \mathbf{R}_O(X) \rightarrow \mathbf{D}_O(X))$$

$$\text{(RD14)} \not\vdash \forall X (\neg \mathbf{D}_O(X) \rightarrow \mathbf{D}_O(X))$$

When things are neither similar overall nor different overall, I say that they are *neutrally similar*. Let ‘ $\mathbf{R}_N$ ’ stand for our predicate of neutral resemblance, I state the following principles about it:

$$\text{(RD15)} \vdash \forall X (\neg \mathbf{R}_O(X) \ \& \ \neg \mathbf{D}_O(X) \leftrightarrow \mathbf{R}_N(X))$$

$$\text{(RD16)} \vdash \forall X (\mathbf{R}_E(X) \ \& \ \neg \mathbf{R}_O(X) \rightarrow \mathbf{R}_N(X))$$

$$\text{(RD17)} \vdash \forall X (\mathbf{D}_E(X) \ \& \ \neg \mathbf{D}_O(X) \rightarrow \mathbf{R}_N(X))$$

(RD15) is thought of as the definition of neutral resemblance. (RD16) and (RD17) are derived principles. The proof of (RD16) runs as follows: suppose that the  $A$ s are exactly similar but fail to resemble overall, which is permitted by (R27), and suppose that the  $A$ s fail to be neutrally similar. Then by (RD15) and classical logic, the  $A$ s differ overall. It follows by (RD9) that

the *As* do not resemble exactly which contradicts the hypothesis. Therefore, the *As* neutrally resemble each other. The proof of (RD17) is symmetrical and uses (D27) instead of (R27) and (RD10) instead of (RD9).

This ends the presentation of the main principles concerning non-comparative resemblance and difference. Further principles for non-comparative resemblance and difference which involve comparative relations of resemblance are introduced in the last section of the appendix. The latter principles and the principles introduced in the present section together constitute a logic for resemblance and difference from which a battery of further principles could be derived.



## Chapter 6

# The Context-Relativity of Resemblance Judgements

Suppose that Sam judges that hippos and baleen whales (for short, whales) resemble each other and Maria judges that they do not (where the meaning of ‘resemble’ is fixed). Intuitively, I believe, under certain conditions it is possible that neither Sam nor Maria has committed any fault. These conditions would include that Sam and Maria both believe what they say, and they believe so for *good reasons*. Now, let us imagine exactly such a case and consider the following two judgements (where  $C_1$  and  $C_2$  are contexts):

**(6.1)** Sam (in  $C_1$ ): “Hippos and whales resemble each other.”

**(6.2)** Maria (in  $C_2$ ): “Hippos and whales do not resemble each other.”

Now if we want to maintain (and *ex hypothesi* we do) that neither Sam nor Maria is at fault, we must conclude that the contexts  $C_1$  and  $C_2$  in which judgements (6.1) and (6.2) are made are relevantly dissimilar. Such faultless disagreements between judgements are often considered as being the characteristic of context-relative judgements (Kölber 2008). That there can be faultless disagreements in resemblance judgements is the mark of the context-relativity of our resemblance judgements, which is the topic of the present chapter.

The aim of the chapter is to provide the conditions under which a disagreement about resemblance would be faultless. Since faultless disagreements between resemblance judgements can only be due to differences in the contexts of assertion, if we can establish that there could be faultless

disagreements between resemblance judgements, the belief that resemblance judgements are context-sensitive is justified.

Here we must be careful with the terminology. In particular, we have to take seriously the distinction between the *propositional content* of an utterance as used in a context and the *assertion* the speaker makes by means of that utterance – the *judgement* she makes. Whether the propositional content of a resemblance judgement is context-relative is controversial and will be considered in the next chapter. Whether the truth value of the propositional content of a resemblance judgement is context-relative is even more controversial and will also be considered in chapter 7. However, that resemblance judgements, the assertion speakers make by means of utterances like (6.1) and (6.2), are context-relative seems to be uncontroversial<sup>1</sup> and it is the context-relativity of resemblance judgements that I consider here.

In the first section of the chapter I review the various manners in which our resemblance judgements can vary with the context. In the second section I account for the context-relativity of resemblance judgements in terms of relativity to a *representational perspective*. As I said above, faultless disagreements between judgements are often considered as the characteristic of context-relative judgements. In the final section of this chapter I provide the conditions under which a disagreement between resemblance judgements would be faultless.

## 6.1 Ways of varying

### 6.1.1 Contextually relevant properties

Suppose that Sam is a biologist working in cladistics. According to Sam, the closest relatives of cetaceans are hippopotamuses. Whales and hippos shared a common semi-aquatic ancestor that branched off from other artiodactyls around 60 million years ago. So he judges that these animals are similar on this basis. Suppose that Maria is an ethologist. What matters to her is the behaviour of animals and she judges that hippos and baleen whales do not resemble each other because they have fairly dissimilar behaviours: baleen whales are solitary, hippos are not; whales migrate, hippos do not; whales are carnivorous, hippos are herbivorous; etc. In Maria's context, closeness

<sup>1</sup>Cf. the introduction of chapter 7. There I quote philosophers who deny that resemblance is context-relative but agree that our resemblance judgements are.

in evolutionary ancestry is irrelevant to compare them. In Sam's context, the behaviour of animals is irrelevant to compare them. Therefore, it seems that one contextual feature that can make resemblance judgements vary is the relevance of properties of the compared individuals.

Importantly, Maria, in the context of her judgement, can agree that hippos and whales are close in evolutionary ancestry. But, for her, closeness in evolutionary ancestry does not make for a resemblance between animals. According to Inegalitarianism<sup>2</sup>, elected properties are the properties which matter for the resemblance of individuals. If so, that closeness in evolutionary ancestry does not make for a resemblance between animals in Maria's context means that closeness in evolutionary ancestry is not an elected property of animals in Maria's context. Therefore, it seems that, regarding our everyday resemblance judgements at least, what it is for a property to be elected is for it to be contextually relevant. Many things can make the relevance of properties vary.

Barsalou (1982) has provided experimental evidence that the relevance of properties varies depending on whether comparison classes are specified. For example, a snake and a racoon were judged much less similar when no explicit comparison class was given than when the comparison class of *pets* was provided. The general idea underlying Barsalou's experiments is that properties that would not have been judged relevant otherwise turn out contextually relevant once we specify a comparison class, and that, to the extent that the compared objects share some of these newly relevant properties, their resemblance is increased.

Linguistic contexts also seem to lead to variations in relevant properties in young children. Landau, Smith, and Jones (1988) report the following experiment: In the control context, the experimenter points to an object and says "See this? Can you find another one?" In the linguistic context, the experimenter says "See this wug? Can you find another wug?" Though children never heard about wugs before, the linguistic context is, relative to the control condition, associated with an increased tendency to make resemblance judgements in terms of shape rather than size or texture. Three-year-old children apparently know that in the context of a general term shapes are more likely to be the relevant properties than sizes or textures are.

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<sup>2</sup>Cf. chapter 1 and chapter 4.

Which properties are relevant also seem to vary depending on which thing is compared with which. For instance, when comparing  $b$  with  $a$ , some properties of  $b$  will appear relevant for the comparison which will then turn out irrelevant when comparing  $b$  with a third individual  $c$ .<sup>3</sup> Also, as was acknowledged when discussing the symmetry of resemblance, the relevant properties vary depending on which object in a comparison is the most familiar, the most salient one. Since  $w_1$  is the most familiar world in  $w_1$ , when comparing  $w_1$  with  $w_2$  in  $w_1$  we will take as relevant properties those which are salient from the perspective of  $w_1$ . But since  $w_2$  is the most familiar world in  $w_2$ , when comparing  $w_2$  with  $w_1$  in  $w_2$  we will take as relevant properties which are salient from the perspective of  $w_2$ .

The kind of variations in relevant properties philosophers have mainly focused on are variations relative to interests or goals. Consider the following example from Goodman:

Suppose we have three glasses, the first two filled with colorless liquid, the third with a bright red liquid. I might be likely to say the first two are more like each other than either is like the third. But it happens that the first glass is filled with water and the third with water coloured by a drop of vegetable dye, while the second is filled with hydrochloric acid – and I am thirsty.  
(Goodman 1970, 445)

To make Goodman's point more salient, Barry Taylor (2004, 248) invites us to consider two situations in which goals appear to influence the relevance of properties: (i) suppose  $S$  is an artist and that her particular goal is to find glasses to be placed in an installation under construction. Then the relevant properties, for  $S$ , would be colours, and she probably would judge the first glass similar to the second but not to the third (where similarity is to be interpreted as overall here). (ii) Suppose that  $S$  is thirsty and thus that her main goal when considering the three glasses is to quench her thirst. Then in such a case,  $S$  will take as relevant the property of quenching thirst and judge the first glass similar to the third provided she is informed about the content of the glasses.

Or consider Grandma's judgement of resemblance I talked about in chapter 1. Suppose that after she judged that my child and I resemble each other,

<sup>3</sup>See the extended report of experiments exhibiting this kind of variation in Medin, Goldstone and Gentner (1993).

I ask her “In which respect?” And suppose Grandma says “You are both human beings.” Typically, in this context, I would think that Grandma is out of her mind if she thinks that being a human being is relevant to compare my child with me and if she thinks that resembling in this respect justifies her resemblance judgement.

Yet suppose that we have been invaded by human-shaped aliens, that Grandma and I are aware of the invasion and that I suspect my wife to be a human-shaped alien. In such circumstances, it is fairly relevant to compare human-shaped individuals regarding whether they are genuine human beings or not. For it appears to be a significant information that my child and I are both human beings.

Therefore, which properties are relevant to judge that individuals resemble constitutes one way in which resemblance judgements are context-relative and many things can make resemblance judgements context-sensitive in this way. According to the accounts of the various resemblance properties offered in chapter 4 and if elected properties are conceived of as relevant properties in the context of a resemblance judgement, it appears that this kind of variations in relevant properties can induce variations in judgements of minimal, overall, as well as exact resemblance and difference.

### 6.1.2 Relative weight of respects

The context-relative feature I consider in this section has been mainly emphasised by David Lewis when discussing his resemblance-based account of the semantics for counterfactuals. It is the variation in importance attached to the various relevant resemblance and difference respects:

It is the same sort of indeterminacy that arises if I say that Seattle resembles San Francisco more closely than it resembles Los Angeles. Does it? That depends on whether we attach more importance to the surrounding landscape, the architecture, the dominant industries, the political temper, the state of the arts, the climate, the public transportation system, the form of the city government, or what. Possible worlds are bigger than cities (sometimes), and are capable of differing in a greater variety of respects. (Lewis 1973, 92)

The surrounding landscape of cities, their architectures, their dominant industries, etc. may all be relevant properties of cities when we are comparing them. But still depending on our interests we can attach more importance to the architecture of cities than to their dominant industries. And thus we may attach more importance to the architecture respect, the similarity ordering between architectures, than to the dominant industries respect, the similarity ordering between dominant industries. To the extent that importance attached to this or that respect of resemblance varies, the comparative resemblance of Seattle to San Francisco and Los Angeles varies relatively.

The respective weight of relevant resemblance respects is not arbitrary but is somehow fixed by the task which is to be performed when comparing objects. When discussing the Future Similarity Objection in (Lewis 1986a), Lewis explains how the importance of respects of resemblance between worlds should be fixed when evaluating the counterfactual “If Nixon had pressed the button there would have been a nuclear holocaust.” The system of weights Lewis has in mind in this context is the following:

1. It is of first importance to avoid big, widespread, diverse violations of law.
2. It is of the second importance to maximize the spatio-temporal region throughout which perfect match of particular fact prevails.
3. It is of the third importance to avoid even small, localized, simple violations of law.
4. It is of little or no importance to secure approximate similarity of particular fact, even in matters that concern us greatly. (Lewis 1986a, 47-8)

However, the system of weights can be different in the context of evaluation of other counterfactuals as Lewis insists in the *Postscripts to* (Lewis 1986a).

Notice that here I have talked about the relative importance attached to relevant resemblance respects rather than to relevant properties. Relevant properties may also be ordered relative to their importance. Plausibly, the importance attached to relevant properties and relevant resemblance respects covary. That is, if a resemblance respect  $r_1$  is, in some context, judged more important than a resemblance respect  $r_2$ , then the properties

ordered on  $r_1$  are, in this context, judged more important than the properties ordered on  $r_2$ , and *vice versa*.

### 6.1.3 The resemblance of properties

According to the analysis provided in the third section of chapter 4, strong minimal resemblance of individuals is a matter of shared elected properties and so is exact resemblance of individuals. But inexact resemblance of elected properties is a sufficient ground for ascribing weak minimal resemblance to individuals and can be a sufficient ground for ascribing overall resemblance to individuals. Is the resemblance of properties fixed or variable in our resemblance judgements? Whether we judge some properties similar or not also seems to vary with context.

Consider  $a$ , which is a carmine red book, and  $b$ , which is an orange book, and assume that colours are, in the present context, elected properties. Suppose that  $a$  and  $b$  stand both in a library where every other book is blue. Entering into the library the resemblance in colour of  $a$  and  $b$  will immediately strike us. But suppose now that  $a$  and  $b$  stand in a library where every other book is a red book. Entering into the library, we will rather immediately observe how much  $b$  is distinct in colour from any other book,  $a$  being one of these other books. In this context, we will agree that  $a$  and  $b$  are dissimilar in colour respect, that they have dissimilar colours, given the assumed comparison class.<sup>4</sup>

Or consider Tom who is six months old and Tim who is eight months old. Given the average length of human life, it seems correct to judge that their respective ages resemble, and thus that Tom and Tim resemble in age. But suppose that Tom and Tim are members of a population whose average length of life is one year. In this case, we would certainly judge that a difference of two months is a huge difference in age.

If we pay attention to these examples, it seems that judgements of resemblance between properties are judgements of overall resemblance between properties. Whether we judge that the colour of the two books  $a$  and  $b$  re-

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<sup>4</sup>One interesting feature of this example is that the perception of similarities seems no more immune to context-sensitivity than our resemblance judgements are. Depending on the environment of the compared objects, and thus of our comparison class, our perception of resemblances varies. See the remarkable work of the Gestaltist Erich Goldmeier (1972) for a study of perceived similarity of forms. Goldmeier shows in a very clear way how groupings in context affect our perception of similarities of shape.

semble each other depends on a standard which is here a class of comparison; if the class of comparison is that of the books which compose the first library, then the colours of *a* and *b* are judged similar to each other; if the class of comparison is that of the books which compose the second library, then the colours of *a* and *b* are judged dissimilar to each other. Likewise, whether Tom and Tim have resembling ages depends on a class of comparison, namely the species they belong to. It also seems that the reason why the colours of books *a* and *b* immediately strike us as similar in the first situation is that their resemblance is saliently greater than is typical relative to the relevant comparison class. What is true here about colours of books also seems true about the ages of Tom and Tim. So judgements of non-comparative resemblance between properties can vary with shifts of context.

Judgements of comparative similarity of properties are not immune of context-sensitivity either. For instance, one may be justified, in some context, in judging that primary colours resemble each other more than each of them resembles any composed colour. For given our purposes we may emphasise features of primary colours which make them significantly similar. In this case red should be judged more similar to blue than to orange. On the other hand, if we focus on physical properties of colours, we would probably judge that the similarity ordering between colours matches the ordering of colours on the colour spectrum. However, if we focus on perception, we would judge violet more similar to red than to yellow, while violet is closer to yellow on the colour spectrum than it is to red. There are different ways to order colours relative to their closeness, and which closeness ordering between colours is the (relevant) similarity ordering between colours appears to be a matter of context.

Or consider the architecture of towns. Architectures of towns are relatively complex properties which can resemble and differ from each other in different respects. Architectures of towns may resemble with respect to the epoch at which the salient buildings have been built, with respect to the materials used, with respect to previous styles which influenced the architects, with respect to the purpose of the salient buildings, with respect to how the architecture is integrated in the surrounding landscape, etc. Given the complexity of architectures, and provided that our comparative judgements of resemblance, as Lewis emphasised, may vary depending on the importance

attached to such and such respects, it is not difficult to imagine that our judgements about whether the architecture of San Francisco resembles that of Seattle more than it resembles that of Los Angeles can vary depending on the context. Depending on whether we attach more importance to materials used or to the influence of previous styles, our agreement with the latter judgement of comparative resemblance between properties of towns could vary.

The first conclusion we should draw from the discussion of resemblance judgements between properties is that the resemblance predicate they involve seems to be an overall resemblance predicate; *i.e.* to judge some properties similar is to judge that they resemble each other saliently more than is typical (given some standard). If so, judgements of non-comparative resemblance between properties are intrinsically context-relative as they involve a reference to a standard. Second, judgements of comparative resemblance of properties also may vary depending on our interests, *i.e.* depending on which closeness ordering is relevant to be identified with the resemblance ordering and depending on the relative importance of the various features of properties under comparison.

#### 6.1.4 Variations in computation

When making judgements of comparative or non-comparative overall resemblance, we compute relevant properties of the compared individuals to evaluate whether they resemble each other more than other things do. There is no evaluation of comparative resemblance and no measure of degrees of resemblance without such a computation. And the way we compute relevant properties to get a comparative evaluation of resemblance or a measure of resemblance is also context-relative. More precisely, it seems that the way we compute relevant properties may vary depending on the cognitive task that is to be performed. When philosophers provide an account of how different relevant properties are computed to obtain a measure of resemblance, they usually assume that the computation is additive; that is, that we add features of resemblance, and sometimes that we subtract features of dissimilarity to obtain a measure of resemblance.<sup>5</sup> But researchers in cognitive sciences have provided evidence that in categorisation processes matching

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<sup>5</sup>See e.g. (Goodman 1970, 443), (Rodriguez-Pereyra 2002, 65-69), (Taylor 2004, 247) and (Buras 2006).

and mismatching relevant properties are combined multiplicatively rather than additively (Medin and Schaffer (1978); Nosofsky (1992)).

In chapter 4 I argued that respects of resemblance are similarity orderings and I proposed to identify these similarity orderings with Gärdenfors's *conceptual spaces* (2000). Now it is important to notice that Gärdenfors does not assume any determinate way of computing respects of comparison when constructing his similarity orderings. The reason for this indeterminacy is clear from the following:

A fundamental question about similarity that is often neglected is: what *kind* of quantity is similarity?<sup>6</sup> Among the few who address the question, one can distinguish three major positions:

1. *Realism*: Similarity is something that exists objectively in the world, independently of any perceptual or other cognitive processes.
2. *Conceptualism, empirical entity*: Similarity is a cognitive magnitude that can be measured directly in subjects. This can be done, for example, by asking them “to rate the similarity or dissimilarity of stimuli on some scale or to judge which set of alternatives is more similar to some standard stimulus” (Medin et al. 1993, 255).
3. *Conceptualism, theoretical entity*: Similarity is a cognitive magnitude that is used as a theoretical entity in *models* of categorisation, concept formation, and so forth. If we follow Sneed's (1971) analysis of theoretical entities, similarity cannot be measured directly, but only determined *by applying* a theoretical model.

[...] The position adopted here is that similarity is best understood as a theoretical entity used in cognitive models. According to position 3, any measurement of similarity, direct or indirect, will be based on some assumptions concerning the properties of

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<sup>6</sup>The traditional view that similarity and dissimilarity are quantities has been convincingly advocated by Meinong (1896). See (Guigon 2005) on Meinong's account of such quantities and the influence of his account on Russell's theory of magnitudes and measurement.

a similarity relation. Such assumptions come from a more or less explicit theoretical model. (Gärdenfors 2000, 110)

Hence, it makes no sense for Gärdenfors to ask which measure of similarity is *the right one* independently of a theoretical model, and which theoretical model is to be used depends on which theoretical application of similarity we are interested in.

Even if we focus on additive computations of relevant properties, there might be variations in ways of computing the elected properties. For instance, in (Rodriguez-Pereyra 2002, 65) and (Buras 2006) we find a computation where only matching elected properties count to measure degrees of resemblance. Rodriguez-Pereyra's account of degrees of resemblance is as follows:

(D)  $x$  and  $y$  resemble each other to degree  $n$  if and only if they share  $n$  [sparse] properties. (Rodriguez-Pereyra 2002, 65)

But in (Hansson 1992, 406-7), for instance, we find three different ways of measuring degrees of resemblance. Let ' $\alpha$ ' be the set of elected properties of  $a$  and ' $\beta$ ' the set of elected properties of  $b$ . Then the first measure of resemblance, called *concurrence* by Hansson, is simply defined as the intersection of sets  $\alpha$  and  $\beta$ ; *i.e.*  $\alpha \cap \beta$ . The second measure of degrees of resemblance, called the *symmetrical difference* of  $\alpha$  and  $\beta$ , is defined thus:  $\alpha \Delta \beta = (\alpha \setminus \beta) \cup (\beta \setminus \alpha)$ .<sup>7</sup> Finally, the *dyadic difference* between  $\alpha$  and  $\beta$  is defined thus:  $\alpha \pm \beta = \{\alpha \setminus \beta, \beta \setminus \alpha\}$ . The latter measures are more properly called measures of difference than measures of resemblance for they firstly take into account the mismatching properties. Yet resemblance may in some contexts be a function of difference. For instance, it may be legitimate to judge that the smaller the symmetrical difference of some things is, the greater their resemblance is.<sup>8</sup>

Rodriguez-Pereyra's as well as Hansson's computations for degrees of resemblance only take into account exactly matching and mismatching (elected) properties. But inexact resemblance of relevant properties can play a role in our everyday resemblance judgements. As a non-biologist, I am firstly

<sup>7</sup>Where the set  $\alpha \setminus \beta$  is the set of elected properties of  $a$  which contains all and only elected properties of  $a$  that are not elected properties of  $b$ .

<sup>8</sup>Hansson (1992) argues that symmetrical difference is the computation which is the best-suited to account for minimal changes of belief.

focusing on shapes when I compare animals. So I may judge that hippos resemble pigs more than they resemble whales on the grounds that hippos and pigs seem to me more similar in shape than hippos and whales are. But hippos and pigs do not have the same shape. An instance of a measure of resemblance which takes into account comparative resemblance of properties has been proposed by Williamson:

We decide that  $w$  overall-resembles  $x$  (at least) as much as  $y$  overall-resembles  $z$  iff there are at least as many of the three respects in which  $w$  resembles  $x$  more than  $y$  resembles  $z$  as there are in which  $y$  resembles  $z$  more than  $w$  resembles  $x$ . (Williamson 1988, 463)

Such a computation of resemblance respects, however, generates failures of the transitivity of comparative resemblance.<sup>9</sup>

Therefore, there are many available computations of relevant properties giving rise to different measures of degrees of resemblance. As far as I can see it is difficult to argue that one of them has a privileged status over the others. Depending on the task we have to perform, depending on our interests, and depending on the nature of the objects under comparison, it is very probable that the computation of relevant properties we use to measure the resemblance of individuals varies.

## 6.2 Representational perspectives

In the previous section I indicated various ways in which our resemblance judgements can vary with the context. The examination of these ways of varying yield the conclusion that the way we judge about the resemblance of individuals and properties depend on our representation of the individuals under comparison and of their surrounding. In some sense, it is trivial to

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<sup>9</sup>“Suppose that in respect 1,  $u$  resembles  $v$  more than  $w$  resembles  $x$  and  $w$  resembles  $x$  more than  $y$  resembles  $z$ ; in respect 2,  $w$  resembles  $x$  more than  $y$  resembles  $z$  and  $y$  resembles  $z$  more than  $u$  resembles  $v$ ; in respect 3,  $y$  resembles  $z$  more than  $u$  resembles  $v$  and  $u$  resembles  $v$  more than  $w$  resembles  $x$ . Then, by our criterion,  $u$  overall-resembles  $v$  as much as  $w$  overall-resembles  $x$  (respects 1 and 3 vs. respect 2) and  $w$  overall-resembles  $x$  as much as  $y$  overall-resembles  $z$  (respects 1 and 2 vs. respect 3), but  $u$  does not overall-resemble  $v$  as much as  $y$  overall-resembles  $z$  (respect 1 vs. respects 2 and 3).” (Williamson 1988, 463). In the appendix, I indicate a situation wherein Williamson’s computation seems correctly used.

claim that judgements, whatever they are about, depend on representation. Since judgements depend on what we mean by the words involved in the judgement and since meanings, or concepts, are representational entities.

But resemblance judgements depend on representation not (only) in this trivial sense. For even if we assume that the meaning of the words involved in a resemblance judgement is fixed upon contexts, the way we judge about the resemblance of individuals can still vary depending on our representation of mind-independent reality. For instance, we can assume that Sam and Maria mean the same thing by the words which compose the judgement “hippos and whales resemble each other” when the former utters this judgement and the latter utters its negation. Nonetheless, Sam’s representation of hippos and whales is different from Maria’s representation of these animals in that Sam’s representation of hippos and whales makes their having a common ancestor relevant, whereas Maria’s representation of hippos and whales makes their having a common ancestor irrelevant.

Let me use the phrase ‘*representational perspective*’ to refer to this specific complex cognitive state in which subjects stand when comparing individuals relative to their resemblance and which makes their resemblance judgements vary with contexts. The representational perspective comprises all and only these features which can make resemblance judgements vary in the various ways emphasised in the previous section and in any other conceivable way.

An important element of our representational perspective that has not been mentioned yet but which is emphasised in the literature is that evolution has had an important impact on the way we judge about the resemblance of objects.<sup>10</sup> Resemblance judgements reveal themselves as extremely important in the struggle for life. The survival of a population depends on its capacity to make valuable resemblance judgements between predators in the environment, and evolution selected those cognitive processes which allow us to draw these patterns of resemblance in our environment which are valuable for our survival.

Our representational perspective thus comprises our innate dispositions to draw some patterns of similarity instead of others in our surrounding which result from evolutionary processes. ‘Dispositions’ should not be taken

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<sup>10</sup>See e.g. (Quine 1969), but also (Medin et al. 1993, 258): “Presumably, people’s perceptual and conceptual spaces have evolved such that information that matters to humans needs and goals can be roughly approximated by a similarity heuristics.”

with too much ontological seriousness here. What I call an innate disposition here is a bodily – genetically? – implemented memory of those inductions that proved successful and those that proved not successful in the struggle for life of our biological ancestors. This implemented memory might be what Quine calls our *innate norm of similarity*, and these innate norms of similarity, or innate similarity orderings, are certainly what Gärdenfors's conceptual spaces are intended to represent (Gärdenfors 2000). Describing this implemented memory in more detail, which is a matter of cognitive sciences rather than metaphysics, exceeds my competence, and the reader should rely on Gärdenfors's book for precise references. These innate dispositions to draw patterns of resemblance seem to constitute the basic element of a representational perspective, but other elements do complement the representational perspective given the context-relative features that have been outlined in the previous section.

As many authors have emphasised part of what makes judgements of resemblance context-sensitive are the goals (Taylor 2004, 247-9), interests (Goodman 1970), or purposes (McClure 1964) of agents. The purposes or interests of an agent will also be part of his representational perspective when the ascription of resemblance to be performed has to do with the achievement of some goal or some specific interests of the agent. Of course, it may happen that resemblance judgements are performed in the absence of any explicit goal to be achieved. When hiking in Berner Oberland I may judge two flowers particularly similar to each other without having any particular interest in flowers. Evolutionary processes here explain why I could judge so about flowers: judging about the resemblance of flowers presumably had some non-negligible importance in the struggle for life of some of my ancestors.

Finally, several other features can be part of the representational perspective of an agent depending on the situation and the cognitive task to be performed: a selection of relevant comparison classes attached to the individuals under comparison, the availability or lack of availability of general terms applying to these individuals, the relative familiarity of the agent with these individuals, and the relative salience of regions surrounding the individuals under representation. The list can and should perhaps be extended with reference to further cognitive processes.

The nature of representational perspectives and, more generally, of complex cognitive states may be worrying. McClure (1964) conceives of purposes relative to which ascriptions of resemblance and properties vary on his account as *universals*. But contemporary advocates of universals such as Armstrong who conceive of universals as sparse would certainly be reluctant to think of complex entities like representational perspectives as universals.

Yet I see no reason to deny that distinct agents can occupy the same representational perspective on distinct occasions, and thus I agree that representational perspectives are repeatable in some loose sense. For agents can share the same dispositions to draw patterns of similarity, the same goals and interests, etc. I do not think that this means that representational perspectives must be universals implemented in agents, however. For abundant properties, conceived of as sets of individuals, are also repeatable in this loose sense. An abundant property can, and usually does, have many instances: distinct individuals can ‘share’, in this loose sense, an abundant property by being co-members of the set to which the property is identical. Thus, I will conceive of representational perspectives occupied by subjects as abundant properties of subjects.

Therefore, I interpret the claim that our resemblance judgements are relative to contexts as the claim that they are relative to the representational perspective of agents when comparing objects relative to their resemblance or difference. In other words, what it means for a resemblance judgement to be context-relative is for it to be relative to a representational perspective. And if subjects disagree regarding a resemblance statement without committing any fault, then this is so because the representational perspectives they occupy are different. But what are the conditions for subjects to disagree with regards to their resemblance judgements without committing any fault? This is the topic of the next section.

### 6.3 Faultless disagreements between resemblance judgements

In the present section, my aim is to account for what is in need for subjects to disagree with regards to their resemblance judgements without being at fault. For I said in the introduction of this chapter that the possibility of faultless disagreements between judgements is the characteristic of context-

relative judgements. Hence, if I can account for the conditions under which a disagreement between resemblance judgements is faultless, I can clarify what we mean by the context-relativity of resemblance judgements. And if there can be such faultless disagreements, it is doubtless that resemblance judgements are context-relative.

My account of the conditions under which a disagreement between resemblance judgements can be faultless is inspired by Barry Taylor's conditions for being *stably warranted* in making a similarity judgement (Taylor 2004, 247-9).<sup>11</sup> I will first provide conditions for being warranted in making a resemblance judgement on the basis of Taylor's account. Since, as I will argue, subjects can be warranted in their resemblance judgements and disagree by committing a fault, I will strengthen the warrant conditions in such a way that if they still disagree, their disagreement can only be due to a difference in the representational perspectives they are occupying. The strengthened warrant conditions are what I call, following Taylor, conditions for being stably warranted in making a resemblance judgement.

### 6.3.1 Warrant conditions for resemblance judgements

Resemblance judgements are context-relative, and I interpret the context-relativity of resemblance judgements in terms of relativity to a representational perspective. When we judge that so and so about the resemblance of objects, we do so relative to a representational perspective we are occupying. However, the representational perspective occupied by subjects when comparing individuals is not sufficient to yield a resemblance judgement between individuals. For instance, one's representational perspective determines, among other things, which properties are relevant to ascribe resemblance to individuals (e.g. given what our purposes are). However, that such and such properties are relevant to ascribe resemblance to individuals can be the basis of no resemblance judgement unless one believes that the individuals under comparison have or fail to have some of these relevant properties. Therefore, it is on the basis of our representational perspective and beliefs together that we judge about the resemblance of individuals.

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<sup>11</sup>Taylor only provides stable warrant conditions for judgements of overall resemblance and my stable warrant conditions for judgements of overall resemblance are different from his.

That we judge about the resemblance of objects on the basis of such beliefs is illustrated by Taylor's example of the three glasses (2004, 247) that I reproduced in section 6.1.1. Consider situation (ii) where  $S$  is thirsty. In this situation,  $S$  judges relative to her goals that the first and third glasses resemble each other more than either resembles the second glass, where the first and third glasses contain water and the second contains hydrochloric acid.  $S$  wouldn't have judged so if she hadn't *believed* that hydrochloric acid is not the adequate substance to quench her thirst, whereas water is. If so, among the beliefs on the basis of which  $S$  utters her resemblance judgement, there is the belief that hydrochloric acid is not the appropriate substance to quench thirst, while water is.

Warrant conditions for judgements of strong minimal resemblance, weak minimal difference, and exact resemblance can thus be stated as follows (where  $p_r$  is the representational perspective occupied by the relevant subject and  $\mathbf{B}$  is the set of beliefs on the basis of which the subject makes her judgement, no matter what these beliefs are):<sup>12</sup>

**(Warrant  $\mathbf{R}_{SM}$ )** A subject  $S$  is warranted in judging the  $As$  strongly minimally similar (relative to  $p_r$  and beliefs  $\mathbf{B}$ ) iff  $S$  is warranted in judging, on the basis of beliefs  $\mathbf{B}$ , that at least one  $p_r$ -relevant property of the  $As$  is had by each of them.

**(Warrant  $\mathbf{D}_{WM}$ )** A subject  $S$  is warranted in judging the  $As$  weakly minimally dissimilar (relative to  $p_r$  and beliefs  $\mathbf{B}$ ) iff  $S$  is warranted in judging, on the basis of beliefs  $\mathbf{B}$ , that there is a  $p_r$ -relevant property  $\mathbf{P}$  such that at least one of the  $As$  has  $\mathbf{P}$  and at least one of the  $As$  lacks  $\mathbf{P}$ .

**(Warrant  $\mathbf{R}_E$ )** A subject  $S$  is warranted in judging that the  $As$  exactly resemble each other (relative to  $p_r$  and beliefs  $\mathbf{B}$ ) iff  $S$  is warranted in judging, on the basis of beliefs  $\mathbf{B}$ , that every  $p_r$ -relevant property of the  $As$  is had by all of them.

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<sup>12</sup>Collective denotation is assumed in the following warrant conditions. It is not difficult to modify these accounts accordingly when plural terms denote otherwise. For instance, whenever 'the  $As$ ' denotes<sub>d</sub> any two individuals among the  $As$ , then a subject  $S$  is warranted in judging the  $As$  strongly minimally similar (relative to  $p_r$  and beliefs  $\mathbf{B}$ ) iff  $S$  is warranted in judging, on the basis of beliefs  $\mathbf{B}$ , that every two  $As$  are such that there is at least one  $p_r$ -elected property which is had by both of them.

In order to account for the warrant conditions for judgements of weak minimal resemblance, strong minimal difference and exact difference, we need to account for what warrants resemblance judgements between properties.

As I emphasised in the section dedicated to judgements of resemblance between properties, to judge that some properties resemble each other is to judge that they resemble overall; that is, that they resemble each other saliently more than is typical relative to the relevant standard. What makes a standard relevant or not is, of course, the representational perspective of agents. Certain criteria should also enter the picture to determine whether some properties resemble more than some other properties do, given the nature of overall resemblance. In other words, there must be some criteria to determine the comparative resemblance of properties. These criteria may be perceptual, or more complex, but are certainly determined by the representational perspective of agents. Thus, the following provides the warrant conditions for resemblance judgements between relevant properties (where the  $p_r$ -relevant standard is this standard among the set of standards of  $p_r$  which is relevant given the compared individuals and the goals or interests of the subject):

**(Warrant P.R.)** A subject  $S$  is warranted in judging that properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  are  $p_r$ -relevant properties which resemble each other (relative to  $p_r$  and beliefs  $\mathbf{B}$ ) iff  $S$  is warranted in judging, on the basis of beliefs  $\mathbf{B}$ , that  $\mathbf{P}_1, \dots, \mathbf{P}_n$  are  $p_r$ -relevant and that the resemblance of  $\mathbf{P}_1, \dots, \mathbf{P}_n$  saliently exceeds (relative to  $p_r$  and  $\mathbf{B}$ ) the  $p_r$ -relevant standard.

The warrant conditions for judgements of weak minimal resemblance, strong minimal resemblance, and exact difference can then be stated as follows:

**(Warrant  $\mathbf{R}_{WM}$ )** A subject  $S$  is warranted in judging the  $As$  weakly minimally similar (relative to  $p_r$  and beliefs  $\mathbf{B}$ ) iff  $S$  is warranted in judging, on the basis of beliefs  $\mathbf{B}$ , either (i) that there is at least one  $p_r$ -relevant property had by each of the  $As$ , or (ii) that there is a series of  $p_r$ -relevant properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that each of the  $As$  has one of them and such that the resemblance of  $\mathbf{P}_1, \dots, \mathbf{P}_n$  saliently exceeds (relative to  $p_r$  and  $\mathbf{B}$ ) the  $p_r$ -relevant standard.

**(Warrant  $\mathbf{D}_{SM}$ )** A subject  $S$  is warranted in judging that the  $As$  are strongly minimally different from each other (relative to  $p_r$  and be-

liefs  $\mathbf{B}$ ) iff  $S$  is warranted in judging, on the basis of beliefs  $\mathbf{B}$ , that there is a series of  $p_r$ -relevant properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that (i) each of the  $As$  has exactly one of  $\mathbf{P}_1, \dots, \mathbf{P}_n$ , (ii)  $\mathbf{P}_1, \dots, \mathbf{P}_n$  are all ordered on a same  $p_r$ -relevant similarity ordering, and such that (iii) some properties among  $\mathbf{P}_1, \dots, \mathbf{P}_n$  are such that their resemblance does not saliently exceed (relative to  $p_r$  and  $\mathbf{B}$ ) the  $p_r$ -relevant standard.

**(Warrant  $\mathbf{D}_E$ )** A subject  $S$  is warranted in judging that the  $As$  exactly differ from each other (relative to  $p_r$  and beliefs  $\mathbf{B}$ ) iff  $S$  is warranted in judging, on the basis of beliefs  $\mathbf{B}$ , that there is no series of  $p_r$ -relevant properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that each of the  $As$  has one of them and such that the resemblance of  $\mathbf{P}_1, \dots, \mathbf{P}_n$  saliently exceeds (relative to  $p_r$  and  $\mathbf{B}$ ) the  $p_r$ -relevant standard.<sup>13</sup>

Finally, concerning judgements of overall resemblance and difference of individuals, subjects must also be warranted relative to the importance of the  $p_r$ -relevant properties and relative to the computation used. Let the *resembling weight* of individuals be the resulting value that derives from the  $p_r$ -relevant additive or multiplicative computation of the comparatively more or less important  $p_r$ -relevant respects in which individuals are compared. Depending on what our representational perspective is the  $p_r$ -relevant respects that enter the computation can be either resemblance respects (respects in which the compared individuals resemble), difference respects (respects in which they differ), or both. Plausibly, the resembling weight of individuals is also evaluated relative to a set of beliefs. Then:

**(Warrant  $\mathbf{R}_O$ )** A subject  $S$  is warranted in judging that the  $As$  resemble overall (relative to  $p_r$  and beliefs  $\mathbf{B}$ ) iff  $S$  is warranted in judging, on the basis of beliefs  $\mathbf{B}$ , that the resembling weight of the  $As$  (relative to  $p_r$  and  $\mathbf{B}$ ) saliently exceeds (relative to  $p_r$  and  $\mathbf{B}$ ) the  $p_r$ -relevant standard.

**(Warrant  $\mathbf{D}_O$ )** A subject  $S$  is warranted in judging that the  $As$  differ overall (relative to  $p_r$  and beliefs  $\mathbf{B}$ ) iff  $S$  is warranted in judging, on the basis of beliefs  $\mathbf{B}$ , that the resembling weight of the  $As$  (relative to  $p_r$

<sup>13</sup>Assuming that identical properties resemble each other, there is no need here for specifying that the  $As$  must also fail to share any  $p_r$ -relevant property.

and **B**) is saliently inferior (relative to  $p_r$  and **B**) to the  $p_r$ -relevant standard.

My characterisation of the resembling weight of individuals is indeterminate. I shall insist that this indeterminacy is to be regarded as a virtue not as a defect. It is indeterminate because the way we compute resemblance and/or difference respects in everyday life is indeterminate and depends on the cognitive task that is to be achieved. The flexibility of the warrant conditions for overall resemblance and difference matches the way we adapt the computation of resemblance and/or difference respects to the cognitive task that is to be achieved.

Suppose now that Sam is warranted in judging that the Rolling Stones and the Beatles weakly minimally resemble each other and that Maria is warranted in judging that they do not weakly minimally resemble each other because, relative to her representational perspective and beliefs, the Rolling Stones and the Beatles have no resembling relevant properties. It may happen that Maria and Sam agree regarding which properties are relevant to compare bands but that Maria falsely believes that the Rolling Stones is a band playing folk music from Ireland. When she will realise her mistake, Maria will perhaps change her mind and agree with Sam's judgement. Therefore, that Sam is warranted in judging that  $j$  while Maria is warranted in judging that  $\neg j$  (where ' $j$ ' stands for an arbitrary resemblance judgement not for the content of such a judgement) is not sufficient for their disagreement to be faultless.

### 6.3.2 Stable warrant conditions for resemblance judgements

The latter example illustrates that a necessary condition for a disagreement between resemblance judgements to be faultless is that the beliefs relative to which agents judge that so and so about the resemblance of individuals are true beliefs.

Second, some restriction on the true beliefs **B** on the basis of which a resemblance judgement is made is to be imposed. To avoid triviality, we require that among the beliefs **B** to which a judgement of resemblance  $j$  is relative, there are no beliefs about the truth of  $j$ . E.g., if  $S$ 's judgement is

“*a* resembles *b*”, *S*’s true belief that “*a* resembles *b*” should not be taken as one of the beliefs to which the truth of “*a* resembles *b*” is relative.<sup>14</sup>

Consider the example with the three glasses again and situation (ii) in particular where *S* aims to quench her thirst. Suppose that there is a further fact *F* such that the obtaining of *F* neutralised the devastating effects of hydrochloric acid and makes it as refreshing as fresh water. Then it seems that it is not the case in the context of *S*’s judgement that the content of glass 1 resembles the content of glass 3 more than it resembles the content of glass 2 (relative to *S*’s goal that is to quench her thirst and to her *true* beliefs about the refreshing faculties of water and hydrochloric acid). If hydrochloric acid has been made as refreshing as fresh water, glass 2 and 3 seem at least equally similar to glass 1 in the context of *S*’s ascription of comparative resemblance.

In order to avoid this difficulty, we say, following Taylor (2004, 249), that beliefs **B**’ *defeat* a subject warranted resemblance judgement relative to the representational perspective she occupies and beliefs **B** if and only if an occupier of this perspective with beliefs **B**  $\cup$  **B**’ loses the warrant to the judgement at hand.

Finally, let us say that *S*’s resemblance judgement is *stably warranted* relative to  $p_r$  and true beliefs **B** if and only if (i) *S* is warranted relative to  $p_r$  and **B**, and (ii) for any *true* beliefs **B**’ which defeat *S*’s resemblance judgement, there are further true beliefs **B**’’ such that **B**’  $\supseteq$  **B**’’ and such that *S* is warranted in her resemblance judgement relative to  $p_r$  and beliefs **B**  $\cup$  **B**’’ (Taylor 2004, 249). Therefore, stable warrant is warrant relative to true beliefs for which there is no *defeater*.

The conditions for stable warrant of resemblance judgements can then be provided simply by substituting ‘stably warranted’ for ‘warranted’ in both

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<sup>14</sup>Taylor proposes a stronger restriction. He proposes to restrict *B* to beliefs that aren’t about resemblance in order to avoid impredicativity (Taylor 2004, 248-249). If I understand him correctly, I think that Taylor’s restriction is too strong. There are contexts in which the belief that some individuals resemble each other is sufficiently informative, relevant and interesting to justify a resemblance judgement between other individuals. For instance, let the context be such that only physical properties are relevant, suppose that we are justified in believing that Sam and Paul resemble each other, and suppose that we know that George and Paul are identical twins. Then we have acceptable reasons to judge that Sam and George resemble each other. In such circumstances it seems to me relevant and legitimate to ground the evaluated resemblance judgement – Sam and George resemble each other – on the belief that Sam and Paul resemble each other.

the left-hand side and the right-hand side of each of the conditions (Warrant  $R_{SM}$ )-(Warrant  $D_O$ ). For illustration I give here the conditions for having stably warranted judgements of strong minimal and overall resemblance.

**(S-Warrant  $R_{SM}$ )** A subject  $S$  is stably warranted in judging the  $A$ s strongly minimally similar (relative to  $p_r$  and true beliefs  $\mathbf{B}$ ) iff  $S$  is stably warranted in judging, relative to true beliefs  $\mathbf{B}$ , that at least one  $p_r$ -relevant property of the  $A$ s is had by each of them.

**(S-Warrant  $R_O$ )** A subject  $S$  is stably warranted in judging the  $A$ s weakly minimally similar (relative to  $p_r$  and true beliefs  $\mathbf{B}$ ) iff  $S$  is stably warranted in judging, relative to true beliefs  $\mathbf{B}$ , that the resembling weight of the  $A$ s (relative to  $p_r$  and  $\mathbf{B}$ ) saliently exceeds (relative to  $p_r$  and  $\mathbf{B}$ ) the  $p_r$ -relevant standard.

Suppose now that Sam is stably warranted (relative to his representational perspective  $p_r$ ) in judging that

**(6.3)** hippos and whales strongly minimally resemble each other

and that Maria is stably warranted (relative to  $p_r'$ ) in judging that

**(6.4)** hippos and whales do not strongly minimally resemble each other.

Now Sam and Maria disagree about the resemblance of hippos and whales, and Sam and Maria's judgements seem inconsistent. Yet since (6.3) and (6.4) are each stably warranted none of Sam and Maria is committing a fault. They both have good, undefeated reasons to judge as they do about the resemblance of hippos and whales. If so, we must conclude that differences in representational perspectives are what explains their disagreement. That there can be such disagreements justifies the claim that resemblance judgements are context-relative, and dependent on a representational perspective. Whether the propositional content of Sam's judgement and the propositional content of Maria's judgement are genuinely inconsistent is an issue I will address in the following chapter and in the first section of chapter 8.

## Chapter 7

# Resemblism and Anti-Resemblism

### 7.1 Introduction

There exist two metaphysical views about the context-relativity of resemblance which have never been labelled or discussed in detail. The main proponents of the one view are George McClure (1964), the Goodman of ‘Seven Strictures’ (1970), and, more recently, Barry Taylor (1993). I call the view of resemblance they advocate *Anti-Resemblism*.<sup>1</sup>

Resemblism and Anti-Resemblism interpret the context-relativity of resemblance judgements in different ways. According to Resemblism, the context-relativity of resemblance judgements is a purely pragmatic matter. The context-relativity of resemblance is a matter of our practical concerns, but practical concerns have nothing to do with ontology. This view about resemblance is nicely expressed in the following quotation from Armstrong:

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<sup>1</sup>It is noticeable that McClure (who is as far as I know the first and main advocate of Anti-Resemblism) and Goodman are both anti-resemblist. For this shows that Anti-Resemblism is not attached to any particular solution to the Problem of Universals. Goodman denies that there are universals and conceives of properties as sets of  $n$ -tuples of individuals in (Goodman 1970), whereas McClure admits that there are universals. But McClure conceives of universals as abundant. According to him, there are at least as many universals as there are predicates, and it is a certain class of mind-dependent universals, namely purposes, that determine which universals play a role in resemblance facts. So an anti-resemblist can be a nominalist or a realist about universals provided universals can be conceived of as abundant.

So statements about the degree of resemblance of particulars may presuppose a list or other criteria of what is to count as “one property” or “one range of properties” in such situations. This list or other criteria will usually reflect something as *ontologically unimportant as our practical concerns*. Practical concerns may also lead us to distinguish between important and not-so-important respects of resemblance and to weight the comparison accordingly. (Armstrong 1978b, 98) [italics are mine]

Rodriguez-Pereyra also endorses Resemblism in the following passage:

Facts about resemblance between particulars are as objective as facts about particulars having properties, and have nothing to do with the language or system of representation we use. Resemblance is not, then, as Goodman believes, relative, variable, and culture-dependent (although our *judgements* of resemblance may be). (Rodriguez-Pereyra 2002, 20)

The anti-resemblist takes the opposite stance and disputes the distinction between the ontology of resemblance and our practical concerns about resemblance: the ontology of resemblance cannot be utterly independent of our judgements of resemblance. If resemblance judgements are context-relative, then this is because resemblance itself is context-relative. Resemblance is this attribute which matters for our practical concerns,<sup>2</sup> and its ontology cannot come totally apart from these concerns.

The two resemblists, Armstrong and Rodriguez-Pereyra, are radical in that they seem to maintain that every resemblance fact obtains independently of any representational perspective, independently of practical concerns. But resemblists need not be that extreme.

Resemblism, as I conceive of it, is a view of resemblance which follows from the carnivorous view of elected properties as sparse properties that I introduced in chapter 1.<sup>3</sup> The two quoted philosophers are philosophers who

<sup>2</sup>Where practical concerns may include theoretical concerns.

<sup>3</sup>According to the carnivorous view, whether a property is elected or not has nothing to do with inductive practices, entrenchment or contextual relevance but is grounded in its real, objective nature. Whether some individuals are identical in nature is an absolute truth because whether a property is an elected one is an objective fact, a fact that is independent of the way we, or any other cognizer, represent individuals.

believe that there is a difference in nature between what I call elected properties and merely abundant properties. According to Armstrong, elected properties are sparse universals; according to Rodriguez-Pereyra, elected properties are sparse properties, where sparse properties are understood in some indeterminate nominalist way.<sup>4</sup>

It does not follow from the carnivorous view of elected properties that every resemblance fact obtains independently of any representational perspective. What follows from the carnivorous view of elected properties is only that facts of strong minimal resemblance, facts of weak minimal difference, and facts of exact resemblance obtain independently of representational perspectives.

Individuals strongly minimally resemble each other if and only if they share an elected property. Therefore, facts of strong minimal resemblance are independent of any representational perspective if and only if whether a property had by individuals is an elected one is independent of any representational perspective. Some individuals are exactly similar if and only if they share all their elected properties. Therefore, facts of exact resemblance are independent of any representational perspective if and only if whether a property had by individuals is an elected one is independent of any representational perspective. The same reasoning yields the conclusion that facts of weak minimal difference obtain independently of any representational perspective if and only if the election of properties is independent of any representational perspective.

However, it does not follow from the carnivorous view that every fact of weak minimal resemblance obtains independently of any representational perspective. For many facts of weak minimal resemblance between individuals obtain in virtue of inexact, though close, resemblances of elected properties of individuals. Yet the carnivorous view of elected properties that I described in chapter 1 remains silent about whether overall resemblance of properties is a mind-independent matter.

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<sup>4</sup>Rodriguez-Pereyra (2002, 60-2) does not commit himself to any analysis of sparse properties as sets nor to any alternative analysis of sparse properties. For he thinks of Resemblance Nominalism as a truthmaker analysis for ascriptions of sparse properties in terms of resemblance and, as he argues, he need not commit himself to any analysis of sparse properties to offer his truthmaker analysis. But, of course, sparse properties are certainly not universals or tropes in his Resemblist Resemblance Nominalism.

Let us call all and only resemblance facts of the former categories – strong minimal resemblance, exact resemblance and weak minimal difference – the *core resemblance facts*. The central idea of resemblism is thus that the core resemblance facts are determined independently of any representational perspective.

Every metaphysician who embraces the doctrine of sparse properties is a resemblist in that sense. Among contemporary resemblists we find D. C. Williams (1997), David Armstrong (1978b), Keith Campbell (1990), David Lewis (1999a), Gonzalo Rodriguez-Pereyra (2002), Peter Simons (1994), and many others.<sup>5</sup>

Then resemblists can disagree about whether the core resemblance facts are the only resemblance facts that obtain independently of any representational perspective. I call *moderate* the resemblists who maintain that, besides the core resemblance facts, there are resemblance facts whose obtaining depends on a representational perspective. I call *radical* the resemblists who maintain that every resemblance fact obtains independently of any representational perspective.

On the other hand, the anti-resemblist maintains that every resemblance fact depends on a representational perspective. For Anti-Resemblism is a judgement-based view of resemblance. If  $S$  judges that the  $A$ s resemble each other and if no belief can defeat  $S$ 's warranted resemblance judgement relative to the representational perspective she occupies, then the  $A$ s resemble each other, given her representational perspective. Now suppose that  $S$  judged that the  $A$ s resemble each other because she judges that the  $A$ s have the property  $\mathbf{P}$  in common. Since  $S$  is stably warranted relative to her representational perspective in judging that the  $A$ s resemble each other, it follows from our assumption and the conditions for stably warranted resemblance judgements that the  $A$ s have the property  $\mathbf{P}$  in common and that  $\mathbf{P}$  is a property such that individuals instantiating  $\mathbf{P}$  resemble each other, according to  $S$ 's representational perspective. Hence,  $\mathbf{P}$  is an elected property relative to  $S$ 's representational perspective. Therefore, Anti-Resemblism yields a vegetarian view of elected properties, since whether a property is elected or not depends on a representational perspective if resemblance does.

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<sup>5</sup>This non-exhaustive list of authors illustrates the fact that Resemblism, just like Anti-Resemblism, is independent of any particular positioning in the realist vs. nominalist debate.

The labels ‘Resemblism’ and ‘Anti-Resemblism’ should remind the reader of a more familiar opposition in metaphysics: that between Essentialism and Anti-Essentialism. There is an important parallelism between Resemblism and Essentialism on the one hand, and Anti-Resemblism and Anti-Essentialism on the other hand, that may help to understand what these two stances about resemblance are.

Just as Lewis (1968) takes Essentialism to be the doctrine that things have real essences, *i.e.* that independently of the way things are conceived of, described or referred to, there is a determinate fact of the matter about an object’s *de re* modal properties, I take Resemblism to be the doctrine that things have real resemblances, *i.e.* that independently of the way things are represented, described or referred to, there is a determinate fact of the matter about whether some things resemble each other or not; at least when the core resemblance facts are concerned.

On the other hand, I take Anti-Essentialism to be the view according to which there are no mind independent facts that constitute truthmakers for *de re* modal propositions, and which looks to ways we conceive of, describe, or refer to objects – mind-dependent facts – as the only viable truthmakers for such propositions. Likewise, Anti-Resemblism is the view according to which there are no mind-independent facts that constitute truthmakers for ascriptions of resemblance or difference to objects, and which looks to the ways we represent, compare, or refer to objects – mind-dependent facts – as the only viable truthmakers for our ascriptions of resemblance.

The best way to characterise the debate between the resemblist and the anti-resemblist is perhaps in terms of *faultless disagreements* between resemblance judgements. As I characterised such disagreements in the final section of the last chapter, whether such a disagreement is faultless is an epistemological issue. Subjects disagree in their resemblance judgements without committing a fault when and only when they each have good reasons to judge that so and so about the resemblance of the compared individuals, *i.e.* when and only when they are each stably warranted, relative to the representational perspective they occupy, in judging that so and so about the resemblance of the compared individuals.

I take the anti-resemblist to go further and contend that disagreements between judgements expressing opposite ascriptions of resemblance can be *semantically* faultless and faultless regarding the ontology. For instance, let

Sam and Maria disagree about whether the *As* strongly minimally resemble each other and assume that the propositional content of Sam's judgement is that the *As* strongly minimally resemble each other, while the propositional content of Maria's judgement is that the *As* do not strongly minimally resemble each other. According to Anti-Resemblism, Sam and Maria can both be right about the resemblance facts. It can be so because, within Anti-Resemblism, resemblance facts depend on a representational perspective and Sam and Maria can both be right relative to the representational perspective they occupy.

On the other hand, Resemblism is such that if opposite resemblance judgements express genuine ascriptions of resemblance,<sup>6</sup> then some of these judgements must be false. Thus, if the propositional content of Sam's judgement is that the *As* strongly minimally resemble each other and if the content of Maria's judgement is that the *As* do not strongly minimally resemble each other, then either Sam or Maria gets the resemblance facts wrong. This is so because, within Resemblism, strong minimal resemblance obtains independently of any representational perspective.<sup>7</sup>

Before I begin the presentation of the two opposite views, I shall emphasise that I conceive of the debate between the resemblist and the anti-resemblist as the most central debate in the metaphysics of resemblance. The most central and most venerable debate in the metaphysics of properties, however, is arguably the debate between the nominalist and the realist. As I outlined in footnotes in this section and as will become more evident in what follows, the resemblist vs. anti-resemblist debate is orthogonal to the debate between the nominalist and the realist. An answer to the question raised by the debate between the resemblist and the anti-resemblist, namely the question of whether resemblance facts are context-relative facts, does not determine any positioning on the nominalist/realist debate, and *vice versa*.

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<sup>6</sup>At least when the focus is on the core resemblances.

<sup>7</sup>The resemblist, of course, can agree that there can be disagreements between resemblance judgements that are faultless regarding the resemblance facts. But as I will describe in section 1 of chapter 8, according to the resemblist, the contents of resemblance judgements are not genuinely opposite in such situations. For the resemblist takes the contents of such opposite resemblance judgements to be consistent ascriptions of resemblance in some respect and negations of ascriptions of resemblance in some respect, instead of ascriptions of resemblance *tout court*.

Once the focus is on resemblance, there is more agreement between an anti-resemblist realist and an anti-resemblist nominalist than there is between an anti-resemblist realist and a resemblist realist (or between an anti-resemblist nominalist and a resemblist nominalist). For one makes resemblance a mind-dependent matter and the other does not. Once we focus on properties, there is more agreement between an anti-resemblist realist and a resemblist realist (or an anti-resemblist nominalist and a resemblist nominalist) than between an anti-resemblist realist and an anti-resemblist nominalist. The reason for this is that the latter disagree on the nature of properties, while the former do not.

The resemblist/anti-resemblist debate is the central metaphysical debate once we focus on resemblance, and the question of whether resemblance facts are context-relative is thus the main issue of the metaphysics of resemblance. The nominalist/realist debate is the main debate once we focus on the nature of properties and the question of the nature of properties is thus the main issue of the metaphysics of properties. This is the reason why the metaphysics of resemblance and the metaphysics of properties are distinct, though not independent, philosophical issues.

## 7.2 Anti-Resemblism

Anti-Resemblism is first a metaphysical position, one about truthmakers for ascriptions of resemblance. But before discussing anti-resemblist truthmaker analyses for ascriptions of resemblance I shall indicate how the anti-resemblist can account for the truth conditions of the propositional content of resemblance judgements. In order to make clear that I am not giving truth conditions for resemblance judgements but for the propositional content of resemblance judgements, I will follow the convention of using angled brackets to form names of propositions. So  $\langle p \rangle$  stands for the proposition that  $p$ .

Anti-resemblists can disagree regarding the truth conditions for the content of resemblance judgements. As far as I know there are three main ways to state anti-resemblist truth conditions for resemblance propositions. Following the terminology of Iris Einheuser (2008), *the contextualist* anti-resemblist puts the representational perspective within the propositional content of resemblance judgements, *the propositional relativist* anti-resem-

blist (for short, propositional anti-resemblist) puts the representational perspective alongside the world to evaluate resemblance propositions, and *the factual relativist* anti-resemblist (for short, factual anti-resemblist) puts the representational perspective within the world.

Each of these three accounts of the truth conditions for the content of resemblance judgements has its advantages and drawbacks, and which of them is correct should be determined by considering how they account for the semantics of context-relative judgements in general rather than by considering how they account for the truth conditions of the content of resemblance judgements. But, focusing on resemblance, my preference goes for the view introduced by Iris Einheuser in (Einheuser 2008), so-called *Factual Relativism*, and its application to the semantics of the content of resemblance judgements.

### 7.2.1 Contextualist anti-resemblist semantics

As an anti-resemblist, the contextualist anti-resemblist agrees that opposite resemblance judgements can each be true. So it may be that Sam is right when judging that

(6.3) hippos and whales strongly minimally resemble each other

and that Maria is right when judging that

(6.4) hippos and whales do not strongly minimally resemble each other.

The reason why they can both be right is that resemblance is relative to a representational perspective and that Sam and Maria can both be right relative to their respective representational perspective.

The contextualist agrees that Sam's judgement and Maria's judgement are opposite, but he denies that the propositional contents of their judgements are inconsistent. For the representational perspective is some sort of hidden indexical, according to the contextualist. So let  $p_r$  be the representational perspective occupied by Sam and let  $p_r'$  be the representational perspective occupied by Maria. According to the contextualist, the propositional content of Sam's judgement is not that hippos and whales strongly minimally resemble each other but the following proposition:

(6.3') ⟨hippos and whales strongly minimally resemble each other relative to  $p_r$ ⟩.

Likewise, the propositional content of Maria's judgement is not that hippos and whales do not strongly minimally resemble each other but the following proposition:

**(6.4')** ⟨hippos and whales do not strongly minimally resemble each other relative to  $p_r'$ ⟩.

Assuming that  $p_r$  and  $p_r'$  are distinct representational perspectives, (6.3') and (6.4') are consistent. Thus, according to the contextualist, a single judgement, e.g. "hippos and whales strongly minimally resemble each other", can express different propositions.

Since he puts the representational perspective within the propositional content of resemblance judgements, the contextualist anti-resemblist gets truth *simpliciter* for the propositional content of resemblance judgements, *i.e.* he gets truth at a world, full stop. For illustration, I state here the contextualist truth conditions for the content of judgements of strong minimal resemblance, overall resemblance, and exact resemblance (where 'the As' is an arbitrary plural constant denoting collectively,  $p_r$  is an arbitrary representational perspective, and  $w$  is an arbitrary world):

**(C-truth  $R_{SM}$ )** ⟨the As strongly minimally resemble each other relative to  $p_r$ ⟩ is true at  $w$  iff in  $w$  there is a property  $\mathbf{P}$  such that each of the As has  $\mathbf{P}$  and  $\mathbf{P}$  is elected relative to  $p_r$ , where 'elected' is interpreted as relevant.

**(C-truth  $R_O$ )** ⟨the As resemble overall relative to  $p_r$ ⟩ is true at  $w$  iff in  $w$  the resembling weight of the As (relative to  $p_r$ ) saliently exceeds (relative to  $p_r$ ) the standard that is  $p_r$ -relevant.

**(C-truth  $R_E$ )** ⟨the As exactly resemble each other relative to  $p_r$ ⟩ is true at  $w$  iff in  $w$  every property that is instantiated by some of the As and that is elected relative to  $p_r$  is a property instantiated by each of the As.<sup>8</sup>

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<sup>8</sup>The contextualist truth conditions for the propositional content of the other forms of resemblance judgements can be obtained analogously by putting the representational perspective within the content. As far as I know the contextualist form of Anti-Resemblism has never been maintained though McClure (1964) and Goodman (1970) have maintained a similar form of Contextualism according to which the hidden indexical is not a representational perspective but a respect of comparison. I discuss this form of Contextualism in the first section of chapter 8.

The main advantage of the contextualist proposal is that it gets truth *simpliciter* for the content of resemblance judgements. But such a semantic contextualism has been found objectionable for various reasons.<sup>9</sup> A first criticism is that the contextualist seems to distort the content of the utterances of Sam and Maria, for it claims that Sam and Maria assert (and believe) propositions that concern their own representational perspectives, even though it seems that they are merely comparing hippos and whales without their assertions having any reflective content.

Another problem concerns attitudes and speech reports. If the judgement “hippos and whales strongly minimally resemble each other” were indexical in such a way that it expresses different propositions in (6.3) and (6.4), then we should expect speech-reports of such utterances to be sensitive to this difference. For example, if Oscar utters the words “I am hungry” at 12 noon, then a report by Alistair: “Oscar said that I am hungry” would not correctly report Oscar’s utterance, because ‘I’ in the report would refer to Alistair. Similarly, if at 2 p.m. Oscar reports his own 12 noon utterance with the words “I said that I am hungry”, then the report would be incorrect, or at least very odd because of the use of the present tense of ‘am’. As Kölber emphasises the following general rule articulates some of these principles of speech reporting:

(SR) If a sentence  $s$  is indexical in such a way that an utterance of  $s$  in context  $C_1$  expresses a different proposition from an utterance of  $s$  in a context  $C_2$ , then an utterance by someone  $A$  of  $s$  in  $C_1$  cannot be correctly reported in  $C_2$  by using the form of words ‘ $a$  said that  $s$ .’ (where ‘ $a$ ’ is some term referring to  $A$ ).  
(Kölber 2008, 13)

However, if Maria reports Sam’s judgement by saying “Sam said that hippos and whales strongly minimally resemble each other”, her report would clearly be correct. So it seems that the contextualist must make the *ad hoc* move that (SR) fails for reports on resemblance judgements if he aims to maintain that the representational perspective is a hidden indexical in the content of resemblance judgements.

A further worry concerning resemblance is that, given the contextualist account and provided propositions represent the states of affairs they seem

<sup>9</sup>Cf. (Kölber 2008) and (MacFarlane 2005).

to represent, resemblance appears to be a relation between individuals and a representational perspective. If you think that resemblance is a binary and dyadic relation between an individual and an individual, then the contextualist account makes resemblance a ternary relation between two individuals and a representational perspective. If you think of resemblance as a monadic multigrade property of individuals as I do, the contextualist account makes resemblance a dyadic multigrade relation between many individuals and a representational perspective. Intuitively, this is wrong. Resemblance is a property of individuals, not a relation between individuals and a representational perspective.

Following the contextualist, there is no such fact as the fact that I and my child resemble each other. There is the fact that I and my child resemble each other relative to my representational perspective, and there is the fact that I and my child resemble each other relative to Grandma's representational perspective, but nothing like the fact that I and my child resemble each other. This seems wrong to me.

None of the latter objections shows that the contextualist position is untenable, but they reveal how much of a departure it requires from ordinary ways of thinking about the relation between judgements, propositions, and indexicals, and about resemblance itself.

### 7.2.2 Propositional anti-resemblist semantics

According to the propositional anti-resemblist, when Sam judges that hippos and whales strongly minimally resemble each other, the content of his judgement is that hippos and whales strongly minimally resemble each other. And when Maria judges that hippos and whales do not strongly minimally resemble each other, the content of her judgement is that hippos and whales do not strongly minimally resemble each other. So the judgement "hippos and whales strongly minimally resemble each other" expresses the same proposition in both judgements. However, the latter proposition is true relative to Sam's representational perspective and false relative to Maria's representational perspective.

According to the propositional anti-resemblist, the content of resemblance judgements is not true *simpliciter*, but true at a world *and* relative to a representational perspective. Therefore, the propositional anti-resemblist

would propose the following truth conditions for the content of judgements of strong minimal resemblance, overall resemblance, and exact resemblance:

**(P-truth  $R_{SM}$ )** (the *As* strongly minimally resemble each other) is true at  $w$  and relative to  $p_r$  iff, in  $w$  and relative to  $p_r$ , there is a property **P** such that each of the *As* has **P** and **P** is elected, where ‘elected’ is interpreted as relevant.

**(P-truth  $R_O$ )** (the *As* resemble overall) is true at  $w$  and relative to  $p_r$  iff, in  $w$  and relative to  $p_r$ , the resembling weight of the *As* saliently exceeds the relevant standard.

**(P-truth  $R_E$ )** (the *As* exactly resemble each other) is true at  $w$  and relative to  $p_r$  iff, in  $w$  and relative to  $p_r$ , every property that is instantiated by some of the *As* and that is elected is a property instantiated by each of the *As*.<sup>10</sup>

Propositional Anti-Resemblism seems to be the view defended by Taylor in (Taylor 2004). The very advantage of the propositional relativist account is that resemblance judgements express what they seem to express, but such a relativism is also objectionable.

First, considering the proposed semantics, it seems that the truth property, if there is such a property, is here a ternary – and plausibly triadic – relation between a proposition, a world, and a representational perspective. But obviously the propositional relativist does not maintain that every truth is relative. Some truths, for instance mathematical truths, are true *simpliciter*. If we focus on the latter truths, the truth property (if there is such a property) rather looks like a binary – and plausible dyadic – relation between a proposition and a world. Now validity is preservation of truth. The inference from “ $2 + 2 = 4$ ” and “hippos and whales resemble each other” to “ $2 + 2 = 4$  and hippos and whales resemble each other” is clearly valid. Yet which truth property is preserved in this inference? Is it the binary property or the ternary property?

If the latter reasoning constitutes an objection, the objection is not conclusive. For the propositional anti-resemblist can maintain that truth is a

<sup>10</sup>The propositional anti-resemblist truth conditions for the content of the other forms of resemblance judgements can be obtained analogously by putting the representational perspective alongside the world.

multigrade property, and that it is this property which is preserved in the inference. Depending on the kind of proposition we are considering we can add more or less parameters to determine the truth of the proposition: a world, a representational perspective, but also a time, a spatial location, and so on and so forth.

A stronger worry concerns the role played by representational perspectives within the propositional relativist framework.<sup>11</sup> On the standard account of propositions, propositions are the representational contents of indicative sentences on an occasion of use and so are ultimately linked with the facts they represent or misrepresent. However, by putting the representational perspective alongside the world, the propositional anti-resemblist semantics has for consequence that the representational perspective does not determine what the world is and thus does not determine which states of affairs obtain in a world. If the representational perspective partly determines whether a proposition about the resemblance of objects is true but if the representational perspective does not help determining the fact that is represented by the latter proposition, then the link between a proposition and the fact it represents is broken, or at least this link is not what we standardly think it is.

For instance, which state of affairs is represented by the proposition ⟨hippos and whales strongly minimally resemble each other⟩ which is true relative to Sam's representational perspective and false relative to Maria's representational perspective? It cannot be the state of affairs that hippos and whales strongly minimally resemble each other. For whether the proposition is true depends on a representational perspective, but whether a state of affairs obtains, whether it is a fact, only depends on the way the world is. Since the world is not determined by the representational perspective, it cannot be that there is a state of affairs (the state of affairs that hippos and whales strongly minimally resemble each other) that obtains dependently on a representational perspective and does not obtain dependently on another representational perspective. Therefore, ⟨hippos and whales strongly minimally resemble each other⟩ does not represent the state of affairs that hippos and whales strongly minimally resemble each other because there is no such state of affairs, according to the propositional anti-resemblist.

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<sup>11</sup>Cf. (Einheuser 2008, 200-2). Einheuser does not consider resemblance judgements but epistemic modals and judgements of taste.

We may think that here the representational perspective selects *what* state of affairs a proposition represents as obtaining. So, relative to Sam's representational perspective, ⟨hippos and whales strongly minimally resemble each other⟩ represents the fact that hippos and whales strongly minimally resemble each other relative to Sam's representational perspective. Likewise, relative to Maria's representational perspective, the proposition that hippos and whales strongly minimally resemble each other represents the *non-obtaining* state of affairs that hippos and whales strongly minimally resemble each other relative to Maria's representational perspective. If so, the proposition itself does not represent any determinate state of affairs, and this seems to be a significant departure from the standard account of propositions.

In order to maintain the standard account of propositions, the propositional anti-resemblist should claim that what the proposition represents is an objective fact of the world. Thus the proposition ⟨hippos and whales strongly minimally resemble each other⟩ represents the fact that there is a property shared by hippos and whales. The problem then is that contradictory propositions – ⟨hippos and whales strongly minimally resemble each other⟩ and ⟨hippos and whales do not strongly minimally resemble each other⟩ – *correctly* represent the same fact.

Again, none of the latter objections shows that Propositional Anti-Resemblism is untenable. But they show that the view leads to an important departure from the standard conception of the relationship between propositions and states of affairs.

### 7.2.3 Factual anti-resemblist semantics

Factual Relativism, which is the view proposed by Einheuser (2008), is an improvement on both Contextualism and Propositional Relativism, or so I believe. Its application to resemblance, *Factual Anti-Resemblism*, displays considerable advantages for the metaphysics of resemblance I am endorsing. Contrary to Contextualist Anti-Resemblism, Factual Anti-Resemblism does not require a modification of my account of resemblance: I can maintain that resemblance is a monadic property of individuals instead of a relation between individuals and a representational perspective. Contrary to Propositional Anti-Resemblism, Factual Anti-Resemblism puts the representational perspective within the world so that I can take representational

perspectives to be part of the truthmakers for the content of resemblance judgements *without assuming that representational perspectives are part of the resemblance facts*.

Moreover, according to Factual Anti-Resemblism, the judgement that hippos and whales strongly minimally resemble each other expresses the proposition that hippos and whales strongly minimally resemble each other, and the latter proposition represents the fact that hippos and whales strongly minimally resemble each other. It is arguably a desirable result of a theory of resemblance that judgements of resemblance express what they seem to express and that the content of these judgements represent the resemblance facts they seem to represent. As we will see in the first section of the next chapter, this is a result that Resemblism fails to get.

In Factual Relativism, a world is represented as an ordered pair. The first member of such a pair is what Einheuser (2008, 190) calls a *substratum*. When resemblance is the issue, the second member of such a pair is a representational perspective. We shall think of the *substratum* as the mind-independent part of the world. The *substratum* is a world of individuals and properties, and the contribution of the *substratum* to the resemblance facts is that it determines which individuals exist and which properties individuals have and fail to have. The second contributing factor, *the representational perspective*, is a collection of physiological and psychological features of agents as I described in section 2 of chapter 6. Following Einheuser, we say that a representational perspective *induces* resemblance facts over a *substratum*.

Let thus  $s_{@}$  be the actual *substratum*. And suppose that Sam occupies the representational perspective  $p_r$  and that Sam's judgement (6.3) is true. Then the world at which Sam's judgement is true is the world  $\langle s_{@}, p_r \rangle$ . This is the world in which  $p_r$  induces the resemblance facts over  $s_{@}$ , and in this world it is a fact that hippos and whales strongly minimally resemble each other, full stop. It differs from the world in which Maria's judgement is true, for Maria's judgement is true at world  $\langle s_{@}, p_r' \rangle$ . And in the latter world, it is a fact that hippos and whales do not strongly minimally resemble each other, full stop.

According to Factual Anti-Resemblism, different worlds with the same *substratum* coincide in their mind-independent facts, but can come apart in

the facts that are induced by representational perspectives, among which we find the resemblance facts.<sup>12</sup>

Since the representational perspective is here part of the world, the factual anti-resemblist gets truth *simpliciter*, that is truth at a world, full stop. The factual anti-resemblist truth conditions for the content of resemblance judgements, which I will assume in the following chapters, are the following (where  $s$  is an arbitrary *substratum*):

**(F-truth  $R_{SM}$ )** (the  $As$  strongly minimally resemble each other) is true at  $w = \langle s, p_r \rangle$  iff in  $w$  there is a property  $\mathbf{P}$  such that each of the  $As$  has  $\mathbf{P}$  and  $\mathbf{P}$  is elected.

**(F-truth  $D_{WM}$ )** (the  $As$  are weakly minimally dissimilar) is true at  $w = \langle s, p_r \rangle$  iff in  $w$  there is a property  $\mathbf{P}$  such that at least one of the  $As$  has  $\mathbf{P}$ , at least one of the  $As$  lacks  $\mathbf{P}$ , and  $\mathbf{P}$  is elected.

**(F-truth P.R.)** ( $\mathbf{P}_1, \dots, \mathbf{P}_n$  are properties which resemble each other) is true at  $w = \langle s, p_r \rangle$  iff in  $w$   $\mathbf{P}_1, \dots, \mathbf{P}_n$  resemble each other saliently more than the relevant standard.

**(F-truth  $R_{WM}$ )** (the  $As$  weakly minimally resemble each other) is true at  $w = \langle s, p_r \rangle$  iff in  $w$  there is a property  $\mathbf{P}$  such that each of the  $As$  has  $\mathbf{P}$  and  $\mathbf{P}$  is elected, or (ii) there is a series of properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that each of the  $As$  has one of them, such that  $\mathbf{P}_1, \dots, \mathbf{P}_n$  resemble each other, and  $\mathbf{P}_1, \dots, \mathbf{P}_n$  are elected.

**(F-truth  $D_{SM}$ )** (the  $As$  are strongly minimally different from each other) is true at  $w = \langle s, p_r \rangle$  iff in  $w$  there is a series of properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that (i) each of the  $As$  has exactly one of  $\mathbf{P}_1, \dots, \mathbf{P}_n$ , such that (ii) there is a relevant similarity ordering on which each of  $\mathbf{P}_1,$

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<sup>12</sup>It is then a question whether Factual Anti-Resemblism requires the rejection of some form of *Materialism*: if the *substratum* can remain fixed while the representational perspective varies, then the representational perspective, which is at least partly a mental entity, does not co-vary with the mind-independent reality. And if you think of supervenience in terms of co-variation and of Materialism in terms of supervenience as Lewis (1999a) does, then it looks like Factual Anti-Resemblism leads to the rejection of Materialism. Nevertheless, which representational perspective is occupied can still be explained in terms of physical facts: biological facts. So if we conceive of Materialism as a theory of explanation, rather than a theory of co-variation, Factual Anti-Resemblism and Materialism seem compatible.

$\dots, \mathbf{P}_n$  is ordered, and (iii) some properties among  $\mathbf{P}_1, \dots, \mathbf{P}_n$  do not resemble each other.

**(F-truth  $\mathbf{R}_O$ )** ⟨the *As* resemble overall⟩ is true at  $w = \langle s, p_r \rangle$  iff in  $w$  the resembling weight of the *As* saliently exceeds the relevant standard.

**(F-truth  $\mathbf{D}_O$ )** ⟨the *As* differ overall⟩ is true at  $w = \langle s, p_r \rangle$  iff in  $w$  the resembling weight of the *As* is saliently inferior to the relevant standard.

**(F-truth  $\mathbf{R}_E$ )** ⟨the *As* exactly resemble each other⟩ is true at  $w = \langle s, p_r \rangle$  iff in  $w$  every elected property that is instantiated by some of the *As* is a property instantiated by each of the *As*.

**(F-truth  $\mathbf{D}_E$ )** ⟨the *As* exactly differ from each other⟩ is true at  $w = \langle s, p_r \rangle$  iff in  $w$  there is no series of properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that (i) each of the *As* has one of them, (ii) each of  $\mathbf{P}_1, \dots, \mathbf{P}_n$  is elected, and (iii)  $\mathbf{P}_1, \dots, \mathbf{P}_n$  resemble each other.

Given that worlds are ordered pairs, there are two ways the resemblance facts can vary in Factual Anti-Resemblism. Suppose that Maria says:

**(7.1)** hippos and whales might have been strongly minimally similar.

Then (7.1) is ambiguous. For (7.1) can be interpreted as meaning that if hippos and whales had had in common a property they lack but which is relevant relative to Maria's representational perspective, then hippos and whales would have been strongly minimally similar. But (7.1) can also be interpreted as, if the representational perspective had been otherwise, then hippos and whales would have been strongly minimally similar (given the properties they actually have).

In order to account for this ambiguity, I follow Einheuser (2008, 194-5) in introducing two sets of modal notions. First, we have the notion of *s*-possibility  $\diamond_s$  which tracks possible variations in the *substratum*. Second, we have the notion of *p<sub>r</sub>*-possibility  $\diamond_{p_r}$  which tracks possible variations of the representational perspective:

**(7.2)**  $\diamond_s \phi$  is true at  $w = \langle s, p_r \rangle$  if and only if there is a *substratum*  $s'$  such that  $\phi$  is true at  $w' = \langle s', p_r \rangle$  (*i.e.* iff  $\phi$  is true at some world that differs from  $w$  only in virtue of the *substratum*, if it differs at all).

(7.3)  $\diamond_{pr}\phi$  is true at  $w = \langle s, p_r \rangle$  if and only if there is a representational perspective  $p_r'$  such that  $\phi$  is true at  $w' = \langle s, p_r' \rangle$  (*i.e.* iff  $\phi$  is true at some world that differs from  $w$  only in virtue of the representational perspective, if it differs at all).

Note that the apparatus allows for a straightforward semantics for ‘relative to every representational perspective’ or ‘in every context’. Suppose we judge that electrons resemble each other in every context, *i.e.* relative to every representational perspective. Then we introduce an operator of  $p_r$ -necessity  $\Box_{pr}$ . The semantics for  $\langle \Box_{pr}$  electrons resemble each other  $\rangle$  is as follows:

(7.4)  $\langle \Box_{pr}$  electrons resemble each other  $\rangle$  is true at  $w = \langle s, p_r \rangle$  if and only if, for any representational perspective  $p_r'$ ,  $\langle$ electrons resemble each other  $\rangle$  is true at  $w' = \langle s, p_r' \rangle$  (*i.e.* iff  $\langle$ electrons resemble each other  $\rangle$  is true at every world that differs from  $w$  only in virtue of the representational perspective, if it differs at all).

But some may object that Factual Anti-Resemblism is threatened by inferences involving premises that are not true relative to the same notion of world. For some truths, for instance mathematical truths, seem to be true only relative to the *substratum*. If so,  $\langle 2 + 2 = 4 \rangle$  is true at  $w$ , where  $w$  is a traditional world, that is just a *substratum*. However,  $\langle$ hippos and whales strongly minimally resemble each other  $\rangle$  is true relative to a world, where the world is an ordered pair having for members a *substratum* and a representational perspective. But then what is the notion of world relative to which  $\langle 2 + 2 = 4$  and hippos and whales strongly minimally resemble each other  $\rangle$  is true?

The factual anti-resemblist’s answer is that the conjunction is true relative to a world conceived of as an ordered pair having for members a *substratum* and a representational perspective because both premises are. The representational perspective, truly, does not contribute to the truth of  $\langle 2+2 = 4 \rangle$  in the considered course of reasoning. But the latter is not incompatible with the fact that in the considered course of reasoning,  $\langle 2 + 2 = 4 \rangle$  is also true relative to a world conceived of as an ordered pair having for members a *substratum* and a representational perspective. It is one thing to say that the representational perspective of the world does not contribute to such a truth, it is another thing to say that such a truth is not relative

to a world which has for part a representational perspective. The factual anti-resemblist agrees with the former, but disagrees with the latter.

I think that Factual Anti-Resemblism is an improvement on both Propositional Anti-Resemblism and Contextualist Anti-Resemblism because here the judgement expresses the proposition it seems to express and the proposition represents the state of affairs it seems to represent, and because here resemblance is what it seems to be: a property of individuals, full stop. In what follows, I will assume the factual anti-resemblist account of the truth conditions for the content of resemblance judgements. So the truthmaker analyses I propose are truthmaker analyses for the content of resemblance judgements understood according to Factual Anti-Resemblism. There are several plausible candidate truthmaker analyses.

#### 7.2.4 Truthmaking in Anti-Resemblism

Assuming the factual relativist version of Anti-Resemblism, the content of resemblance judgements is made true by the mutual effort of the *substratum* and the representational perspective. Yet there is still room for disagreement between anti-resemblists regarding what the truthmakers for the content of resemblance judgements are. There are various positions in the logical space, and I just state here the most obvious truthmaker account of our ascriptions of resemblance. Thus (where truth is truth at a world understood in the factual relativist way):

(**TM**  $\mathbf{R}_{SM}$ ) What makes it true that the *As* strongly minimally resemble each other is that there is at least one property had by each of the *As* that is elected.

(**TM**  $\mathbf{R}_{WM}$ ) What makes it true that the *As* weakly minimally resemble each other is either (i) that there is at least one elected property had by each of the *As*, or that (ii) there is a series of elected properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that each of the *As* has one of them and such that the resemblance of  $\mathbf{P}_1, \dots, \mathbf{P}_n$  saliently exceeds the relevant standard.

(**TM**  $\mathbf{D}_{WM}$ ) What makes it true that the *As* weakly minimally differ from each other is that there is an elected property  $\mathbf{P}$  such that at least one of the *As* has  $\mathbf{P}$  and some of the *As* lacks  $\mathbf{P}$ .

- (TM  $\mathbf{D}_{SM}$ ) What makes it true that the *As* strongly minimally differ from each other is that there is a series of elected properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that (i) each of the *As* has one of  $\mathbf{P}_1, \dots, \mathbf{P}_n$ , (ii) there is a relevant similarity ordering on which each of  $\mathbf{P}_1, \dots, \mathbf{P}_n$  is ordered, and (iii) the resemblance of some properties among  $\mathbf{P}_1, \dots, \mathbf{P}_n$  does not saliently exceed the relevant standard.
- (TM  $\mathbf{R}_O$ ) What makes it true that the *As* resemble overall is that the resembling weight of the *As* saliently exceeds the relevant standard.
- (TM  $\mathbf{D}_O$ ) What makes it true that the *As* differ overall is that the resembling weight of the *As* is saliently inferior to the relevant standard.
- (TM  $\mathbf{R}_E$ ) What makes it true that the *As* exactly resemble each other is that every elected property of the *As* is had by all of them.
- (TM  $\mathbf{D}_E$ ) What makes it true that the *As* exactly differ from each other is that there is no series of elected properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that each of the *As* has one of them and such that the resemblance of  $\mathbf{P}_1, \dots, \mathbf{P}_n$  saliently exceeds the relevant standard.

According to these truthmaker explanations, the election of properties, which is relative to a representational perspective, partly makes it true that individuals resemble or differ. The *substratum* on the other hand, makes it true that individuals have the properties they have.

The metaphysical view that I discuss in the last chapter of this study, and which I call *Vegetarian Resemblance Nominalism*, denies at least (TM  $\mathbf{R}_{SM}$ ). According to the vegetarian resemblance nominalist (for short, the V-resemblance nominalist), strong minimal resemblance of individuals is what explains their having elected properties (where elected properties are conceived of in a vegetarian way and properties are conceived of in a nominalistic way). The V-resemblance nominalist may agree that other, less fundamental, kinds of ascriptions of resemblance are explained in terms of elected properties. But he specifically denies that ascriptions of strong minimal resemblance are to be explained in terms of elected properties because, according to him, it is the resemblance of the  $\mathbf{P}$ -individuals (which is determined by a representational perspective) which makes it true that  $\mathbf{P}$  is elected.

Since I believe Nominalism is true, the most plausible and attractive alternative to this V-Resemblance Nominalism is to my mind the vegetarian counterpart of Natural Class Nominalism, that we may call *Vegetarian Elected Class Nominalism* (for short V-Class Nominalism). The V-class nominalist is an anti-resemblist who maintains (TM  $R_{SM}$ ) and thus explains strong minimal resemblance in terms of the sharing of an elected property. But the V-class nominalist denies that elected properties differ in nature from merely abundant properties, and thus, assuming that abundant properties of individuals are sets of individuals, maintains that elected properties are sets of individuals. According to V-Class Nominalism what explains that a property  $\mathbf{P}$  is elected is the representational perspective  $p_r$ , and the explanation of why some individuals have the property  $\mathbf{P}$  is a matter of the *substratum* (the mind-independent part of the world): the individuals themselves.

But we may also conceive of an Anti-Resemblist Realism about Universals akin to the position defended by McClure (1964) or an Anti-Resemblist Realism about Tropes. However, given the vegetarian view of elected properties to which Anti-Resemblism yields, these realisms incur commitment to abundant universals or tropes and, what is more interesting, are such that the sharing of a universal or the instantiation of exactly similar tropes is not sufficient for strong minimal resemblance. This is McClure's proposal. According to him, in order to get resemblance from the sharing of a universal by the compared individuals, subjects must also have purposes that make the shared universal relevant; where purposes are themselves universals instantiated by subjects. So an anti-resemblist realist about universals has a more complicated, but to my mind much more plausible, account of resemblance than its resemblist counterpart.

Given the latter remarks on Anti-Resemblist Realism, we see that a further plausible anti-resemblist metaphysics of resemblance can be such that it denies (TM  $R_{SM}$ ), explains why a property is elected in terms of resemblance (which is determined by the representational perspective), and maintains that there are universals in an abundant way. There is nothing incompatible, in Anti-Resemblism, between Realism about Universals and an explanation of the instantiation of elected properties in terms of resemblance. So an explanation of ascriptions of elected properties to individuals can be an explanation in terms of resemblance and nevertheless fail to be nominalist.

However, an anti-resemblist explanation of ascriptions of elected properties in terms of resemblance which admits an abundance of universals will have most of the defects of V-Resemblance Nominalism without having its advantages. For it would be much less economical than V-Resemblance Nominalism but would roughly explain the election of properties as V-Resemblance Nominalism does. Nevertheless, that such an anti-resemblist position is conceivable shows how little the anti-resemblist/resemblist debate is constrained by the realist/nominalist debate.

### 7.3 Resemblism

Resemblism, as I conceive of it, is a consequence of the carnivorous view of elected properties as sparse properties. I shall thus begin my presentation of Resemblism by a presentation of the sparse view of elected properties.

#### 7.3.1 The real joints of nature

Let me first emphasise that the belief in an objective realm of sparse properties would not have yield Resemblism, if sparse properties had not been conceived of as the properties that are linked with resemblance. Someone might have said that there is an objective elite of properties, called *sparse properties*, that capture the causal relations between objects but which have nothing to do with resemblance facts. Such a view is possible, but it is not the view of advocates of sparse properties who ascribe to sparse properties the role of being *elected properties*, *i.e.* the role of being those properties that are linked with resemblance. This view goes back at least to Plato and has been stated by Lewis in the following terms:

[The abundant properties] pay no heed to the qualitative joints, but carve things up in every which way. Sharing of them has nothing to do with similarity [...]. The sparse properties are another story. Sharing of them makes for qualitative similarity they carve at the joints, they are intrinsic, they are highly specific, the sets of their instances are *ipso facto* not entirely miscellaneous, there are only just enough of them to characterise things completely and without redundancy. (Lewis 1986b, 59-60)

There are several and important disagreements between proponents of the sparse view of properties regarding the individuation of these properties<sup>13</sup> and it is difficult to provide an uncontroversial account of them. To simplify the matter I shall make the following assumptions about them: the sparse properties of an individual are the most natural properties of this individual. Sparse properties are neither disjunctive, nor negative, nor conjunctive. Sparse properties are not determinable properties but lowest determinate properties of individuals.<sup>14</sup> Sparse properties are intrinsic, highly specific. They carve reality at its natural joints and nowhere else.

The most controversial claim in this list is that I use a notion of sparse properties which is relative to the individual which instantiates it: the sparse properties of an individual are the most natural properties of that individual. This characterisation of sparse properties makes use of Lewis's notion of naturalness of properties which permits degrees but does not correspond to Lewis's own. Lewis uses the labels 'sparse properties' and '*perfectly natural properties*' synonymously, and according to him perfectly natural properties are the most natural properties of the most basic, simplest individuals.

Some may, as Lewis and others do, prefer to restrict the label 'sparse properties' to the perfectly natural ones. My preference for assuming that the sparseness of a property is relative to the individuals that have it is that on the assumption that complex individuals can resemble each other, my account of strong minimal resemblance (SMR) turns out false if elected properties are identified with Lewis's perfectly natural properties. So following Lewis's account of sparse properties would require a modification of (SMR) in the presentation of Resemblism.<sup>15</sup> Yet I prefer to take the liberty of modifying Lewis's account of sparse properties in the proposed way on the grounds that a modification of (SMR) would suggest that the resemb-

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<sup>13</sup>On this issue see (Schaffer 2004).

<sup>14</sup>There are disagreements between resemblists on this point. Hirsch maintains that determinables that are not even highest determinables, like *being red* are sparse in (Hirsch 1993). But the orthodoxy among resemblists seems to be that determinables are not sparse; see e.g. (Armstrong 1978b, 117-9) and (Rodriguez-Pereyra 2002, 48-9).

<sup>15</sup>This modification of (SMR) would take the following form: the *As* strongly minimally resemble each other iff (i) they share an elected property or (ii) there is an elected property which is shared by at least one proper part of each of the *As*. Modifying (SMR) in this way makes every strong minimal resemblance between complex individuals a kind of Husserl's transferred similarity: it is a similarity based on the direct similarity of parts. On transferred similarity, see section 1 of chapter 4.

list and the anti-resemblist are talking past each other when talking about resemblance, which I think is not the case.

So the sparse properties of an individual are the most natural properties of this individual; where the most natural properties of an individual are these properties of an individual which are definable in the least complicated fashion out of the perfectly natural properties. In other words, the sparse properties of an individual are the simplest<sup>16</sup> Boolean constructs out of the perfectly natural properties.

Once we admit objectively sparse properties, the context-relativity gets out of the picture, at least regarding the core resemblance facts. Again, I will begin by giving truth conditions for ascriptions of resemblance: first for the core ascriptions of resemblance, then for other kinds of ascriptions of resemblance relative to the moderate and radical resemblist views respectively. Finally, I will consider truthmakers.

### 7.3.2 Resemblist truth-conditions for core ascriptions of resemblance

Here again the provided resemblist truth conditions are truth conditions for propositions about the resemblance and difference of individuals. However, it is not clear whether these truth conditions correspond to the truth conditions for the content of resemblance judgements, at least when everyday resemblance judgements are the concern. For in Resemblism the content of resemblance judgements need not be what it seems to be.<sup>17</sup>

Since the core resemblances are those resemblances that are ultimately linked with the instantiation of sparse properties, and since whether a sparse property is wholly determined by the mind-independent world, *i.e.* the *substratum*, the truth of ascriptions of core resemblances is wholly determined by the mind-independent world. To make it clear that we are here talking of mind-independent worlds, I say that propositions are here true at a world  $w = s$ , where  $s$  is an arbitrary *substratum*.

**(R-Truth  $R_{SM}$ )** ⟨The  $A$ s strongly minimally resemble each other⟩ is true at  $w = s$  iff in  $w$  there is a property  $\mathbf{P}$  such that  $\mathbf{P}$  is a sparse property (relative to the  $A$ s) and such that all the  $A$ s instantiate  $\mathbf{P}$ .

<sup>16</sup>Though I have no clue regarding how simplicity is to be measured here.

<sup>17</sup>See below section 1 of chapter 8.

**(R-Truth  $D_{WM}$ )** ⟨The *As* weakly minimally differ from each other⟩ is true at  $w = s$  iff in  $w$  there is a property **P** such that **P** is a sparse property (relative to the *As*) and such that there is some of the *As* which has **P** and another of the *As* which lacks **P**.

**(R-Truth  $R_E$ )** ⟨The *As* resemble exactly⟩ is true at  $w = s$  iff in  $w$  for all property **P** such that **P** is sparse (relative to the *As*), if some of the *As* has **P** then each of the *As* has **P**.

I take every resemblist to agree with each of (R-Truth  $R_{SM}$ )-(R-Truth  $R_E$ ). Regarding the truth conditions for other kinds of ascription of resemblance, resemblists disagree relative to the radicality of their resemblist view.

### 7.3.3 Moderate resemblist's truth conditions for other ascriptions of resemblance

At one end of the resemblist scale is the view that the core ascriptions of resemblance, and only the core ascriptions of resemblance, are made true by the mind-independent world. Regarding other kinds of ascription of resemblance, their truth value is dependent on a representational perspective because every other form of ascription of resemblance is, or involves, an overall ascription of resemblance between individuals or properties and because overall resemblance is a context-dependent matter. This is the view I call *Moderate Resemblism*.

Nevertheless, the moderate resemblist's truth conditions for non-core ascriptions of resemblance, even if context-sensitive, are not the same as the anti-resemblist ones. For the anti-resemblist maintains that whether a property is elected depends on a representational perspective, whereas the resemblist contends that the election of a property is an objective matter since elected properties are sparse properties. What the moderate resemblist contends is that the resemblance of sparse properties, the relative importance of sparse properties, and the computation of sparse properties we use to evaluate the overall resemblance of individuals are each dependent on a representational perspective and help determining the non-core resemblance facts and the truth of non-core ascriptions of resemblance.<sup>18</sup>

<sup>18</sup>I tend to think that Lewis is a moderate resemblist of the presented kind. He never explicitly described himself as such of course, but Lewis's views on natural properties and on counterpart theory appear to conflict if Lewis accepts any other stance in the

I will state the moderate resemblist truth conditions for the remaining ascriptions of resemblance, according to the factual relativist framework I adopted when presenting Anti-Resemblism. So the truth of propositions is here relative to a world understood as an ordered pair constituted of a *substratum* and a representational perspective, but the contribution of the representational perspective is not the same as it is within Anti-Resemblism. So (where ‘MR-truth’ stands for moderate resemblist’s truth):

**(MR-Truth  $R_{WM}$ )** ⟨The *As* weakly minimally resemble each other⟩ is true at  $w = \langle s, p_r \rangle$  iff in  $w$  (i) there is a property  $\mathbf{P}$  such that  $\mathbf{P}$  is a sparse property (relative to the *As*) and such that all the *As* have  $\mathbf{P}$ , or (ii) there is a series of sparse properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that each of the *As* has one of them and such that the resemblance of  $\mathbf{P}_1, \dots, \mathbf{P}_n$  saliently exceeds the relevant standard;

(where the representational perspective’s contribution consists only in the resemblance of  $\mathbf{P}_1, \dots, \mathbf{P}_n$  and the determination of the standard of resemblance for the relevant properties). From (MR-Truth  $R_{WM}$ ) we get the following moderately resemblist truth conditions for exact difference:

**(MR-Truth  $D_E$ )** ⟨The *As* exactly differ from each other⟩ is true at  $w = \langle s, p_r \rangle$  iff in  $w$  (i) there is no property  $\mathbf{P}$  such that  $\mathbf{P}$  is a sparse property and such that each of the *As* has  $\mathbf{P}$ , and (ii) there is no series of sparse properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that each of the *As* has one of them and such that the resemblance of  $\mathbf{P}_1, \dots, \mathbf{P}_n$  saliently exceeds the relevant standard.

The moderate resemblist’s truth conditions for strong minimal difference are as follows:

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resemblist/anti-resemblist debate. Anti-Resemblism conflicts with his views on natural properties, and a Radical Resemblism would make his counterpart theory essentialist, while Lewis claims that it is anti-essentialist.

Todd Buras (2006) recently argued that Lewis’s admission of sparse properties makes counterpart theory essentialist. If I am right, Buras’s reasoning is not conclusive because it involves premises that only a radical resemblist would admit. In particular, it involves the premise that one, and only one, computation of the sparse properties gives us an objective evaluation of the comparative resemblance of individuals. But a moderate resemblist need not admit that there is an objectively privileged way of computing the sparse properties, and Lewis may have been, and should have been to prevent inconsistency, a resemblist of the moderate kind.

**(MR-Truth  $D_{SM}$ )** ⟨The *As* strongly minimally differ from each other⟩ is true at  $w = \langle s, p_r \rangle$  iff in  $w$  there is a series of sparse properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that (i) each of the *As* has exactly one of  $\mathbf{P}_1, \dots, \mathbf{P}_n$ , (ii)  $\mathbf{P}_1, \dots, \mathbf{P}_n$  occupy a position on a same  $p_r$ -relevant similarity ordering, and (iii) the resemblance of properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  does not saliently exceed the relevant standard.

Finally, regarding overall resemblance and difference, the moderate resemblist agrees that the truth of such resemblance statements is sensitive to the relative importance attached to such and such sparse properties in a given context, to the relevant computation of the sparse properties, and to the relevant standard.

Let a *sparse respect* be defined as a similarity ordering of sparse properties. Let then the *resembling weight\** of individuals be the resulting value that derives from the  $p_r$ -relevant additive or multiplicative combination of the comparatively more or less important  $p_r$ -relevant sparse respects in which individuals are compared. Here again, the  $p_r$ -relevant respects may be either sparse resemblance respects, sparse difference respects, or both depending on what the  $p_r$ -relevant computation is. Then the moderate resemblist truth conditions for statements of overall resemblance and difference are as follows:

**(MR-Truth  $R_O$ )** ⟨The *As* resemble overall⟩ is true at  $w = \langle s, p_r \rangle$  iff in  $w$  the resembling weight\* of the *As* saliently exceeds the relevant standard.

**(MR-Truth  $D_O$ )** ⟨The *As* differ overall⟩ is true at  $w = \langle s, p_r \rangle$  iff in  $w$  the resembling weight\* of the *As* is saliently inferior to the relevant standard.

#### 7.3.4 Radical resemblist's truth conditions for other ascriptions of resemblance

At the other extreme of the resemblist scale is the radical resemblist. The radical resemblist maintains that every resemblance fact is an objective fact and thus that every ascription of resemblance is true relative to the mind-independent world only.

Radical Resemblism can take two forms. The radical resemblist can maintain that the only resemblance facts are core resemblance facts: facts

of strong minimal difference, facts of weak minimal difference, and facts of exact resemblance. Then though there are resemblance judgements like judgements of overall resemblance which wrongly suggest that there are other resemblance facts, these judgements either express no proposition or express a proposition that represents no resemblance fact. According to this strategy, every resemblance fact is an objective fact but there are significantly less resemblance facts than the anti-resemblist and the moderate resemblist believe.

But the radical resemblist can also maintain that there are facts of weak minimal resemblance, overall resemblance and difference. However, this radical resemblist should contend that I failed to correctly grasp what overall resemblance of individuals and properties is, since I made overall resemblance intrinsically context-sensitive. Overall similarity, this radical resemblist should maintain, is a comparative notion of resemblance, as I think it is, but is wholly determined by the mind-independent world.

The candidates for alternative notions of overall resemblance of individuals and properties which are the best-suited to be close enough to my notions of overall resemblance without being intrinsically context-relative are the following:

(OR') Some individuals/properties resemble overall iff they are more similar to each other than they differ from each other.

(OD') Some individuals/properties differ overall iff they differ from each other more than they resemble each other.

The analysis of overall resemblance (OR) provided in chapter 1 can be seen as an *external* account of overall resemblance in that overall resemblance is determined by the comparison of the resemblance of some individuals with an external standard. On the other hand, (OR') provides an *internal* account of overall resemblance. Obviously, these accounts are not equivalent. Here what determines the overall resemblance of some things is the internal comparison between their resemblance and their difference. If the resemblance exceeds the difference, then the compared things resemble overall. If the difference exceeds their resemblance, then the compared things differ overall. If neither of them is the case, things are neutrally similar.<sup>19</sup>

<sup>19</sup>In (Taylor 2004, 247), Taylor actually provides an internal account of context relative overall resemblance on the line of (OR'). So an anti-resemblist can agree with (OR') and

There are two reasons why I prefer (OR) to (OR'). First, the virtue of (OR) and (OD) is their relative indeterminacy which nicely matches the indeterminacy of the way resemblance and/or difference respects are computed relative to the cognitive task that is to be achieved. (OR') and (OD') are comparatively less indeterminate mainly because they suggest that resemblance and difference respects always matter both in the evaluation of overall resemblance. So if we embrace (OR'), we run the risk that sometimes overall resemblance is not evaluated as (OR') says it should; for instance, when only resemblance respects are relevant.

Second, as I already emphasised, it seems reasonable to think that the predicates 'resemble overall' and 'differ overall' have the same behaviour as vague predicates such as 'tall' and 'rich'. 'Tall' and 'rich' are vague in that we get a *sorites* by assuming, as seems *at first sight* plausible about them, that a tiny loss of height (or richness) cannot bring it about that tall (or rich) people lose their tallness (or richness). I think that 'resemble overall' is vague in just the same way: we get a *sorites* about overall resemblance because it is *at first sight* plausible to assume that a tiny loss of resemblance cannot bring it about that individuals that are similar overall lose their overall resemblance. But, according to (OR'), 'resemble overall' cannot yield such a *sorites* since (OR') introduces a clear boundary to the result that if a tiny loss of resemblance brings it about that things cross the boundary, they lose their overall resemblance. Some may think of this result as an advantage of (OR'), I think the contrary because it shows that (OR') distorts the way we judge about resemblance.

(OR') and (OD') still appeal to comparative resemblance, and if the radical resemblist wants objective truth conditions for overall resemblance statements, he must argue that there is an objective similarity ordering. In order to account for overall resemblance of properties in particular, the resemblist must argue that there is an objective measure of the comparative resemblance of properties. I have no clue as to how such an objective measure would look so I will allow myself to state the radical resemblist's truth conditions for the resemblance of properties, weak minimal resemblance, strong minimal difference and exact difference of individuals thus (where

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maintain that the internal resemblance and difference are determined by the representational perspective.

‘ $w = s$ ’ is here to signify that the world is conceived of as a *substratum* or mind-independent world):

**(RR-Truth P.R.)**  $\langle \mathbf{P}_1, \dots, \mathbf{P}_n$  are properties that resemble each other  $\rangle$  is true at  $w = s$  iff in  $w$   $\mathbf{P}_1, \dots, \mathbf{P}_n$  resemble each other more than they differ from each other.

**(RR-Truth  $\mathbf{R}_{WM}$ )**  $\langle$ The *As* weakly minimally resemble each other  $\rangle$  is true at  $w = s$  iff in  $w$  either (i) there is a property  $\mathbf{P}$  such that  $\mathbf{P}$  is a sparse property (relative to the *As*) and such that all the *As* instantiate  $\mathbf{P}$  or (ii) there is a series of sparse (relative to the *As*) properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that each of the *As* has one of them and such that  $\mathbf{P}_1, \dots, \mathbf{P}_n$  resemble each other.

**(RR-Truth  $\mathbf{D}_{SM}$ )**  $\langle$ The *As* strongly minimally differ from each other  $\rangle$  is true at  $w = s$  iff in  $w$  there is a series of sparse (relative to the *As*) properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that (i) each of the *As* has exactly one of  $\mathbf{P}_1, \dots, \mathbf{P}_n$ , (ii)  $\mathbf{P}_1, \dots, \mathbf{P}_n$  are ordered on a same (objectively determined) similarity ordering, and (iii)  $\mathbf{P}_1, \dots, \mathbf{P}_n$  do not resemble each other other.

**(RR-Truth  $\mathbf{D}_E$ )**  $\langle$ The *As* are exactly different  $\rangle$  is true at  $w = s$  iff in  $w$  there is no series of sparse (relative to the *As*) properties  $\mathbf{P}_1, \dots, \mathbf{P}_n$  such that each of the *As* has one of them and such that  $\mathbf{P}_1, \dots, \mathbf{P}_n$  resemble each other.

Now concerning comparative resemblance of individuals, advocates of sparse properties provided candidate objective measures for comparative resemblance of individuals.

Oliver (1996, 52) has proposed that the degree of resemblance of individuals has to be a ratio of the sparse properties shared to the sparse properties unshared. It might look as follows:

**(dR)** The *As* resemble each other to degree  $d_r$  if and only if  $m/n = d_r$ , where  $m$  is the number of sparse properties shared by the *As* and  $n$  is the average number of properties had by them.<sup>20</sup>

<sup>20</sup>See (Rodriguez-Pereyra 2002, 67-9) for other accounts of degrees of resemblance based on Oliver’s proposal. My (dR) is somewhat similar to the account of degree of resemblance called (D<sub>2</sub>) by Rodriguez-Pereyra. However, (dR) is not threatened by the objection

However, Rodriguez-Pereyra proposes the following measure of degrees of resemblance:

- (D) The *As* resemble each other to degree  $n$  if and only if they have  $n$  [sparse] properties in common. (Rodriguez-Pereyra 2002, 65)

The choice between (dR) and (D) will depend on whether you think that unshared sparse properties have anything to do with resemblance. Rodriguez-Pereyra (2002, 67-9) denies that they do. It should also be noticed that these two measures for degrees of resemblance between individuals do not take into account imperfect but sufficient resemblance of properties. In other words, these are measures constructed on a strong notion of minimal resemblance. So a resemblist who, like Armstrong (1978b, 96), thinks that imperfect resemblance of sparse properties plays an objective role in the determination of degrees of resemblance, would have to provide another measure.

Parallel to (dR) and (D) we find two possible objective measures of degrees of difference:

- (dD) The *As* differ from each other to degree  $d_d$  if and only if  $p/n = d_d$ , where  $p$  is the average number of sparse properties had by the *As* but not shared by all of them and  $n$  is the average number of properties had by them.

- (D-) The *As* differ from each other to degree  $n$  if and only if their average number of unshared sparse properties is  $n$ , where the average number of unshared sparse properties is obtained by calculating the average of properties that each of the *As* does not share with the other *As*.

Pairs (dR)-(dD) and (D)-(D-) provide truth conditions for the radical resemblist's internal notions of overall resemblance and difference of individuals. Since I do not want to enter the resemblist debate about which of the pairs (dR)-(dD) and (D)-(D-) is the *real* resemblance measure, I state the radical resemblist truth conditions for overall resemblance and difference thus:

- (RR-Truth  $R_O$ )** ⟨The *As* resemble overall⟩ is true at  $w = s$  iff in  $w$  the degree of resemblance of the *As* is greater than the degree of difference of the *As*.

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Rodriguez-Pereyra addresses to (D<sub>2</sub>) because it appeals to the average number of properties had by the *As* instead of simply their number of properties.

(RR-Truth  $D_O$ )  $\langle$ The  $A$ s differ overall $\rangle$  is true at  $w = s$  iff in  $w$  the degree of difference of the  $A$ s is greater than the degree of resemblance of the  $A$ s.

### 7.3.5 Truthmaking in Resemblism

As I endorse anti-resemblism, Moderate Resemblism seems to me closer to the truth. However, I do not want to enter the debate between these two forms of Resemblism since I endorse neither of them. For this reason, I restrict my attention to the truthmakers for the core ascriptions of resemblance which are ascriptions of strong minimal resemblance first, but also weak minimal difference and exact resemblance.

What makes it true that some individuals resemble or differ according to the resemblist account? The alternative resemblist truthmaker accounts of ascriptions of resemblance are those provided by the proponents of alternative solutions to the Problem of Universals which endorse the sparse view of elected properties and which I roughly introduced in section 6 of chapter 2. The resemblist can take strong minimal resemblance as primitive and facts of strong minimal resemblance as brute, *i. e.* grounded purely in existence facts, and then explain instantiation of sparse properties and ascriptions of other properties of resemblance in terms of this primitive. This is what a carnivorous resemblance nominalist does.

The alternative consists in endorsing some of the classical views about the nature of sparse properties that are Realism about Universals, Realism about Tropes, or Natural Class Nominalism, and then explain ascriptions of resemblance in terms of the favoured account of sparse properties. These different metaphysics of properties and accounts of objective resemblances between individuals are well-known and well-described in the literature; there is no need for restating them here.

So far so good for the presentation of Resemblism and Anti-Resemblism. The two views are irreducibly opposed; therefore, we must make a choice.

## Chapter 8

# In Defence of Anti-Resemblism

The remaining of this study, that is, the present chapter and the following, focuses on the core ascriptions of resemblance in order to avoid undesired complexities pertaining to differences between Moderate Resemblism and Radical Resemblism.

When the focus is on core ascriptions of resemblance, Resemblism and Anti-Resemblism are radically opposite philosophical positions. One makes resemblance facts objectively determined by the mind-independent world, the other makes resemblance facts partly determined by a representational perspective.

We must choose between these two views of resemblance, and in this chapter I argue in favour of Anti-Resemblism. There are three main reasons why I endorse Anti-Resemblism. First, it provides an explanation of the context-sensitivity of our resemblance judgements. Second, Anti-Resemblism, allied with Nominalism, provides the most powerful metaphysics of resemblance by the usual standards. Finally, I do not believe in the objective realm of natural joints and sparse properties, and this is a reason not to endorse Resemblism.

First, I display the advantages of the anti-resemblist position over the resemblist positions, then I discuss arguments in favour of Resemblism and undermine them.

## 8.1 Resemblism and the context-relativity of resemblance judgements

An explanation of the context-relativity of resemblance judgements is an explanation of why there can be faultless disagreements between resemblance judgements. In other words, it is an explanation of why agents can make opposite resemblance judgements and be each stably warranted in their respective judgement, *i.e.* be each such that they have committed no fault when judging as they did. Anti-Resemblism provides such an explanation. There can be faultless disagreements between resemblance judgements because each of the opposite judgements expresses a true proposition representing an obtaining resemblance fact (though these facts obtain in different worlds conceived of as pairs whose members are a *substratum* and a representational perspective). But Resemblism, according to which the truth of ascriptions of resemblance depends on no mind-dependent feature of reality is not in itself an explanation of the context-sensitivity of our judgements. Does it matter in a metaphysical debate? I think that it matters a lot.

Following Armstrong's lead (Armstrong 1997a, 101), many metaphysicians agree that accounting for so-called 'Moorean facts of apparent sameness of type' is "compulsory in the philosophical examination paper" (Lewis 1999a, 20). Armstrong thinks that Moorean facts of apparent sameness of type should be denied by no philosopher on the grounds that they are believed, with certainty, by common sense and he takes these facts as constituting "a *prima facie* case for postulating universals" (Armstrong 1997a, 101).

I suggest that the fact that our resemblance judgements are context-sensitive, the fact that there can be faultless disagreements between resemblance judgements, is no less Moorean than facts of apparent sameness of type. It is a fact that no philosopher should deny and it is a fact that actually no resemblist denies.<sup>1</sup> For it is a common sense truism, a common experience we all share, that whether we judge that so and so about the resemblance of objects depends, for instance, on which respects we are focusing on. Then clearly, if Moorean facts of apparent sameness of type

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<sup>1</sup>See the quotations from Armstrong and Rodriguez-Pereyra in this first section of chapter 7. Eli Hirsch (1993), who is a resemblist, maintains that the context-sensitivity of resemblance judgements is much more restricted than the anti-resemblist thinks it is. But as I argue in section 3.3 of the present chapter, Hirsch's argument is not conclusive.

constitute a *prima facie* case for postulating universals, Moorean facts of faultless disagreements between resemblance judgements constitute a *prima facie* case for Anti-Resemblism as well. This is the reason why an account of Moorean facts of faultless disagreements between resemblance judgements, *i.e.* an explanation of the context-relativity of resemblance judgements, is compulsory for a theory of resemblance, if not in the philosophical examination paper.

How would a resemblist explanation of the context-sensitivity of resemblance judgements look like? Consider again Sam who judges that

**(6.3)** hippos and whales strongly minimally resemble each other

and Maria who judges that

**(6.4)** hippos and whales do not strongly minimally resemble each other.

Let the representational perspective occupied by Sam be  $p_r$  and the representational perspective occupied by Maria be  $p_r'$  and suppose that the disagreement between Sam and Maria is faultless. In other words, suppose that they are both stably warranted, relative to the representational perspective they occupy, in judging what they judge: their judgements have no defeater.<sup>2</sup>

The (factual) anti-resemblist explains that the disagreement is faultless by saying that the propositional contents of (6.3) and (6.4) are each true at some world, and that these propositions are true because they represent each a fact of the world. Thus the propositional content of (6.3) – namely,  $\langle$ hippos and whales strongly minimally resemble each other $\rangle$  – is true at  $w = \langle s_{@}, p_r \rangle$  because in the latter world it is a fact that hippos and whales strongly minimally resemble each other. And the propositional content of (6.4) –  $\langle$ hippos and whales do not strongly minimally resemble each other $\rangle$  – is true at  $w = \langle s_{@}, p_r' \rangle$  because in the latter world it is a fact that hippos and whales do not strongly minimally resemble each other.

Now what is the content of judgements (6.3) and (6.4), according to the resemblist? The content of Sam's judgement cannot be that hippos and whales strongly minimally resemble each other relative to Sam's representational perspective. For in Resemblism, strong minimal resemblance is not

<sup>2</sup>Cf. section 3 of chapter 6. Sam is stably warranted (relative to  $p_r$ ) in judging (6.3) if and only if he is stably warranted in judging (on the basis of true beliefs) that there is a contextually relevant property shared by hippos and whales.

relative to a representational perspective. But in Resemblism it cannot be that the content of (6.3) is that hippos and whales strongly minimally resemble each other and the content of (6.4) is that hippos and whales do not strongly minimally resemble each other, as I shall argue.

Suppose for *reductio* that the content of (6.3) is ⟨hippos and whales strongly minimally resemble each other⟩ and that the content of (6.4) is ⟨hippos and whales do not strongly minimally resemble each other⟩. In Resemblism the truth of an ascription of strong minimal resemblance is wholly determined by the mind-independent world, the *substratum*. Since the propositions ⟨hippos and whales strongly minimally resemble each other⟩ and ⟨hippos and whales do not strongly minimally resemble each other⟩ are inconsistent, either of them is false at the actual (mind-independent) world. This means that there is a fact in the mind-independent world that makes either ⟨hippos and whales strongly minimally resemble each other⟩ or its negation true. Suppose that this fact makes it true that ⟨hippos and whales strongly minimally resemble each other⟩. Then an occupier of the representational perspective  $p_r'$  that is aware of this fact loses the warrant to the judgement (6.4) which by assumption expresses the proposition that hippos and whales do not strongly minimally resemble each other. If so, by the definition of a stably warranted judgement,<sup>3</sup> Maria is not stably warranted in judging (6.4). For she could come to believe something that would make her lose the warrant to her judgement. Yet we assumed that Maria was stably warranted when judging (6.4). If we assume now that there is a fact that makes true the content of Maria's judgement, we get the result that Sam's judgement is not stably warranted contrary to the assumption. *Reductio* complete.

If the content of Sam's judgement is neither that hippos and whales strongly minimally resemble each other relative to Sam's representational perspective nor that hippos and whales strongly minimally resemble each other, what is the content of this judgement? According to the resemblist, though (6.3) looks like an ascription of strong minimal resemblance,

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<sup>3</sup>  $S$ 's resemblance judgement is *stably warranted* relative to  $p_r$  and true beliefs  $\mathbf{B}$  if and only if (i)  $S$  is warranted relative to  $p_r$  and  $\mathbf{B}$ , and (ii) for any true beliefs  $\mathbf{B}'$  which defeat  $S$ 's resemblance judgement, there are further true beliefs  $\mathbf{B}''$  such that  $\mathbf{B}' \supseteq \mathbf{B}''$  and such that  $S$  is warranted in her resemblance judgement relative to  $p_r$  and beliefs  $\mathbf{B} \cup \mathbf{B}''$ .

it is is an ascription of (exact) resemblance in some respect.<sup>4</sup> ‘With respect to’-clauses are hidden indexicals in our resemblance judgements, and resemblance judgements are incomplete judgements of resemblance in some respect.<sup>5</sup> Hence, the content of Sam’s judgement is of the following form:

(6.3'') (hippos and whales (exactly) resemble with respect to  $r_1, \dots, r_n$ ).

And the content of Maria’s judgement is of the following form:

(6.4'') (hippos and whales do not (exactly) resemble with respect to  $r_1', \dots, r_n'$ ).

Now the disagreement between Sam and Maria is faultless because respects  $r_1, \dots, r_n$  are distinct from respects  $r_1', \dots, r_n'$  and because (6.3'') and (6.4'') are both true.

The resemblist strategy to explain the context-relativity of resemblance judgements has some similarities with the contextualist anti-resemblist view, and have similar drawbacks. First, judgements of resemblance do not (always) express what they seem to express: some judgements of minimal resemblance, those that are context-relative, do not express ascriptions of minimal resemblance but ascriptions of resemblance in some respect. Second, since the resemblist tells us that (6.3) and (6.4) are indexical in such a way that “hippos and whales strongly minimally resemble each other” expresses different propositions in (6.3) and (6.4), we should expect speech-reports of these judgements to be sensitive to the indexical difference according to the rule (SR).<sup>6</sup> But speech-reports of resemblance judgements are not sensitive to this difference since Maria can correctly report Sam’s judgement by saying “Sam said that hippos and whales strongly minimally resemble each other.”

None of these worries shows that the resemblist explanation of the context-relativity of resemblance judgements is untenable. Yet I shall argue that it is untenable because it is false.

<sup>4</sup>Exact resemblance in some respect is required because, since the judgement is one of strong minimal resemblance, imperfect resemblance in some respect would not suffice to make the judgement faultless.

<sup>5</sup>This view that judgements of resemblance *tout court* are incomplete and elliptical for judgement of resemblance in some respect is popular among philosophers, and not only among resemblists: e.g., Searle (1959), McClure (1964, 181), Goodman (1970), and more recently Heil (2003, 152) have all endorsed this view.

<sup>6</sup>Cf. section 2.1 of chapter 7.

Suppose that I judge that

**(8.1)** my DNA resembles that of my (biological) father.

Let us interpret (8.1) as a judgement of strong minimal resemblance to avoid complications. Interpreted as such, I know that (8.1) is true about me. The reason why I know that (8.1) is true about me is not that my father and I made any DNA test, since we did not. My knowledge of (8.1) is only due to my very poor knowledge of evolution theory and genetic science. Since I know the basics of genetic science and given our biological interests in DNAs, I know that (8.1) is true. Let us call my actual representational perspective ' $p_r$ '. So I am stably warranted (relative to  $p_r$ ) in asserting (8.1).

On the other hand, we can well imagine a context in which we are interested in specific features of DNAs in such a way that, in this context, I would be stably warranted relative to our scientific interests in judging that my DNA does not (strongly minimally) resemble that of my father. If there can be such a context, (8.1) is not immune of context-relativity: there could be faultless disagreements about (8.1). If so and according to the resemblist explanation of the context-sensitivity of resemblance judgements, the content of (8.1) is a proposition of the following form:

**(8.1')** ⟨the DNA of Ghislain Guigon and the DNA of Gérard Guigon (exactly) resemble with respect to  $r_1, \dots, r_n$ ⟩.

Suppose then that the content of (8.1) is a proposition of the form (8.1'). Then it is not possible for me to know that (8.1) is true without knowing every proposition of the form (8.1'), since I cannot not know that a judgement is true without knowing that its content is true. Yet I know that (8.1) is true but I fail to know every proposition of the form ⟨the DNA of Ghislain Guigon and the DNA of of Gérard Guigon (exactly) resemble with respect to  $r_1, \dots, r_n$ ⟩. I fail to know the latter because in order to know in which respects my DNA and that of my father resemble, my father and I would have to make a DNA test. But we made no such test. Therefore, the content of my judgement (8.1) cannot be a proposition of the form (8.1').

The resemblist may reply that when we judge in the absence of epistemic access to any respect of comparison – what is the case when I assert (8.1) – the content of the judgement is an indeterminate ascription of resemblance in some respect. If so, the content of (8.1) is the following proposition:

(8.1'') (there is at least one respect in which the DNA of Ghislain Guigon and the DNA of Gérard Guigon (exactly) resemble).

But consider the following counterfactual situation. In the counterfactual world, Ghislain Guigon has the DNA he actually has and so does Gérard Guigon. But in the counterfactual world a branch of genetic science has emerged which proved so successful in predictions about hereditary diseases that ordinary people think about this branch of genetic science as *the* genetic science given their interest in health care. Now the relevant respects of comparison between DNAs according to this branch of genetic science are much more restricted than they actually are because many features of genotypes have been found irrelevant regarding the predictions we are interested in: predictions about hereditary diseases. Since they are so restricted it is not at all trivial that my DNA resembles that of my father in the counterfactual situation. Suppose then that, in this world, Ghislain Guigon makes a DNA test because he wishes to know whether he has inherited diseases from his father. Now suppose that Ghislain Guigon is no more aware of genetics in this world than he actually is. So he cannot interpret the test and asks the laboratory assistant whether he could have inherited some diseases from his father. The laboratory assistant, who knows how to interpret the test and which respects are relevant given the development of genetics and Ghislain Guigon's interests but does not want to lose time in explanations with him, answers: "No, your DNA and that of your father do not resemble at all." Reassured, Ghislain Guigon leaves the test to the laboratory and goes back home.

After the test, Ghislain Guigon is stably warranted in judging that his DNA does not (strongly minimally) resemble that of his father relative to his representational perspective (let us call it  $p_r'$ ). For his judgement is based on the true belief that there is no (relevant) respect in which his DNA and that of his father resemble – which belief is itself based on the true belief that the laboratory assistant was sincere and is competent – and because the latter belief has no defeater; since it is a fact that his DNA and that of his father resemble in no relevant respect.

In the counterfactual situation, Ghislain Guigon is stably warranted (relative to  $p_r'$ ) in denying (8.1) without having any epistemic access to the relevant respects in which the DNAs of human beings can resemble or fail to resemble. If so, the content of the judgement he denies is not:

(8.1') ⟨the DNA of Ghislain Guigon and the DNA of Gérard Guigon (exactly) resemble with respect to  $r_1, \dots, r_n$ ⟩.

For he is stably warranted in denying no such proposition, according to our assumption that he has no epistemic access to respects in which DNAs can resemble or differ. In particular, he has no true belief on the basis of which he is warranted in denying such a proposition. According to the resemblist's reply to the claim that the content of (8.1) cannot be (8.1') when I am stably warranted (relative to  $p_r$ ) in asserting (8.1) in the absence of any epistemic access to respects in which DNAs can resemble or differ, the content of (8.1) should then also be the following in the counterfactual context:

(8.1'') ⟨there is at least one respect in which the DNA of Ghislain Guigon and the DNA of Gérard Guigon (exactly) resemble⟩.

Therefore, (8.1) has the same content in a context wherein I am stably warranted (relative to  $p_r$ ) in asserting it and in a context wherein I am stably warranted (relative to  $p_r'$ ) in denying it; however, my DNA and that of my father are the same in the actual world and in the counterfactual situation. It follows that either (i) (8.1'') can vary in truth value depending on the representational perspective since there is no change in my DNA and that of my father to explain the change in truth value, or (ii) there is one context in which I am committing a fault when judging about the resemblance between my DNA and that of my father.

Consider (i). Asking whether some things exactly resemble in some respect in Resemblism amounts to asking whether these things share a sparse property. Since whether my DNA and that of my father share some sparse property is independent of any representational perspective, it is not plausible that the resemblist maintains that (8.1'') can vary in truth value depending on the representational perspective I occupy. Moreover, there would be no point in maintaining that whether some things resemble in some respect is context-relative and denying that whether some things resemble *tout court* is context-relative.<sup>7</sup>

<sup>7</sup>However, notice that a traditional anti-resemblist who, like McClure and Goodman, endorses the view that ascriptions of resemblance are incomplete ascriptions of resemblance in some respect should maintain that (8.1'') varies in truth value depending on the representational perspective. But then this anti-resemblist will have to say whether (8.1'') is to be evaluated according to the propositional relativist framework or according to the

Therefore, (ii): the resemblist should contend that there is one context in which I am committing a fault when judging about the resemblance holding between my DNA and that of my father. If this is so, then there is a fact in (the actual or counterfactual) mind-independent world that makes (8.1'') true in one world and false in another. But my DNA and that of my father is the same in both worlds. So what is this fact? Moreover, if there is such a fact, then I am not stably warranted in asserting (8.1) either in the actual or in the counterfactual situation contrary to the hypotheses. For I could come to believe something that would make me lose the warrant to my judgement. So unless the resemblist is ready to claim that the counterfactual situation I described is not a possible one,<sup>8</sup> we should conclude that the content of my judgement (8.1) is neither a determinate nor an indeterminate ascription of resemblance in some respect.

The resemblist account of the context-relativity of (strong minimal) resemblance judgements fails. Therefore, the resemblist, contrary to the anti-resemblist, fails to address the compulsory demand for an account of Moorean facts of context-relative resemblance judgements.<sup>9</sup>

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factual relativist framework. So the traditional anti-resemblist strategy has most of the defects of the contextualist strategy I presented in the previous chapter but does not have its advantages. Factual Anti-Resemblism, in which resemblance judgements have the content they seem to have and in which the content of a resemblance judgement represents the fact it seems to represent, is an improvement on the traditional form of Anti-Resemblism.

<sup>8</sup>The only way the resemblist could motivate the idea that the counterfactual situation I described is not a possible one consists in maintaining that the fictional geneticists *ought to be wrong* in thinking that the relevant comparison respects are what they think they are. Then I am not stably warranted in denying (8.1) in the counterfactual situation because the geneticists themselves are not stably warranted in their resemblance judgements. But I cannot see any good reason to warrant this normative claim. Perhaps the resemblist would say that they ought to be wrong because the respects of comparison that should be relevant in every science are the sparse respects; and since DNAs of immediate ancestors can resemble in sparse respects, and since my DNA and that of my father are the same in both situations, then the fictional scientists are wrong about the respects of comparison they take as relevant.

Here I can only call for scientific humility. The metaphysician has no authority to assert a normative judgement about what scientists should take as relevant or not. And it is doubtless that biologists, among which we find geneticists, can find relevant properties that are not sparse according to the standard accounts of sparse properties: having a common ancestor who lived 60 million years ago is not a sparse property of hippos and whales.

<sup>9</sup>When introducing the debate between Resemblism and Anti-Resemblism I emphasised its parallelism with the debate between Essentialism and Anti-Essentialism. Contempo-

## 8.2 The most powerful metaphysics of resemblance

That Anti-Resemblism explains the context-sensitivity of our resemblance judgements while Resemblism does not explain it makes Anti-Resemblism more explanatory than Resemblism in at least one respect. Other things make Anti-Resemblism the most powerful metaphysics of resemblance when combined with Nominalism: Anti-Resemblist Nominalism scores better than any alternative metaphysics of resemblance with respect to ontological economy, commitment to *ad hoc* ontology, and explanatory power.

A good metaphysics by the usual standards is a coherent metaphysics which explains what it purports to explain without multiplying entities beyond necessity and by avoiding *ad hoc* ontology. Indeed, an Anti-Resemblist Nominalism is the best metaphysics of resemblance by these standards: it explains everything it purports to explain without multiplying entities beyond necessity and without commitment to any *ad hoc* ontology. When arguing for the superiority of Anti-Resemblist Nominalism in this section, I will assume for the sake of the argument that none of the metaphysics I compare is incoherent or implausible. It is the purpose of the remaining of the present chapter and of the following chapter to show that Anti-Resemblist Nominalism is coherent and plausible.

Consider the resemblist realist vs. the resemblist nominalist. The resemblist nominalist accounts for facts of resemblance but does so by assuming brute primitive facts. These brute facts are either brute resemblance facts, according to Resemblist Resemblance Nominalism, or brute facts of membership in some natural class, according to Natural Class Nominalism. Why does it happen then that some individuals resemble while others do not? Resemblist resemblance nominalists offer no explanation for these differences. Why does it happen that two individuals are co-members in some natural class while others do not? Natural class nominalists offer no explanation for these differences. In Resemblist Nominalism, some crucial differences between individuals have no difference-makers.

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rary essentialists like Laurie Paul agree that accounting for the context-variability of our *de re* modal intuitions is “the most threatening antiessentialist objection to essentialism” (Paul 2004, 181). And Paul proposes an essentialist account of this sort of context-variability. I think resemblists should not think otherwise about the context-relativity of resemblance judgements, and, if I am right, they fail to account for it.

On the other hand, the resemblist realist about universals or tropes appeals to no such brute necessities and explains what there is to explain: that individuals resemble each other while other individuals do not, that individuals share (or at least seem to share according to Realism about Tropes) properties while others do not.<sup>10</sup> But the resemblist realists do so by appealing to some *ad hoc* ontology: an ontology of universals or tropes.<sup>11</sup> The resemblist nominalist avoids commitment to such an *ad hoc* ontology and is superior in this respect, but the resemblist realist seems to explain more. And it is pretty difficult to evaluate by rational means which virtue should be favoured: absence of *ad hoc* ontology or explanatory power.<sup>12</sup>

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<sup>10</sup>But to my mind Realism about Tropes pushes the problem back instead of solving it since then it is the resemblance of tropes which turns out primitive.

<sup>11</sup>Cf. (Rodriguez-Pereyra 2002, 210-21).

<sup>12</sup>The realist Hossack (2007) has recently argued that it is the realist who scores better than the resemblist nominalist regarding avoidance of an *ad hoc* ontology: “As serious metaphysics, sets seem dubious at best, and *possibilia* merit only an incredulous stare. Whatever initial reluctance one may feel about believing in the real existence of universals, at least they are less difficult to believe in than the Set Nominalist’s alternative offering of sets plus *possibilia*.” (Hossack 2007, 38-9).

I do not discuss *possibilia* here because I will argue that the nominalist can avoid commitment to non-actual *possibilia* when discussing the Coextension Difficulty in chapter 9. So let us discuss whether universals are less difficult to believe in than sets alone. I think there are plenty of reasons why, contrary to Hossack’s judgement, it is less difficult to believe in sets than in universals, but I shall focus on two of them. The first thing is that sets supervene on individuals. Their existence is wholly determined by that of their members. Universals, however, do not supervene on concrete individuals as such. Aristotelian realists, of course, maintain that the existence of universals depends on the individuals that have them. But the dependence is at best only generic since the existence of a universal does not depend on the existence of any particular instance of it: all the instances of a universal can be annihilated and, provided a new instance of the universal comes into being, the universal can continue to exist. However, the existence of a set is wholly grounded in the singular existence of its members. If one member is annihilated so is the set. Since the dependence of sets on individuals appears thinner than that of universals on individuals, it should be less difficult to accept sets than universals once we accept individuals. Also, if we follow Lewis’s lead (Lewis 1991), we can understand a set as a mereological fusion of its members and we can understand composition as some sort of collective identity between a whole and its parts. A set, and thus a nominalist property, turns out to be identical to the many individuals that have it. Taking this stance, the nominalist is committed to no more than concrete individuals, and sets turn out to be no less dubious than concrete individuals are. However, universals are far from being no less dubious than concrete individuals are.

Take the anti-resemblist realist about universals now, that is George McClure, vs. the resemblist realist about universals. Just like the resemblist realist, the anti-resemblist realist has an explanation for differences in resemblance and for the difference between individuals that share an elected property (conceived of as an abundant universal) and individuals that instantiate no common elected property; these are explained in terms of purposes which are themselves universals (McClure 1964). The superiority of Anti-Resemblist Realism over Resemblist Realism is that the former, contrary to the latter, explains the context-relativity of resemblance and avoids commitment to an *ad hoc* realm of objectively privileged properties with superpowers: the realm of sparse properties. The anti-resemblist realist avoids such an *ad hoc* ontology because cognitive processes of selection of properties relative to a representational perspective is, in Anti-Resemblism, what plays the role of the resemblist realm of sparse properties.<sup>13</sup> However, Anti-Resemblist Realism, as it incurs commitment to abundant universals, is quantitatively less economical than Resemblist Realism. Yet my opinion is that if a theory  $t$  scores better than a theory  $t'$  regarding its explanatory power and avoidance of *ad hoc* ontology, while  $t'$  only scores better than  $t$  regarding quantitative economy – thus the number of entities of a given kind –, then  $t$  is superior to  $t'$ . But nowadays popularity of Resemblist Realism shows that metaphysicians can think otherwise.

Consider now the anti-resemblist nominalist vs. the anti-resemblist realist. The anti-resemblist nominalist can explain everything the realist can explain. For the nominalist can explain differences in resemblance and differences in commonality of elected properties without recourse to brute necessities in terms cognitive processes of representation. Moreover, both theories explain the context-relativity of resemblance judgements. However, Anti-Resemblist Nominalism scores much better than Anti-Resemblist Realism regarding ontological economy and commitment to an *ad hoc* ontology. For the nominalist needs no *ad hoc* realm of universals or tropes to explain what the realist explains. The anti-resemblist nominalist's ontology is made of individuals, some of them having representational capacities, and sets whose existence is wholly grounded in individuals.<sup>14</sup> The superiority of

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<sup>13</sup>In section 5 of the present chapter, I shall argue, following Taylor (1993), that the theoretical advantages of sparse properties can be recovered using a vegetarian, *i.e.* anti-resemblist, substitute for them.

<sup>14</sup>See the preceding footnote for the comparison between sets and universals.

Anti-Resemblist Nominalism over Anti-Resemblist Realism is thus evident: the former explains as much as its rival with fewer tools.

But then Anti-Resemblist Nominalism is also clearly superior to its resemblist rivals. The anti-resemblist nominalist explains more than the resemblist realist because it explains facts of resemblance and facts of instantiation of elected properties but also explains, contrary to the resemblist, the context-relativity of resemblance judgements. And the anti-resemblist nominalist does so without admitting the *ad hoc* realm of properties objectively elected by reality to be the elite of properties, and without admitting any suspicious kind of entities like universals and tropes. More explanatory power, no *ad hoc* ontology, qualitative economy: these are the features of Anti-Resemblist Nominalism.

Finally, Anti-Resemblist Nominalism is also a better metaphysics of resemblance than its resemblist counterpart is. The anti-resemblist and the resemblist nominalist have the same ontology made of individuals and sets. But the anti-resemblist nominalist appeals to no brute differences, avoids commitment to the *ad hoc* objective realm of sparse properties, and explains the context-relativity of resemblance judgements. What are brute necessities in Resemblist Nominalism are explained by the representational perspective in Anti-Resemblist Nominalism.

All these features should make Anti-Resemblist Nominalism the most attractive project of a metaphysics of resemblance and show that the project is well worth defending. The remaining of the present chapter defends Anti-Resemblism against objections raised by the resemblist. In the following chapter, I develop an anti-resemblist, or vegetarian, resemblance nominalist project.

### 8.3 Objections to Anti-Resemblism

There are two resemblist strategies to object to Anti-Resemblism. The resemblist can argue against Anti-Resemblism as a theory of resemblance, or, since Resemblism is a corollary of the sparse view of elected properties, he can use any argument to the conclusion that there is an objective divide between sparse and abundant properties as an argument in favour of Resemblism. I shall first discuss arguments against Anti-Resemblism as a

theory of resemblance and then arguments in favour of the sparse/merely abundant divide.

### 8.3.1 The internality of resemblance

One of the main motives for Resemblism is plausibly the view that resemblance is internal to the individuals that instantiate it. For metaphysicians seem to have the strong intuition that resemblance is such an internal property<sup>15</sup> and Anti-Resemblism makes it external.<sup>16</sup>

What exactly is an internal property? Following Armstrong (1989, 43) and Mulligan (1998, 344) we might say that a property is internal when, given certain entities with certain natures, the property must hold between these entities. Resemblance is internal because there is no possible world, according to Armstrong (1989, 44), in which the objects remain unaltered but in which their resemblance varies.

If external is the negation of internal, then Anti-Resemblism, of course, makes resemblance external. For even in our own world it happens that objects remain unaltered whereas their resemblance varies from one context to another if the representational perspective of the agents ascribing resemblance to objects varies. So just as Armstrong (1989, 44) as objected that, according to Resemblance Nominalism, “Resemblance would have to be what it is not: an external relation.” he could have objected to Anti-Resemblism that, according to it, resemblance is what it is not: an external property. Yet what grounds Armstrong’s certitude that resemblance is internal?

I guess that the ground for this certitude is that it seems odd that hippos and whales can change in resemblance without there being any change in hippos and whales. But the anti-resemblist has a natural explanation of this oddity given that resemblance is, according to the theory, a matter of representation. Since faultless disagreements between resemblance

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<sup>15</sup>Of course, in the literature it is said that resemblance is an internal *relation* instead of an internal property, but I talk of internal property here since, as I argued, resemblance is a monadic property.

<sup>16</sup>It should be noticed that resemblance is not external according to every form of Anti-Resemblism. For, according to the contextualist anti-resemblist, resemblance is internal to its *relata*, where its *relata* are individuals and a representational perspective. But this is different from what the resemblist believes. For the resemblist believes that resemblance is internal to the individuals that resemble each other, full stop.

judgements make it plausible that our resemblance judgements can vary in virtue of differences in representational perspectives, it is also plausible that resemblance can vary for the same reason.

Another motivation for the view that resemblance is an internal property is to be found in (Mulligan 1998). Mulligan, by means of several examples, shows that there is an intuitive difference between two categories of relations, the thick ones, and the thin ones. Clearly, resemblance is to be classified as a thin relation, according to him, and I agree with him that resemblance is thin, even if I do not agree that it is a relation. Then he discusses different ways of articulating the difference between thin and thick relations. (i) Thin relations are *topic-neutral*,<sup>17</sup> thick relations are not. (ii) Thin relations are *formal*, thick relations are material. Mulligan disapproves these two ways of articulating the distinction because the present account of topic-neutrality is too vague to be satisfactory and because the formal/material distinction relies on controversial claims about relations which have a logic and relations which have no logic.

Since he thinks that the previous ways of characterising the thin/thick distinction are inappropriate, Mulligan claims that the best way of articulating the distinction consists in conceiving thin relations as internal, and thick relations as external. If resemblance truly is a thin property and if thin properties are internal, so is resemblance. Yet the anti-resemblist denies the conclusion and should thus deny that thin properties are all internal if he agrees, as I do, that resemblance is a thin property.

The anti-resemblist is justified in conceiving resemblance as a thin property if the idea that thin properties are the properties which are topic neutral<sup>18</sup> can be made clearer. For resemblance clearly is topic-neutral in the strongest sense of the term: resemblance is a property that can hold between entities of any kind whatsoever, and resemblance is so no matter whether Anti-Resemblism or Resemblism is true. It is true that, presently, there is no satisfactory account of topic-neutrality, but we may hope for better days. Perhaps, there is no determinate way to be a thin property: some properties are thin in that they are internal but not strictly speaking topic-neutral; some properties, like resemblance, are thin in that they are topic-neutral but not internal. If so, the category of thin properties is a disjunctive one, but

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<sup>17</sup>Cf. (Ryle 1954, 115f).

<sup>18</sup>Or the properties about which we have a topic-neutral concept.

I do not think that this constitutes a challenge. At any rate, it does not constitute a challenge to Anti-Resemblism but only to possible taxonomies of properties.

It is not the purpose of this study to determine what thin properties are. What matters here is that Anti-Resemblism makes resemblance external, whereas the resemblist maintains that resemblance is internal. Unless we beg the question in favour of an objective divide between sparse and merely abundant properties, and thus Resemblism, I can think of no good reason to believe that resemblance is internal. For the empirical evidence that resemblance judgements are context-relative provides a *prima facie* case for Anti-Resemblism and the view that resemblance is not internal.

### 8.3.2 The fallacy of generalising from borderline cases

But perhaps I am wrong in thinking that empirical evidence confirms Anti-Resemblism in the view that resemblance is context-relative. This is Hirsch's strategy against Anti-Resemblism (Hirsch 1993, 71). According to Hirsch, anti-resemblists like Goodman commit a "fallacy of generalising from borderline cases" when they say that resemblance judgements are context-relative. They commit such a fallacy because they focus on few cases such that resemblance seems to vary with context and generalise to every judgement of resemblance. But there are clear-cut cases of judgements of resemblance following Hirsch.

Let us examine Hirsch's alleged context-insensitive judgements of resemblance to see whether they really are so. Hirsch focuses on judgements of comparative resemblance:

- (a) Whenever  $a$  is identical to  $b$  but  $a$  is not identical to  $c$ , then  $a$  and  $b$  resemble each other more than  $a$  and  $c$  do.
- (b) Whenever  $a$  and  $b$  are duplicates but  $c$  is not a duplicate of  $a$ , then  $a$  and  $b$  resemble each other more than  $a$  and  $c$  do.
- (c) Whenever  $a$  and  $b$  resemble in many respects, whereas  $a$  and  $c$  resemble in few respects, then  $a$  and  $b$  resemble each other more than  $a$  and  $c$  do.
- (d) Whenever  $a$  and  $b$  share more natural properties than  $a$  and  $c$  do, then  $a$  and  $b$  resemble each other more than  $a$  and  $c$  do.

Consider the following instance of the antecedent of (a):  $a$  and  $b$  are identical, whereas  $a$  and  $c$  aren't identical but exact duplicates; *i.e.*, in resemblist terms,  $a$  and  $c$  share all their sparse properties.<sup>19</sup> If the resemblist is right that resemblance is a matter of sparse properties, then what follows from our assumption is that  $a$  and  $b$  resemble each other as much as  $a$  and  $c$  do which contradicts the consequent of (a). If so, if (a) is valid, then this result seems to falsify Resemblism.

Moreover, Lewis has rejected (a) for theoretical reasons. Lewis (1986b, 227) considers the possibility that the actual world is a world of one-way eternal recurrence with a first epoch but no last. Suppose that I live in the seventeenth epoch. It is true that I might have lived in the fifteenth epoch. The only way to leave room for this possibility in counterpart theory is by rejecting the postulate that an individual has only one counterpart in its own world, and thus by admitting that, within the actual world, there is a  $y$  such that  $y$  is not identical to  $x$  but such that  $y$  resembles  $x$  as much as  $x$  resembles itself. Lewis's rejection of the postulate according to which one individual can have more than one counterpart in its own world, entails the rejection of the postulate that whenever  $a$  is identical to  $b$  but  $a$  is not identical to  $c$ , then  $a$  resembles  $b$  more than it resembles  $c$ . But Lewis was a resemblist! Therefore, the validity of (a) is controversial among resemblists, and if (a) were valid, this would constitute a problem for the resemblist.

Now, consider (b). (b) is question-begging because the relation of *duplication* has been introduced by Lewis in (Lewis 1999a, 25-9) as an objective kind of resemblance purely determined by sparse or natural properties. That is, two individuals are duplicates whenever they share all their sparse properties. Thus (b) begs the question since the antecedent of (b) involves a context-insensitive property of resemblance, namely duplication, which is a purely resemblist construct. Moreover, resemblists disagree about cases of the form of (b). Suppose degrees of objective resemblance are to be measured using Rodriguez-Pereyra's definition (D).<sup>20</sup> Now let  $a$  and  $b$  be duplicates such that each of them instantiates three sparse properties, and let  $c$  be such that it instantiates seven sparse properties among which we find the three sparse properties instantiated by  $a$  and  $b$ . By (D)  $a$  and  $b$ , which are duplicates, resemble each other to degree 3 and  $a$  and  $c$ , which

<sup>19</sup>This situation is plausible according to the doctrine of sparse properties because duplicates can still differ relative to merely abundant properties like extrinsic properties.

<sup>20</sup>See sections 6.1.4 and 7.3.4 on (D) and (Rodriguez-Pereyra 2002, 77) on this point.

are not duplicates, resemble each other to degree 3, what contradicts (b). Therefore, (b) begs the question, and that the consequent of (b) follows from its antecedent is controversial among resemblists.

Consider cases of the form of (c). Even if it were true that the consequent of (c) follows from the antecedent – what is unlikely since resembling in a very important respect can make for more similarity than resembling in many relevant but far less important respects does –, this won't prove that cases of the form of (c) are clear-cut and context-insensitive. For the anti-resemblist has plenty of reasons to think that (c)'s antecedent is context-relative, and if he is right, the consequent of (c) is also context-relative. For (c) to constitute a counterexample to Anti-Resemblism, it must be argued that its antecedent is context-insensitive. In the absence of such an argument, (c) does not threaten the anti-resemblist.

Finally, are cases of the form of (d) clear cut cases of comparative resemblance? They are, . . . provided we assume that there is an objective distinction between the sparse properties and the others. But that there is such a distinction is what Hirsch, as a resemblist, has to prove. Presenting (d) as a clear-cut case of comparative resemblance, again, is question-begging, since it assumes the distinction between sparse and merely abundant properties from which Resemblism follows.

Hirsch's counterexamples are hardly persuasive. Moreover, his strategy would not be conclusive even if he had displayed genuine examples of resemblance judgements that are true in every context. For it is one thing to claim that some judgements are true in every context; yet it is another thing to claim that the latter are true independently of any context.<sup>21</sup> Anti-Resemblism is not the view that no ascription of resemblance is true in every context, it is the view that their truth-value is context-dependent as it is partly determined by a representational perspective. As I emphasised when introducing Factual Anti-Resemblism in section 2.3 of chapter 7, the anti-resemblist can account for ascriptions of resemblance that are true in every context, and thus relative to every representational perspective, using the operator ' $\Box_{pr}$ '. Therefore, Anti-Resemblism could be true even if it were the case that some or even most resemblance judgements, and their contents, are true in every context.

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<sup>21</sup>Compare: it is one thing to say that assertions, once true, are true eternally, it is another to say that they are timelessly true.

## 8.4 Speculative arguments for sparse properties

Any argument to the conclusion that there is an objective distinction between sparse and abundant properties is *ipso facto* an argument for Resemblism, at least once we admit, as resemblists usually do, that sparse properties are those properties that have to do with the resemblance of individuals. So we should consider how advocates of the objective divide between sparse and merely abundant properties argue for their view.

First, there are intuitions. When considering such properties as *being grue* and *being gricular* (which is analysed as being green or circular) we have the intuition that these properties are not genuine, that they are merely disjunctive, that they are not intrinsic, that they do nothing for the similarity of their bearers (Hirsch 1993, 66-7), that they do not make their bearers have something identical (Armstrong 1989, 82). I agree that we have such intuitions. These intuitions, however, do not show that there is an objective distinction between sparse properties and merely abundant ones, that the mind-independent reality privileges some properties instead of others. These intuitions would show that there is an objective distinction between sparse and merely abundant properties, if arguments to the premise that we have the strong belief that something exists to the conclusion that this thing exists were valid. But they are not. These intuitions do not establish that there is an objective distinction between genuine and *pseudo* properties. Nevertheless, they constitute an undeniable *prima facie* case in favour of the objective distinction between sparse and merely abundant properties just as Moorean facts of faultless disagreements between resemblance judgements constitute a *prima facie* case for Anti-Resemblism.

However, the difference between the resemblist and the anti-resemblist on this point is that the anti-resemblist can explain our intuitions in favour of the objective divide between properties, whereas the resemblist does not satisfactorily explain the context-relativity of our resemblance judgements. The anti-resemblist can argue that the properties we intuit as genuine are the ones which proved the most helpful in the struggle for life and in predictions. Or he can argue that some properties are thought of as genuine and others as not genuine using Goodman's notion of entrenchment (Goodman 1983). The more entrenched is the predicate or general term having as semantic value the property **P**, the more genuine **P** appears to us. In any case,

which properties appear to us as genuine and which do not appear as such is determined by our representational perspective.

Second, there is the argument according to which the objective reality is economical and elegant, and that since some properties are redundant relative to other properties, reality is such that only non-redundant properties, the fundamental ones, exist. These fundamental properties are the sparse properties understood as perfectly natural.

This idea that nature is economical and elegant does not seem really justified when we pay attention to the object of empirical sciences. From the point of view of empirical sciences, nature rather seems to be extremely complex, uneconomical and even messy.<sup>22</sup> But even if the objective reality were economical and if some properties were somewhat redundant and superfluous relative to others, this line of argument would not target Anti-Resemblist Nominalism, but only Anti-Resemblist Realism. To admit an abundance of universals or tropes is uneconomical, but to admit an abundance of sets of individuals is just inescapable once we admit sets and given the cardinality of individuals.

Given the latter reply, some resemblist may argue against Nominalism that we need a substantive kind of entities to play the role of properties: universals or tropes. If she succeeds, if properties are universals or tropes, and if the anti-resemblist must admit an abundance of properties, then Anti-Resemblism is threatened by worries of quantitative economy. But as I emphasised in section 2 of the present chapter, this lack of quantitative economy is balanced by an increased explanatory power and the absence of commitment to an *ad hoc* objective distinction between sparse properties and merely abundant properties.

One standard argument against nominalists who deny that properties are of a substantive kind is that it reverses the order of explanation. This line of argument has been taken by Armstrong (1978a, 36), Mellor (1997, 262), and more recently by Molnar in the following passage:

The nominalist's formalist substitute for a robust explanation faces an obvious Euthyphro question: Do some things freeze when cooled to 0°C because they satisfy the predicate 'freezes when cooled to 0°C' [or alternatively, because they are members of the set of things that freeze when cooled to 0°C], or do these

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<sup>22</sup>On this point, see (Rescher 2000).

things satisfy the predicate ‘freezes when cooled to 0°C’ [or alternatively, are members of the set of things that freeze when cooled to 0°C] because they in fact freeze when cooled to 0°C? Once formulated the question looks easy to answer. Surely *a* belongs to the extension of ‘F’ because of some property or properties it has, and not conversely. (Molnar 2003, 23-4)<sup>23</sup>

The worry with this traditional argument is that the nominalist does not have to accept the terms of the addressed question. If the nominalist accepts the question, then he commits himself to the claim that there are two kinds of entities: predicates or sets of individuals on the one hand, and properties on the other hand. Truly, if the nominalist admits that these kinds of entities are distinct, a problem may be raised. But if a nominalist identifies, as I do, properties with sets of individuals (or alternatively with predicates) Molnar’s questions do not make much sense. If *a* is identical with *b*, it is neither *a* which explains *b* nor *b* which explains *a*. So the nominalist theory I favour is not the target of this traditional objection.

Another line of argument against the nominalist view I endorse and which is in favour of Realism about Tropes concerns perception. Mulligan, Simons, and Smith argue that opposite theories of properties must account for cases where we seem to see and hear tropes, *i.e.* cases we report with descriptions like ‘the scarletness of the table’.<sup>24</sup> They are right that we must account for such cases.

My reply to this objection is a traditional one: we do not perceive the scarletness of the table; what we perceive is that the table is scarlet. And perceiving that the table is scarlet is nothing but perceiving that the table is one of the many scarlet individuals. But adapting an example of theirs (1984, 307), Mulligan, Simons, and Smith could reply that Susan may see the scarletness, but fail to recognise that it is the table’s one. This is true, but we can account for the case saying that Susan sees that something is scarlet without recognising that this something is the table. And seeing that something is scarlet is just seeing something which is one of the many scarlet individuals.

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<sup>23</sup>Parenteses are mine.

<sup>24</sup>This is the example discussed in (Rodriguez-Pereyra 2002, 93). The example used in (Mulligan et al. 1984) is ‘the smile that just appeared on Rupert’s face’. But I agree with Rodriguez-Pereyra that the scarletness of the table is a clearer example of a trope than the smile that just appeared on Rupert’s face is.

Nef (2006, 181-1) provides a further example of what he takes to be a perception of a *free-floating* trope, *i.e.* a trope that has no bearer: the twinkling of the screen at the moment of a collision of particles that annihilated each other.<sup>25</sup> This example can be interpreted as an example of a perception of a free-floating trope only if we think of the twinkling as a property of the annihilated particles. If the example *must* be interpreted in this way, then here we cannot say that what we see is something twinkling. But we need not interpret the example in this way, and grammar rather suggests that the twinkling is a property of the screen, which is not annihilated, rather than a property of the particles. The twinkling is a trace on the screen of the event which ended with the annihilation of the particles. Particles do not twinkle, it is a region of the screen which twinkles, and perceiving the twinkling of a region of the screen is just perceiving that that region of the screen twinkles. This further example is no more convincing than the others.

Finally, one may claim that some properties are causally non-*efficacious* while other properties are causally *efficacious*. These properties that are causally *efficacious* are the sparse ones. Yet that a property is causally *efficacious* need mean no more than that the individuals which have it are causally *efficacious* in virtue of having it; that is, in virtue of being among the many individuals the set of which is the property in question.

There exist many other arguments against Nominalism that I cannot discuss here without going too far away from the topic of the present study and that have been discussed in many other essays. My opinion is that the mentioned arguments are the strongest ones but are not conclusive. Anyway, even if some argument against Nominalism proves conclusive, then my attitude would be to endorse the abundant view of universals or tropes that follows from Anti-Resemblism rather than the sparse view of universals or tropes defended by the *resemblist*. For even if it is true that Anti-*Resemblist* Realism is less economical than its *resemblist* rival, the lack of economy is only quantitative: it admits more entities of the kinds of entity already admitted by the *resemblist*. And I consider that this lack of quantitative economy is less problematic than the inability to explain the context-relativity of resemblance judgements, and the *resemblist* commitment to an *ad hoc* objective realm of elite properties.

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<sup>25</sup>The translation is mine. The French says “La scintillation de l’écran lors d’une collision de particules qui se sont mutuellement anéanties.”

## 8.5 The resemblist utilitarian case for belief

I do not believe in the objective distinction between sparse and merely abundant properties and in the present section I explain why I need not believe in this distinction. The content of this section is more or less a summary of Barry Taylor's paper "On Natural Properties in Metaphysics" (Taylor 1993) reproduced also in (Taylor 2006). I apologise for such a rephrasing, but my agreement with Taylor on these issues is so widespread and his argument so important for the general claim of this chapter that I shall restate his argument without much modifications.

The best argument for the view that there is an objective divide between sparse properties and merely abundant properties is that it is very useful to believe such a thing. This is a utilitarian case for belief. Lewis is a specialist of this line of argument and his utilitarian argument for the carnivorous divide between sparse and non-sparse properties is very impressive given the long list of applications of this distinction.<sup>26</sup>

Sparse or natural properties are used to define duplication (Lewis 1999a, 25-9) which itself is used to defend *humean supervenience* (Lewis 1986c, ix), and formulate other supervenience claims like Minimal Materialism (Lewis 1999a, 33-9). Sparse properties are also useful to analyse *lawhood* (Lewis 1999a, 39-45) and they provide an objective constraint on interpretation that allows us to solve puzzles about the content of thought and language (Lewis 1999a, 45-55). But first of all, the doctrine is useful to account for Moorean facts of commonality of type and is compulsory for systematic philosophy. Therefore, if the doctrine of sparse properties has as corollary Resemblism, it is better to sustain Resemblism than to deprive ourselves of the benefits of the objective divide between the sparse and the merely abundant properties.

Taylor (1993) has argued that most of the alleged benefits of the doctrine of sparse properties can be recovered with a vegetarian substitute for sparse properties and that the benefits we cannot recover in this way do not make a very strong utilitarian case for belief in favour of sparse properties.

Taylor proposes his vegetarian substitute because he finds "these joints [of nature] utterly mysterious, the manner of the carving entirely arcane" (Taylor 1993, 88). I agree with him. Taylor's vegetarian substitute to the doctrine of sparse properties is relativised to theories. The substitutes for

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<sup>26</sup>See Lewis (1986b) and (1999a), but also Oliver (1996, 38-44) and Taylor (1993).

the natural properties are the  $T$ -cosy properties – those properties that are cosy relative to a theory  $T$ .<sup>27</sup>  $T$ -cosy properties are defined in terms of  $T$ -cosy predicates, these predicates being the predicates which play the most central classificatory roles within  $T$ . The method favoured by Taylor to make this idea clear is in terms of the deductive connections between predicates revealed in an axiomatic formulation of a theory  $T$ . The reader can consult Taylor's paper for more details.

Taylor's vegetarian view is a form of Anti-Resemblism. For the  $T$ -cosy properties are the properties that are elected, contextually relevant, relative to a representational perspective in which things are represented according to theory  $T$ . As such, the  $T$ -cosy/non- $T$ -cosy divide, like the division between the sparse and the other properties, separates properties relative to their importance. But while the resemblist's division is absolute and grounded in an allegedly objective difference in nature, the vegetarian  $T$ -cosy/non- $T$ -cosy divide is relative to theories and is grounded in human classification practices.

Does the relativised divide between the  $T$ -cosy properties and the non- $T$ -cosy ones have the same benefits as the absolute divide between the sparse properties and the merely abundant ones? To answer the question, Taylor accurately notices, we should distinguish Lewis's use of the doctrine of sparse or natural properties to solve problems which are idiosyncratic to his own philosophy and the applications of the doctrine to solve genuine philosophical problems. For instance, we need not endorse Lewis's point of view regarding humean supervenience, his Modal Realism, or his definition of events:

‘Bypassing Lewis's uses of natural properties’ does not mean reaching a similar conclusion to Lewis himself on all issues, though without benefit of natural properties. Sometimes, indeed, this may be the way to go; on other occasions, and particularly when Lewis's application of the notion is to address questions highly internal to his own metaphysic, the foe of natural properties may just dismiss Lewis's position as irredeemably tainted by false ideology. The question is whether the sum of the positions thus adopted on specific issues constitutes (or can be embedded in)

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<sup>27</sup> $T$  need not be a scientific theory. Following Taylor,  $T$  can also be an axiomatic regimentation of common-sense.

a coherent, prima facie adequate, alternative to Lewis's philosophy. (Taylor 1993, 93-4)

The objective distinction between sparse and merely abundant properties is in the first place used by Lewis to define duplication. And it is duplication which is highly useful in Lewis's philosophy to define divergent worlds and Determinism, to formulate supervenience theses such as Humean supervenience and Minimal Materialism, and to distinguish between genuine and *pseudo*-events.<sup>28</sup> As Taylor emphasises (1993, 94) we can parody Lewis's definition of duplication using *T*-cosy properties to define a notion of *T*-duplication. From this vegetarian substitute for duplication, we get substitutes for all the notions and relations defined by Lewis in terms of duplication. For instance, we can say that two possible worlds are *T*-divergent iff they are not *T*-duplicates but they do have *T*-duplicate initial temporal segments. And we can then provide a Lewisian style of definition of Determinism using this definition of *T*-divergent worlds.

But do we need such substitutes to get a coherent and systematic philosophy? A systematic philosophy need not be a theory which mimics Lewis's theory, and a systematic philosophy that does not mimic Lewis's philosophy may need no such parody of Lewis's theory of duplication. Take supervenience claims. Perhaps, we should better abandon Humean supervenience as a mere simplification of reality. Moreover, different notions of supervenience can be distinguished without recourse to any objective distinction between the sparse and the non-sparse properties.<sup>29</sup>

The most fundamental explanatory tasks that metaphysics of properties shall carry is an account of resemblance and an account of so-called Moorean facts of commonality of type. Anti-resemblist metaphysics of properties carries the task of accounting for resemblance at least as well as resemblist metaphysics do. For anti-resemblist metaphysics of properties, contrary to resemblist ones, explain the context-sensitivity of our resemblance judge-

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<sup>28</sup>We may add that Lewis also used duplication to distinguish between intrinsic and extrinsic properties in (Lewis 1999b). But many have found Lewis's attempt to define intrinsicness in terms of duplication unsatisfactory, and a definition of intrinsicness that does not appeal to duplication and an objective distinction between sparse and merely abundant properties has recently been proposed by Francesconi (Francesconi 1999).

<sup>29</sup>Cf. (Leuenberger 2008) and (Correia 2005, 131-49) for definitions of supervenience notions that do not appeal to an objective distinction between the sparse and the other properties.

ments. Concerning the account of Moorean facts of commonality of properties, I provide an anti-resemblist and nominalist account of them in the next chapter. If I succeed in doing so, we need not make use of the objective distinction between sparse and merely abundant properties to carry these two fundamental tasks.

Also metaphysics of properties have to enter an account of lawhood and causation, as Lewis acknowledges. The reader can consult section VIII of (Taylor 1993) to see how the vegetarian analysis of properties together with Goodman's notion of entrenchment can be used to provide an analysis of lawhood and predictability.

Therefore, the utilitarian case for belief in favour of the objective distinction between sparse/merely abundant properties is not conclusive. It is far from obvious that the belief in the carnivorous view of elected properties is more useful than the belief in the vegetarian view of elected properties, leaving apart applications of the carnivorous divide that are idiosyncratic to Lewis's philosophy. At least the utilitarian case does not convince me. I do not believe in the objective realm of natural joints, and this is part of the reason why I endorse Anti-Resemblism.

## Chapter 9

# Vegetarian Resemblance Nominalism

In the present chapter I develop the view that I labelled ‘Vegetarian Resemblance Nominalism’ in chapter 7 and which is an anti-resemblist solution to the Problem of Universals. Let me make clear from the start that I neither endorse nor reject the view. The main reason for this position is that I think that the proposed V-Resemblance Nominalism is a good and coherent anti-resemblist solution to the Problem of Universals but it seems to me as good as the view I labelled ‘Vegetarian Elected Class Nominalism’ in chapter 7. For both theories incur the same ontological commitments and have, or so I believe, equal explanatory power.<sup>1</sup>

The aim of focusing on Resemblance Nominalism at the end of the study is double. First, the objective is to introduce a new plausible application of resemblance as grounding a context-sensitive divide between elected and merely abundant properties. Second, the aim is to connect the content of the first part of the dissertation with the content of the second part. In

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<sup>1</sup>That both theories are equally good also seems to have been Lewis’s opinion about what he calls ‘adequate forms’ of their carnivorous counterparts: Resemblist Resemblance Nominalism, and Natural Class Nominalism; cf. footnote 9 of (Lewis 1999a). Lewis even claims that “At any rate, it is not at all clear to me that Moderate Class Nominalism and Resemblance Nominalism in its present form are two different theories, as opposed to a single theory presented in different styles.” (Lewis 1999a, 15). It is not at all clear to me either that the version of V-Resemblance Nominalism I present in this chapter and a version of V-Class Nominalism that adopts the proposed solution to the Coextension Difficulty are not a single theory presented in different styles. If they are a single theory presented in different styles, then I do endorse this theory.

other words, the aim is to connect the result that resemblance is a monadic multigrade property and the discussion of Anti-Resemblism. For conceiving resemblance as a monadic multigrade property is not without benefit for Resemblance Nominalism, be it Anti-Resemblist or not. Also a study of the metaphysics of resemblance should not fail to discuss Resemblance Nominalism.

I say that the view is an anti-resemblist solution to the Problem of Universals? But do we need a solution to this problem once we embrace Anti-Resemblism? Doesn't the Problem of Universals presuppose the carnivorous distinction between sparse and non-sparse properties? No, it does not, and the anti-resemblist has to solve the Problem as well, or so I argue in the first section of the chapter. Section 2 introduces the idea of V-Resemblance Nominalism. Section 3 displays how the V-resemblance nominalist accounts for ascriptions of resemblance and in section 4 I exhibit how I think the V-resemblance nominalist should explain ascriptions of elected properties. In section 5 I discuss the classical objections to Resemblance Nominalism and show how the V-resemblance nominalist can address them. The last section of the chapter is devoted to the discussion of the difficulty of coextensive properties. In this final section, I uphold the view that coextensive properties are identical, and I show how the resemblance of properties is used to account for the fact that we misleadingly believe that coextensive properties are distinct.

## 9.1 Anti-Resemblism and the Problem of Universals

Taylor's vegetarian theory of *T*-cosy properties that I introduced in the last chapter is one among many possible vegetarian substitutes to the carnivorous doctrine of sparse properties, as Taylor himself acknowledges. Taylor understands Armstrong's demand for an account of Moorean facts of apparent sameness of types as a demand to explain why basic precepts of common-sense having the form "the *As* are of the same kind" are highly plausibly true and why these precepts are confidently believed to be true by ordinary folk (Taylor 1993, 91). I do not deny that there is an issue here. Yet, this is not what Armstrong is asking for when demanding an account of these Moorean facts.

Armstrong's demand for an account of the Moorean facts of apparent sameness of type is a rhetorical means to express his demand for a solution to the Problem of Universals. The Problem of Universals being "the problem of how numerically different particulars can nevertheless be identical in nature, all be of the same 'type'" (Armstrong 1978b, 41). The issue, following Armstrong, is not to explain why some common-sense precepts appear to be very plausibly true, but why they are true. It seems plainly true that different individuals can be identical in nature, that they can be of the same type. Thus, *prima facie*, no fact allows us to rule out the Problem of Universals as a *pseudo* problem.

### 9.1.1 Is the Problem of Universals a pseudo problem?

But whether the problem is a *pseudo* problem depends on what is meant by being of the same nature, being of the same type. If 'being identical in nature' is interpreted as sharing a sparse property, then clearly the question is idiosyncratic to the doctrine of sparse properties, and the relevance of the question itself is idiosyncratic to the doctrine.

However, we need not understand the question like this. When I introduced the notion of an elected property in chapter 1, I said that the core of the notion of an elected property is that of a property the sharing of which makes individuals *have something genuinely in common* or be identical in nature. The Problem of Universals, in Armstrong's terms, is thus to be understood as the problem of how distinct individuals can nevertheless share an elected property. And as such, this problem is to be addressed by the vegetarian as well as by the carnivorous about properties.

The vegetarian way of addressing the Problem will obviously differ from the carnivorous way in that the election of a property is determined by the mind-independent world given the sparse theory of properties, while it is determined by a representational perspective and our classificatory habits according to the vegetarian. Nevertheless, acknowledging that truths of apparent identity of nature are truths relative to our classificatory habits does not make the demand of explanation of these truths a *pseudo* or futile issue.

### 9.1.2 What is the Problem of Universals?

The anti-resemblist shall provide a solution to the Problem of Universals. For the superiority of Anti-Resemblism over Resemblism depends on its capacity to address difficulties both theories have to address and the Problem of Universals is one such difficulty. If the addition of a hidden realm of sparse properties is the only way to solve it, we should endorse the doctrine of sparse properties.

First what is the Problem of Universals? As Oliver (1996, 49-50) emphasises the problem is the demand of an account, what is to be accounted for vacillating in Armstrong's work between the following six forms of truths:

- (1)  $a$  and  $b$  are of the same type/have a common property.
- (2)  $a$  and  $b$  are both  $\mathbf{P}$ .
- (3)  $a$  and  $b$  have a common property,  $\mathbf{P}$ .
- (4)  $a$  has a property.
- (5)  $a$  is  $\mathbf{P}$ .
- (6)  $a$  has the property  $\mathbf{P}$ .

What is meant by 'a property' here is not an abundant property, but an elected property given Armstrong's formulation of the Problem of Universals as the problem of how distinct objects can nevertheless be identical in nature. Hence, to disambiguate (1)-(6), I shall restate them as follows:

- (1')  $a$  and  $b$  are of the same type/have a common elected property.
- (2') There is a property  $\mathbf{P}$  such that  $a$  and  $b$  are both  $\mathbf{P}$  and  $\mathbf{P}$  is elected.
- (3')  $a$  and  $b$  have a common property,  $\mathbf{P}$ , which is elected.
- (4')  $a$  has an elected property.
- (5') There is a  $\mathbf{P}$  such that  $\mathbf{P}$  is elected and  $a$  has  $\mathbf{P}$ .
- (6')  $a$  has the elected property  $\mathbf{P}$ .

Anyone who admits that there is a distinction between merely abundant properties and elected properties, no matter whether this distinction is objective or not, should admit that (1')-(6') is the correct restatement of (1)-(6). Philosophers who think that we need not restate (1)-(6) in terms of (1')-(6') are philosophers who deny the status of properties to merely abundant properties. I am not such a philosopher.

As Oliver (1996, 50) points out, Armstrong also vacillates between three candidate views about what an account of (1')-(6') amounts to:

- (a) a *conceptual* analysis of the *content* of (1')-(6');
- (b) an account of the *ontological commitment* of (1')-(6'); and
- (c) an account of the *truthmakers* or *ontological grounds* of (1') to (6').

I agree with Rodriguez-Pereyra that the problem should be understood as a demand for an account of the truthmakers for the truths under examination. I agree with Rodriguez-Pereyra that it suffices to provide truthmakers for truths of the form (6) to get an account of the truthmakers of (1)-(6), and so that it suffices to provide truthmakers for (6') to get the truthmakers of (1')-(6') and provide a solution to the Problem of Universals.<sup>2</sup> So I will assume here that the Problem of Universals first demands an account of the truthmaker(s) of true propositions of the form  $\langle a \text{ has the [elected] property } \mathbf{P} \rangle$ . Such truths are conjunctive truths, as their logical form is the following:  $a$  has the property  $\mathbf{P}$ , and  $\mathbf{P}$  is elected.

It is not the case that the Problem of Universals vanishes when the doctrine of sparse properties is dismissed; it is not even the case that the nature of the problem changes depending on whether we adopt Resemblism or Anti-Resemblism. What varies is the type of truthmakers for (6'): in Anti-Resemblism, the representational perspective is part of the truthmakers.

### 9.1.3 A note on Truthmaker Realism

It must be emphasised that not any anti-resemblist metaphysics needs to address the Problem of Universals if the Problem of Universals is, as I contend, a truthmaker problem. For a solution to the Problem understood in this way implies a commitment to a certain correspondence theory of truth,

<sup>2</sup>Cf. (Rodriguez-Pereyra 2002, 28-30), (Rodriguez-Pereyra 2002, 35-42), and (Rodriguez-Pereyra 2000).

a Truthmaker Realism. Yet, some anti-resemblist may adopt an antirealist theory of truth to account for the truth of ascriptions of resemblance and elected properties, and deny Truthmaker Realism.

Taylor is an antirealist about truth (Taylor 2006), and this may explain why he does not feel the need to address the Problem of Universals and only addresses the demand of an account of Moorean facts of apparent sameness of type understood as an account of why common-sense precepts appear plausibly true.

A reason why an opponent of the doctrine of sparse properties may be reluctant to Truthmaker Realism is that one of Lewis's applications of the doctrine of sparse properties is to solve Putnam's model-theoretic argument against Realism.<sup>3</sup> Putnam's argument is an argument against a realism according to which there is a ready-made world out there to interpret scientific theories. In the terms that I introduced in chapter 7, Putnam's argument is an argument against a realism according to which the interpretation of scientific theory is determined by the *substratum* and not by our representational perspective.

As a contingent matter of fact, the main advocates of Truthmaker Realism also are the main advocates of the sparse property/merely abundant property divide.<sup>4</sup> Truthmaker Realism is almost always stated in such a way that the truthmakers for truths have to be out there, objectively present in the external world, benefiting from a mind-independent mode of existence. So realists about truthmakers seem to be among the realists Putnam's model-theoretic argument is targeting at: those who believe that there is a ready-made world out there to interpret scientific theories.

As Taylor acknowledges, a drawback of the rejection of the sparse theory of properties is that Putnam's argument turns out sound,<sup>5</sup> so that truthmaker realists who believe that there is a ready-made world to interpret scientific theories are still in the target area. But it seems to me that the kind of Truthmaker Realism I advocate, as an anti-resemblist, is not the kind of Truthmaker Realism which is threatened by the conclusion of Putnam's argument. Neither are the truthmakers for resemblance statements nor the truthmakers for statements of sameness of type part of an invari-

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<sup>3</sup>See e.g. (Putnam 1983).

<sup>4</sup>The notable names in the list are Armstrong, Molnar, Mulligan, Rodriguez-Pereyra, and Simons.

<sup>5</sup>Cf. (Taylor 2006).

able ready-made mind-independent world in Anti-Resemblism. They are part of a world made by the evolution of our inductive practices and our interests; this world has already varied a lot and will vary again. Given Factual Anti-Resemblism, there is no inconsistency in maintaining that the interpretation of scientific theories is not determined by the *substratum* and that such an interpretation has truthmakers which are part of our representational perspective. Hence, I can embrace the conclusion that Putnam's model-theoretic argument is sound; its conclusion does not threaten the kind of truthmaker Realism I endorse.

Anti-resemblist metaphysics of properties have to solve the Problem of Universals, and I discuss one such solution having resemblance as part of the solution in the present chapter.

## 9.2 Another Vegetarianism

Vegetarianism about elected properties acknowledges that the elected/merely abundant property divide corresponds to nothing in the objective reality. According to it, whether a property is elected or not is a matter of our classification practices, is determined by our representation of reality. Vegetarianism acknowledges that when the focus is on contexts of classification, there is a psychological divide between properties thought of as genuine and properties thought of as *pseudo* properties. However, the vegetarian denies that this psychological divide corresponds to any objective divide between real and *pseudo* joints in reality. Our classificatory practices might have been different, and the divide between the elected properties and the merely abundant properties varies depending on our interests in classificatory and inductive practices.

A vegetarian may take the election of properties relative to representational perspectives as primitive to address the Problem of Universals. On the other hand, because of its restricted context-relativity, resemblance has been used in philosophy to account for context variable phenomena such as the truth value of counterfactuals and our variable *de re* modal intuitions. If resemblance is useful to account for context sensitive phenomena, why not use resemblance to account for what, according to the vegetarian, is another context sensitive phenomenon, namely the election of properties? This is the project of *V-Resemblance Nominalism*.

Resemblance Nominalism is a solution to the Problem of Universals which explains commonality of elected properties in terms of resemblances between individuals. In its most recent form, *i.e.*, in the version proposed by Rodriguez-Pereyra, Resemblance Nominalism appears as a carnivorous solution to the Problem of Universals. But Resemblance Nominalism is not essentially carnivorous.

Of course, Rodriguez-Pereyra describes his Resemblance Nominalism as a solution to the Problem of Universals conceived of as the demand for an account of ascriptions of sparse or natural properties. Nevertheless, his use of the terminology of the doctrine of sparse properties is not a sufficient reason for classifying his theory as carnivorous. What makes Rodriguez-Pereyra's theory a carnivorous theory is his account of the truthmakers for ascriptions of resemblance and his account of the nature of the primitive resemblance 'relation'.

Resemblance is, according to Rodriguez-Pereyra, "ontological and objective". This means that:

resemblance facts, for example, that *a* resembles *b*, obtain independently of any system of representation which human beings or any other cognizers might happen to use. (Rodriguez-Pereyra 2002, 62)

That resemblance obtains independently of any system of representation is one of the basic claims of Resemblism. Thus the reason why Rodriguez-Pereyra's Resemblance Nominalism is a carnivorous solution to the Problem of Universals is that Rodriguez-Pereyra's account of resemblance is resemblancealist. What grounds his resemblancealist view according to which resemblance is objective and ontological is his account of the truthmakers for ascriptions of resemblance. According to Rodriguez-Pereyra, what makes it true that *a* resembles *b* is that *a* exists and *b* exists.<sup>6</sup> Resemblance facts are, according to his account, wholly grounded in existence facts and since existence facts are wholly grounded in the mind-independent reality, so are resemblance facts. Now if such resemblance facts are what explains that individuals are ascribed properties the sharing of which makes them identical in nature, we get a solution to the Problem of Universals which is carnivorous.

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<sup>6</sup>Cf. (Rodriguez-Pereyra 2002, 63-5).

But Resemblance Nominalism is not essentially carnivorous. Essential to Resemblance Nominalism is the claim that resemblance is what explains ascriptions of elected properties together with the claim that the sharing of an elected property is not what explains the strong minimal resemblance of individuals. However, nothing in this fundamental claim of Resemblance Nominalism makes it compulsory to ground resemblance facts on existence facts or any other allegedly objective facts. *Prima facie*, there is no incompatibility between the view that resemblance is what grounds ascriptions of elected properties and the claim that resemblance facts are not only grounded in existence facts but also in our representational perspective.

In what follows, I first exhibit what explains resemblance facts, according to the V-resemblance nominalist. Then I shall discuss in detail the V-resemblance nominalist's solution to the Problem of Universals. This discussion will lead to the discussion of the classical difficulties raised to Resemblance Nominalism and to the demonstration that the favoured version of Resemblance Nominalism can address these difficulties.

### 9.3 Explanation of ascriptions of resemblance

Resemblance nominalists may disagree regarding the kind of resemblance they take as primitive to explain commonality of properties. Price (1969) takes as primitive a comparative overall resemblance relation to a paradigm individual. Rodriguez-Pereyra's version of Resemblance Nominalism as well as Carnap's version and the one I discuss here have this in common that the primitive kind of resemblance is strong minimal resemblance: the kind of resemblance such that the sharing of an elected property is not only sufficient but also necessary for resemblance.

Since the issue is strong minimal resemblance in this chapter I will use 'resemblance' exclusively as a shorthand for 'strong minimal resemblance' and I will assume that plural terms denote collectively in the present technical context. Thus "ascribing resemblance to the As" here will mean ascribing strong minimal resemblance to the As where 'the As' denotes<sub>c</sub> the As.

As a resemblance nominalist, the V-resemblance nominalist agrees that the resemblance of individuals is what explains that individuals have elected properties, and thus that their having a common elected property is not what explains why individuals resemble each other. Since it is anti-resemblist, V-

Resemblance Nominalism contends that ascriptions of resemblance are relative to representational perspectives. What distinguishes the V-resemblance nominalist from its anti-resemblist opponents is that the resemblance nominalist denies the following explanation for ascriptions of resemblance (where the factual version of Anti-Resemblism is assumed; cf. section 2.3 of chapter 7):

**Contested explanation of resemblance:** it is true at  $w = \langle s, p_r \rangle$  that the *As* [strongly minimally] resemble each other *because* in  $w$  there is at least one property **P** had by each of the *As* that is elected.

For this would turn Resemblance Nominalism on its head. Moreover, the V-resemblance nominalist cannot contend that the *As* themselves make the *As* resemble each other because the *As* exist independently of any representational perspective. What the V-resemblance nominalist should maintain is the following:

**Purported explanation for resemblance:** What makes it true at  $w = \langle s, p_r \rangle$  that the *As* [strongly minimally] resemble each other are the existence of the *As* in  $w$  and the representational perspective  $p_r$ .

The V-resemblance nominalist explains the resemblance of the *As* by the mutual contribution of the existence of the *As*, which is determined by the *substratum*, and the nature of the relevant representational perspective: relevant goals or tasks to be achieved, and relevant dispositions to perform such and such inductive reasonings instead of others which result from evolutionary processes, relative familiarity of the objects under representation, etc. Therefore, resemblance facts are not brute facts here.

In chapter 6 I said that representational perspectives presumably are properties of their occupiers: of agents occupying representational perspectives. So part of what makes true that individuals resemble each other is a property. Is this a difficulty? No, because the task of solutions to the Problem of Universals is not to explain the instantiation of properties by individuals. Properties, as abundant, are out there as soon as individuals are. Abundant properties, as I assumed in this study, are sets of  $n$ -tuples of individuals and it is certainly neither resemblance nor universals or tropes which explain why there are the sets of individuals there are. The V-resemblance nominalist has to explain the instantiation of *elected* properties, not the

instantiation of properties. Hence, the fact that part of what explains the resemblance of the *As* is a property is unproblematic provided this property, the representational perspective, is not itself an elected property, and it is not. The occupied representational perspective and resemblance are here what explains ascriptions of elected properties but are not themselves elected properties.

#### 9.4 Explanation of ascriptions of elected properties

There exist various resemblance nominalist explanations of elected property instantiation which are more or less satisfactory and more or less translatable into the anti-resemblist framework. There is Price's version (Price 1969) which makes use of paradigms or exemplars and which is inadequate for the reasons exposed in (Rodriguez-Pereyra 2002). There is Carnap's version (Carnap 2002) which fails because of the Imperfect Community Difficulty and the Companionship Difficulty. Rodriguez-Pereyra's version (2002) plausibly works as a carnivorous solution to the Problem of Universals but is inadequate for the anti-resemblist because it is based on the assumption that there is a unique and objective measure of degrees of resemblance (Rodriguez-Pereyra 2002, 65-69). Moreover, Rodriguez-Pereyra's Resemblance Nominalism takes resemblance to be a binary relation what resemblance, as I argued in chapter 2, is not.

The version of Resemblance Nominalism I prefer and which, as I think, can be adapted to the anti-resemblist framework is the one proposed by Lewis (1999a) and which makes use of a multigrade and contrastive resemblance property. The V-resemblance nominalist explains the instantiation of an elected property as follows:

**VRN explanation of elected property instantiation:** It is true at  $w = \langle s, p_r \rangle$  that  $a$  has the elected property  $\mathbf{P}$  because in  $w$  (i) the  $\mathbf{P}$ -individuals resemble each other and do not likewise resemble anything which is not a  $\mathbf{P}$ -individual, and (ii)  $a$  is one of the  $\mathbf{P}$ -individuals.

Clause (ii) of the purported explanation states that  $a$  is one of the  $\mathbf{P}$ -individuals. That  $a$  is one of the  $\mathbf{P}$ -individuals is wholly determined by the *substratum*, the mind-independent reality. Since I identify  $\mathbf{P}$  with the

set of **P**-individuals, clause (ii) amounts to an explanation of why  $a$  has the property **P**. Again, this is unproblematic since I conceive of properties as abundant, and Resemblance Nominalism does not purport to explain the instantiation of abundant properties.<sup>7</sup>

It is in virtue of clause (i) that the purported explanation is an explanation in terms of resemblance, and it is in virtue of the purported explanation for resemblance that the proposed explanation of elected property instantiation is vegetarian or anti-resemblist. Clause (i) of the proposed explanation describes in virtue of what **P** is elected: **P** is elected because in the world the bearers of the property resemble each other and do not likewise resemble anything which is not a bearer of the property. And given the purported explanation for ascriptions of resemblance it is the mutual contribution of the *substratum* and the representational perspective that makes (i) be the case in  $w$ . Of course, the **P**-individuals need not resemble anything that is not a **P**-individual. So the contrastive feature of the predication of resemblance introduced in (i) is to be understood thus: for all  $y$  that is not a **P**-individual, if the **P**-individuals resemble  $y$ , then they do not resemble  $y$  as they do resemble each other.

So (i) of the purported explanation actually involves three predications of resemblance:<sup>8</sup> it involves that the **P**-individuals strongly minimally resemble each other; it conditionally involves that the **P**-individuals and  $y$  (that is anything which is not among the **P**-individuals) strongly minimally resemble each other; and it involves the negation of a predication of a new resemblance predicate, *i.e.* the negation of the claim that the **P**-individuals do likewise

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<sup>7</sup>It is because of clause (i) that the proposal is a resemblance *nominalist* proposal. A little modification of the explanation of elected property instantiation would make it a resemblance *universalist* proposal:

**VRU explanation of elected property instantiation:** It is true at  $w = \langle s, p_r \rangle$  that  $a$  has the elected property **P** because in  $w$  (i) the **P**-individuals resemble each other and do not likewise resemble anything which is not a **P**-individual, and (ii)  $a$  instantiates the universal **P**.

So as I emphasised in chapter 7 there is no incompatibility between a Realism about Universals and an explanation of the election of properties in terms of resemblance if we admit an anti-resemblist abundance of universals.

<sup>8</sup>Notice that in Lewis's proposal there is a single complex primitive resemblance predicate which does not distinguish these three predications (Lewis 1999a, 15). I prefer to make explicit the logical form of (i) of the V-explanation of ascriptions of elected property instantiation.

resemble  $y$ . The newly introduced minimal resemblance predicate can be represented as a multigrade and contrastive dyadic predicate of minimal resemblance.<sup>9</sup> Thus let the predicate ‘... do likewise resemble ...’ be noted ‘ $R_C$ ’. The complex predication of resemblance involved in the V-resemblance nominalist explanation of elected property instantiation “some individuals resemble each other and do not likewise resemble anything which is not among them” should therefore be analysed as follows (where ‘ $A$ ’ is the *among* predicate):

$$(9.1) \exists X [R_{SM}(X) \ \& \ \forall y (\neg(yAX) \rightarrow (R_{SM}[X, y] \rightarrow \neg R_C(X, [X, y])))]$$

(9.1) is a first-order plural sentence to be read: there are some individuals, the  $x$ s, which resemble each other and for every  $y$  that is not among the  $x$ s, if the  $x$ s and  $y$  resemble each other, then the  $x$ s on the one hand, and the  $x$ s and  $y$  on the other hand, do not resemble likewise.

Since it has this form (9.1) is true whenever its second conjunct is vacuously true, *i.e.* whenever there is no  $y$  that is not among the  $x$ s and is such that the  $x$ s and  $y$  strongly minimally resemble each other. Whenever the second conjunct of (9.1) is vacuously true, then the strong minimal resemblance of some individuals, for instance the **P**-individuals, is all we need to explain that **P** is an elected property and that  $a$  has an elected property which is **P**.

But unless there is no **P**-individual distinct from  $a$ , this should not be the way to go. For, in virtue of the distributivity of resemblance, if the **P**-individuals resemble each other, any individuals among the **P**-individuals that are not identical to the **P**-individuals resemble each other. Let for instance the **P**-individuals be  $a$ ,  $b$ , and  $c$ . If they resemble each other, so do  $a$  and  $b$ . But we may deny that the property that  $a$  and  $b$  have in common and do not share with  $c$ <sup>10</sup> is an elected one. According to the proposed explanation for ascriptions of elected properties, it would not be the case that the property which is common to  $a$  and  $b$  but not to  $c$  is an elected

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<sup>9</sup>I say that the predicate is ‘contrastive’ but not that it is ‘comparative’. Comparative resemblance is a quantitative matter: it is about whether some things resemble each other at least as much as others do. Contrastive resemblance is a qualitative matter: it is about whether some things resemble *as* – which is not the same as resembling *as much as* – other things do.

<sup>10</sup>There is such a property assuming that properties are abundant.

one because  $a$  and  $b$  on the one hand, and  $a$ ,  $b$ , and  $c$  on the other hand, resemble likewise.

The V-resemblance nominalist can then provide an explanation for each of the candidate *explananda* of the Problem of Universals:

- $a$  and  $b$  are of the same type/have a common elected property because  $\exists X [\mathbf{R}_{SM}(X) \ \& \ \forall y (\neg(yAX) \rightarrow (\mathbf{R}_{SM}[X, y] \rightarrow \neg\mathbf{R}_C(X, [X, y]))) \ \& \ a, bAX]$ .
- there is a property  $\mathbf{P}$  such that  $a$  and  $b$  are both  $\mathbf{P}$  and  $\mathbf{P}$  is elected because the  $\mathbf{P}$ -individuals resemble each other and do not likewise resemble anything which is not a  $\mathbf{P}$ -individual and  $a$  and  $b$  are among the  $\mathbf{P}$ -individuals.
- $a$  and  $b$  have a common property  $\mathbf{P}$  which is elected because  $a$  and  $b$  are among the  $\mathbf{P}$ -individuals and the  $\mathbf{P}$ -individuals resemble each other and do not likewise resemble anything which is not a  $\mathbf{P}$ -individual.
- $a$  has an elected property because  $\exists X [\mathbf{R}_{SM}(X) \ \& \ \forall y (\neg(yAX) \rightarrow (\mathbf{R}_{SM}[X, y] \rightarrow \neg\mathbf{R}_C(X, [X, y]))) \ \& \ aAX]$ .
- there is a  $\mathbf{P}$  such that  $\mathbf{P}$  is elected and  $a$  is  $\mathbf{P}$  because the  $\mathbf{P}$ -individuals resemble each other and do not likewise resemble anything which is not a  $\mathbf{P}$ -individual and  $a$  is one of the  $\mathbf{P}$ -individuals.
- $a$  has the elected property  $\mathbf{P}$  because the  $\mathbf{P}$ -individuals resemble each other and do not likewise resemble anything which is not a  $\mathbf{P}$ -individual and  $a$  is one of the  $\mathbf{P}$ -individuals.

' $\mathbf{R}_{SM}$ ' is the familiar strong minimal resemblance predicate: the predicate individuals satisfy if and only if they share some elected property. So if I am requested to provide further clarification on clause (i) of the proposed analysis of ascriptions of elected properties, this demand should concern ' $\mathbf{R}_C$ '.

As I said above, this proposal is inspired by Lewis's proposal which makes use of a multigrade and contrastive predicate akin to ' $\mathbf{R}_C$ ' though more complex than ' $\mathbf{R}_C$ ' in (Lewis 1999a, 14-5). But Lewis dismisses his own primitive resemblance predicate on the grounds that such a resemblance primitive predicate is artificial, so artificial that it does not mark any real explanatory progress.

It should be noticed that Lewis's disapproval is only that if we have the choice between an artificial primitive resemblance predicate and an unexplained difference between natural classes and classes that are not natural, then "the game is not worth the candle" (Lewis 1999a, 14-5). So Lewis does not take this artificiality as motivating the claim that the view is false but only as motivating the claim that it would be a loss of time to defend the view against an alleged rival he finds equally good regarding its ontological commitments: Natural Class Nominalism. I think that ' $R_C$ ' is not artificial in the context of Anti-Resemblism. However, I agree with Lewis that if the predicate were artificial, we should not conclude that the view is false but only that arguing in favour of V-Resemblance Nominalism against V-Class Nominalism is a loss of time as both views seem equally good regarding their ontological commitments.

What makes a predicate like ' $R_C$ ' artificial? First, artificiality cannot be due to the contrastive character of ' $R_C$ '. For it should be noted that contrastive predicates are used in everyday talk and are understood by ordinary folk. Consider "I love my mother and do not likewise love anybody else" or "I enjoy Bach's music and do not likewise enjoy the work of Mozart". If you try to formalise these contrastive love and enjoyment predicates in a first-order language, their formal representation would also look less familiar than the usual representation of the ordinary, non-contrastive, love and enjoyment predicates. But this does not make these contrastive predicates artificial. Moreover, the artificiality of ' $R_C$ ' cannot be ascribed to its multigrade character because, as I argued in chapter 2, resemblance is multigrade. If ' $R_C$ ' is neither artificial because it is contrastive nor because it is multigrade, what makes it artificial?

I think that Lewis's judgement about the artificiality of ' $R_C$ ' should be due to the fact that it is a contrastive *primitive* predicate once we attempt to explain an objective distinction between sparse and merely abundant properties in terms of it. If the contrast can be explained, the predicate is not artificial. However, if the contrast is not to be explained, if it is not explained why some individuals do not resemble some individual as they resemble each other, we are facing a difference without difference maker so that our use of the contrastive predicate does not mark any real explanatory progress. The target of Lewis's depreciation is a resemblist resemblance nominalist who would make use of a predicate like ' $R_C$ ' to explain why a

certain set is a sparse property. In the resemblist context, I think that the worry is legitimate. But it is not legitimate in Anti-Resemblism, since here the contrast can be explained.

What is puzzling about ‘ $R_C$ ’ is that it looks like a predicate that involves commitment to *ways* of resembling, and that we think of ways of resembling as intrinsic features of individuals under comparison. But in Anti-Resemblism, intrinsic differences do not suffice to explain differences in resemblance. There are different ways of resembling that ‘ $R_C$ ’ tracks, but these different ways of resembling are not intrinsic features of individuals under comparison within Anti-Resemblism. Ways of resembling are, at least partly, ways the world could be; specifically, they are ways the representational part of the world could be.

Suppose that the *As* have in common an elected property that they share with no individual that is not among them, and that they share with *b*, which is not among the *As*, another elected property. So the *As* strongly minimally resemble each other, the *As* and *b* strongly minimally resemble each other, but the *As* do not likewise resemble *b*. In Anti-Resemblism, be it Nominalist or Realist, the fact that the property that is had by the *As* but not by *b* is distinct from the property which is shared by the *As* and *b* does not explain why the *As* do not likewise resemble *b*. For in Anti-Resemblism, *and even if the anti-resemblist thinks of properties as universals or tropes*, the instantiation of a property does not suffice to explain resemblance so that the distinctness of instantiated properties does not suffice to explain differences in resemblance: there are individuals instantiating different properties that resemble likewise.

In order to explain why the *As* on the one hand, and the *As* and *b* on the other hand, do not resemble likewise, the anti-resemblist shall insist that each resemblance is associated with distinctive goals, distinctive classificatory practices, or distinctive genetically implemented traces of the history of our biological ancestors. In order to simplify the explanation let me use the phrase ‘representational task’ as an umbrella term for elements of representational perspectives such as goals, implemented traces, etc. so that the explanation can be as indeterminate as is required with variations in elements of representational perspectives. So the resemblance of the *As* is associated with distinctive representational tasks, the resemblance of the *As*

and  $b$  is associated with other representational tasks and this is the reason why they do not resemble likewise.

Consider the world  $w_1 = \langle s_{@}, p_r \rangle$  which is a variation of the actual world  $@ = \langle s_{@}, p_{@} \rangle$ .<sup>11</sup> No representational task associated with the  $As$  and  $b$  (taken together) belongs to the representational perspective  $p_r$  of  $w_1$ .<sup>12</sup> However, the representational tasks that are actually associated with the  $As$ , abstracted from any individual that is not among them, belong to  $p_r$  of  $w_1$ . Then the  $As$  resemble and resemble likewise in  $w_1$ , whereas the  $As$  and  $b$  do not resemble in  $w_1$ . As a result, the elected property that the  $As$  have in common and do not share with  $b$  in  $@$  is also elected in  $w_1$ . However, the property that the  $As$  share with  $b$  and that is elected in  $@$  is no more elected in  $w_1$ .

Now consider the world  $w_2 = \langle s_{@}, p_r' \rangle$  which is a variation of the actual world  $@ = \langle s_{@}, p_{@} \rangle$ . The representational tasks that are associated with the  $As$  and  $b$  (taken together) in the actual world belong to the representational perspective  $p_r'$  of  $w_2$ . However, the representational tasks that are associated in  $@$  with the  $As$  – abstracted from any individual that is not among them – do not belong to  $p_r'$ . Then the  $As$  and  $b$  resemble each other in  $w_2$ , the  $As$  resemble each other in  $w_2$ , but the  $As$  on the one hand, and the  $As$  and  $b$  on the other hand, *do* resemble likewise in  $w_2$ . As a result, the elected property that the  $As$  have in common and do not share with  $b$  in  $@$  is not elected in  $w_2$ . But the property that the  $As$  and  $b$  have in common and is elected in  $@$  is also elected in  $w_2$ .

So the  $V$ -resemblance nominalist can explain why  $R_C$  holds or does not hold between individuals in terms of variations in elements of representational perspectives. In section 2 of chapter 8 I argued that Anti-Resemblist Nominalism is superior to Resemblist Nominalism because what the resemblist nominalist does not explain, *i.e.* what is a brute necessity in his theory, is explained by the anti-resemblist nominalist in terms of representational perspective. That the  $V$ -resemblance nominalist can explain the contrastive

<sup>11</sup>So we suppose that the *substratum* is the same in both worlds. If the variation is due to a variation in our biological history, then the *substratum* should also vary. What matters here is that there is not objective change in the  $As$  and  $b$ , *i.e.* no change in the properties they instantiate, so that changes in resemblance are not to be explained in terms of intrinsic changes in the compared individuals.

<sup>12</sup>*I.e.* neither is it the case that the representational tasks that are *actually* associated with the  $As$  and  $b$  (taken together) belong to  $p_r$ , nor is it the case that other representational tasks that could have been associated with the  $As$  and  $b$  (taken together) belong to  $p_r$ .

feature of ‘ $R_C$ ’ while a resemblist who uses ‘ $R_C$ ’ cannot explain it illustrates the superiority in explanatory power of Anti-Resemblist Nominalism over its Resemblist rival.

Besides Lewis’s own moderate disapproval, there is Rodriguez-Pereyra’s objection against the use of resemblances holding between more than two individuals in Resemblance Nominalism that I already discussed in chapter 2. Rodriguez-Pereyra argues that a collectivist resemblance nominalist cannot account for the distributivity of resemblance. My V-resemblance nominalist is a collectivist resemblance nominalist. And as I argued in chapter 2, the collectivist resemblance nominalist can explain why resemblance distributes in terms of (Nec)<sup>13</sup> and the claim that whenever some individuals resemble in some respect, any two of the latter resemble in some respect. Yet none of these necessary truths are primitive in Collective Resemblance Nominalism since they are explained by the resemblance nominalist explanation of ascriptions of elected properties.

Resemblance Nominalism is better known for the classical difficulties that have been raised against it than for its own proposal. So I shall exhibit how the present vegetarian proposal addresses these classical difficulties.

## 9.5 Objections against Resemblance Nominalism

### 9.5.1 The Imperfect Community Difficulty II

The classical objection which has arguably been thought of as the most decisive against classical versions of Resemblance Nominalism is the so-called Imperfect Community Difficulty. As I mentioned when discussing the arity of resemblance, an imperfect community is a class such that any two members of it resemble each other but such that all the members of the class do not share a property. Imperfect communities are challenging because they show that the resemblance of any two of the *As* is not sufficient for there to be an elected property shared by the *As*. This is true. But the result of chapter 2 is that the resemblance of any two of the *As* is not sufficient for the resemblance of the *As* either, (Rcumulativity) being invalid.

Imperfect communities raise a challenging difficulty to these versions of Resemblance Nominalism which agree that resemblance is a binary relation

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<sup>13</sup>Where (Nec) is the claim that whenever some individuals resemble, they resemble in some respect.

and aim to explain the fact that  $a$  has an elected property,  $\mathbf{P}$ , by the fact that  $a$  resembles every  $\mathbf{P}$ -individual. But resemblance is not a binary relation. The advocated version of V-Resemblance Nominalism embraces this result and takes the resemblance of the  $\mathbf{P}$ -individuals and the fact that  $a$  is one of them as grounding the fact that  $a$  has an elected property instead of the resemblance of  $a$  to each  $\mathbf{P}$ -individual. Given (Nec), it is not possible that the  $\mathbf{P}$ -individuals strongly minimally resemble each other – and do not likewise resemble anything which is not among them – without it being the case that the  $\mathbf{P}$ -individuals share an elected property.

It is not that the present version of Resemblance Nominalism provides a solution to the Imperfect Community difficulty. Strictly speaking, the truth is rather that the Imperfect Community Difficulty vanishes, ceases to be a difficulty at all, once it is acknowledged that (Nec) is a non-negotiable claim about resemblance and that resemblance can hold between more than two individuals.

### 9.5.2 The Companionship Difficulty

A genuine difficulty against Resemblance Nominalism, which is also due to Goodman (1966, 160-2) but had been anticipated by Carnap (2002), is the so-called *Companionship Difficulty*. The difficulty is intended to show that it is false that what makes an individual have an elected property  $\mathbf{P}$  is that it resembles all the  $\mathbf{P}$ -individuals. For suppose that all the  $\mathbf{P}$ -individuals are also  $\mathbf{Q}$ -individuals (where  $\mathbf{Q}$  is elected as well) but not *vice versa*. In this case we say that the elected property  $\mathbf{Q}$  accompanies  $\mathbf{P}$ . All the  $\mathbf{Q}$ -individuals resemble all the  $\mathbf{P}$ -individuals so that resembling all the  $\mathbf{P}$ -individuals cannot be what makes an individual have the elected property  $\mathbf{P}$ . For, by assumption, some  $\mathbf{Q}$ -individuals do not have  $\mathbf{P}$ .

It is the contrastive feature of  $R_C$  which allows us to solve the Companionship Difficulty. Considering the former situation where the elected property  $\mathbf{Q}$  accompanies the elected property  $\mathbf{P}$ , the  $\mathbf{P}$ -individuals resemble each other but do not *likewise* resemble any  $\mathbf{Q}$ -individual which is not a  $\mathbf{P}$ -individual. As I described in section 4 of the present chapter, differences in associated representational tasks would explain why the  $\mathbf{P}$ -individuals do not resemble any  $\mathbf{Q}$ -individual that is not a  $\mathbf{P}$  individual as they resemble each other.

Hence, the Companionship Difficulty does not threaten the proposed version of V-Resemblance Nominalism because of the contrastive character of  $R_C$ .

### 9.5.3 Russell's Regress

Here is a difficulty which also has been thought of as lethal to Resemblance Nominalism but is, according to me, misguided. This difficulty against Resemblance Nominalism finds its roots in a famous passage from Russell:

If we wish to avoid the universals *whiteness* and *triangularity*, we shall choose some particular patch of white or some particular triangle, and say that anything is white or triangle if it has the right sort of resemblance to our chosen particular. But then the resemblance required will have to be a universal. Since there are many white things, the resemblance must hold between many pairs of particular white things; and this is the characteristic of a universal. It will be useless to say that there is a different resemblance for each pair, for then we shall have to say that these resemblances resemble each other, and thus at last we shall be forced to admit resemblance as a universal. The relation of resemblance, therefore, must be a true universal. And having being forced to admit this universal, we find that it is no longer worth while to invent difficult and implausible theories to avoid the admission of such universals as whiteness and triangularity. (Russell 1997, 48)

Russell's passage is often interpreted as arguing that Resemblance Nominalism leads to a vicious infinite regress. The premises of the argument are (i) that resemblance has a characteristic which is typical of universals, namely that it can have distinct instances and (ii) that if you deny that resemblance can have distinct instances, if you maintain that it is bearer-specific, then you are pressed to accept a universal of resemblance to avoid an infinite regress of resemblances between resemblances. I reject (i) and show that rejecting it does not yield the conclusion of (ii).

As far as I know, none of the philosophers who make use of Russell's argument to argue against Resemblance Nominalism ever wondered whether what Russell calls "the characteristic of a universal" really is the character-

istic of a universal. What this characteristic is, according to Russell, is the ability to have distinct instances. We should wonder whether this characteristic is a characteristic of universals or a characteristic of properties. I think it is a characteristic of properties.

Advocates of universals such as Armstrong (1989) and Mellor (1997) have argued that if there are universals, universals must be sparse, not abundant. It is not the case that to any predicate there corresponds a universal. In particular, universals, if there are any, aren't disjunctive or negative, while there are disjunctive or negative predicates. However, since I conceive of properties as abundant, to each predicate there corresponds a property, and there are more properties than predicates. If there are disjunctive and negative predicates, these have as semantic values disjunctive or negative properties. For instance, the property *green or circular* is disjunctive, and the property *non-red* is negative.<sup>14</sup>

Armstrong (1989, 82) insists that there are no disjunctive universals. For instance, being green or circular cannot be a universal, since that some things share it "does not show that, in any serious sense, they thereby have something identical. The whole point of universals, however, is that it should be identical in its different instances." Nevertheless, given my view of properties, there is the disjunctive property of being green and circular and it is true that this property can have distinct instances: the green individuals and the circular ones. Therefore, disjunctive properties have Russell's characteristic of universals but are not universals if universals have to be conceived of as sparse.<sup>15</sup>

Russell misleadingly ascribed to universals a characteristic which is a characteristic of properties. Does resemblance have this characteristic? I think it does. Hence, resemblance is a property. Yet no difficulty for the V-resemblance nominalist follows from that claim since he does not intend to explain property instantiation in terms of resemblance. Property instan-

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<sup>14</sup>Though disjunctiveness of a property would depend on which properties we take as basic or atomic. And which properties we take as basic is plausibly determined by our representational perspective.

<sup>15</sup>If an anti-resemblist admits universals and conceives of them as abundant, then he can agree that resemblance is a universal, provided he maintains that resemblance is a merely abundant universal. For in Anti-Resemblism we can conceive of resemblance as a universal and still explain the instantiation of an elected universal in terms of resemblance. If resemblance is an elected universal, we have a regress. But there is no need to think of it as an elected universal.

tiation is a matter of set theory: an individual instantiates the properties which are identical to the sets of which it is a member.

Some may reply that the characteristic of universals Russell has in mind in the quoted passage is that of repeatability, *i.e.* the property of being wholly identical in its different instances. Strictly speaking, properties are not wholly identical in all their instances. Properties are multi-located, the multi-location of properties being the many locations of its bearers (Lewis 1999a, 10-9). Universals on the other hand are genuinely repeatable, and the characteristic that Russell intends to ascribe to resemblance in the quoted passage is the property of repeatability. I think the objector is right about the intention of Russell. But identifying the intention of Russell does not make his argument valid. Russell's argument fails to show that resemblance is a repeatable property because, as I have shown, the property of being able to hold between distinct instances is not identical to the repeatability property, and emphasising that resemblance holds between different instances, as *being green or circular* does, is not sufficient to show that it is repeatable.

Therefore, I deny that resemblance has anything that could be thought of as a characteristic of universals. Shall I then conclude, as Russell says, that "there is a different resemblance for each pair"? No, since I do not deny that resemblance has many instances, that it holds between distinct bearers. All I deny is that this feature of resemblance is a characteristic of a universal. Hence, I am not pressed to admit that particular resemblances share a universal of resemblance, and the regress does not follow.

## 9.6 The Coextension Difficulty

### 9.6.1 The difficulty

The previously discussed difficulties are all difficulties having Resemblance Nominalism as specific target. On the other hand, the *Coextension Difficulty* does not specifically threaten the discussed version of Resemblance Nominalism but threatens more generally the identification of properties with their extension. The Coextension Difficulty is classically the difficulty that theories of properties which identify properties with their extension fail to distinguish intuitively distinct but coextensive properties. The Coextension Difficulty threatens the present proposal not because it makes use of resemblance to explain why properties of individuals are elected, but be-

cause it identifies properties, be they elected or merely abundant, with sets of  $n$ -tuples of individuals.

The V-resemblance nominalist is threatened by this difficulty because it may arise that for some elected properties  $\mathbf{P}$  and  $\mathbf{Q}$ , the  $\mathbf{P}$ -individuals are all and only the  $\mathbf{Q}$ -individuals; in other words,  $\mathbf{P}$  and  $\mathbf{Q}$  have the same extension. I do not endorse V-Resemblance Nominalism, but I endorse Anti-Resemblance Nominalism which can take either the form of a Vegetarian Elected Class Nominalism or a Vegetarian Resemblance Nominalism. Both forms of Anti-Resemblance Nominalism are targeted by the Coextension difficulty, so I have to address this difficulty.

Lewis and Rodriguez-Pereyra address the difficulty by committing themselves to Modal Realism<sup>16</sup>, and by identifying properties with sets of  $n$ -tuples of actual and merely possible individuals.<sup>17</sup> For let  $\mathbf{P}$  and  $\mathbf{Q}$  be coextensive properties such that in some possible world some  $\mathbf{P}$ -individual is not a  $\mathbf{Q}$ -individual. The class of every possible  $\mathbf{P}$ -individual turns out distinct from the class of every possible  $\mathbf{Q}$ -individual.  $\mathbf{P}$  and  $\mathbf{Q}$  being respectively identified with the class of every possible  $\mathbf{P}$ -individual and every possible  $\mathbf{Q}$ -individual, we get the intended result that  $\mathbf{P}$  and  $\mathbf{Q}$  are distinct properties.

My worry with Lewis's and Rodriguez-Pereyra's solution is not that it incurs commitment to Modal Realism. Of course, it would be better to avoid commitment to non-actual possibilities for matter of quantitative economy. But there is a stronger reason to favour an alternative solution. The account of properties as sets of  $n$ -tuples of possible and actual individuals leads to a decisive difficulty as Andy Egan has proved (Egan 2004). Suppose that Elmer has a favourite property which is *being green*. Elmer might have had another favourite property instead. It is a modal fact that *being green* might

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<sup>16</sup>Where Modal Realism is, roughly, the view (i) that first-order existential quantification ranges over a domain of individuals among which only some actually exist and (ii) that a possible world is a concrete object; cf. (Divers 2002). Notice that 'world' here is not an ordered pair whose members are a *substratum* and a representational perspective. A possible world is here a possible *substratum*. Thus the relevant notion of possibility is that of *s*-possibility that I introduced in section 2.3 of chapter 7.

<sup>17</sup>According to Rodriguez-Pereyra, the resemblance nominalist need not identify properties with anything since Resemblance Nominalism is a solution to the Problem of Universals and since the Problem of Universals is not a demand for a reductive analysis of reference to properties. But he agrees that if the resemblance nominalist had to identify sparse properties with something, he would identify them with property classes.

fail to have been anybody's favourite property. In other words, *being green* has the property of being somebody's favourite property only contingently. If you think of first-order properties as sets of  $n$ -tuples of possible individuals, then it is consistent to think of second-order properties such as *being somebody's favourite property* as sets of  $n$ -tuples of first-order properties. Let @ be the actual world in which *being green* is Elmer's favourite property and let  $w$  be a world where *being green* fails to be anybody's favourite property. Sets have their members necessarily. Then since *being green* is somebody's favourite property in @, *being green* must be one of the members of *being somebody's favourite property*. But since *being green* fails to be anybody's favourite property in  $w$ , *being green* must not be a member of *being somebody's favourite property*. But it cannot be both.

Notice that Rodriguez-Pereyra may not be threatened by this difficulty because he only identifies sparse property classes with sets of  $n$ -tuples of actual and possible individuals. He abstains himself to identify merely abundant properties with sets of  $n$ -tuples of entities. No second-order property is sparse, following his account, so that he needs not identify second-order properties with sets of  $n$ -tuples of first-order properties. However, I do identify abundant second-order properties with sets of first-order properties and I would thus be threatened by Egan's inconsistency, if I had to admit Modal Realism to address the Coextension Difficulty. But I need not admit such a thing.

My favourite solution to the Coextension Difficulty consists in biting the bullet. Yes, coextensive properties are identical and we are wrong when believing that they are not. The reason why we misleadingly believe that coextensive properties are distinct is that, contingently coextensive properties at least, are only contingently identical; they could have been distinct. This solution, as I shall show, is less counterintuitive than it at first sight seems to be. For this solution to the Coextension Difficulty is analogous to a popular solution to another problem, the *modal problem of coincidence*. This parallelism has been suggested to me by Mark Heller.<sup>18</sup> From the proposition that the coextensive properties **P** and **Q** are identical but could not have been identical, it seems to follow by Leibniz's Law that **P** could not have been identical to itself, which is self-contradictory. The difficulty is overcome by endorsing a counterpart theory for properties.

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<sup>18</sup>Cf. (Heller 1998, 313).

### 9.6.2 Coextensive properties and coincidence

The Coextension Difficulty is the counterpart in the domain of properties to the Modal Problem of Coincidence in the domain of individuals. It is not only that the two difficulties are analogous. To my mind they are one and the same difficulty applied to two distinct domains of entities: the domain of properties and the domain of individuals. So possible strategies to solve the difficulty in one domain of entities are also strategies to solve the difficulty in the other domain of entities.

The statue and the lump of clay constituting it occupy one and the same spatial region but have distinct *de re* modal properties. The statue could not have failed to be a statue, while the lump of clay could have failed to be a statue. The statue could have failed to be a lump of clay, while the lump of clay could not have failed to be a lump of clay. If you admit transworld identity for individuals, this means that there is a possible world wherein the actual lump of clay is distinct from the actual statue. Since identity and distinctness are necessary, this yields the result that the statue and the lump of clay constituting it are two distinct entities even though they have the same extension, that is, the same spatial location.

The parallel view regarding the Coextension Difficulty consists in maintaining that coextensive properties are distinct even though they have the same extension. Coextensive properties are thus conceived of as distinct but coinciding in extension. For this solution to succeed, a necessary requirement is that properties are not identified with their extension. I do identify properties with their extension, therefore, this approach to the Coextension Difficulty is not available to me.

Another approach to the problem of coincidence consists in denying transworld identity but in maintaining that ‘the lump of clay’ and ‘the statue’ do not refer to worldbound entities but to fusions, mereological sums, of worldbound entities. So let us agree that there is only one object that occupies the spatio-temporal region where the statue-lump of clay is actually located, but maintain that when talking of the lump of clay we are not talking of the actual object but of the mereological fusion which is the sum of all the counterparts of the actual lump of clay. Maintain also that when talking of the statue we are not referring to the actual statue but to the mereological fusion which is the sum of all the counterparts of the actual statue. Understood as such the lump of clay and the statue are distinct

objects, distinct mereological fusions, since some counterpart of the lump of clay is not a counterpart of the statue. Nevertheless, according to this solution to the modal problem of coincidence, the statue and the lump of clay have an identical part, which is the actual statue-lump of clay.

Lewis's and Rodriguez-Pereyra's approach to the Coextension Difficulty parallels the latter solution to the problem of coincidence. Strictly speaking, it is not that they admit transworld identity for properties, it is rather that they take referential expressions for properties as referring to the set of the many possible **P**-individuals. Just as the extension of 'the statue' is not worldbound, the extension of the property of being red is not worldbound. But the property of being red is not wholly located in the actual world since it is not a universal. Let **P** and **Q** be contingently coextensive properties; it then follows that these two properties are distinct because they refer to two different sets of possible individuals even if these two sets have some members in common, namely the actual ones.

A last strategy regarding the modal problem of coincidence consists in maintaining that 'the lump of clay' and 'the statue' refer to the actual individual that occupies a same spatial region. Since there is only one spatial region occupied by the statue and the lump of clay, there is only one individual here. Yet the statue might not have been identical to the lump of clay. The latter seems to conflict with the necessity of identity, but it does not if you deny transworld identity and endorse counterpart theory. No thing can fail to be identical with itself, but something can have distinct counterparts, a statue counterpart and a lump of clay counterpart, in the same possible world.

The reasons which lead to this strategy are the following: (i) truly, the lump of clay and the statue have different *de re* modal properties; (ii) truly, when saying "the statue is composed of the lump of clay" we are not referring to a worm in the logical space but to the actual statue which can be seen or touched, and (iii) the same metaphysical principle that there can be only one individual occupying a same spatial region. This is the solution of the modal problem of coincidence defended by Lewis (Lewis 1971).

A parallel view on the Coextension Difficulty, which as far as I know has never been endorsed though it has been suggested by Heller (1998, 313),<sup>19</sup> consists in maintaining that (i) truly, contingently coextensive properties

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<sup>19</sup>Heller does not endorse it because he is not a nominalist.

have distinct modal properties; (ii) truly, when talking of properties, we are not referring to a set of individuals some of which exist in different possible worlds but we are referring to a set of actual individuals; and (iii) truly, properties are nothing over and above their extension. Contingently coextensive properties are identical but only contingently so. They might have been distinct in the loose sense that they can have distinct counterparts, and it is because they might have been distinct that we misleadingly believe that they are. This is the view I wish to advocate, and it involves commitment to a counterpart theory for properties.

### 9.6.3 Property counterparts and the resemblance of properties

It is well-known that Lewis promoted the view that concrete individuals are worldbound, *i.e.* that there is no transworld identity for concrete individuals. He makes use of counterpart relations between individuals to solve the modal problem of coincidence. But his strategy to deal with the Coextension Difficulty is different. He should better have used the same strategy, the use of counterpart relations, to deal with both difficulties. For he would then have avoided Egan's difficulty.

Another advantage of using counterpart theory for properties as I do is that counterpart theory does not incur commitment to Modal Realism. If we maintain that properties are worldbound, we need not commit ourselves to the existence of non-actual *possibilia*. The solution incurs commitment to counterpart theory, but counterpart theory is compatible with Actualism. For instance, Sider (2002) and Heller (1998) defend each an ersatzist, and thus actualist, theory of possible worlds which makes use of counterpart theory.

I assume that counterpart relations for properties are to be analysed as comparative overall similarity relations between properties as follows:<sup>20</sup>

**(Property Counterpart)** property **P** is a counterpart of property **Q** iff **P** and **Q** minimally resemble each other and there is no **R** in **P**'s world

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<sup>20</sup>I say 'relation' here because counterparthood is a complex property, a conjunctive one, which is composed of a non-relational element which is minimal resemblance, and a relational element which is the comparative one. Counterparthood is relational in virtue of its comparative element.

such that **R** and **Q** resemble each other more than **P** and **Q** resemble each other.

This account of property counterparts provides an opportunity to say more about the resemblance of properties.

As already argued in chapter 6, whether we take properties to resemble or not seems to be a matter of context. There are contexts in which we will agree that the red shade of a book resembles the orange shade of another book. But there are contexts in which we will deny that the red shade of the same book resembles the orange shade of the other book depending on the colour of the books which surround them in the library. Since I endorse Anti-Resemblism, I maintain that this context-relativity is not only a feature of our resemblance judgements about properties but a feature of the resemblance of properties itself. Whether some properties resemble each other or not depends on a representational perspective. So counterparthood of properties shall be understood as relative to a representational perspective.

Since counterparthood is relative to a representational perspective, the way we compare properties is an indeterminate context-sensitive matter. So there is no determinate way in which a property resembles another more than a third. But here is a suggestion regarding how counterpart properties can be compared.

Heller's proposal is that properties can be compared relative to the role they play. These roles can be nomological or otherwise. I shall illustrate his suggestion. Consider, for instance, *being renate* and *being cordate*. *Being renate* is coextensive, and thereby identical, with *being cordate*. This property is associated with various biological roles, and some of these roles constitute its cordate aspect, while other roles constitute its renate aspect. The roles which constitute its cordate aspect are those that are determined by what hearts are;<sup>21</sup> the cordate aspect is the set of these roles. The roles which constitute its renate aspect are those that are determined by what kidneys are;<sup>22</sup> the renate aspect is the set of these roles. When we think of the *being cordate/renate* property as the property of *being cordate*, the roles that constitute its cordate aspect turn out relevant to compare it, while the roles that constitute its renate aspect turn out irrelevant. When we think of it as the property of *being renate*, the roles that constitute its renate

<sup>21</sup>Hence, determined by properties of hearts.

<sup>22</sup>Hence, determined by properties of kidneys.

aspect turn out relevant to compare it, while the roles that constitute its cordate aspect turn out irrelevant. And we misleadingly believe that *being cordate* and *being renate* are distinct because we misleadingly believe that the irrelevant roles are absent.

In another possible world,  $w_1$ , it is not the case that every renate individual is also a cordate individual, or *vice versa*. So the actual property of *being renate/cordate* has two counterparts in  $w_1$ : a *renate* counterpart and a *cordate* counterpart. The *renate* counterpart is the counterpart of the actual property of *being renate/cordate* when focusing on the *renate* aspect of the actual property. In other words, the *renate* counterpart of *being renate/cordate* in  $w_1$  is the property instantiated in  $w_1$  which is the most similar to *being renate/cordate* when the relevant roles are the roles which constitute the *renate* aspect of the actual property. On the other hand, the *cordate* counterpart is the counterpart of the actual property of *being renate/cordate* we obtain when focusing on the *cordate* aspect of the actual property. In other words, the *cordate* counterpart of *being renate/cordate* in  $w_1$  is the property instantiated in  $w_1$  which is the most similar to *being renate/cordate* when the relevant roles are the roles which constitute the *cordate* aspect of the actual property. Variations in importance attached to roles of properties thus explain why a single property can have distinct counterparts in a same world, and why we misleadingly believe that coextensive properties are distinct.<sup>23</sup>

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<sup>23</sup>The content of this paragraph is to be compared with the counterpart theorist's solution to the modal problem of constitution proposed by Lewis in (Lewis 1971).

We can in a similar vein explain why we wrongly believe that necessarily coextensive properties are distinct, while they are necessarily identical. The difference is only that necessarily coextensive properties have the same counterpart in every world, but the process of change of focus also explains our belief in their distinctness. Suppose, for instance, that *being triangular* and *being trilateral* are necessarily coextensive. The property of *being triangular* is identical to that of *being trilateral* and necessarily so. This property is associated with various geometrical roles, and some of these roles constitute its *triangularity* aspect, while other roles constitute its *trilaterality* aspect. The roles which constitute its *triangularity* aspect are those that are determined by what angles are (determined by geometrical properties of angles); the *triangularity* aspect is the set of these roles. The roles which constitute its *trilaterality* aspect are those that are determined by what sides are (determined by geometrical properties of sides); the *trilaterality* aspect is the set of these roles. When we think of the *being triangular/trilateral* property as the property of *being triangular*, the roles that constitute its *triangularity* aspect turn out relevant to compare it, while the roles that constitute its *trilaterality* aspect turn out irrelevant. When

This strategy might be regarded as *ad hoc*. It is true that the strategy is introduced to solve the Coextension Difficulty, but the proposal seems to me plausible on its own. Anyway, the value of the proposal should be compared with the strategy which consists in the commitment to Lewis's Modal Realism. And my strategy seems to me more appealing than the latter as it commits us to no extra entities and gives a plausible psychological explanation of why variations in focus on roles make us wrongly believe that identicals are distinct.

I wish I have shown that an anti-resemblist version of Resemblance Nominalism can address the difficulties raised to Resemblance Nominalism and thus that this version of Resemblance Nominalism is an available solution to the Problem of Universals in Anti-Resemblism.

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we think of it as the property of *being trilateral*, the roles that constitute its trilaterality aspect turn out relevant to compare it, while the roles that constitute its triangularity aspect turn out irrelevant. And we misleadingly believe that *being triangular* and *being trilateral* are distinct because we wrongly believe that the roles that are irrelevant are absent. They are still here, it is just that we are not paying attention to them.

## Concluding Remarks

I have argued for the superiority of Anti-Resemblism over Resemblism, and I have argued, I hope with success, that a nominalist version of Anti-Resemblism, namely V-Resemblance Nominalism, is coherent and plausible. To my mind, my arguments provide good reasons to endorse an Anti-Resemblist Nominalism. But I am conscious that most metaphysicians will be reluctant to take this stance mainly because Anti-Resemblism involves some moderate dose of Idealism that is not very popular at a time when Realism on steroids dominates the metaphysical debate.<sup>24</sup>

My first aim when introducing these views and arguing for them was to show that the anti-resemblist/resemblist debate is a deep and fruitful one and that it can be combined with alternative positions in the realist/nominalist debate about resemblance. As I think that the anti-resemblist vs. resemblist debate is the central issue in the metaphysics of resemblance, this shows that a positioning regarding the metaphysics of resemblance is not determined by any positioning regarding the metaphysics of properties.

Each view defended or displayed in this study will find its opponents. For instance, some will attempt to defend the view that resemblance is binary and dyadic against my arguments; and for this project to succeed, a further account of collective resemblances must be offered. Some will attempt to defend that Resemblism can afford a plausible account of the context-relativity of our resemblance judgements; and the latter have lots of work to achieve this task, if it can be achieved at all. Many will insist that ways of resembling must be wholly intrinsic to the compared individuals; and for these people to be convincing, it is required that the arguments they

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<sup>24</sup>Anti-Resemblism is idealist in so far as it maintains that some apparent mind-independent feature of reality, namely resemblance, is in fact a mind-dependent one. But its Idealism is very moderate since Anti-Resemblism maintains that the existence of individuals and properties is a mind-independent matter.

propose do not beg the question in favour of Resemblism or the doctrine of sparse properties. I believe that it is difficult to propose non-question-begging arguments on this point.

I hope that the arguments I have displayed are strong enough to convince the opponents of the defended views that arguing for their metaphysical view of resemblance is a taxing topic. At least, they will be convinced that it has been taxing to argue for my view of resemblance. To show that the metaphysics of resemblance is a taxing topic has been the purpose of this dissertation.

# Appendix: Plural Logic for Comparative Resemblance

## A.1 Definitions and some properties

First a short terminological note. On some views of comparative resemblance and difference, overall resemblance is obtained by focusing on resemblance respects, and overall difference is obtained by focusing on respects of difference. So that “the *As* resemble each other more than the *Bs* do” is not equivalent to “the *Bs* differ from each other more than the *As* do” and to “the *As* differ from each other less than the *Bs* do.”

The logic of comparative resemblance, which is the topic of this appendix, is not a logic for focused but overall comparative resemblance. Comparative resemblance is here intended as resulting from a computation of all comparison respects of the compared entities be they resemblance respects, different respects or both. The notion being overall, I take “the *As* resemble each other more than the *Bs* do” as equivalent to “the *Bs* differ from each other more than the *As* do” and to “the *A* differ from each other less than the *Bs* do.”

First, I shall propose a logic for comparative resemblance, and then consider how non-comparative notions of resemblance can be introduced in terms of comparative resemblance. Though I will take weak resemblance as my primitive, the most basic relations of comparative resemblance are, in natural language, strict and equal resemblance, noted SR and ER. These two relations are exclusionary in that it is not possible for the *As* and the *Bs* to stand in both relations with each other, in the same context. The reference to a fixed arbitrary context will in this appendix always be intended but suppressed. The language used is the one introduced in chapter 5.

Some properties of strict and equal resemblance are uncontroversial in most contexts:

1. For all  $xs$  and  $ys$ , if the  $xs$  resemble each other more than the  $ys$  do, the  $ys$  do not resemble each other more than the  $xs$  do;
2. For all  $xs$  and  $ys$ , if the  $xs$  resemble each other as much as the  $ys$  do, the  $ys$  resemble each other as much as the  $xs$  do;
3. For all  $xs$ , the  $xs$  resemble each other as much as the  $xs$  do;
4. For all  $xs$  and  $ys$ , if the  $xs$  resemble each other more than the  $ys$  do, the  $xs$  do not resemble each other as much as the  $ys$  do.

4. states that strict and equal resemblances are exclusionary. 1. states that strict resemblance is asymmetrical, and it also follows from 1. that strict resemblance is irreflexive. For whenever the  $xs =$  the  $ys$ , if the  $xs$  stand in a reflexive relation to the  $ys$ , then the  $ys$  stand in that same relation to the  $xs$ , which is not the case with strict resemblance. 2. states that equal resemblance is symmetrical, and 3. states that equal resemblance is reflexive.

The following is a restatement of the former properties of strict and equal resemblance:

$$\text{(CR.1)} \vdash \forall X, Y (\text{SR}(X, Y) \rightarrow \neg \text{SR}(Y, X))$$

$$\text{(CR.2)} \vdash \forall X, Y (\text{ER}(X, Y) \rightarrow \text{ER}(Y, X))$$

$$\text{(CR.3)} \vdash \forall X \text{ER}(X, X)$$

$$\text{(CR.4)} \vdash \forall X, Y (\text{SR}(X, Y) \rightarrow \neg \text{ER}(X, Y))$$

By (CR.3) we obtain the following:

$$\text{(CR.5)} \vdash \forall X, Y (X = Y \rightarrow \text{ER}(X, Y))^{25}$$

Note that, as usual, weak resemblance can be defined in terms of strict and equal resemblance:

$$\text{(WR)} \text{WR}(X, Y) =_{df} \text{SR}(X, Y) \vee \text{ER}(X, Y)$$

<sup>25</sup>See the first section of chapter 5 for the definition of identity in terms of ‘among’.

But weak resemblance can be substituted for strict and equal resemblance as our primitive comparative resemblance relation for matter of simplicity. For we can define strict and equal resemblance in terms of weak resemblance as follows:

$$\text{(SR)} \quad \text{SR}(X, Y) =_{df} \text{WR}(X, Y) \ \& \ \neg\text{WR}(Y, X)$$

$$\text{(ER)} \quad \text{ER}(X, Y) =_{df} \text{WR}(X, Y) \ \& \ \text{WR}(Y, X)$$

According to (SR), some things resemble each other more than some things do if and only if the former resemble each other at least as much as the latter do, while the latter do not resemble each other at least as much as the former do. According to (ER), some things resemble each other as much as other things do if and only if the former resemble each other at least as much as the latter do, and the latter resemble each other at least as much as the former do.

The proof of (SR) is as follows. *Left-to-right*: suppose that some things, the  $xs$ , resemble each other more than some things, the  $ys$ , do, *i.e.*  $\text{SR}(X, Y)$ . By (WR) it follows from  $\text{SR}(X, Y)$  that  $\text{WR}(X, Y)$ . From  $\text{SR}(X, Y)$  we deduce by (CR.1) that  $\neg\text{SR}(Y, X)$ , and from (CR.4) that  $\neg\text{ER}(X, Y)$ , and thus by (CR.2) we obtain  $\neg\text{ER}(Y, X)$ . So by classical logic we get  $\neg(\text{SR}(Y, X) \vee \text{ER}(Y, X))$  which by (WR) gives  $\neg\text{WR}(Y, X)$ . *Right-to-left*: suppose that the  $xs$  resemble each other at least as much as the  $ys$  do and that the  $ys$  do not resemble each other at least as much as the  $xs$  do. By (WR) it follows from  $\text{WR}(X, Y)$  that either  $\text{SR}(X, Y)$  or  $\text{ER}(X, Y)$ . By the same definition  $\neg\text{WR}(Y, X)$  yields  $\neg\text{SR}(Y, X)$  and  $\neg\text{ER}(Y, X)$  which by (5.2) gives  $\neg\text{ER}(X, Y)$ , and thence we obtain  $\text{SR}(X, Y)$ .

(ER) can be proved as follows. *Left-to-right*: suppose that some things, the  $xs$ , resemble each other as much as some things, the  $ys$ , do; that is  $\text{ER}(X, Y)$ .  $\text{ER}(X, Y)$  and (WR) give  $\text{WR}(X, Y)$ . By (CR.2) we get  $\text{ER}(Y, X)$ , thence the conclusion by (WR). *Right-to-left*: suppose that the  $xs$  resemble each other at least as much as the  $ys$  do, and *vice versa*. By (WR) it follows from  $\text{WR}(X, Y) \ \& \ \text{WR}(Y, X)$  that  $\text{SR}(X, Y) \vee \text{ER}(X, Y)$  and  $\text{SR}(Y, X) \vee \text{ER}(Y, X)$ . By (CR.2) we obtain  $\text{SR}(Y, X) \vee \text{ER}(X, Y)$ . By (CR.1) it is not true that both  $\text{SR}(X, Y)$  and  $\text{SR}(Y, X)$ , and by (CR.4) it is neither true that both  $\text{SR}(X, Y)$  and  $\text{ER}(X, Y)$  nor that both  $\text{SR}(Y, X)$  and  $\text{ER}(Y, X)$ . Given that  $\text{ER}(X, Y)$  entails  $\text{ER}(Y, X)$  and *vice versa*, we conclude that  $\text{ER}(X, Y)$ .

It directly follows from definition (SR) that weak resemblance is non-symmetrical. And from (ER) and (CR.3) it follows that WR is a reflexive relation. Reflexivity of weak resemblance is stated thus:

$$\text{(CR.6)} \vdash \forall X \text{WR}(X, X)$$

## A.2 Connectedness

$$\text{(CR.7)} \vdash \forall X, Y (\text{WR}(X, Y) \vee \text{WR}(Y, X))^{26}$$

(CR.7) expresses that weak resemblance is *connected*. As we will see later on, the assumption of connectedness is necessary if we expect to define degrees of resemblance in terms of weak resemblance.

In many everyday situations, however, we do not have, and do not need, connected resemblances. Suppose that the *As* and the *Bs* are of very distinct types. Imagine, for instance, that the *As* are some dogs and that the *Bs* are some abstract entities, e.g. some sets. No matter how much these dogs resemble each other and how much these sets resemble each other, it seems that asking whether these dogs are more or less similar to each other than these sets are is in most contexts asking a non-answerable question. In such contexts, we would agree that sets and dogs are *incomparable*. Likewise, asking whether my cats resemble each other at least as much as my screwdrivers do does not seem to have any definite answers.

Failures of connectedness of comparative similarity happen when the compared items have a similarity value but when their similarity values are obtained from wholly distinct similarity scales.

## A.3 Symmetry of resemblance

In comparative terms symmetry of resemblance is to be understood as the proposition that for any  $x$  and  $y$ ,  $x$  resembles  $y$  at least as much as  $y$  resembles  $x$ . Stated in terms of Williamson's relation  $T$ , the property of symmetry of resemblance is represented as follows (Williamson 1988):

$$\text{(T5)} \vdash \forall x, y T(x, y, y, x)$$

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<sup>26</sup>See Lewis's condition 2 on (centered) comparative similarity systems in (Lewis 1973, 92) and Williamson's axiom (T1) in (Williamson 1988). Williamson (1988) agrees that connectedness should be assumed by the most useful theories of similarity.

This property is not trivial when stated in terms of  $T$  since Tversky and Lewis have objected against it.<sup>27</sup> However, this property of symmetry turns out trivial when expressed in terms of WR:

$$\text{(CR.8)} \vdash \forall x, y \text{ WR}([x, y], [y, x])$$

The reason why (CR.8) is trivial is that  $[x, y]$  and  $[y, x]$  are one and the same term in virtue of the fact that the brackets '[' and ']' do not introduce any ordering just as the word 'and' in " $x$  and  $y$  resemble each other" does not introduce any ordering between  $x$  and  $y$ . In other words, (CR.8) is an instance of reflexivity of weak resemblance (CR.6). I already undermined the doubts cast on the symmetry assumption in chapter 3 and will thus assume that (CR.8) and (T5) are equivalent.

The following sequent also seems to be valid:

$$\text{(CR.9)} \vdash \forall w, x, y, z (w = x \ \& \ y = z \rightarrow \text{WR}([x, y], [z, w]))$$

For from the antecedent of (CR.9) and by (CR.7) it clearly follows that  $\text{WR}([x, y], [w, z])$ . And since  $[w, z] = [z, w]$  (since ' $w$  and  $z$ ' has the same denotation as ' $z$  and  $w$ '), we obtain the conclusion.

## A.4 Transitivity of comparative resemblance

### A.4.1 Properties of transitivity

One important logical property of comparative resemblance is the following:

$$\text{(CR.10a)} \vdash \forall X, Y, Z (\text{WR}(X, Y) \ \& \ \text{WR}(Y, Z) \rightarrow \text{WR}(X, Z))$$

(CR.10a) states that no matter what some things, the  $x$ s, the  $y$ s, and the  $z$ s, are, if the  $x$ s resemble each other at least as much as the  $y$ s do and the  $y$ s resemble each other at least as much as the  $z$ s do, then the  $x$ s resemble each other at least as much as the  $z$ s do; hence, it states that weak resemblance is transitive.

The corresponding properties of the other two relations are defined analogously:

$$\text{(CR.10b)} \vdash \forall X, Y, Z (\text{SR}(X, Y) \ \& \ \text{SR}(Y, Z) \rightarrow \text{SR}(X, Z))$$

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<sup>27</sup>Cf. Section 2 of chapter 3.

(CR.10c)  $\vdash \forall X, Y, Z (ER(X, Y) \& ER(Y, Z) \rightarrow ER(X, Z))$

We will call *quasi-transitive* any weak resemblance relation  $WR$  such that its strict part – that is such that  $SR$  is defined in terms of  $WR$  – is transitive.

‘Mixed’ transitivity properties of comparative resemblance can also be defined. The most important of these are:

(CR.11)  $\vdash \forall X, Y, Z (ER(X, Y) \& SR(Y, Z) \rightarrow SR(X, Z))$

(CR.12)  $\vdash \forall X, Y, Z (SR(X, Y) \& ER(Y, Z) \rightarrow SR(X, Z))$

These properties are logically related because we can prove that if  $WR$  satisfies (CR.10a) then (CR.10b)-(CR.12) are valid:

That (CR.10c) follows from (CR.10a) can be proved as follows: by (ER) the antecedent of (CR.10c) yields  $WR(X, Y)$  and  $WR(Y, Z)$ . Then  $WR(X, Z)$  follows by (CR.10a). Similarly, by (CR.2) we obtain, from the antecedent of (CR.10c),  $ER(Z, Y)$  and  $ER(Y, X)$  so that by (ER) we get  $WR(Z, Y)$  and  $WR(Y, X)$  which entail  $WR(Z, X)$  by (CR.10a). Hence, we get  $WR(X, Z)$  and  $WR(Z, X)$ , this conjunction being by (ER) equivalent to  $ER(X, Z)$ .

The proof that (CR.10a) entails both (CR.10b) and (CR.11) is as follows: by (SR) the antecedent of (CR.10b) yields  $WR(X, Y)$  and  $WR(Y, Z)$  which by (CR.10a) yield  $WR(X, Z)$ . Suppose that  $SR(X, Z)$  is not the case; it then follows from  $WR(X, Z)$  that  $ER(X, Z)$  from which, by symmetry of equal resemblance and (ER), it follows that  $WR(Z, X)$ . From this result and  $WR(X, Y)$  we obtain  $WR(Z, Y)$  by (CR.10a). Yet  $WR(Z, Y)$  contradicts  $SR(Y, Z)$ . It follows from this contradiction that  $SR(X, Z)$ .

Finally the proof of (CR.12) runs as follows: by (SR) and (ER) it follows from the antecedent of (CR.12) that  $WR(X, Y)$  and  $WR(Y, Z)$  from which  $WR(X, Z)$  follows by (CR.10a). Suppose now that  $SR(X, Z)$  is not the case; it then follows from  $WR(X, Z)$  that  $ER(X, Z)$  so that by (CR.2) and (ER) we get  $WR(Z, X)$ . From this result and  $WR(Y, Z)$ , we obtain  $WR(Y, X)$  by transitivity of weak resemblance, contrary to  $SR(X, Y)$ . It follows from this contradiction that  $SR(X, Z)$ .

#### A.4.2 Derived properties

If we assume that weak resemblance is both connected and transitive, then important derived properties follow. For instance, the following property, called *virtual connectivity* (Hansson 2001, 327), is one such derived property:

**(CR.13)**  $\vdash \forall X, Y, Z (\text{SR}(X, Z) \rightarrow \text{SR}(X, Y) \vee \text{SR}(Y, Z))$

(CR.13) tells us that no matter what the  $x$ s, the  $y$ s, and the  $z$ s are, if the  $x$ s resemble each other more than the  $z$ s do, then either the  $x$ s resemble each other more than the  $y$ s do or the  $y$ s resemble each other more than the  $z$ s do. The proof of (CR.13) runs as follows:

$$\forall X, Y, Z (\text{SR}(X, Z) \rightarrow \text{SR}(X, Y) \vee \text{SR}(Y, Z))$$

**iff 2:**  $\forall X, Y, Z (\text{SR}(X, Z) \rightarrow \neg(\neg\text{SR}(X, Y) \& \neg\text{SR}(Y, Z)))$

**iff 3:**  $\forall X, Y, Z (\text{SR}(X, Z) \rightarrow \neg(\text{WR}(Y, X) \vee \text{WR}(Z, Y)))$

**iff 4:**  $\forall X, Y, Z \neg(\text{SR}(X, Z) \& \text{WR}(Y, X) \& \text{WR}(Z, Y))$

**iff 5:**  $\forall X, Y, Z \neg(\text{WR}(Z, Y) \& \text{WR}(Y, X) \& \text{SR}(X, Z))$

**iff 6:**  $\forall X, Z \neg(\text{WR}(Z, X) \& \text{SR}(X, Z))$

**iff 7:**  $\forall X, Z (\text{SR}(X, Z) \rightarrow \neg\text{WR}(Z, X))$

Step 2 follows by De Morgan's Law. Step 3 follows from connectedness in that if weak resemblance is connected, then  $\neg\text{SR}(X, Y)$  is equivalent to  $\text{WR}(Y, X)$ .<sup>28</sup> Step 4 and 5 follow by elementary logic. Step 6 follows by transitivity of weak resemblance, step 7 by elementary logic. The conclusion 7 is a direct consequence of (SR) since (SR) tells us that  $\text{SR}(X, Z)$  implies  $\text{WR}(X, Z) \& \neg\text{WR}(Z, X)$ . Thence 7 is to be admitted if (SR) is. Since we have proved by (CR.11a) and connectedness that (CR.13) is equivalent to the obvious 7, (CR.13) is valid provided (CR.10a) and connectedness of weak resemblance are.

The following important property of *semi-transitivity* also follows if weak resemblance is transitive and connected:

**(CR.14)**  $\vdash \forall W, X, Y, Z (\text{SR}(X, Y) \& \text{SR}(Y, Z) \rightarrow \text{SR}(X, W) \vee \text{SR}(W, Z))$

<sup>28</sup>Here is the proof that, given connectedness of weak resemblance,  $\neg\text{SR}(X, Y)$  is equivalent to  $\text{WR}(Y, X)$ : *left-to-right* if  $\neg\text{SR}(X, Y)$ , it follows from (SR) that  $\neg(\text{WR}(X, Y) \& \neg\text{WR}(Y, X))$ , which by elementary logic entails  $\neg\text{WR}(X, Y) \vee \text{WR}(Y, X)$ . Since by connectedness we have  $\text{WR}(X, Y) \vee \text{WR}(Y, X)$ , it follows by elementary logic that  $\text{WR}(Y, X)$ . *right-to-left* if  $\text{WR}(Y, X)$ , then either  $\text{SR}(Y, X)$  or  $\text{ER}(Y, X)$ . If  $\text{SR}(Y, X)$ , it follows by (CR.1) (*i.e.* asymmetry of strict resemblance) that  $\neg\text{SR}(X, Y)$ . If  $\text{ER}(Y, X)$ , then by (CR.2) we get  $\text{ER}(X, Y)$  which by (CR.4) yields  $\neg\text{SR}(X, Y)$ . Thence  $\neg\text{SR}(X, Y)$ .

(CR.14) tells us that no matter what the  $ws$ , the  $xs$ , the  $ys$  and the  $zs$  are, if the  $xs$  resemble each other more than the  $ys$  do and the  $ys$  resemble each other more than the  $zs$  do, then either the  $xs$  resemble each other more than the  $ws$  do or the  $ws$  resemble each other more than the  $zs$  do. The proof of (CR.14) parallels that of (CR.13) and runs as follows:

$$\forall W, X, Y, Z (\text{SR}(X, Y) \ \& \ \text{SR}(Y, Z) \rightarrow \text{SR}(X, W) \vee \text{SR}(W, Z))$$

$$\text{iff 2: } \forall W, X, Z (\text{SR}(X, Z) \rightarrow \neg(\neg\text{SR}(X, W) \ \& \ \neg\text{SR}(W, Z)))$$

$$\text{iff 3: } \forall W, X, Z (\text{SR}(X, Z) \rightarrow \neg(\text{WR}(W, X) \ \& \ \text{WR}(Z, W)))$$

$$\text{iff 4: } \forall W, X, Z \neg(\text{SR}(X, Z) \ \& \ \text{WR}(W, X) \ \& \ \text{WR}(Z, W))$$

$$\text{iff 5: } \forall W, X, Z \neg(\text{WR}(Z, W) \ \& \ \text{WR}(W, X) \ \& \ \text{SR}(X, Z))$$

$$\text{iff 6: } \forall X, Z \neg(\text{WR}(Z, X) \ \& \ \text{SR}(X, Z))$$

$$\text{iff 7: } \forall X, Z (\text{SR}(X, Z) \rightarrow \neg\text{WR}(Z, X))$$

Step 2 follows from (CR.14) by elementary logic and transitivity of strict resemblance and thus by transitivity of weak resemblance, given (SR). Step 3 follows by connectedness of weak resemblance and elementary logic. Steps 4 and 5 follow by elementary logic. Step 6 follows by (CR.10a) and step 7 by elementary logic. Since 7 is uncontroversial by (SR). (CR.14) is valid given transitivity and connectedness of weak resemblance.

Finally, I state the following property of weak resemblance, called *Interval Order*:

$$\text{(CR.15)} \vdash \forall W, X, Y, Z (\text{SR}(W, X) \ \& \ \text{SR}(Y, Z) \rightarrow \text{SR}(W, Z) \vee \text{SR}(Y, X))$$

(CR.15) tells us that no matter what the  $ws$ , the  $xs$ , the  $ys$ , and the  $zs$  are, if the  $ws$  resemble each other more than the  $xs$  do and the  $ys$  resemble each other more than the  $zs$  do, then either the  $ws$  resemble each other more than the  $zs$  do or the  $ys$  resemble each other more than the  $xs$  do. Consider the following equivalences:

$$\forall W, X, Y, Z (\text{SR}(W, X) \ \& \ \text{SR}(Y, Z) \rightarrow \text{SR}(W, Z) \vee \text{SR}(Y, X))$$

$$\text{iff 2: } \forall W, X, Y, Z (\text{SR}(W, X) \ \& \ \text{SR}(Y, Z) \rightarrow \neg(\text{WR}(Z, W) \ \& \ \text{WR}(X, Y)))$$

$$\text{iff 3: } \forall W, X, Y, Z \neg(\text{SR}(W, X) \ \& \ \text{SR}(Y, Z) \ \& \ \text{WR}(Z, W) \ \& \ \text{WR}(X, Y))$$

**iff 4:**  $\forall W, X, Y, Z \neg(WR(Z, W) \& SR(W, X) \& WR(X, Y) \& SR(Y, Z))$

Step 2 follows from (CR.15) by connectedness and elementary logic. Step 3 and 4 follow by elementary logic. Then, if transitivity of weak resemblance is assumed, 4. is a valid sequent. For suppose that there are some *ws*, some *xs*, some *ys*, and some *zs* such that  $WR(Z, W) \& SR(W, X) \& WR(X, Y) \& SR(Y, Z)$ . From  $WR(Z, W)$  it follows by (SR) and (ER) that  $ER(Z, W) \vee SR(Z, W)$ . From  $(ER(Z, W) \vee SR(Z, W))$  and  $SR(W, X)$  it follows that  $SR(Z, X)$  by (CR.10c) and (CR.11). From  $WR(X, Y)$  it follows by (SR) and (ER) that  $ER(X, Y) \vee SR(X, Y)$ . From  $(ER(X, Y) \vee SR(X, Y))$  and  $SR(Y, Z)$ , it follows that  $SR(X, Z)$  by (CR.10c) and (CR.11). So we get  $(SR(Z, X) \& SR(X, Z))$  which contradicts asymmetry of strict resemblance. Step 4, and thence (CR.15), are valid given transitivity of weak resemblance, connectedness of weak resemblance and the uncontroversial (CR.1).

#### A.4.3 An apparent failure of the transitivity of comparative resemblance

Should transitivity of weak resemblance hold? Consider Sam, a European client of a travel bureau. Sam is facing a dilemma. He is hesitating whether he will spend his next holidays in San Francisco, Los Angeles, or Montreal. Sam spent his last holidays in Seattle and really enjoyed the place. What Sam particularly appreciated during his journey in Seattle was the landscape surrounding the agglomeration, its public transportation system, and its architecture. Sam asks an agent of the travel bureau to help him to make a decision for the destination of his next holidays.

Given Sam's preferences, the agent of the travel bureau proceeds as follows to determine which of San Francisco, Los Angeles and Montreal is the best destination for Sam's holidays. She collects information in order to decide which one of the three cities is the most similar to Seattle in each relevant resemblance respect. She expects that in each of the three respects – architecture, surrounding landscape, and public transportation system – one of the three cities is more similar to Seattle than the other cities are. Finally, she uses the following additive criterion to determine whether one city is more similar to Seattle than another is:

(C) City *x* resembles Seattle more than city *y* does if and only if the number of relevant respects in which *x* resembles Seattle

more than  $y$  does is greater than the number of relevant respects in which  $y$  resembles Seattle more than  $x$  does.

The agent assumes that by using this method she will be able to determine which one of the three cities is the most similar to Seattle given the features that are important for Sam and thus that she will be able to determine which destination Sam will prefer.

Suppose now (i) that – according to the data the agent has collected on Seattle, San Francisco, Los Angeles, and Montreal –, San Francisco and Seattle are more similar in architecture than Seattle and Los Angeles are, and that Los Angeles and Seattle are more similar in architecture than Montreal and Seattle are; (ii) with respect to the surrounding landscape, Montreal is more similar to Seattle than San Francisco is, and San Francisco is more similar to Seattle than Los Angeles is; finally (iii), with respect to the public transportation system, Los Angeles is more similar to Seattle than is Montreal, but Montreal is more similar to Seattle than San Francisco is.

Given her criterion (C), the agent of the travel bureau obtains the following ordering: San Francisco resembles Seattle more than Los Angeles does (architecture and landscape vs. transportation system); Los Angeles resembles Seattle more than Montreal does (architecture and transportation system vs. landscape), but Montreal resembles Seattle more than San Francisco does (landscape and transportation system vs architecture).<sup>29</sup>

Given the combination of similarity respects used by the agent of the travel bureau, we get an intransitive instance of the binary relation ‘ $x$  resembles Seattle more than  $y$  does’. It should not be concluded from this result that the agent of the travel bureau is irrational when judging that San Francisco is more similar (in the relevant respects) to Seattle than Los Angeles is, that Los Angeles is more similar (in the relevant respects) to Seattle than Montreal is, and that Montreal is more similar (in the relevant respects) to Seattle than San Francisco is. For no rationality constraint is violated by the agent during her evaluation of the relative similarity of the three cities to Seattle.

Let us call a *resemblance cycle* any violation of the transitivity of weak resemblance. The controversial cycles are those that contain at least one

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<sup>29</sup>This is an adaptation of Condorcet’s paradox to relations of comparative similarity first proposed by Williamson in (Williamson 1988, 463).

instance of SR. All SR-containing cycles contradict transitivity of weak resemblance.

## A.5 Exact resemblance as maximal resemblance

Consider the following property:

**(CR.16)**  $\vdash \forall x, Y \text{ WR}(x, Y)$

What (CR.16) expresses is that no matter what certain things are, anything resembles itself at least as much as they do. If we aim to define a distance function of degree of resemblance in terms of WR, (CR.16) must be assumed. For necessarily, the distance from something to itself is at least as small as the distance between (distinct) objects.

(CR.16) seems invalid given some measure of resemblance. For instance, Rodriguez-Pereyra's (D)<sup>30</sup> entails the following:

**(D')**  $w$  and  $x$  resemble each other more than  $y$  and  $z$  do if and only if  $m > n$ , where  $m$  is the number of sparse properties common to  $w$  and  $x$  and  $n$  is the number of sparse properties common to  $y$  and  $z$ .

(CR.16) and (D') are incompatible given that the number of sparse properties shared by two objects may exceed the number of sparse properties had by one object. However, (D') is not a definition of overall comparative resemblance but of some focused comparative resemblance, and therefore fails to invalidate (CR.16) which is conceived of as a principle concerning overall comparative resemblance.<sup>31</sup>

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<sup>30</sup>Cf. section 6.1.4 on (D).

<sup>31</sup>In order to see that the notion of comparative resemblance defined in (D') is a focused one, suppose that  $w$  and  $x$  instantiate each three sparse properties and share all of them in such a way that  $w$  and  $x$  are exactly similar. Now suppose that  $y$  and  $z$  instantiate each eight sparse properties and share five of them. An obvious consequence of (D) is that  $y$  and  $z$  resemble each other more than  $w$  and  $x$  which are exactly similar. If (D') were a definition of overall comparative resemblance, then it would follow from the previous result that  $w$  and  $x$  differ from each other more than  $y$  and  $z$  do. But this clearly is not the case since  $w$  and  $x$  differ in no respect, while  $y$  and  $z$  differ in several respects. Therefore, the inference from "the  $A$ s resemble each other more than the  $B$ s do" to "the  $B$ s differ from each other more than the  $A$ s do" is invalid for the comparative resemblance introduced by (D'). From which it follows that (D') is not a definition of overall comparative resemblance.

(CR.16) is clearly valid when understood as a principle of overall comparative resemblance. For any failure of (CR.16) would be such that some things resemble each other more than something resembles itself, which, if comparative resemblance is understood as overall, is equivalent to the claim that something differs from itself more than some things differ from each other. The latter, however, is implausible.

## A.6 Exactly resembling objects and monotonicity of resemblance

The following principle is analogous to the Principle of Identity of Indiscernibles and may be called the principle of identity of exactly similars (Assuming that some things are exactly similar iff they are as similar as something is to itself):

**(CR.17)**  $\vdash \forall w, X (WR(X, w) \rightarrow \forall Y, Z (YAX \ \& \ ZAX \rightarrow Y = Z))$

(CR.17) states that no matter what the  $x$ s are, if the  $x$ s resemble each other at least as much as anything resembles itself, then for any  $y$ s and any  $z$ s that are among the  $x$ s, the  $y$ s are identical to the  $z$ s. Anyone who denies the principle of Identity of Indiscernibles must deny (CR.17). (CR.17), however, is a very useful property of resemblance in that it has traditionally been maintained that, in order to define a function of degree of resemblance in terms of a metric, (CR.17) must be assumed.

As Williamson (1988, 463) suggests, it is possible to recover the advantages of the assumption of (CR.17) by means of a less controversial property of weak resemblance which is:

**(CR.18)**  $\vdash \forall X, y (WR(\lfloor X, y \rfloor, y) \rightarrow \forall Z WR(\lfloor X, Z \rfloor, \lfloor y, Z \rfloor))$ <sup>32</sup>

(CR.18) states that no matter what some things, the  $x$ s, are and for all  $y$ , if the  $x$ s resemble  $y$  at least as much as  $y$  resembles itself, then, no matter what some things, the  $z$ s, are, the  $x$ s and the  $z$ s resemble each other at least as much as  $y$  resembles the  $z$ s. This property of weak resemblance might be called *monotonicity*.

<sup>32</sup>Compare with Williamson's axiom T6 in (Williamson 1988).

## A.7 Representing degrees of resemblance

Judgements of comparative resemblance can often be interpreted as ascriptions of degrees of resemblance. “The *As* resemble each other more than the *Bs* do” can be interpreted as “the degree to which the *As* resemble each other is greater than the degree to which the *Bs* resemble each other”, and “the *As* resemble each other as much as the *Bs* resemble each other” can be interpreted as stating that the degree to which the *As* resemble is equal to the degree to which the *Bs* resemble. Degrees of resemblance, we may assume, can be adequately represented in numerical terms. Let  $D$  be a unary function that assigns a real number to each element of a domain of *relata*. We can then construct a model of comparative resemblance in terms of postulates as follows: ( $\mathfrak{R}$  being the set of real numbers.)

Let our similarity ordering be such that it contains a countable number of similarity values, *i.e.* a countable domain of locations in the ordering. Then the following conditions are equivalent:

- WR satisfies connectedness and transitivity.
- There is a unary distance function  $D$  from our domain of objects to  $\mathfrak{R}$  such that  $WR(X, Y)$  iff  $D(X) \leq D(Y)$ .<sup>33</sup>

Postulating that the number of ordered objects in our similarity ordering is countable and postulating connectedness and transitivity, the relation  $\leq$  filled by degrees of resemblance is a total ordering.<sup>34</sup> Then we can define the real-valued function  $D$  of degree of resemblance as the function satisfying the three following criteria (where 0 is absence of difference, and thus the maximal degree of resemblance):

$$(D1) \quad D(X) \geq 0;$$

$$(D2) \quad D(X) = 0 \rightarrow ((YAX \ \& \ ZAX) \rightarrow Y = Z);$$

$$(D3) \quad D(\lfloor X, Z \rfloor) \leq D(\lfloor X, Y \rfloor) + D(\lfloor Y, Z \rfloor).$$

(D1) follows from (CR.16), (D2) follows from (CR.17), and (D3) is the plural substitute for *triangle inequality* which follows from (CR.13), *i.e.*

<sup>33</sup>The proof is a plural adaptation of the general proof proposed in (Roberts 1979, 109-10).

<sup>34</sup>See (Williamson 1988, 458-9) about similarity orderings such that the number of ordered objects exceeds the cardinality of the reals.

virtual connectivity. (*D3*) is to be read “the degree to which the *x*s and the *z*s resemble is at least as great as the degree to which the *x*s and the *y*s resemble added to the degree to which the *y*s and the *z*s resemble.”

We can by means of the unary real function *D* define a real-valued binary function *d* that takes only singular terms as arguments. Such a binary function *d* is what is generally called a metric function. *d* is a metric function of resemblance if and only if it satisfies the following definition:

**(Metric)**  $d(w,x) \leq d(y,z)$  iff  $D(\lfloor w, x \rfloor) \leq D(\lfloor y, z \rfloor)$

The following standard constraints that define a metric follow from our definition of a metric, conditions (*D1*)-(*D3*), and the trivial (CR.8):

**(M1)**  $d(x, y) \geq 0$ ;

**(M2)**  $d(x, y) = 0$  iff  $x = y$ ;

**(M3)**  $d(x, y) = d(y, x)$ ;

**(M4)**  $d(x, z) \leq d(x, y) + d(y, z)$ .<sup>35</sup>

Hence, it seems that by postulating connectedness and transitivity we can define a metric function of resemblance in terms of WR and thus in terms of a binary plural comparative resemblance predicate.

## A.8 Axiomatic for non-comparative resemblance

This section is devoted to the connection between comparative resemblance relations and the major types of non-comparative resemblance properties we discussed in the dissertation. As we will see, we can provide an axiomatic definition of the non-comparative resemblance properties in terms of the comparative properties.

There are four main pairs of non-comparative properties of resemblance and difference: strong minimal resemblance and weak minimal difference; weak minimal resemblance and strong minimal difference; exact resemblance and difference; overall resemblance and difference. There are properties involving comparative resemblance that some of these pairs satisfy and others do not satisfy. Let *R* and *D* be an arbitrary pair of non-comparative resemblance properties. We can introduce these important properties as follows:

<sup>35</sup>See, for instance (Beals et al. 1968).

**(Positivity)**  $\forall X, Y (WR(X, Y) \& R(Y) \rightarrow R(X))$

**(Negativity)**  $\forall X, Y (WR(X, Y) \& D(X) \rightarrow D(Y))$

**(Closeness)**  $\forall X, Y (SR(X, Y) \rightarrow R(X) \vee D(Y))$

**(Excluded neutral)**  $\forall X, Y (WR(X, Y) \rightarrow R(X) \vee D(X))$

**(Maximal value)**  $\forall X (R(X) \rightarrow \neg \exists Y SR(Y, X))$

**(Minimal value)**  $\forall X (D(X) \rightarrow \neg \exists Y SR(X, Y))$

In what follows I consider which of these principles are satisfied by the various pairs of non-comparative resemblance and difference properties.

### A.8.1 Axioms for strong minimal resemblance and weak minimal difference

Let us interpret minimal resemblance as strong and minimal difference as weak so that the resemblance of properties gets out of the picture. Which of the above listed properties is satisfied by the pair strong minimal resemblance-weak minimal difference?

Is (Positivity) valid for this pair? I think it is not. Assume that the *As* resemble each other at least as much as the *Bs* do, that the *Bs* strongly minimally resemble each other, and that the *As* fail to strongly minimally resemble each other. If the *Bs* strongly minimally resemble each other, they share some elected property. If the *As* do not strongly minimally resemble each other, they share no elected property. Yet the *As* may be such that they inexactly, but closely, resemble each other in many very important respects, while the *Bs* resemble in only one relatively less important resemblance respect but exactly resemble in this respect. In this case we may, and plausibly would, agree that the *As* resemble each other more than the *Bs* do. Yet the *Bs* strongly minimally resemble each other, whereas the *As* do not strongly minimally resemble each other; which means that (Positivity) may fail for strong minimal resemblance.

Is (Negativity) valid for weak minimal difference? It clearly is. If the *As* resemble each other at least as much as the *Bs* do and if the *As* weakly minimally differ from each other, *i.e.* are such that some of them has an elected property that some of them lacks, then the *Bs* weakly minimally differ from each other. For otherwise the *Bs*, contrary to the *As*, would

resemble each other exactly which is impossible since things that are not exactly similar to each other cannot resemble each other at least as much as exactly similar things.

(Closeness) is valid for the pair strong minimal resemblance-weak minimal difference. For suppose the *As* resemble each other more than do the *Bs* and suppose that the *As* fail to be strongly minimally similar to each other. In this case the *As* are not exactly similar. Suppose now that the *Bs* fail to weakly minimally differ from each other. This means that the *Bs* are exactly similar. If so and given that things that are not exactly similar cannot be more similar to each other than things that are, the *As* are not more similar to each other than the *Bs* are; which contradicts the hypothesis.

(Excluded neutral) also is satisfied by this pair of resemblance properties. For if the *As* fail to strongly minimally resemble each other, they clearly weakly minimally differ from each other, and if the *As* fail to weakly minimally differ from each other, they strongly minimally resemble each other.

(Maximal value) clearly is not satisfied by strong minimal resemblance. That the *As* strongly minimally resemble each other is not sufficient for them to be such that there are no things more similar to each other than the *As* are.

(Minimal value) is not satisfied by weak minimal difference for the same reason. The *As* can be weakly minimally different from each other and be very similar to each other. In which case the *As* can be more similar to each other than some other things are.

We get the following axioms for the pair strong minimal resemblance-weak minimal difference:

$$\text{(Negativity}_{\mathbf{D}_{WM}}\text{)} \quad \forall X, Y (\text{WR}(X, Y) \ \& \ \mathbf{D}_{WM}(X) \rightarrow \mathbf{D}_{WM}(Y))$$

$$\text{(Closeness}_{\mathbf{R}_{SM}-\mathbf{D}_{WM}}\text{)} \quad \forall X, Y (\text{SR}(X, Y) \rightarrow \mathbf{R}_{SM}(X) \vee \mathbf{D}_{WM}(Y))$$

$$\text{(Excluded neutral}_{\mathbf{R}_{SM}-\mathbf{D}_{WM}}\text{)} \quad \forall X, Y (\text{WR}(X, Y) \rightarrow \mathbf{R}_{SM}(X) \vee \mathbf{D}_{WM}(X))$$

### A.8.2 Axioms for weak minimal resemblance and strong minimal difference

When we interpret minimal resemblance weakly, inexact but close resemblance in some respect suffices for there to be a resemblance between some

things. If we interpret minimal difference strongly, that some elected property had by one of the *As* is not shared by all of the *As* is not sufficient for the *As* to minimally differ from each other. For, in order to strongly minimally differ from each other, the *As* must also be such that there is a series of elected properties such that each of the *As* has one of them, such that these elected properties are ordered on a same relevant similarity ordering, and such that they do not resemble each other according to this similarity ordering. Which of our principles are satisfied by this pair of resemblance and difference properties?

Given what we said about (Positivity) and strong minimal resemblance in the previous subsection, it should be clear that (Positivity) is valid for weak minimal resemblance. If the *As* resemble each other at least as much as the *Bs* do, and the *Bs* resemble – exactly or not – in some respect, then the *As* resemble – exactly or not – in some respect.

Is (Negativity) satisfied by strong minimal difference? I think it is. If the *As* resemble each other at least as much as the *Bs* do and the *As* differ in some respect, *i.e.* are such that there is a relevant similarity ordering on which properties of the *As* are ordered but not closely ordered, then the *Bs* must differ in some respect. For suppose they do not. This means that either the *Bs* exactly resemble each other or that they resemble in every respect but imperfectly in some respect. In both cases, the *Bs* would resemble each other more than the *As* do, contrary to the hypothesis.

(Closeness) is clearly valid for this pair. For suppose that the *As* resemble each other more than the *Bs* do. Then suppose that the *As* fail to weakly minimally resemble each other. The latter means that the *As* are exactly different. There is no way exactly different things can resemble each other more than some other things do. Therefore, if the *As* resemble more than the *Bs* do, the *As* weakly minimally resemble each other.

(Excluded neutral) is also valid for this pair. If the *As* fail to strongly minimally differ from each other, then either they share all their elected properties, or they at least resemble in every respect, though imperfectly in some respect. In both cases, they weakly minimally resemble each other.

(Maximal value) is not satisfied by weak minimal resemblance for obvious reasons. (Minimal value) is not satisfied by strong minimal difference for obvious reasons.

Therefore, we get the following axioms for the pair weak minimal resemblance-strong minimal difference:

**(Positivity $_{R_{WM}}$ )**  $\forall X, Y (WR(X, Y) \ \& \ R_{WM}(Y) \rightarrow R_{WM}(X))$

**(Negativity $_{D_{SM}}$ )**  $\forall X, Y (WR(X, Y) \ \& \ D_{SM}(X) \rightarrow D_{SM}(Y))$

**(Closeness $_{R_{WM}-D_{SM}}$ )**  $\forall X, Y (SR(X, Y) \rightarrow R_{WM}(X) \vee D_{SM}(Y))$

**(Excluded neutral $_{R_{WM}-D_{SM}}$ )**  $\forall X, Y (WR(X, Y) \rightarrow R_{WM}(X) \vee D_{SM}(X))$

### A.8.3 Axioms for exact resemblance and exact difference

Consider the pair exact resemblance-exact difference now. Does exact resemblance satisfy (Positivity)? It clearly does. If the *Bs* are exactly similar to each other while the *As* are not, the *Bs* are more similar to each other than the *As* are. So (Positivity) is valid for exact similarity.<sup>36</sup> (Negativity) is also clearly valid for exact difference. If the *Bs* do not differ exactly while the *As* differ exactly, then the *Bs* resemble each other more than the *As* do so that the *As* do not resemble each other at least as much as the *Bs* do.

(Closeness) is clearly not satisfied by the pair exact resemblance-exact difference. For it is possible that the *As* resemble each other more than the *Bs* do, that the *As* weakly minimally differ from each other, and that the *Bs* strongly minimally resemble each other. If the *As* weakly minimally differ from each other, they do not resemble exactly. And if the *Bs* strongly minimally resemble each other, they do not differ exactly. Likewise, (Excluded neutral) is clearly not satisfied by the pair exact resemblance-exact difference. The *As* can be at least as similar to each other as the *Bs* are and be such that they fail to exactly resemble each other and fail to exactly differ from each other.

(Maximal value) is valid for exact resemblance, as exact resemblance, if comparative resemblance is overall, is the maximum of resemblance. No resemblance exceeds exact resemblance. Likewise, (Minimal value) is valid for exact difference. There is no greater difference than exact difference.

We thus get the following axioms for exact resemblance and difference:

<sup>36</sup>It should be noticed that (Positivity) is not valid for exact resemblance if we assume Rodriguez-Pereyra's measure for degrees of resemblance (D). But as I said in section 5 of this appendix, (D) is not a measure for degrees of overall resemblance, but only for degrees of focused resemblance. So if one assumes that WR is interpreted as overall comparative resemblance in (Positivity), (D) is irrelevant here.

(**Positivity** <sub>$R_E$</sub> )  $\forall X, Y (WR(X, Y) \ \& \ R_E(Y) \rightarrow R_E(X))$

(**Negativity** <sub>$D_E$</sub> )  $\forall X, Y (WR(X, Y) \ \& \ D_E(X) \rightarrow D_E(Y))$

(**Maximal value** <sub>$R_E$</sub> )  $\forall X (R_E(X) \rightarrow \neg \exists Y \ SR(Y, X))$

(**Minimal value** <sub>$D_E$</sub> )  $\forall X (D_E(X) \rightarrow \neg \exists Y \ SR(X, Y))$

#### A.8.4 Axioms for overall resemblance and overall difference

Finally, we will consider which of the above listed properties hold for overall resemblance. By considering which of these properties hold here, we shall pay attention to keep the standard for typicality of resemblance fixed.

(Positivity) is clearly valid for overall resemblance. If the *As* resemble each other at least as much as the *Bs* do, it cannot be the case that the *Bs* resemble each other saliently more than is typical, while the *As* do not. Likewise, (Negativity) is valid for overall difference. If the *As* resemble each other at least as much as the *Bs* do, it cannot be the case that the *As* differ saliently more than is typical, while the *Bs* do not differ saliently more than is typical.

(Closeness) seems to me valid for the pair overall resemblance-overall difference. For suppose it is neither the case that the *As* resemble overall nor the case that the *Bs* differ overall. This means that either (i) both the *As* and the *Bs* are neutrally similar, (ii) the *As* differ overall and the *Bs* resemble overall, (iii) the *As* are neutrally similar and the *Bs* resemble overall, or (iv) the *As* differ overall and the *Bs* are neutrally similar. If either of (ii)-(iv) is true, then the *Bs* resemble each other at least as much as the *As* do. If (i) is true, I think we will agree that the *As* and the *Bs* resemble equally. In every case, it is false that the *As* resemble each other more than the *Bs* do. Therefore, (Closeness) is valid for this pair.

(Excluded neutral) is not valid for overall resemblance and difference. For precisely, the *As* can be neutrally similar and resemble each other at least as much as some other things do.

(Maximal value) is invalid for overall resemblance for obvious reasons: in many contexts, overall resemblance is not the maximal amount of resemblance. Likewise, (Minimal value) can fail for overall difference.

We therefore obtain the following axioms for overall resemblance and difference:

(**Positivity** $_{R_O}$ )  $\forall X, Y (WR(X, Y) \& R_O(Y) \rightarrow R_O(X))$

(**Negativity** $_{D_O}$ )  $\forall X, Y (WR(X, Y) \& D_O(X) \rightarrow D_O(Y))$

(**Closeness** $_{R_O-D_O}$ )  $\forall X, Y (SR(X, Y) \rightarrow R_O(X) \vee D_O(Y))$

I restate the results of this section in the following table (where '+' means that the property is satisfied by the pair and '-' means that it is not):

**Properties of non-comparative resemblances**

	$R_{SM}$ and $D_{WM}$	$R_{WM}$ and $D_{SM}$	$R_E$ and $D_E$	$R_O$ and $D_O$
(Positivity)	-	+	+	+
(Negativity)	+	+	+	+
(Closeness)	+	+	-	+
(Excluded Neutral)	+	+	-	-
(Maximal value)	-	-	+	-
(Minimal value)	-	-	+	-

These axioms should be added to the properties of the various resemblance and difference properties displayed in chapter 5 to get a full logic for non-comparative resemblance properties.

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