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The direct relational model of object perception

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> Total ignorance is not a sufficient condition for total blindness.
> Fred Dretske (1969: 17)

0 Introduction

This text aims at presenting a general characterization of the act of perceiving a particular object, in a framework in which perception is conceived of as a mental and cognitive faculty having specific functions that other faculties such as imagination and memory do not possess. I introduce *the problem of determining the occurrence of singular perception of a physical object* (henceforth named 'occurrence problem' for brevity), as opposed to the occurrence of other mental states or attitudes. I propose that clarifying this occurrence problem requires making explicit the conditions of perceptual competence/faculty so as to explain the occurrence of each perceptual performance on the basis of the use of this competence. I argue then for a *direct relational model* according to which the singular perception of an object depends on a competence of connecting the perceiver *directly* with each target object. This model is

compatible with a disjunctive approach to perception according to which each particular experience of an object corresponds either to a direct perceptual relation with this object or to the illusion of having the experience of this object. The arguments in favour of this relational model rest on the idea that the faculty of perception (conceived of as a *direct* relation with objects) grounds the capacity to demonstratively identify physical objects.

1 The occurrence problem: Essence, competence and performance of the faculty to perceive an object

As a rather minimal conceptual requirement, one expects from a theory aiming at explaining a phenomenon φ that this theory clarifies the principles and the methods to individualize this φ in the physical universe – so as to understand the *essence* of this phenomenon φ. The theory must thus provide specific and predictive criteria making it possible to judge that φ occurs in particular areas and circumstances of the physical world. For instance, the criteria provided by chemistry and physics fulfil this constraint by making explicit descriptions and methods which individualize in the universe elements such as copper or gold. To be adequately grounded, a theory of the faculty of perception must in the same way provide criteria that make it possible to locate in the world the conditions which cause or imply the phenomenon of perception, because it is by specifying such conditions that it becomes possible to individualize, to classify and to explain events of a perceptual nature. Moreover, since perception is *a faculty of the mind* or *a mental competence* whose exercise gives place to varied *acts* or varied *performances*, it is necessary to be able to distinguish (on the basis of objective criteria) at which particular time a mind is engaged in object perception rather than in performances depending on other mental faculties (such as for example imagination).

The study of the abilities which determine object perception also relates to the problem of the essence of perception (e.g., What is the nature of the act of perceiving?) and to the problem of the localization of its manifestations (e.g., Where and when did *x* perceive *y*?). On the basis of what kind of conditions can one claim that an intentional agent perceives an object? What are the conditions that distinguish the occurrence (or the act, performance) of the perception of an object from the performance of other faculties or mental activities such as memory or imagination, which can also concern themselves with the relationships with objects? These questions relate to what I will call the *singular perception* of an object, to indicate that the object concerned is unique, according to a meaning which will be analyzed below. These questions thus relate to the conceptual study of the psychological nature of object perception, and to the nature of the relationship between the perceptual competence and its particular performances. They return thus to what one can call the 'problem of the occurrence of object perception', or '*occurrence problem*' for brevity. Here is a possible formulation of this problem:

> *The occurrence problem of object perception (or 'occurrence problem')*: What are the conditions c_1, c_2 … c_n which, in a given situation, determine the occurrence of the perception of a physical object *x* by an intentional agent *s* – as opposed, for instance, to the imagination of a new object *y* by *s*?

Among the possible answers to this occurrence problem, I suggest below that one of the preferable answers might assume that one of the essential conditions of object perception is *a direct relationship* between the perceiver and the perceived physical object. This kind of

answer points toward what can be called a *relational* or *dyadic*[1] *model* of object perception. According to a *direct relational model*, any response to the occurrence problem takes the following form: "the intentional agent *s* perceives the physical object *x* because there is a relation *R* between *s* and *x*"; in this notation, '*R*' refers to a relationship that can be described as *direct* according to ontological and epistemological arguments. To introduce this model, it shall be useful to introduce some initial specifications about the main concepts of the occurrence problem, that is the concepts of *perception* and *physical object.*

2 Opening note on the concept of 'perception'

First precision, to begin with the analysis of the occurrence problem, one may adopt a non restrictive and liberal interpretation of the concept of 'perception'. According to such a liberal interpretation, the perception of a physical object does not necessarily imply the conscious, explicit or reflexive experience of the perception of this object. In other words, this use does not exclude that a perceptual episode *e* may occur for the perceiver in near or complete absence of phenomenological evidence about the occurrence this particular episode *e*. Given that sensory, motor or memory phenomena have been described as possessing the property to occur (functionally) without entailing the consciousness of their occurrence, it would be arbitrary to exclude them without justification from the domain of perception.[2] For instance, the deficits related to visual agnosia can leave unimpaired implicit procedures of visuo-motor control (Jacob & Jeannerod, 2003; Milner, 1998; Milner & Goodale, 1995). Does one have to consider *implicit* visuo-motor control as a form of 'perception' and if so of what nature? An answer to this question requires the specification of the theoretical use of the concept of 'perception'. This type of question ought to be asked about the diverse uses of the concept of perception and their study makes it possible to clarify the *theoretical uses* of this concept. Consequently, so as to avoid arbitrariness, we will use in this analysis a neutral meaning of the concept of perception – i.e., one that does not imply the exclusive reference to phenomenological criteria. This starting

[1] The phrases 'relational models' and 'dyadic model' of object perception are here semantically equivalent. They refer to the tradition resulting from the Russellian theory of acquaintance according to which the experience of an object by acquaintance implies a direct relation with this object (Russell, 1912, 1918, 1956), which is more primitive than a thought in connection with an object and which, because it gives a direct access to the object, makes possible the singular or demonstrative thought in connection with the object. The expression 'Relational View' is employed in particular by Campbell (2002: 6, 114-131, 145-56) to refer to this tradition, in opposition to what he calls the 'Representational View'; Dokic (2000; 2001) uses the expression of 'dyadic model' or 'binary model' (in opposition to a triadic or ternary model) of perception.

[2] In cognitive science, and in particular in experimental cognitive science, the most usual attitude may consist in taking into account non conscious phenomena to explain mental states. For example, in order to preserve the possibility of distinguishing perception and conscious awareness, Kanwisher writes (2001 : 90) that the word 'perception' will be used throughout his article "to refer to the extraction and/or the representation of perceptual information starting from a stimulus, without any assumption that such information is necessarily experienced consciously". For other examples of this interpretation of the concept of perception one can also consult Baars et al. (2003) and, for a philosophical discussion, Dretske (2004). To consider the possibility of an occurring perception without consciousness is rather recent from an historical point of view: for example, Hamilton formulated the probably prevalent conception for the XVIIIth and XIXth centuries in the following way: "All Perception is an act of Consciousness; no Perception, therefore, is possible except under the conditions under which Consciousness is possible." (Hamilton, 1895b : 877).

point is thus much less specific than purely phenomenological or introspective analyses of perception according to which 'perception' refers *exclusively* to conditions or phenomenal and explicit data. This said, we will primarily consider the case of perceptual experience or awareness as a paradigmatic case of perception.

3 Opening note on the concept of 'physical object'

The second initial precision relates to the distal target of perception as considered in the occurrence problem, i.e. *the physical object.* According to my realist formulation, each occurrence of the singular perception of an object is a *relation* with a unique physical object. It occurs at the time of an event which can be called '*a perceptual episode*', i.e. a sequence of perceptual acquaintance (and possibly motor contacts) with a distal object, organized according to a goal, and open to affect the memory (namely episodic[3] memory) of the perceiver.

The notion of an 'object' can prove to be conceptually vague for it is considered to be problematic in several theoretical fields.[4] On the one hand, common sense has more or less coherent intuitions about what is an "object" and these intuitions could influence the theoretical constructions suggested by philosophers and scientists. In addition, among the scientific analyses, several theories use technical concepts of *object*, in particular in cognitive science. In the latter case, the significance of the term 'object' depends closely on the theory which uses it, and it thus deviates from the vague uses of the term 'object' in ordinary language. Lastly, philosophical analyses in metaphysics carry out the analysis of the ontology of the material objects in terms which can sometimes deviate radically at the same time from intuitions of common sense and from contents of the scientific theories. [5]

In the following analysis, I shall adopt a realistic analysis of the concept of *physical object,* which is more specific than the unanalyzed notions of common sense and in addition does not depend on a unique philosophical or scientific theory. Here I adopt a provisional notion because one cannot exclude *a priori* that it can be, or must be, replaced in certain contexts by concepts having greater explanatory relevance. Moreover, this analysis conflicts with other conceptions of what an 'object' is.[6] According to this analysis, the phrase 'physical object' refers to

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[3] The notion of 'episodic memory' is to be interpreted within the current psychological meaning related to the recollection of experiences and events experienced at personal level, similar to that which is specified by Tulving (2001; 2002). It is relatively natural to estimate that episodic memory is related to the perceptual episodes which generate this kind of memory. The relationship between episodic memory and the encoding of perceptual information is a topic under discussion, because some models suppose that perceptual information must be encoded in the semantic memory before being encoded in the episodic memory, while according to other models perceptual information can be encoded directly in the episodic memory (cf. Köhler, Moscovitch, & Melo, 2001; Tulving, 2001: 1510-12; Zimmer et al., 2001).

[4] The distinction made in this paragraph is indebted to Casati (2004).

[5] Cf. for instance Hirsch (1978: 471-3), Rea (1997), van Inwagen (1990).

[6] For instance, the concept of physical object which I use in this article is not compatible with (or is more specific than) the concept of *object* suggested by Quine in the following passage: "Physical objects, conceived thus four-dimensionally in space-time, are not to be distinguished from events or, in the concrete sense of the term, processes. Each comprises simply the content, however heterogeneous, of some portion of space-time, however disconnected and gerrymandered." (Quine, 1960 : 171). In addition, such analysis of the concept of physical object is less specific than the concept of material object conceived of as referring only to the living organisms (for instance, van Inwagen, 1990: 142-68, adopts with Locke a notion of physical object restricted to living organisms).

individual, macroscopic material bodies with which human beings interact, and about which they collect and continuously memorize information. As examples of physical objects we can cite vegetables, animal or human organism or artifacts like books or tables. *Mutatis-mutandis* in the philosophical and metaphysical vocabulary resulting in particular from the works of Russell (1912; 1956), R. W. Sellars (1944; 1959), Joske (1967), Strawson (1959; 1997), Wiggins (1980; 2001) or Evans (1982), physical objects are also called 'individuals', 'particulars'[7] or 'objective particulars', 'substances'[8] or 'continuants'[9].

In conformity with a number of philosophical and psychological theories one can admit that physical objects have characteristics satisfying what is sometimes called "identity or persistence criteria." [10] Moreover, these criteria can be called *criteria of objecthood.* The phrase refers to the properties which determine the objecthood and the identity[11] of each instance or

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[7] The use of the notion of particular resulting from the nominalization of the adjective 'particular' is used as a technical term in analytical philosophy at least since the work of Russell (1912). In general, it is used to refer to a token or concrete and individual element, as opposed to a universal. According to some constructivist analyses the basic or fundamental 'particulars' are not physical objects (which would be according to constructivism a logical or mental construction), but a *sense datum* (p. ex. Broad, 1923; Price, 1950; Russell, 1911; Russell, 1912; 1913: 80; 1922: 482-3) or a *quale* (p. ex. Sellars, 1952, 1963). In opposition to the constructivist tradition, the concept of physical object used here belongs to the realist tradition of R. W. Sellars (1944; 1959), Strawson (1959), Quinton (1979), Evans (1982) or Campbell (2002) who admit, or at least are inclined to admit, a realist ontology built up from 'objective particulars', i.e., encompassing physical objects that exist independently of the mind and the mental states (which is not the case with sense data or sensations).

[8] The notion of *substance*, whose use can be traced back to Aristotle's *Metaphysics*, is central to the analyses of for instance Quinton (1973), Millikan (1984 : 257-81), Ayers (1991) or Smith (1998: 6-8).

[9] The notion of *continuant* is used for example by Quinton (1973), Shoemaker (1984b : 247-48), Strawson (1988: 110-11) and Wiggins (1980).

[10] For a philosophical presentation of the debates, one can refer to Hirsh (1976; 1982), Lowe (1998), Burke (1994) – the last uses the concept of 'persistence condition' – or to Wiggins (2001) who defends a sortalist and conceptualist approach to the theory of object identity. Works by psychologists, such as Spelke and her collaborators (Spelke, 1990; Spelke, Gutheil, & Van de Walle, 1995; Xu, 1997), have contributed to the psychological and philosophical debate concerning the development of the perceptual faculties allowing us to track and identify elements respecting the basic objecthood criteria (Ayers, 1997; Bloom, 2000; Carey & Xu, 2001; Hirsch, 1997; Landau, Smith, & Jones, 1998; Pylyshyn, 2003; Wiggins, 1997; Xu, 1997).

[11] Selon l'analyse dont nous partons, l'*identité* d'un objet physique est en relation avec les propriétés fondamentales suivantes. Les objets peuvent être *comptés*, parce qu'un objet forme une unité discriminable et dénombrable parce qu'elle est discriminable. Un objet particulier est *unique* dans le monde, parce qu'il est individualisé de manière unique par ses propriétés causales et spatio-temporelles, qui déterminent ce qu'on appelle parfois son 'identité numérique' (Strawson, 1959 : 33-34). Enfin, un objet physique peut être classé dans un *genre*, parce que chaque objet individuel peut être catégorisé ou reconnu comme membre d'une classe ou d'un universel.

[11] According to the present analysis, the *identity* of a physical object is related to the following fundamental properties. First, the objects can be *counted* because an object forms a distinct unit and it is countable because of this distinctness. A particular object is *unique* in the world because it is individualized in a single way by its causal and spatio-temporal properties, which determine what is sometimes called its 'numerical identity' (Strawson, 1959 : 33-34). Secondly, a physical object can be classified as belonging to a *kind* (or *sort*) because each individual object can be categorized or recognized as a member of a class or universal. If this analysis is acceptable (given that other ontological views could be philosophically plausible and justifiable), it implies that any physical object *x* respects the

token of the kind 'physical object'. Among the fundamental physical characteristics of an object's objecthood, it seems necessary to count spatio-temporal features relating to the cohesion/composition of the parts and to the shape of the object. For instance, as long as it is not decomposed or destroyed by other elements of the world, a physical object generally possesses a relatively rigid and impenetrable form as well as surfaces which remain in contact with each other during movement. Consequently, an object has co-localised properties, persists through time, is located at a place (which is sometimes stationary relative to an allocentric frame of reference) and follows a continuous spatio-temporal trajectory. These spatio-temporal non trivial characteristics depend on causally distinctive (and unique) properties of the object, constituting what we can call the causal or categorical dispositions of the object properties (see below the section on categorical properties).

Some of the causal dispositions of a physical object allow interactions with intentional agents. When a perceptual episode occurs a human individual can usually perceive an object by means of several sensory modalities (for example, see, hear, listen to, manipulate), can refer to this object during acts of demonstrative reference and identification, and can acquire knowledge about the singular history of this object. In a number of cases, one object can also be affected by motor behavior (e.g. be displaced, modified, broken, sacrificed) and more precisely by the execution of *routines, skills* or of *practical know-how* combining sequences of gestures such as answering the call by handling the compound *c*, starting one vehicle *v*, beginning a discussion with *s,* or adjusting the camera *a.*

It is important to note that a physical object is an element which is primarily different from a an imagined content or a sensory impression, for the latter do not fulfil many criteria of objecthood. For example, a simple sensation does not occupy a stationary place in an allocentric frame of reference or one cannot move away and approach a sensation so that our descriptive resources of the spatial relationships with objects is not directly applicable to the description of the phenomenal universe of sensations. For instance, an after-image – which can be conceived of as a sophisticated type of visual sensations – moves according to the ocular movements, i.e. it is stationary as considered within the frame of reference of the retina but mobile when considered within an allocentric frame of reference. One can clearly make explicit this experience during the experience of the physiological nystagmus, as illustrated by the experience of the after-image below.

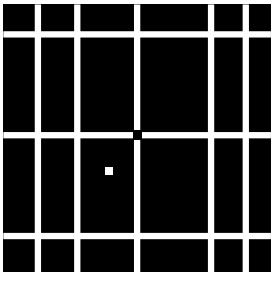

Figure 1 Effects of physiological nystagmus.

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criteria of unity, uniqueness and kind identity (sometimes also known as sortal or categorial identity). The distinction of these various factors (uniqueness, unity, kind identity) allows analyzing in a precise way what one usually refers to in a vague manner as being 'the identity' of an object. This said, the reader should keep in mind that the nature of the relations between these various objecthood factors is a widely discussed topic.

Stare at the black central square during 30 seconds or more, then fixate the white square (below, on its left side). The movement which is perceived in the position of the after-image relative to the grid is caused by the tremor (trembling) of the eyes muscles. This illustration is freely inspired by the demonstration presented by Palmer (1999: 521-23) to illustrate the phenomenon.

According to the realist position of the present analysis, in spite of the possible interactions between objects and intentional agents, the occurrence of the relationship with intentional agents is not a necessary condition for the existence of physical objects. Indeed, in circumstances such as the masking by an occluder or the spatial inclusion within another object, a particular object can preserve its status as a physical object (because the components of its categorical basis continue to respect the objecthood criteria) while being impossible to perceive, to know or to handle directly. Consequently, according to this analysis, physical objects are *independent* of our mind and mental states because objecthood depends on essential physical features (i.e. on causal and spatio-temporal properties) which are more fundamental than those that are determined by the occurrence of a relation with an intentional agent.

4 The direct relational model of the singular perception of an object

Generally a perceiver explores complex spatial configurations encompassing several physical objects. It seems, however, correct to consider that, in the kind of perception referred to here as *singular perception*, the agent can select by means of his/her perceptual, attentional and motor capacities a unique object among a configuration which includes several objects. In the last case each occurrence of the singular object perception may be defined by the occurrence of a direct relation between the perceiver and the perceived distal physical object. If this description is correct perception must be conceived of from the viewpoint of *a relational model.* According to the latter, an explicit answer to the occurrence problem must be given in the following form: an agent/subject *s* perceives an object *x* because there is a relation *R* between *s* and *x.* In this case, specifying the occurrence conditions of the perception of an object mainly consists in specifying the nature of the relation *R* which connects the subject and the object.

A number of theories have developed a relational model by analyzing the occurrence of perception as the occurrence of a *dyadic* or *binary relation* with at least one object.[12] This approach is original when compared to the theories that define perception in terms of the occurrence of a 'sensory representation', internal to the mind or the brain of the perceiver and (especially if this sensory representation does not depend on a direct relation with an external physical object). In the next sections, I will attempt to make explicit some of the advantages of a direct relational model, and develop the thesis according to which singular perception is a direct relation between the perceiver and the perceived object.

This model can contribute to the treatment of the occurrence problem by preserving its unity for at least three reasons. On the one hand, it offers a specification of the essence of the faculty

[12] See for instance the analysis of the relation of acquaintance by Russell (1912) which bears similarity on some points with that of James (1890 : 221-222). For example, Russell writes "(...) A's experiencing of O is different from O, and it is in fact a complex, of which A himself, or some simpler entity bound with A, is a constituent as well as O. Hence experiencing must be a relation, in which one term is the object experienced, while the other term is that which experiences." (Russell, 1956 : 162). It is also the theory of the demonstrative thoughts of Evans (1982), Perry (1977), McDowell (1998b), Snowdon (1992: 48, 50) or Campbell (2002).

to perceive an object by defining it as the capacity or the disposition to establish a direct relation with a physical object. In addition, it makes it possible to distinguish object perception from other cognitive faculties such as imagination, for the occurrence of imagination of an object does not require in the same manner a direct relation or acquaintance with a particular object. Lastly, it provides a general criterion to determine the occurrence of the perception of an object. The perception of an object occurs when there is a direct relation (presently) instantiated (or, exemplified) at that particular moment between the perceiver and the perceived object. The direct relational model thus rests on theses which answer the problem of the occurrence. Its elementary formulation is as follows:

> *Direct Relational Model (DRM) of singular perception*: An agent/subject *s* perceives a physical object *x* if and only if the two following conditions are met:
>
> DRM_1: There exists a single/unique physical object *x*, which is independent of *s*.
>
> DRM_2: There exists a direct relation between the agent *s* and the physical object *x*, which is grounded in the use of sensory and motor capacities.

In the terminology adopted here, the elementary version of the direct relational model corresponds to the conjunction of the theses DRM_1 and DRM_2. One of the central problems of this model is to succeed in justifying why the relation founded by the faculty of perception is a 'direct' relation. This difficulty is increased by the varied uses of the phrases 'direct perception' and 'indirect perception', in the philosophical and psychological analyses studying object perception. [13]

To accept the conjunction of theses DRM_1 and DRM_2 has several important conceptual consequences. First, from the viewpoint of traditional philosophical terminology, the direct relational model is a form of 'direct realism' (for instance in the sense defined by Dancy, 1985; Dretske, 1995a). For example, it satisfies the rudimentary characterization (which is not the only possible one) given by Dretske (1995a: 338), according to which direct realism holds that (1) there is real world whose existence is independent of our perception of it, and (2) under normal conditions perceivers are, in a direct and unmediated way, perceptually aware of the objects and facts that constitute the world. There are several types of analyses leading to direct realism and it will be necessary to specify precisely in which direction the perceptual relation can be known as 'direct' according to the model I adopt. Besides this, the direct relational model may be compatible with several types of realist analyses, in particular about the aspects concerning the epistemology of perception.[14]

By thinking of the perceptual relation as a relation between ontologically distinct elements, the second thesis of the relational model (DRM_2) implies conceding that a physical object exists independently of the mental states of the perceiver who is himself or herself a physical

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[13] Schematically, on one hand philosophical research deals with the components to which perception relates. On the other, psychological or physiological viewpoints analyse the mechanisms implied in perception. In both cases, 'direct' and 'indirect' theories have been proposed, and the significance of these expressions can vary, so that the distinction is manifestly recognized as sometimes causing confusions (Dancy, 1985 : 144-4). Among others, Dancy (1985 : 143-59), Dretske (1995a), and Snowdon (1992) tried to shed light in the debates concerning the direct or indirect nature of perception. Dretske (1995a) distinguishes the philosophical debates regarding the nature of 'objects' from the perceptual consciousness and the psychological debates centring on nature of the process/operations leading to the perceptual awareness (Gibson, 1979; Rock, 1997; Ullman, 1980).

[14] I consider here *inter alia* about the contributions of philosophers such as R. W. Sellars (1944; 1959: 15), Strawson (1959; 1979), Mandelbaum (1964), Goldman (1967; 1976), Quinton (1973: 172-207), Evans (1982), Burge (1991) and McDowell (1991).

object. The main outcome is that the physical object does not cease to exist when it is not perceived any more, and that it *preserves* some of its perceptible properties[15] even when it is no longer perceived. This independent existence is allowed for by the majority of the followers of the philosophical[16] and scientific tradition to which I am referring. According to this form of realism, which is often at least partially consistent with common sense realism, the perceptible material bodies like the animal individuals, or the trees can exist in the absence of creatures having the capacity to perceive them. Moreover, it is at least in theory possible for the artifacts (houses, vehicles, books, instruments) and human bodies to exist in this manner. This independence thesis of the perceptible physical object is thus endorsed by analyses like those conducted by Strawson (1959), Evans (1982) or Dretske (1969; 1995a) who admit that perception is a faculty endowed with the function to put humans in a *knowledge* relationship with independent objects, conceived of from the viewpoint of a realistic ontology.

These analyses are distinct from non realist analyses – such as those of idealist (p. ex. Berkeley, 1710) or phenomenist (p. ex. Ayer, 1969: ch. 5; Lewis, 1946: ch. 7) – which do not admit that a perceived physical object *x* can continue to exist independently (as an objective basis of the possibility of perceiving *x*) once that *x* is not perceived any longer. For instance, typically, to explain the possibility of continuous perception of object *x* (and that to again perceive *x* after it disappeared from the perceptual field), phenomenism will support that there is (instead of an independent physical object) the continuous possibility of a similar experience set in motion according to suitable conditions. Thus, phenomenism explains the perceptual experience of *x* by the reference to a *subjectively* true conditional in a permanent way, according to which 'if such conditions of the experience are satisfied, then the subject has perceptual experience of *x*'.

5 Ontological aspects of the direct relational model: A disjunctive analysis of experience

The direct relational model has several ontological implications. The conjunction of theses DRM_1 and DRM_2 implies the rejection of phenomenism favoring an analysis of the psychological essence of perception which treats perception as being opposed to illusion. Phenomenism typically consists in claiming that it is not possible to distinguish the veridical experience from the illusory experience of an object, so that the existence of a relation to an independent object can never be guaranteed – this claim conflicts with thesis DRM_2. The central premise of the phenomenist arguments is typically that each illusory (or hallucinatory) experience has the same phenomenological properties as the veridical experiences. However, my goal here is not to present a new objection to phenomenism because I accept the traditional objections to the phenomenist arguments.[17] My goal shall be to develop the relational model of object perception, which implies avoiding the phenomenist analysis.

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[15] In what follows I will describe these properties as 'categorical' or 'primary' properties.

[16] It is in particular the tradition resulting from the writings of Strawson (1959), Dretske (1967; 1969: 43-54; 1981; 1995a), Quinton (1973; 1979), Evans (1982), Proust (1997a; 1997b), Dokic (2000; 2001) and Campbell (2002). This tradition is characterized by the principled denial of phenomenism. It is rather well summarized by the 'object perception model' presented by Shoemaker (1994).

[17] For a presentation of the traditional analytical arguments against phenomenism implied by the argument of illusion, one can refer to the analysis of this argument in Dokic (2001 : 165-229). Our

Another conceptual implication is also related to the denial of phenomenism, but concerns its positive consequence on the contents of the relational model. In the latter, to challenge phenomenism implies that the very perception of an object can be veridical *or* illusory, and that it is generally possible to make a distinction between the two cases. The main thesis of the relational model (expressing the condition described by DRM_2) claims that the occurrence of the direct relation with the physical object makes veridical the perceptive experiment of the object. However, if one admits that the experience of an object is either veridical or illusory, as opposed to what phenomenism affirms, one agrees to what is sometimes called *a disjunctive theory of the experience.*[18] The direct relational model that I am analyzing is compatible with at least one type of disjunctive analysis.

A disjunctive analysis of experience rests on the idea that the ordinary concept of perceptual experience in fact covers two distinct concepts, that of *veridical perception* and that of *illusion*. According to a formulation of the disjunctive theory, the ordinary reports of perceptual experience can be systematically described again in the form of exclusive disjunctions.[19] For example, here are three similar reports of experience: 'the subject *s* has a visual experience of a book', 'the subject *s* seems to see a book', 'the subject *s* seems to see that a book has fallen'. According to a disjunctive analysis, these reports of experiences can be specified in a more precise way in the form of disjunctive (exclusive) reports such as:

The subject *s* has a veridical visual experience of a book *or*

The subject *s* has an illusory visual experience of a book.

The subject *s* sees a book in a veridical way *or*

The subject *s* has the illusion to see a book.

The subject *s* sees in a veridical way that a book has fallen *or*

The subject *s* has the illusion of seeing that a book has fallen.

The main idea is that, independent of the grammatical form of experience reports, the occurrence of the (original, genuine) perceptual episode can satisfy only one of the alternatives of the disjunction. *Either* the subject of a given experience perceives in a veridical manner an independent object *or* he/she is victim of an illusion, but the original experience cannot be simultaneously veridical and illusory. This version of the disjunctive theory restrains the use of the concept of perception, because the disjunctive concept of perception of object is no longer coextensive with that of the experience of an impression or sensory quality. The expressions 'occurrence of the perception of an object' and 'veridical experience of an object' become coextensive, which breaks with uses of the verb 'to perceive' in ordinary parlance (for example, if one maintains an usage such as - 'to perceive' or 'see' an illusion).

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analysis admits the objections which he formulates against phenomenism and to the argument of illusion. For other objections to phenomenism, see also for example Dancy (1985 : 160-3).

[18] The disjunctive analysis of experience was introduced in particular by Hinton (1967; 1973a; 1973b) and Snowdon (1981; 1990; 1992). McDowell (1982), Child (1992), Dokic (2001) and Campbell (2002) also developed distinct versions from the disjunctive theory and the relational model.

[19] Cf. for instance Hinton (1967), Snowdon (1981), Dokic (2001 : 175-95). Here it is worth mentioning a fact which is generally overlooked in the strictly philosophical literature, although it is illuminating for epistemological analysis. This fact is that the disjunctive analysis of the distinction between perception and illusion is obviously compatible with several psychological concepts tracing back to the beginning of experimental and clinical psychology (Descourtis, 1889; Helmholtz, 1867; Sully, 1889) or more recent research, in particular in the field of vision (Gregory, 1966; Pylyshyn, 2003).

The direct relational model can be formulated within the framework of a disjunctive theory. In this formulation if an agent/subject *s* enjoys the experience of an object *x*:

Either *s* has a (veridical) perceptual experience of a physical object *x* because:

(DRM_1) There exists a unique physical object *x* independent of *s*.

(DRM_2) There exists a direct relation between the agent *s* and the physical object *x*.

Or *s* has an illusory or hallucinatory experience, because:[20]

(Negation of DRM_1) There does not exist a unique physical object *x* independent of *s*.

(Negation of DRM_2) There does not exist a direct relation between the agent *s* and the physical object *x*.

A disjunctive analysis of experience can be interpreted in a weak or strong fashion (Campbell, 2002; Dokic, 2001 : 175-84). According to a weak version deprived of ontological or psychological implications, a disjunctive theory is a simple instrument at the service of the conceptual clarification of the concept of experience. A weak disjunctive theory asserts simply that the description of perception in terms of the disjunctive meaning (among other possible meanings of the concept of perception), requires the effective existence of an object, contrary to an illusion. In this interpretation, the disjunctive analysis is *formal* in the sense that it is limited to clarifying the various possible uses of the concepts of perception and illusion. Consequently, this version is not sufficient to ground ontologically or psychologically the direct relational model of singular perception.

A *substantial* disjunctive analysis however seems to be able to support the direct relational model. Several authors explicitly proposed disjunctive analyses of this type, in particular J. Dokic (2001 : 177-8) and J. Campbell (2002).[21] According to this type of analysis, perception and illusion differ for an ontological reason concerning the psychological essence of experience itself. According to the formulation given by Dokic of this idea, "there is an essential ontological difference between a perceptual experience of *x* and an illusory experience of *x*" (Dokic, 2001 : 177) According to the formulation given by Campbell (2002), "the experience is an experience of categorical" (Campbell, 2002 : 137). The significance of these assertions rests on a strong construal of the second thesis of the relational model (DRM_2).[22] According to this interpretation, an essential property of the perception of an object *x* is to target an existing object because the perceptual capacities are endowed with the power to reach the spatio-temporal and causal properties (or, according to an expression introduced below, the *categorical* properties) of this object *x*. This idea can be used to specify the central theses of the relational model. Applied to thesis DRM_2 this disjunctive analysis claims that a perceiver *s* perceives a physical object *s* if:

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[20] A more detailed analysis of the various types of illusions is possible by detailing the various possible combinations between the conditions DRM_1 and DRM_2, their subordinate conditions and the cases where they are not satisfied – cf. for example Evans (1982 : 132-5). Such classification exceeds the scope of the present analysis.

[21] Moreover, even if they do not explicitly describe their analyses as 'disjunctive', the defense of realism by authors like R. W. Sellars (1944; 1959), Drestke (1969), Sanford (1976), Evans (1982), Burge (1986; 1991) and McDowell (1984; 1986; 1991; 1998a) is generally consistent with a substantial disjunctive analysis, because the defense of realism leads to the defense of the distinction between veridical perception and illusion.

[22] Cf. Dokic (2001: 178-9) and Campbell (2002: 116-20, 137-45).

$DRM_{2'}$: There is a direct relation between the agent *s* and the object *x*, which is grounded on the experience of, or the sensory and/or motor interactions with, the causal/categorical properties $F_1 \ldots F_n$ of *x*.

The 'direct relation' which is mentioned in the second thesis of model (DRM_2) is analyzed here as a relation of existential dependence between the experience of certain properties and certain causal/categorical properties of the object. Consequently, it is in the spirit of this concept to estimate that at the time of occurrence of this direct relation:

DRM_3: The subject *s* is informed by the perceptual experience about the properties (causal, spatio-temporal) $F_1, F_2 \ldots F_n$ of the causal/categorical basis of the physical object *x*.

According to this view, the target physical object – or the categorical/causal properties of the object – of an experience is an essential feature of this experience. Consequently, one cannot conceive of the nature of the perceptual experience without taking into account the nature of the physical object which determines it. One should not interpret this dependence like a direct or omniscient access to the integral set of the causal properties of the object, which would be an unlikely concept for direct realism (Dancy, 1985 : 145-6) but only as one direct access to *a subset* of properties of the causal/categorical base of the object.

Another way of referring to this dependence relation consists in saying that perception depends on a causal relation and background conditions (see for instance the condition (iii) expressed in Dretske, 1969: 82-8) which imply, according to an empirical constraint, that *x* could not have been presented in the experience as being *F* if it did not have the causal/categorical properties $F_1 \ldots F_n$ independently of the experience of *s*. Here is a formulation:

$DRM_{3(i)}$: The conditions under which *s* perceives *x* are such that *x* would not appear as being *F* if it did not have the categorical properties $F_1 \ldots F_n$.

The understanding of these principles and their epistemological entailments require specifying the reasons for which perceiving an object can be regarded as a relation with the object's 'categorical' properties. The following section examines the analyses suggested in particular by John Campbell (2002) on this subject, along the lines of those of Shoemaker (1984a; 1984b; 1997) because they clarify the importance of these principles for a clear understanding of the epistemological stakes of the perception of object and the occurrence problem.

6 Accessing the categorical properties of the target object at the time of occurrence of perception

The analysis by Campbell (2002) adopts a relational model grounded in the ontological principle called *The Intrinsicness Condition*. According to this principle, the (veridical) perceptual experience is an "experience of the categorical" (Campbell, 2002: 137) or a relation with the categorical properties of the object concerned. It means that the perceptual experience is a relation whose function is to provide access to some of the causal, 'intrinsic' (categorical, primary) properties of the objects that determine their capacities or dispositions. This access allows the subject to establish epistemic relations with the objects which he perceives on the basis of perceptual access to the properties of the object.

In endorsing this principle, Campbell (2002) adopts as the ontology of perception a distinction between (i) the dispositional or functional properties and (ii) the categorical

properties of objects. This distinction is discussed in ontology by often conflicting theories. According to some reductionist analyses, it is possible to reduce dispositions to categorical and causal properties, while non reductionist analyses aim at preserving a dualistic ontology where the dispositional and categorical properties are preserved as distinct.[23] Several philosophical debates relate thus to the nature of the distinction between the categorical dispositions and properties. The problem is that this opposition is often made without a clear specification of the distinguishing criteria (this defect is stated clearly by Mumford, 1998 : 65-6, 75). Typically, the paradigmatic examples of concepts referring to dispositions are for example concepts such as 'fragile', 'soluble', or 'elastic'; the paradigmatic examples of concepts referring to categorical properties are for example 'triangular', 'broken', and 'having a molecular structure *xyz*'. There is no universal agreement on the criteria which must be adopted to clarify the distinction. An orthodox approach consists in considering that the attribution of dispositions depends on subjunctive conditionals which are not implied by the attribution of categorical properties. But other analyses have also been proposed. For example, Mumford (1998) claims that the distinction must be understood as sprouting from a functionalist theory of the dispositions according to which the attribution of dispositions are attributions of properties which occupy a particular functional role, and the attribution of the categorical properties corresponds to the attribution of forms and structures which depend on specific empirical (*a posteriori*) and scientific investigations.

Independently of a having a general theory of dispositions (whose discussion falls outside the scope of the present analysis), it however seems possible to apply the dispositional/categorical distinction to the analysis of object perception (Campbell, 2002; Dancy, 1985 : 160-3). For carrying out this application, Campbell (2002) distinguishes the 'functional role of a physical object' and the 'categorical basis' of this functional role which he calls the categorical object. Moreover, he associates the singular identity of a physical object to the categorical basis of this object. Thus according to him, one must make a distinction between:

> "(1) the range of effects provided when various inputs are given to a situation including the concrete object – characterizing these is characterizing the functional role of the object – and (2) the categorical object itself, whose presence in the situation explains why these effects are yielded in the presence of the specified inputs." (Campbell, 2002: 138)

The notion of *categorical object* – proposition (2) – is introduced (to the best of my knowledge) by Campbell (2002). However, it gives an account of rather traditional ideas relating to the existence of properties – like the position, the size, the speed or the form – which are regarded as 'intrinsic', 'categorical' or 'primary'[24] properties/qualities because they characterize in an objective way each macroscopic physical object. This is an ontological

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[23] For an example of the metaphysical and epistemological discussions concerning the relations between categorical and dispositional properties, one can consult the debates between Armstrong (1988) and several commentators (Franklin, 1986, 1988; Smith, 1977), or between Averill (1990) and Reeder (1995), and also Prior (1982) or Mumford (1994; 1998).

[24] The distinction between primary and secondary qualities was introduced by Locke and Boyle and developed by several others such as Hamilton (1895a). It is employed in contemporary literature in particular by Quinton (1973 : 202-07), Averill (1982), Jackson (1977), and Dennett (1998). In the traditional uses, the distinction rests on a dependence thesis (Averill, 1982) according to which secondary qualities of an object (e.g. its property of being hot or cold, its color, its taste or its odor) depend on the nature of the human perceptual systems, while primary qualities of an object (e.g. the position, speed, dimension, and shape) do not depend on the nature of the human perceptual systems. Even if one cannot deny that it is necessary to make more subtle distinctions in certain contexts, the concept of primary qualities of an object is almost equivalent to that of its categorical properties.

concept of '(categorical) property' which is distinct from the semantic concept of property defined as 'reference of a grammatical predicate' (Shoemaker, 1984b: 248). The categorical properties are the causal properties which, according to a realistic ontology, exist independently of a subject perceiving the object and determine the dispositions of the physical object. If this terminology is adopted, the first condition of the relational model can be formulated in the following way:

> $DRM_{1(i)}$: There exists a unique physical object *x* which possesses the categorical/intrinsic properties F_1 , F_2 … F_n and exists independently of *s*.

The traditional examples of categorical properties include properties of which one can have direct perceptual experience, such as the size of an object, its shape, or its rigidity or impenetrability. Campbell (2002) calls them 'categorical' properties or properties of the categorical object. In certain cases, according to this conception, an object has certain physical or chemical properties that may not be directly perceived, such as electric conductivity or solubility.

Some similar expressions (similar to that of 'categorical properties') are used in the literature on object perception. For instance, some authors, including some in cognitive sciences, use the concept of 'intrinsic properties' (see for instance Jeannerod, Arbib, Rizzolatti, & Sakata, 1995; Shoemaker, 1984b: 249). Other philosophers maintain the use of the traditional expression of 'primary' qualities (cf. for instance Averill, 1982; Dennett, 1998; Jackson, 1977: 1). If the vocabulary is not completely stable, the conceptual constraints are convergent. In the case of realist analyses, the principal idea is that, in spite of the fact that a perceiver continuously has experience of relational properties (or secondary qualities, whose nature depends on the perceptual systems), the perception of an object however has the capacity to inform about the categorical properties of the target physical object, i.e. about the first or intrinsic properties of this object. Properties of the categorical basis correspond to the physical chemical, and spatio-temporal properties, which determine the *causal* capacity of the object and its relations with other objects. They make it possible to explain why the object is in such a physical state rather than in another, for example, in a solid state rather than in a liquid one.

The terminology used by Campbell (2002) is based on a functional conception of object dispositions. The dispositions are functional properties corresponding to the effects determined by the categorical object. From the point of view of the study of the relation between the mind and the objects, each object can thus be known as having *functional properties* compared to the relation to the perceptual or motor capacities of the perceivers (e.g. (1) above). For example, if the vision (via a functional human visual system) of a cubic glass object *x* led to a certain type of experience which was distinct from the vision of a spherical object *y* made of steel, it is because the functional properties of the two objects *x* and y differ, even though they share the property of being visible.

Under a metaphysical and apparently technical standpoint, which deserves to be mentioned for it is important relative to the problem of the uniqueness of objects, Campbell (2002 : p. ex. 141-42) insists on the need to make the distinction between the categorical basis of a particular object and the functional implications of this categorical basis. This is a critical position with regard to a functionalist theory of properties, which implicitly seems to be allowed for by a number of authors (p. ex. Helmholtz, 1867 : 581; Shoemaker, 1984a; 1984b: 249).

According to Campbell's thesis, for principled reasons, it is not possible to give a satisfactory and exhaustive functionalist explanation of *the identity* of a physical object (Campbell, 2002 : e.g. 141-42). This critical view of the functionalist analysis of properties aims at rectifying a problem which arises from an interpretation of Shoemaker's position (Shoemaker, 1984b: 249). This concerns Shoemaker's admission of a metaphysical reduction of each object to a

collection of intrinsic properties, specifiable functionally, and whose essence seems to be *autonomous* with respect to each particular object to which they confer a causal power. This interpretation is possible on the basis of the following description of the intrinsic properties:

> (…) what constitutes the identity of such a property [*i.e. intrinsic property*], what makes it the particular property it is, is its potential *for contributing to the causal powers of the things that have it*. Each of the potentialities that makes up a property can be specified by saying that in combination with such and such other properties that property gives rise to a certain causal power. (Shoemaker, 1984b: 249) (The emphasis is mine.)

This passage clearly states that, according to this conception of properties, the properties are not completely particularized, so that the same property can belong to *several* objects. However, according to Shoemaker, persistence through time of the same object (or continuant) is nothing more than the maintenance of certain relations between the instantiation of various properties (Shoemaker, 1984b : 247), i.e. the maintenance of certain causal and spatio-temporal relations between these properties. Shoemaker gives the following example:

> Thus, for example, the property of having the shape of an ordinary kitchen knife – for short, the property of being knife-shaped – is partially specified by saying that if anything has this property together with the property of being made of steel, it thereby has the power of being able to cut wood if applied to it with suitable pressure. (Shoemaker, 1984b: 249)

This kind of functionalist analysis seems to apply correctly to the example of properties characterizing *the shape* of an object. If an object has a particular form, such as being spherical or cubic, then given that it has this form, the object is a complex of dispositional or functional states. According to the functionalist analysis of Shoemaker, the property of form combines with other properties of the object to produce the individual (unique) behavior of the object and finally to produce the historical characteristics of this behavior. For example, a spherical object will roll, but only if it is composed of a sufficiently rigid material, of a sufficient density, and if it is propelled in a suitable way on a sufficiently smooth surface. Shoemaker's analysis seems correct in the broad sense. However, the analysis can pose problems of apprehending the *uniqueness* of the physical object insofar as it does not particularize the properties according to a unique property-bearer (the physical object instantiated in a single way). It is, according to my interpretation, the direction of the correction suggested by Campbell (2002) of the functionalism of the properties admitted by Shoemaker. In particular, this seems to be the case when Campbell introduces the concept of *categorical object* as categorical particular basis determining varied functional dispositions. For instance, if one still considers the shape, it does not seem plausible to think that the causal properties of the shape of an object can be characterized in a unique way by a small number of functional descriptions (descriptions of functional properties such as Shoemaker's descriptions). It seems more intuitive to refer to the causal power of a *particular* object, the so-called categorical object, which one faces and reaches in singular perception while confronting the functional properties of some of its dispositions. For example, a baseball ball has a spherical form which explains its disposition to roll. But a particular baseball ball has additional categorical properties which determine its uniqueness, for example, the microscopic structure of its surface is not exactly the same as that of a tennis ball or another baseball ball. To account and *keep track* of *the uniqueness of a physical object* it thus seems more plausible *to rather start from the concept of categorical object* (the categorical basis grounding functional dispositions) rather than attempting to 'conquer' the access to uniqueness on the basis of the conjunction of functional (un-particularized) properties. With respect to uniqueness, one might find in perception a primacy accorded to objects over properties, comparable to the 'know-which' requirement discussed in

the externalist philosophy of language (Evans, 1982; Kripke, 1980; McDowell, 1990; Strawson, 1959).

An ontological analysis such as Campbell's (2002) – which grants each physical object a *singular* causal capacity and a *singular identity* – has a significant advantage for the study of the occurrence problem. It implies that perceptual cognition aims at or interacts with particular physical objects and not only functional properties – according to Shoemaker's analysis (1984b: 249) or to a theory of the sensations or *sense data.* It outlines an ontological analysis which allows, at least in theory, to make a distinction between the singular perception of an object, in which the agent has the capacity to remain in contact with the uniqueness, of the object, and the simple detection of properties whose enumeration does not necessarily guarantee the fixing of the identity of an individual target in a single way. Thus, this type of analysis suggests resisting the idea to reduce the object to a collection of functional dispositions specified by general descriptions (such as 'the property to cut wood in the such-and-such a context' or 'the property to roll in the such-and-such a context'). In addition, this analysis makes it possible to have a concept referring to the categorical basis which guarantees the *individuality* of the target physical object. It would not be commonplace to discover that perception and motricity have means to pursue the individuality of a target object, possibly even in the absence of an explicit conceptualization of this target.

These last remarks however require greater attention. The advantage of this conception is more clearly understood once it is realised that the singular perception of an object makes it possible to ground the *knowledge* which one obtains about the physical objects, in particular when one makes use of demonstrative terms such as 'this' or 'there'. Fundamental for the establishment of the direct relational model, this aspect is also at the center of Campbell's (2002) analysis when he claims that the reason for which the experience of an object can provide *a knowledge of the referent of a demonstrative term* is that *the perceptual experience of the object provides a conception of the categorical object itself* (Campbell, 2002: 138). About the understanding of a demonstrative term, he claims that:

> To understand the demonstrative you will need to know which thing it refers to. This understanding has to be provided by your experience of the object. So experience of the object has to be enough to guarantee that the object exists. It will not be enough, for understanding, merely that you have an experience which is reliably though not invariably correlated with the existence of a reference for the demonstrative. So only experience, conceived as on the Relational View, in which the object figures as a constituent of the experience itself, will be enough for an understanding of the demonstrative. (Campbell, 2002: 128)

Several persuasive reasons suggest that singular perception indeed makes it possible to determine the reference of the demonstrative terms and to ground the acts of demonstrative identification. One advantage of the direct relational model is that it helps explain how one can know the reference of a demonstrative term such as 'this' in a demonstrative identification of the form 'this is *F*'.

7 The principle of the foundation of demonstrative identification by singular perception

It is perhaps not possible to introduce a decisive proof in favour of the direct relational model, for the model uses disputable concepts, whose theoretical meaning remains weakly stabilized in the literature. Yet there are various independent reasons to prefer the direct relational model to

several indirect alternatives. A number of reasons are psychological[25], but there are also epistemological arguments that we shall now consdier. The direct relational model is indeed useful to understand the *cognitive* entailments of perception and thus seems to be able to contribute successfully to the epistemology of perception. This epistemological value constitutes a *general justification* in favour of its adoption. This value is particularly significant in cases where singular perception serves *demonstrative* (or *deictic*) *identification* – i.e. when acts of reference making use of a demonstrative term (as in the sentence 'this is *F*') exploit the occurring perception of an object to determine and reach the reference of the demonstrative. The direct relational model[26] seems necessary to explain why the demonstrative thoughts and judgements are fundamental for the identification of the objects and thus for the formation of the beliefs concerning them. One of the reasons of this claim is that the truth value of a demonstrative judgements referring to an object *x* seems to depend on whether the perception of this *x* is veridical or illusory. Consequently, the understanding of the reason for which it is possible to obtain knowledge about the reference of a demonstrative term requires understanding how the *veridical perception* of an object can be *exploited for the demonstrative identification* of this object. There are thus reasons to think that demonstrative identification is linked in a quite essential way with singular perception, since the perceptual selection of an object *x* provides knowledge of the reference of the demonstratives referring to this *x*.

My goal in this section will be to specify the general epistemological considerations in favour of the direct relational model. There are probably several possible arguments and I do not attempt to present a complete account of these arguments.

Traditional arguments were introduced by Strawson (1950; 1956; 1959). They generally conclude that a 'demonstrative element' (Strawson, 1956 : 446) is necessary for 'anchoring' in the world the capacity to perform acts of identifying reference both in language and thought. One of Strawson's (1956 : 444-48) arguments aims at showing that demonstrative singular terms cannot be eliminated from ordinary language if one wants to preserve the capacity of language to refer to independent individuals (in particular to physical objects). The argument can be summarized in the following way – here I follow the summary given by Strawson (1956 : 446) himself. Language uses 'universal' or 'general' terms: they are the names and the predicates by which the attributes of the things are represented in the ordinary language. Within the descriptivist theories of reference, following Russell's theory of descriptions (Russell, 1905; 1911; 1919), the significance of the general terms can be conceived of as being definite or indefinite descriptions. However, some universal terms must *be connected with our experience* so that the universal terms can *be understood* in particular when they must be understood in relation to the elements of a scene of which one has perceptual experience.[27] In this latter case, these universal terms must be put in relation to particular components, or particular parts, *of our experience*. Thus, if the general terms must be understood as being predicates of particular individuals, they must be ranked as predicates of *demonstratively identified* particular individuals. In order to give a meaning to the idea that they would have this status – being treated as predicates of demonstratively identified individuals – it is necessary that language contains expressions used to refer to and identify *particular* individuals. In other words, it is

[25] Cf. Appendix.

[26] Via the theses $DRM_{2(i)}$ and DRM_3 and the 'principle of the foundation of the demonstrative identification on singular perception' which we will present below and that yields to the conditions $DRM_{4/4(i)}$ expressed below.

[27] The emphasize on the concept of understanding is found in the later debates too, cf. for instance Evans (1982) and Campbell (2002).

necessary that language contains *singular terms* to refer to particular individuals. Lastly, these terms cannot be compared to descriptions in the sense of Russell's theory of descriptions.

This argument aims at showing that the general terms, conceived along the descriptivist line, do not make it possible to anchor identifying references or singular thoughts about individuals in the world. The argument brings forth other miscellaneous arguments against descriptivism[28], showing the essential character of demonstrative reference and the indexical terms. The directing idea of this argument can contribute to ground the direct relational model but this supposes the possession of a straightforward specification of the nature of the relation between demonstrative identification and singular perception. For (when considered literally) Strawson's argument does not provide any obvious reason to prefer the direct relational model because it relates initially to the nature of language and not to object perception. However, the argument supposes that the demonstrative identification of an individual (such as a physical object) via perception is essential for the comparison with and the knowledge of this object. One can consequently suppose that an epistemological argument in favour of the direct relational model can be formulated by analyzing more closely the way in which singular perception is articulated by demonstrative identification and singular knowledge. An argument taking this direction uses an application of Gettier's problem (Gettier, 1963) to the perception of object, in a manner which was suggested, among others, by Snowdon (1992 : 66) – and which has certain similarities with a approach defended by Evans (1982 : 133-4). The next paragraph adapts freely the suggestion by Snowdon. This argument is based on the examination of the cognitive genesis of beliefs regarding configurations of objects leading to true beliefs in spite of identification errors during the process of acquiring perceptual information.

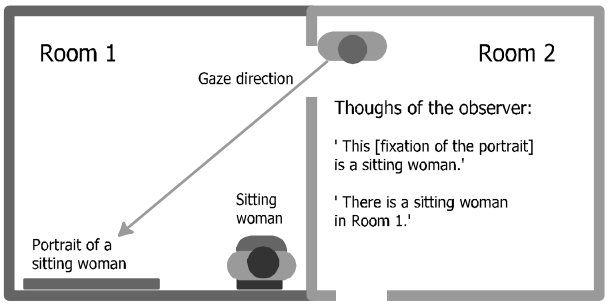

Figure 2 Problem of true existential belief accidentally grounded in a false demonstrative judgment

Consider the example of an observer *s* who visits a museum (cf. the figure above). In Room 1, there are two things viz. a sitting woman and a portrait depicting in a very realistic manner a sitting woman. At the time of her passage to Room 2, and while passing in front of an opening on Room 1, an observer looks furtively inside Room 1 and, without seeing the woman who is sitting (because the latter is occluded by the wall separating Room 1 and 2), carries out a visual fixation on the misleading portrait and mistakenly interprets his experience by forming the false demonstrative judgement 'This [*fixation of the portrait*] is a sitting woman'. The correct demonstrative identification in this situation would have been in fact 'This is the portrait of a sitting woman'. While making an inference based on the knowledge she had on the location occupied by the reference of the demonstrative 'this', the observer comes to adopt the existence

[28] For other versions of Strawson's argument, or for arguments in favor of the essential character of indexical reference in language, thought or perception, one can consult for example Perry (1979), Recanati (1993), Pylyshyn (2000; 2001; 2003), and Bullot, Casati and Dokic (sous presse).

belief ‘There is a sitting woman in Room 1’. This last general statement is rendered true by the existence of the (occluded) woman sitting in this same room. Though it is correct to believe the general proposition ‘There is a woman sitting in Room 1’, according to a robust epistemological intuition under such circumstances, the observer however does not have a *genuine* knowledge of the existence of the woman who is sitting in Room 1. This is the ‘problem of true existence belief grounded accidentally in a false demonstrative judgment’. What are the reasons for rejecting the analysis according to which the observer *knows* that a woman is sitting in Room 1 given that she otherwise believes in a true existential statement that refers ostensibly to this woman?

One of the possible answers to solve this problem consists in supporting that the true belief was acquired by a flawed epistemic process because it contains an error at an *essential stage* for the *incremental construction*[29] of singular knowledge. Let us specify the nature of the error, and then its epistemological implications.

The defective stage of the epistemic process is precisely the demonstrative identification carried out by means of the judgement ‘this is *F*’. In the example, it is about the judgement ‘This [*fixation of the portrait*] is a sitting woman’, which is a false demonstrative identification, and only accidentally yields the true existential belief. In the vocabulary introduced into the preceding sections, to assert that it is about ‘a false demonstrative identification’ means that the property *F* asserted by the demonstrative judgement is not exemplified by the categorical properties of the object targeted by the visual fixation. In other words, the target categorical concerned is not part of the truth conditions of the demonstrative judgement that refers to it. The disparity between the property *F* ascribed by the judgement (‘is a sitting woman’) and the categorical properties F_1, F_2 … F_n of the target physical object (those of a pictorial representation) explains the erroneous character of the demonstrative identification. For instance, the categorical properties of a real woman and a canvas covered by a pictorial depiction of a woman differ with respect to shape properties and internal part properties. Consequently, the example presents a case in which the conditions $DRM_{3/3(i)}$ of the direct relational model are not fulfilled.

L’implication épistémologique est la suivante. Il ne semble pas qu’une croyance puisse être considérée comme étant une connaissance si elle dérive directement d’une identification démonstrative fausse – ce qui signale *a contrario* l’importance des conditions DRM_3 et $DRM_{3'}$ (et de DRM_2 sous leur interprétation) pour l’acquisition d’une connaissance singulière. En effet, plusieurs analyses et intuitions au sujet de la genèse des *connaissances* singulières ne peuvent pas être satisfaites dans l’exemple. Par exemple, considérons comme dans une théorie causale de la connaissance (Goldman, 1967, 1976) que la connaissance repose sur des processus causaux qui produisent et maintiennent la croyance, et que pour compter comme connaissance effective, une croyance doit être fondée sur des mécanismes ou des processus causaux et perceptifs *fiables* (Goldman, 1976: 771).

The epistemological implication is as follows. It does not seem that a belief can be regarded as being a piece of knowledge if it derives directly from a false demonstrative identification – this points out *a contrario* to the importance of conditions DRM_3 and $DRM_{3(i)}$ (and of DRM_2 under their interpretation). Indeed, several analyses and intuitions about the genesis of singular *knowledge* cannot be satisfied by the example. For example, let us consider the example within

[29] The expression ‘incremental construction’ refers to the fact that the *dynamic* construction of singular knowledge during epistemic perception is a *gradual process*, which rests on the sequential acquisition of information (for example at the time of distinct ocular fixations). The incremental character of epistemic perception (visual) is analyzed for instance by Dretske (1969: 78-139) and Pylyshyn (2001; 2003 : 204).

the framework of a causal theory of knowledge (Goldman, 1967, 1976). According to a causal theory of knowledge, knowledge rests on causal processes which produce and maintain the belief; consequently, to count as effective knowledge, a belief must be grounded on causal and perceptual mechanisms or processes which are *reliable* (Goldman, 1976: 771). Within the framework of this epistemology, the existential belief of the subject *s* is not knowledge because it derives from an epistemic process that yields a false judgement at an essential stage of the acquisition of information. This analysis could be refined, but it is sufficient for the present version of the epistemological argument.

La présente analyse s'apparente à une sorte d'analyse transcendantale (des conditions de possibilité de la connaissance singulière) relativement générale. Toutefois, dès ce niveau général d'analyse, une double leçon semble pouvoir en être tirée de l'exemple. D'une part, l'analyse du problème épistémologique précédent suggère que les croyances perceptives démonstratives sont fondamentales pour 'ancrer' les croyances existentielles au sujet des espaces et des objets perceptibles, de telle sorte qu'une analyse rigoureuse des connaissances singulières ne devrait pas omettre les croyances démonstratives. Les croyances fondées sur des identifications démonstratives semblent reposer sur le pouvoir de la perception de mettre en relation *directe* avec les propriétés catégoriques de l'objet – c'est là le sens de la notion de relation 'directe' dans le modèle relationnel, et elle est liée à la satisfaction des conditions exprimées par les thèses DRM_3 et $DRM_{3(i)}$.

The previous analysis is somewhat akin to a transcendental analysis (of the possible conditions of singular knowledge) and thus it remains relatively general. However, even at this level of generality, a double lesson may be drawn from the problem. First, the analysis of the epistemological side of the problem confirms that the demonstrative perceptual beliefs are basic to 'anchor' the existential beliefs about spaces and perceptible objects so that a precise analysis of singular knowledge should not omit the consideration of demonstrative beliefs. The beliefs based on demonstrative identifications seem to rest on the power of perceptual faculties to connect *directly* to the categorical properties of the object – and this is the meaning of the concept of 'direct' relation in the relational model and it is related to the satisfaction of the conditions expressed by theses DRM_3 and $DRM_{3(i)}$.

Second, if one wants to account for the contribution of perception to the demonstrative identification of objects (i.e. by means of demonstrative thoughts/assertions such as 'this object *x* is *F*'), then it seems necessary that the object *x* has to be presented directly and in a veridical way in the perceptual experience. This requires the satisfaction of the conditions described by the conditions DRM_3 and $DRM_{3(i)}$. If these conditions are not satisfied, as in the example of the perception of the misidentified portrait of the sitting woman, then the resulting demonstrative thought shall not be genuinely grounded or justified epistemically by the *occurrence* of perception. Consequently, if one wants to understand how the mind 'builds' its relation with the elements and particular individuals of the objective world, one cannot exempt oneself from studying the conditions of the veridical character of object perception and consequently one cannot escape from a consideration of the occurrence problem.

The former analysis also supports the idea that if the occurrence of singular perception is to contribute to the demonstrative identification of objects it is necessary that this perception is veridical and satisfies the conditions DRM_3 and $DRM_{3'}$. The epistemological implication of this analysis can be formulated by means of the following principle:

> *Foundation of demonstrative identification by singular perception:* If the agent/subject *s* perceives (in a veridical manner) a physical object *x*, which is presented in the occurring perception as being *F*, then the agent *s* and object *x* are in a direct relation *R* such that the

demonstrative identification 'this is a *F*' is true if it is thought of or asserted by the agent *s*.

This principle derives from the most interesting epistemological interpretation of the direct relational model. It summarizes the epistemological argument in favour of its use: if this principle is true, then we have to admit a version of the direct relational model ('direct' always being interpreted here as relative to conditions $DRM_{3/3(i)}$). This principle corresponds to the addition of a condition DRM_4 to the direct relational model, which can be formulated as follows. An agent *s* perceives a physical object *x* if the following conditions are satisfied:

DRM_4 : If conditions described by $DRM_{3/3(i)}$ are satisfied (perception is veridical) and if *s* believes that the conditions of $DRM_{3/3(i)}$ are satisfied, *s* can think of or assert the demonstrative true judgement 'this is *F*' (apt to ground a singular knowledge of the physical object *x*).

The preceding condition contains the following condition – akin to that expressed by Dretske (1969 : 88-92) for the case of primary epistemic vision:

$DRM_{4(i)}$: Considering that the conditions are in conformity with $DRM_{3/3(i)}$, the agent *s* believes that *x* is *F*.

According to the principle of the foundation of the demonstrative identification, the knowledge value of an act of demonstrative identification targeting an object *x* depends on the occurrence of the perception of this object *x*. The act of perception of an object and the act of demonstrative identification of this object must be concurrent (so that the identification is to be grounded by the perception of the object and the independent existence of this object). Such a principle rests on the idea that the object belongs to the truth conditions of the demonstrative thought. It could not be accepted if the perception of an object could not be distinguished from the illusion of an object, because it requires that perception be not illusory. So this principle depends on a disjunctive concept of perception and the direct relational model of the perception of object according to which the perception of an object is the establishment of a direct relation with the categorical properties of an independent object. The occurrence of the perceptual relation with the object is conceived here as being a veridical relation of accessibility to the properties (causal, categorical) of the target physical object.

Here is a simple example in which the principle seems to be applicable. An observer looks at a configuration encompassing three cubes, piled up one on top of the other (for instance, as in the figure presented below). The principle of the foundation of the demonstrative identification asserts that if the cube placed at the top of the pile is presented in perception (in the disjunctive sense) as being *F*, then the demonstrative judgement 'This [*visual fixation of the cube*] is *F*' is true. This implication should apply to all the properties which can be presented in the experience in a veridical way whether they are perceived as being intrinsic[30] to the cube or as being relational[31].

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[30] The perceived 'intrinsic' properties of an individual cube could be: F_n = 'to have the shape of a cube', 'to have opaque surfaces', 'to have opaque surfaces whose texture is relatively smooth', 'to have plane surfaces' etc.

[31] The cube's 'relational' properties, i.e. those properties which depend on a relation between the cube and other elements of the situation where the perceptual episode takes place, could be for example: F_n = 'to be in the visual field of the perceiver', 'to be located at the top of the pile', 'to be at the top of the cube x_2' and so on.

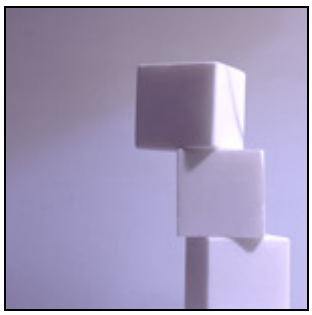

Figure 3 A configuration including three cubes

In this example, it seems considerably intuitive to maintain that the observer's experience conforms to the essential constraints included in the principle of the foundation of demonstrative identification.

First, the condition DRM_1 is fulfilled. The element targeted by the visual experience is a *physical object* independent of the observer and not a mental entity not respecting the principal criteria of objecthood previously mentioned. There are several reasons to consider that the cube is an independent physical object. These reasons relate to the criteria of objecthood respected by this cube as well as to the uniqueness which they confer to it. The fulfilled criteria of objecthood are for example: possessing a cohesive form and boundaries determined by the causal relations of the internal parts, occupying a position within a framework of allocentric reference, following continuous spatio-temporal trajectories during displacements. The cube's uniqueness also imports from the fact that it constrains the range of cognitive[32] (and sensory-motor) relations that it is possible to establish with it. In this sense the concept of *uniqueness* of a physical object x – or a categorical object x in Campbell's (2002) sense – refers to the fact that x is unique in the world, is not perfectly identical to any other physical object and possesses properties which allow (at least in principle if not in fact) to distinguish it from all the other physical objects. This concept of uniqueness plays an essential role in a theory of object perception because the capacity to remain in cognitive relation with a unique physical object x is required by many procedures of cognitive investigation of x and action on x, and it depends in a fundamental way on the capacity to be in direct relation with the object via its perceptual and motor tracking. In this example the target cube is unique because it is the only one to have the spatio-temporal properties it possesses. It is the one and only cube to be placed at the top of the pile and to occupy the precise position which it occupies relative to an environmental frame of reference (for example, the plan of the surface which is used to support of the pile of cubes). The cube is an object which has causal properties that differ from the images which could represent it (like the illustration above), as for example the photographic image resulting from the action of photographing it or a figurative drawing representing it in a particularly realistic manner. Contrary to the parts of a photographic image, it has a three-dimensional shape, the location it occupies with respect to the other elements of the configuration can be modified and it can be seen from different perspectives. For these reasons, the cube at the top of the pile corresponds to what is called a 'physical object'.

Second, the conditions described by DRM_2 and $DRM_{3/3(i)}$ are also satisfied. According to an analysis consistent with the direct relational model, the properties presented in the experience must depend existentially (causally and functionally) on the properties belonging to the

[32] Cf. the 'Russell's principle' (Evans, 1982).

categorical basis of the target object. Various reasons justify the statement that the perceptual experiment and the actions of the agent are organized according to the relation to the *causal* or *categorical* properties of the unique target physical (distal) object. In order to perform the perceptual individuation of the object, the observer must acquire information on the object, often in a deliberated way. For obtaining information about the properties of the object, he/she must bring about a causal and functional relation between the contents of his/her perceptual experience and the object about which he/she seeks to obtain information. For example, this relates to *directing the sensory organs (e.g. the eyes or the hands) towards the physical object,* or to putting them in contact with the object in the case of grasping. If we admit that the visual experience of the object is veridical, the causal relation aims in this case at introducing a direct relation with the properties of this unique external individual. Given that the object concerned belongs to the spatial configurations surrounding the agent and that the agent must direct his/her sensors towards the object to acquire information on the object, one can say that the veridical perceptual experience depends existentially (i.e., causally and functionally) on it (the external physical object aimed at by the experience and composing the perceived scene). Hence, this analysis supposes that a functional perceptual system informs about the categorical properties of the target.

The need for this relation of existential dependence for perception is also found in the fact that we can describe perception in terms of a counterfactual dependency, by using counterfactual conditionals which would not have the significance that they have without assuming the relation of causal dependency. In these terms, *if* the observer had not been placed in the situation where he/she directed his/her sensory organs towards the cube, *then* he/she could not have directly obtained (by means of vision) information which he has in this connection (e.g. its localization, its texture, its size). This last type of assertion, based on the use of a counterfactual conditional ('if... then...'), is an indicator of the reference to a causal and existential dependency (here, between the contents of the experience and the physical object which belongs of the causal sources of these contents) – see e.g. Noë (2003).

8 Recapitulation of the theses of the direct relational model

I can recapitulate the main ideas presented so far to specify the direct relational model of the singular perception of an object *x* by a subject *s*. As a realist model, it admits ontological conditions related to the independent existence of the physical object perceived by *x* and its categorical properties $F_1 \ldots F_n$:

> $DRM_{1(i)}$: There is a unique physical object *x* which possesses the categorical/intrinsic properties $F_1, F_2 \ldots F_n$ and is independent of *s*.

The occurring perception is defined by the occurrence of a direct relation between the mental states of *s* and the target (categorical) object, i.e. with some of its categorical properties. This fundamental condition is specified by the second thesis:

> $DRM_{2(i)}$: There is a direct (non- or pre- epistemic) relation between the agent *s* and the object *x* grounded in the experience of, or the sensory/motor interaction with, the categorical properties $F_1 \ldots F_n$ of *x*.

The thesis $DRM_{2/2(i)}$ is specified by the clauses relating to the existence of an existential dependence with regard to the target object and more precisely with regard to the properties of the categorical basis of this object:

> DRM_3: The agent *s* is informed in perception about the nature of certain categorical properties (causal, spatio-temporal) $F_1 \ldots F_n$.

$DRM_{3'}$: The conditions under which *s* perceives *x* are such that *x* would not appear as being *F* if it were not $F_1 \ldots F_n$.

The conditions specified by $DRM_{3/3(i)}$ characterize the meaning of the notion of '*direct relation*'. In this model, to conceive of perception as a 'direct relation' does not imply the denial of the existence of causal or psychological intermediaries (between the physical states of the object and the mental states of the agent). The concept of 'direct relation' refers to the fact that the *presentation* of the object as being *F* in perception depends on the effective existence of the object and its categorical properties, since perception is conceived of as being within a disjunctive framework. This point can be formulated in a neo-Russellian manner by affirming that the object is not only the vanishing line of object-based perceptual experience but that it is a *constituent* of experience and singular propositions which are referring to it. The concept of 'direct relation' must thus be understood here as referring to *an existential dependence* with regard to the external physical object and of its categorical properties, which obviously admit the role of various causal intermediaries.[33]

The assumption could seem to be too strong because perceptual experience can be illusory or (perhaps) partly illusory. Moreover, the experimental study of perceptual illusions is a source of discoveries about the nature of the sensory, motor and cognitive capacities. However, the main idea of the direct relational model is not to claim that the experience of an object by the senses is immune from identification errors; which is false. The main idea is that the experience of an object is equivalent to occurring perception of an object when it succeeds to inform the perceiver about the categorical basis of the properties of an independent physical object. For this reason it includes conditions contributing to the demonstrative reference and the demonstrative identification of the physical object. The following are the conditions:

DRM_4: If the conditions described by $DRM_{3/3(i)}$ are satisfied and if *s* believes that the conditions of $DRM_{3/3(i)}$ are satisfied then *s* can think of or assert the true demonstrative judgement 'this is *F*' (apt to ground a singular knowledge of the physical object *x*).

$DRM_{4(i)}$: Considering that the conditions are in conformity with $DRM_{3/3(i)}$, the agent *s* believes that *x* is *F*.

9 Conclusion

For providing a general answer to the occurrence problem, I introduced the direct relational model according to which the occurrence of the singular perception of a physical object is a *direct relation* between the perceiver and the perceived object (condition DRM_2 specified by $DRM_{3/3'}$). This relational model rests on a disjunctive analysis of perception according to which the nature of object perception has to be defined in opposition to the nature of illusion and is a way of accessing the categorical properties of the target object (condition $DRM_{3/3'}$). One can now have a better understanding of why it is useful to preserve the unity of the occurrence problem. The occurrence problem relates to the understanding of the epistemic value – or

[33] This version of the direct relational model belongs to the so-called *externalist* analyses of the content of perceptual experience and demonstrative identification – cf. for example Evans (1982), McDowell (1984; 1991), and Dretske (1995b) who defend distinct approaches to externalism. These analyses are based on the consideration of arguments introduced by Kripke (1980) and Putnam (1973; 1975) into the semantic theory in favor of externalism. The very discussion of the internalist/individualist (Egan, 1999; Fodor, 1980, 1987; Segal, 1989, 1991, 2000) and externalist options (Burge, 1986, 1991; Clark & Chalmers, 1998; Davies, 1991; McDowell, 1986, 1991) is beyond the scope of this article.

cognitive function – of perception. In the course of perception and action, intentional agents (at least humans) acquire singular information and *knowledge* about physical objects. In addition, the knowledge of physical objects may be constitutive of our conceptual scheme, in Strawson's sense (1959). In this case the demonstrative identification of these objects plays a mediating fundamental role to connect the cognitive and epistemic attitudes of the intentional agents and the objects which they aim at by means of their perceptual and motor capacities. In order to fulfill this mediating role, it is (necessarily) required that perception provides a cognitive and situated access to these objects (namely for demonstrative identification). It is in relation to this particular requirement that the direct relational model of object perception demonstrates explanatory superiority. This model clarifies the concept of the notion of (non epistemic) perception that makes it possible to account for the epistemic function of perception. This epistemic function is to obtain an objective foundation for the demonstrative/deictic acts by virtue of an existential dependence of experience on the categorical object target which cannot be found, for example, in the imagination of an object.

10 Appendix: The epistemological strategy and the experimentalist strategy

I will not develop this point in the present article, but it seems that experimental arguments also support, for partially independent and strictly empirical reasons, the direct relational model (DRM) I am developing in this article with respect to ontological and epistemological arguments. One can thus distinguish at least two argumentative strategies in favor of the direct relational model and the externalist understanding of the object perception (a view is 'externalist' if it sustains that explaining perceptual capacities requires taking into account mental states which are individualized by reference to external properties or objects *of the environment*, including those relating to the target physical object in the case of object perception). The two types of strategies start from distinct premises. The *epistemological strategy* (that I am developing in this article) consists in (i) clarifying the conditions of possibility of a knowledge of the physical objects (conceived as 'categorical objects' or bearers of categorical and particularized properties), and (ii) showing that this knowledge requires demonstrative identification of the target objects, which in its turn requires veridical perception in the sense of the validity of thesis $DRM_{3/3(i)}$. The *experimentalist strategy* (see for instance Ballard, Hayhoe, Pook, & Rao, 1997; Churchland, Ramachandran, & Sejnowski, 1994; Clark, 1999; Findlay & Gilchrist, 2003; O'Regan & Noë, 2001; Pylyshyn, 2003) starts from the fact that each human agent possesses a complex repertory of perceptual and motor capacities which enables him to reach, track and reach again physical objects in perception and action. This repertory corresponds to the psychological conditions of what the direct relational model calls the 'direct relation' with the independent physical objects. One of the paradigmatic examples is the visual tracking of independent objects (Pylyshyn, 2003; Pylyshyn & Storm, 1988) and the use of the eye movements and gaze fixations to incrementally acquire knowledge on the properties (categorical) of the physical objects at the time of the realization of ordinary tasks (Ballard et al., 1997; Hayhoe, Bensinger, & Ballard, 1998; Triesch, Ballard, Hayhoe, & Sullivan, 2003). According to a possible interpretation of experimental results on these capacities, associated to the tradition of situated cognition, the mind would thus systematically have recourse to demonstrative (or deictic) strategies in order to *directly* acquire information and knowledge about physical objects. This last empirical assertion seems to come into conflict with the assumptions of the indirect models of perception postulating that the perception of an object x requires, in a systematic way, the internal construction of a representation of this

object *x* – as postulated by certain theories of *sense data* or by the computational model described by D. Marr (1982).

11 References

Armstrong, D. M. (1988). Are dispositions ultimate? Reply to Franklin. *Philosophical Quarterly, 38*(150), 84-86.

Averill, E. W. (1982). The primary-secondary quality distinction. *The Philosophical Review, 91*(3), 343-361.

Averill, E. W. (1990). Are physical properties dispositions? *Philosophy of Science, 57*(1), 118-132.

Ayer, A. J. (1969). *The Foundations of Empirical Knowledge*. London: Macmillan.

Ayers, M. (1991). Substance: Prolegomena to a realist theory of identity. *The Journal of Philosophy, 88*(2), 69-90.

Ayers, M. (1997). Is 'physical object' a sortal concept? A reply to Xu. *Mind and Language, 12*(3/4), 393-405.

Baars, B. J., Banks, W. P., & Newman, J. B. (Eds.). (2003). *Essential Sources in the Scientific Study of Consciousness*. Cambridge, MA: MIT Press.

Ballard, D. H., Hayhoe, M. M., Pook, P. K., & Rao, R. P. N. (1997). Deictic codes for the embodiment of cognition. *Behavioral and Brain Sciences, 20*(4), 723-767.

Berkeley, G. (1710). *A Treatise Concerning the Principles of Human Knowledge*. Dublin: Printed by Aaron Rhames, for Jeremy Pepyat.

Bloom, P. (2000). *How Children Learn the Meanings of Words*. Cambridge, MA: MIT Press.

Broad, C. D. (1923). *Scientific Thought*. New York: Harcourt, Brace and Co.

Bullot, N. J., Casati, R., & Dokic, J. (sous presse). L'identification des objets et celle des lieux sont-elles interdépendantes? In C. Thinus-Blanc & J. Bullier (Eds.), *Agir dans l'espace*. Paris: Maison des Sciences de l'Homme.

Burge, T. (1986). Individualism and psychology. *The Philosophical Review, 95*(1), 3-45.

Burge, T. (1991). Marr's Theory of Vision. In J. L. Garfield (Ed.), *Modularity in Knowledge Representation and Natural-Language Understanding* (pp. 365-381). Cambridge, MA: MIT Press.

Burke, M. B. (1994). Preserving the principle of one object to a place: A novel account of the relations among objects, sorts, sortals, and persistence conditions. *Philosophy and Phenomenological Research, 54*(3), 591-624.

Campbell, J. (2002). *Reference and Consciousness*. Oxford: Clarendon Press.

Carey, S., & Xu, F. (2001). Infant's knowledge of objects: beyond object files and object tracking. *Cognition, 80*, 179-213.

Casati, R. (2004). *Common sense, philosophical and theoretical notions of an object: some methodological problems.* Paper presented at the ESPP-SPP joint conference, July 2004, Barcelona.

Child, W. (1992). Vision and experience: The causal theory and the disjunctive conception. *Philosophical Quarterly, 42*(168), 297-316.

Churchland, P. S., Ramachandran, V. S., & Sejnowski, T. J. (1994). A critique of pure vision. In C. Koch & J. L. Davis (Eds.), *Large Scale Neuronal Theories of the Brain* (pp. 23-60). Cambridge, MA: MIT Press.

Clark, A. (1999). An embodied cognitive science? *Trends in Cognitive Sciences, 3*, 345-351.

Clark, A., & Chalmers, D. J. (1998). The extended Mind. *Analysis, 58*, 10-23.

Dancy, J. (1985). *An Introduction to Contemporary Epistemology*. Oxford, Cambridge: Blackwell.

Davies, M. (1991). Individualism and perceptual content. *Mind, 100*(4), 461-484.

Dennett, D. C. (1998). Instead of qualia, *Brainchildren: Essays on Designing Minds* (pp. 141-152). Cambridge, MA: MIT Press.

Descourtis, G. (1889). *Des hallucinations de l'ouïe*. Paris: G. Masson.

Dokic, J. (2000). Le cercle bipolaire, Intentionnalité et contenu perceptif. In P. Livet (Ed.), *De la Perception à l'Action, Contenus Perceptifs et Perception de l'Action* (pp. 83-118). Paris: J. Vrin.

Dokic, J. (2001). *L'esprit en mouvement, Essai sur la dynamique cognitive*. Standford, CA: Éditions CSLI, Université de Standford.

Dretske, F. I. (1967). Can events move? *Mind, 76*, 479-492.

Dretske, F. I. (1969). *Seeing and Knowing*. Chicago: The University of Chicago Press.

Dretske, F. I. (1981). *Knowledge and the Flow of Information*. Cambridge, MA: MIT Press.

Dretske, F. I. (1995a). Meaningful perception. In S. M. Kosslyn & D. N. Osherson (Eds.), *An Invitation to Cognitive Science: Visual Cognition, Second Edition* (pp. 331-352). Cambridge, MA: MIT Press.

Dretske, F. I. (1995b). *Naturalizing the Mind*. Cambridge, MA: MIT Press.

Dretske, F. I. (2004). *Perception without awareness.* Paper presented at the Mind and Language Seminar, New York University.

Egan, F. (1999). In defence of narrow mindeness. *Mind & Language, 14*(2), 177-194.

Evans, G. (1982). *The Varieties of Reference*. Oxford: Oxford University Press.

Findlay, J. M., & Gilchrist, I. D. (2003). *Active Vision: The Psychology of Looking and Seeing*. Oxford: Oxford University Press.

Fodor, J. A. (1980). Methodological solipsism considered as a research strategy for cognitive psychology. *Behavioral and Brain Sciences, 3*(1), 63-73.

Fodor, J. A. (1987). *Psychosemantics*. Cambridge, MA: MIT Press.

Franklin, J. (1986). Are dispositions reducible to categorical properties? *The Philosophical Quarterly, 36*(142), 62-64.

Franklin, J. (1988). Reply to Armstrong on dispositions. *The Philosophical Quarterly, 38*(150), 86-87.

Gettier, E. L. (1963). Is true justified belief knowledge? *Analysis, XXII*(6), 121-123.

Gibson, J. J. (1979). *The Ecological Approach to Visual Perception*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Goldman, A. I. (1967). A causal theory of knowing. *The Journal of Philosophy, 64*(12), 357-372.

Goldman, A. I. (1976). Discrimination and perceptual knowledge. *Journal of Philosophy, 73*(20), 771-791.

Gregory, R. L. (1966). *Eye and Brain: The Psychology of Seeing* (Fifth edition ed.). London: Weidenfeld and Nicolson.

Hamilton, W. (1895a). Note D. Distinction of the primary and secondary qualities of body, *The works of Thomas Reid, with notes and supplementary dissertations by Sir William Hamilton, Vol. II* (pp. 825-875). Edinburgh, London: James Thin; Longmans, Green & Co.

Hamilton, W. (1895b). Note D.* Perception; Perception proper and sensation proper, *The works of Thomas Reid, with notes and supplementary dissertations by Sir William Hamilton, Vol. II* (pp. 876-888). Edinburgh, London: James Thin; Longmans, Green & Co.

Hayhoe, M. M., Bensinger, D. G., & Ballard, D. H. (1998). Task constraints in visual working memory. *Vision Research, 38*(1), 125-137.

Helmholtz, H. v. (1867). *Optique Physiologique, II* (É. Javal & N. T. Klein, Trans.). Paris: Victor Masson.

Hinton, J. M. (1967). Visual experiences. *Mind, 76*(302), 217-227.

Hinton, J. M. (1973a). *Experiences: An Inquiry into Some Ambiguities*. Oxford: Clarendon Press.

Hinton, J. M. (1973b). Visual experiences: A reply to I. C. Hinckfuss. *Mind, 82*(326), 278-279.

Hirsch, E. (1976). Physical identity. *The Philosophical Review, 85*(3), 357-389.

Hirsch, E. (1978). A sense of unity. *The Journal of Philosophy, 75*(9), 470-494.

Hirsch, E. (1982). *The Concept of Identity*. New York, Oxford: Oxford University Press.

Hirsch, E. (1997). Basic objects: A reply to Xu. *Mind and Language, 12*(3/4), 406-412.

Jackson, F. (1977). *Perception: A Representative Theory*. Cambridge: Cambridge University Press.

Jacob, P., & Jeannerod, M. (2003). *Ways of Seeing, The Scope and Limits of Visual Cognition*. Oxford: Oxford University Press.

James, W. (1890). *The Principles of Psychology*. New York: Henry Holt.

Jeannerod, M., Arbib, M. A., Rizzolatti, G., & Sakata, H. (1995). Grasping objects: the cortical mechanisms of visuomotor transformation. *Trends in Neurosciences, 18*(7), 314-320.

Joske, W. D. (1967). *Material Objects*. London: MacMillan.

Kanwisher, N. (2001). Neural events and perceptual awareness. *Cognition, 79*, 89-113.

Köhler, S., Moscovitch, M., & Melo, B. (2001). Episodic memory for object location versus episodic memory for object identity: Do they rely on distinct encoding processes? *Memory & Cognition, 29*(7), 948-959.

Kripke, S. (1980). *Naming and Necessity*. Oxford: Basil Blackwell.

Landau, B., Smith, L. B., & Jones, S. (1998). Object perception and object naming in early development. *Trends in Cognitive Sciences, 2*(1), 19-24.

Lewis, C. I. (1946). *An Analysis of Knowledge and Valuation*. LaSalle: Open Court.

Lowe, E. J. (1998). Objects and identity, *The Possibility of Metaphysics: Substance, Identity, and Time* (pp. 28-57). Oxford: Clarendon Press, Oxford University Press.

Mandelbaum, M. (1964). Toward a critical realism, *Philosophy, Science and Sense Perception: Historical and Critical Studies* (pp. 171-245). Baltimore: The Johns Hopkins Press.

Marr, D. (1982). *Vision*. San Francisco: W.H. Freeman.

McDowell, J. (1982). Criteria, defeasibility, and knowledge. *Proceedings of the British Academy, 68*, 455-479.

McDowell, J. (1984). De Re Senses. *Philosophical Quarterly, 34*(136), 283-294.

McDowell, J. (1986). Singular thought and the extent of inner space. In P. Pettit & J. McDowell (Eds.), *Subject, Thought, and Context* (pp. 137-168). Oxford: Clarendon Press.

McDowell, J. (1990). Peacocke and Evans on demonstrative content. *Mind, 99*(394), 255-266.

McDowell, J. (1991). Intentionality *De Re*. In E. Lepore & R. Van Gulick (Eds.), *John Searle And His Critics* (pp. 215-225). Oxford, Cambridge: Blackwell.

McDowell, J. (1998a). Intentionality *De Re*, *Meaning, Knowedge, and Reality* (pp. 260-274). Cambridge, MA: Harvard University Press.

McDowell, J. (1998b). *Meaning, Knowedge, and Reality*. Cambridge, MA: Harvard University Press.

Millikan, R. G. (1984). *Language, Thought, and Other Biological Categories*. Cambridge, MA: MIT Press.

Milner, A. D. (1998). Streams and consciousness: visual awareness and the brain. *Trends in Cognitive Sciences, 2*(1), 25-30.

Milner, A. D., & Goodale, M. A. (1995). *The Visual Brain in Action*. Oxford: Oxford University Press.

Mumford, S. (1994). Dispositions, supervenience and reduction. *The Philosophical Quarterly, 44*(177), 419-438.

Mumford, S. (1998). *Dispositions*. Oxford: Oxford University Press.

Noë, A. (2003). Causation and perception: The puzzle unravelled. *Analysis, 63*(2), 94-100.

O'Regan, J. K., & Noë, A. (2001). A sensorimotor account of vision and visual consciousness. *Behavioral and Brain Sciences, 24*(5), 939-1031.

Palmer, S. E. (1999). Visual Selection: Eye Movements and Attention, *Vision Science, Photon to Phenomenology* (pp. 519-571). Cambridge, London: MIT Press.

Perry, J. (1977). Frege on demonstratives. *Philosophical Review, 86*(4), 474-497.

Perry, J. (1979). The problem of the essential indexical. *Noûs, 13*, 3-21.

Price, H. H. (1950). *Perception* (2nd ed.). London: Methuen.

Prior, E. (1982). The disposition/categorical distinction. *Analysis, 42*, 93-96.

Proust, J. (1997a). *Comment l'esprit vient aux bêtes, Essai sur la représentation*. Paris: Gallimard.

Proust, J. (1997b). L'espace, les sens et l'objectivité. In J. Proust (Ed.), *Perception et intermodalité, Approches actuelles de la question de Molyneux* (pp. 125-178). Paris: Presses Universitaires de France.

Putnam, H. (1973). Meaning and reference. *The Journal of Philosophy, 70*(19), 699-711.

Putnam, H. (1975). The meaning of 'meaning', *Mind, Language and Reality: Philosophical Papers, Volume 2* (pp. 215-271). Cambridge: Cambridge University Press.

Pylyshyn, Z. W. (2000). Situating vision in the world. *Trends in Cognitive Sciences, 4*(5), 197-207.

Pylyshyn, Z. W. (2001). Visual indexes, preconceptual objects, and situated vision. *Cognition, 80*, 127-158.

Pylyshyn, Z. W. (2003). *Seeing and Visualizing: It's Not What You Think*. Cambridge, MA: MIT Press.

Pylyshyn, Z. W., & Storm, R. W. (1988). Tracking multiple independents targets: Evidence for a parallel tracking mechanism. *Spatial Vision, 3*(3), 179-197.

Quine, W. V. O. (1960). *Word and Object*. Cambridge: The MIT Press.

Quinton, A. (1973). *The Nature of Things*. London & Boston: Routledge & Kegan Paul.

Quinton, A. (1979). Objects and events. *Mind, 88*(350), 197-214.

Rea, M. C. (Ed.). (1997). *Material Constitution*. Lanham, Boulder, New York, Oxford: Rowman & Littlefield Publishers.

Recanati, F. (1993). *Direct Reference: From Language to Thought*. Oxford: Blackwell Publishers.

Reeder, N. (1995). Are physical properties dispositions? *Philosophy of Science, 62*(1), 141-149.

Rock, I. (1997). *Indirect Perception*. Cambridge, MA: MIT Press.

Russell, B. (1905). On denoting. *Mind, 14*(56), 479-493.

Russell, B. (1911). Knowledge by acquaintance and knowledge by description. *Proceedings of the Aristotelian Society, 11*, 108-128.

Russell, B. (1912). *Problems of Philosophy*. London: Williams and Norgate.

Russell, B. (1913). The nature of sense-data -- A reply to Dr. Dawes Hicks. *Mind, 22*(85), 76-81.

Russell, B. (1918). Knowledge by acquaintance and knowledge by description, *Mysticism and Logic and Other Essays*. London: Longmans, Green.

Russell, B. (1919). Descriptions, *Introduction to Mathematical Philosophy*. London: Allen & Unwin.

Russell, B. (1922). Physics and perception. *Mind, 31*(124), 478-485.

Russell, B. (1956). *Logic and Knowledge, Essays 1901-1950 (ed. by R. C. Marsh)*. London: George Allen & Unwin.

Sanford, D. H. (1976). The primary objects of perception. *Mind, 85*(338), 189-208.

Segal, G. (1989). On seeing what is not there. *The Philosophical Review, 98*.

Segal, G. (1991). Defence of a reasonable individualism. *Mind, 100*(4), 485-494.

Segal, G. (2000). *A Slim Book about Narrow Content*. Cambridge: MIT Press.

Sellars, R. W. (1944). Causation and perception. *The Philosophical Review, 53*(6), 534-556.

Sellars, R. W. (1959). Sensations as guides to perceiving. *Mind, 68*(269), 2-15.

Sellars, W. (1952). Particulars. *Philosophy and Phenomenological Research, 13*(2), 184-199.

Sellars, W. (1963). Particulars, *Science, Perception and Reality* (pp. 282-297). Atascadero, CA: Ridgeview Publishing Company.

Shoemaker, S. (1984a). Causality and properties, *Identity, Cause and Mind* (pp. 206-233). Cambridge, MA: Cambridge University Press.

Shoemaker, S. (1984b). Identity, properties, and causality, *Identity, Cause and Mind* (pp. 234-260). Cambridge, MA: Cambridge University Press.

Shoemaker, S. (1994). Self-knowledge and "inner-sense": Lecture I: The object perception model. *Philosophy and Phenomenological Research, 54*(2), 249-269.

Shoemaker, S. (1997). Causality and Properties [1980]. In D. H. Mellor & A. Olivier (Eds.), *Properties* (pp. 228-254). Oxford: Oxford University Press.

Smith, A. D. (1977). Dispositional properties. *Mind, 86*(343), 439-445.

Smith, B. (1998). The basic tools of formal ontology. In N. Guarino (Ed.), *Formal Ontology in Information Systems* (pp. 19-28). Amsterdam, Oxford, Tokyo, Washington: DC: IOS Press (Frontiers in Artificial Intelligence and Applications).

Snowdon, P. (1981). Perception, vision, and causation. *Proceedings of the Aristotelian Society, 81*, 175-192.

Snowdon, P. (1990). The objects of perceptual experience. *Proceedings of the Aristotelian Society, Supp. Vol.*, 121-150.

Snowdon, P. (1992). How to interpret 'direct perception'. In T. Crane (Ed.), *The Contents of Experience: Essays on Perception* (pp. 48-78). Cambridge: Cambridge University Press.

Spelke, E. S. (1990). Principles of object perception. *Cognitive Science, 14*, 29-56.

Spelke, E. S., Gutheil, G., & Van de Walle, G. (1995). The development of object perception. In S. M. Kosslyn & D. N. Osherson (Eds.), *Visual Cognition: An Invitation to Cognitive Science, Second Edition* (pp. 297-330). Cambridge, MA: MIT Press.

Strawson, P. F. (1950). On referring. *Mind, 59*, 320-344.

Strawson, P. F. (1956). Singular terms, ontology and identity. *Mind, 65*(260), 433-454.

Strawson, P. F. (1959). *Individuals, An Essay in Descriptive Metaphysics*. London: Methuen.

Strawson, P. F. (1979). Perception and its objects. In G. McDonald (Ed.), *Perception and Identity: Essays presented to A. J. Ayer* (pp. 41-60). London, Basingstoke: Macmillan.

Strawson, P. F. (1988). Perception and its objects. In J. Dancy (Ed.), *Perceptual Knowledge* (pp. 92-112). Oxford: Oxford University Press.

Strawson, P. F. (1997). *Entity and Identity and Other Essays*. Oxford: Clarendon Press.

Sully, J. (1889). *Les illusions des sens et de l'esprit (2e éd.)*. Paris: Félix Alcan.

Triesch, J., Ballard, D. H., Hayhoe, M. M., & Sullivan, B. T. (2003). What you see is what you need. *Journal of Vision, 3*(86-94).

Tulving, E. (2001). Episodic memory and common sense: how far apart? *Phil. Trans. R. Soc. Lond. B, 356*, 1505-1515.

Tulving, E. (2002). Episodic memory: From mind to brain. *Annual Review of Psychology, 53*, 1-25.

Ullman, S. (1980). Against direct perception. *Behavioral and Brain Sciences, 3*, 373-415.

van Inwagen, P. (1990). *Material Beings*. Ithaca, London: Cornell University Press.

Wiggins, D. (1980). *Sameness and Substance*. Oxford: Blackwell.

Wiggins, D. (1997). Sortal concepts: A reply to Xu. *Mind and Language, 12*(3/4), 413-421.

Wiggins, D. (2001). *Sameness and Substance Renewed*. Cambridge: Cambridge University Press.

Xu, F. (1997). From Lot's wife to a pillar of salt: Evidence that 'physical object' is a sortal concept. *Mind and Language, 12*(3/4), 365-392.

Zimmer, H. D., Cohen, R. L., Guynn, M. J., Engelkamp, J., Kormi-Nouri, R., & Foley, M. A. (2001). *Memory for Action: A Distinct Form of Episodic Memory?* Oxford: Oxford University Press.