

What is a Perspective Problem? Developmental Issues in Belief Ascription and Dual Identity*

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Introduction

Our main objective here is to propose an explanation for the finding by Doherty & Perner (1998) that children start to understand false belief at the same time as they become able to succeed on an “alternative naming” game, involving (pseudo)synonyms (rabbit/bunny), or superordinate/subordinate categories (rabbit/animal; Stummer & Perner 2001). One person names the item by one sortal and the other (e.g. child) has to use the other sortal. Our explanation rests on the claim that both tasks are *perspective problems*, in that they require understanding that the same thing—individual, event, situation, or whatever—is described differently from different perspectives. This explanation works, we claim, despite the fact that there is an important difference between understanding false belief and the dual identity cases. Whereas in the former task a perspective problem arises because truth-incompatible propositions are used to ascribe beliefs that involve a misrepresentation of reality, this is not so in the second case. What needs to be shown, therefore, is that such problems arise independently of whether or not they manifest themselves in incompatible propositions.

We approach this task by clarifying our terminology: First we specify what we mean by a perspective and a difference in perspective, following the way in which this term is used in natural language and by many developmental psychologists (section 1). Secondly, we define what we mean by a perspective problem and illustrate this definition with an example that serves as an ‘intuition pump’ for us (section 2). We then

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introduce a general procedure for detecting such problems which can be applied to a variety of cases. A first group of examples will be used to motivate our hypothesis that perspective problems do not arise as long as conflicting information can be integrated into a single- or multiple-target picture without making implicit or explicit reference to a representational fact (section 3). This hypothesis will then be used to argue that in visual perspective cases an integration of this kind with the help of hidden indexicals is not appropriate and that for this reason such cases have to count as genuine perspective problems (section 4). On this basis we will then argue that the same result holds for the dual identity tasks, like naming objects with different sortals (section 5) which then allows us to explain the developmental data showing that children understand false belief at the same time as they master the alternative naming task (section 6). Although on first appearance alternative naming seems quite different from standard perspective problems—like the false belief task—here too a perspective problem has to be solved that is known to be mastered only at about the age of four years.

1 What is a perspective?

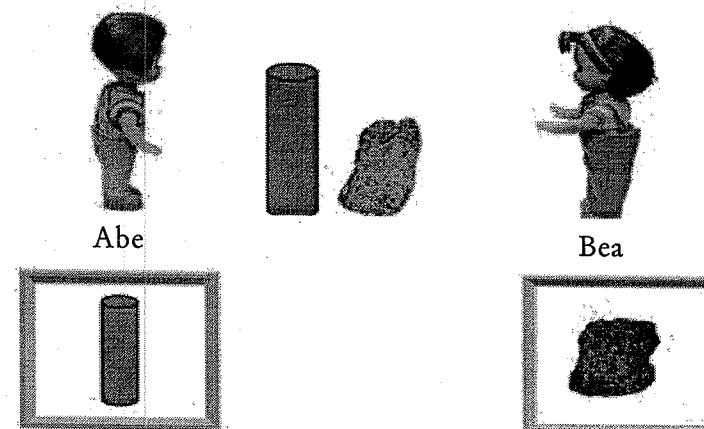
The Concise Oxford English Dictionary (Thompson, 1995) gives 3 relevant definitions.

1. the art of drawing solid objects ... so as to give the right impression of relative positions, size, etc.;
2. the apparent relation between visible objects as to position, distance, etc.;
3. a mental view of the relative importance of things (*keep the right perspective*).

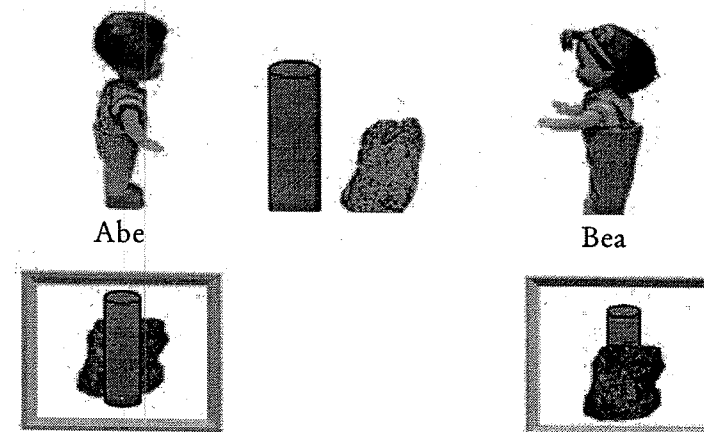
Interestingly, all three definitions refer to a way in which certain objects or things are represented: how they are *drawn*, how they *appear* to be, or what *mental view* is taken of them. For instance, when somebody looks at two objects, one may appear in front of the other for her, while it is just the other way round for somebody else looking at the same two objects from the opposite direction. We will later discuss this example in more detail (section 4). Here we want to use it to illustrate what we typically mean when we use the concept 'perspective' in common language. Depending on whether only one or both objects are visible for both observers, we may distinguish two cases here: a visual perspective can mean a restriction on *which* things can be seen; or it can mean a restriction on *how* certain things appear. The following diagram illustrates this difference by comparing how two persons, Abe and Bea, would draw what they see when looking at a rock and a pillar from different perspectives:

Figure 1:

- (a) Abe and Bea drawing different things seen from different perspectives



- (b) Abe and Bea drawing the same things seen from different perspectives



In its broadest sense, then, the concept of a perspective may be defined as "a way something is represented in a representational medium". This very general definition covers both uses illustrated with the above example. It is wide-ranging also in another respect. It applies to pictures, statements, mental states, or to any other representational medium. In all these cases we can distinguish the representational *medium* (or

vehicle) from 'what is represented', where this latter phrase has to be further disambiguated: it can merely mean the *target (object)* of representation, independently of how it is represented; or it can mean the specific way in which something is represented—the *aspectual shape* or *mode of presentation*. This mode of presentation is commonly called the *content* of a representation, picking up the terminology of Franz Brentano and his pupils who distinguished between the 'object' and the 'content' of presentations (see Twardowski, 1892, and more recently Crane, 2001, pp. 18–33). How the distinction between target and content is to be drawn, is a delicate matter. What seems clear is that nothing—no target—can be represented without representing it in a certain way. One cannot use a representational vehicle without taking a perspective, a standpoint or point of view.

The same broad use of this notion can also be found in psychology when psychologists speak of perspective-taking. In the developmental literature children's ability to predict how a scene looks from another person's point of view runs under "visual perspective taking," (Piaget & Inhelder, 1948/1956; Flavell, et al., 1968), and to predict what a person would feel in certain circumstances as "emotional perspective taking" (or empathy, Borke, 1971). Appreciation of the appropriate choice of words (Clark, 1997; Tomasello, 1999) is referred to as "conceptual perspective taking". Sometimes this expression is also used for children's understanding that another person may not know what oneself knows, e.g. about the content of a box (Marvin, et al., 1976; Mossler, et al. 1976). In this case, though, "*cognitive perspective taking*" may be a better term to describe the fact that a certain proposition is known by one person but not by the other. Different conceptual perspectives are involved, for instance, when somebody describes an object as a statue, while someone else describes it as a piece of clay, or when someone describes a surface as flat and somebody else (taking a microscopic view) as "bumpy".

A "difference in perspective" occurs when people represent (are intentionally related to) the *same target* but their representations differ in aspectual shape. Our example of Abe and Bea in Figure 1 underlines this. When each of them depicts a different object (upper panel of Figure 1) we would not want to speak of a difference in perspective. We would only want to do so when they both depict the same objects and scene but differently, i.e., "from a different perspective" (Figure 1 lower panel). Equally, a word chosen for *it*, only gives a different perspective from another word chosen for *it*, if the "it" refers to the same 'thing' in both cases. But how do we decide in concrete cases what the target of a

given representation is, and whether two representations have the same target or not?

The spectrum of possible answers here is very wide and we have to rely on our intuitions to rule out the most implausible answers. One option would be to say that a target can be represented correctly in only one way and that any difference in perspective must therefore involve a misrepresentation. This seems to be at odds with the standard cases of visual perspectives, however. Neither Abe nor Bea are misrepresenting what they see when they paint the pillar and the rock in different ways. Another, equally implausible view would be that differences in perspective are ubiquitous because a common target of representation can be introduced *ad libitum*. For instance, if one believes that it is raining in Salzburg and someone else believes that it is sunny in Rome, one could say that they have different views about the weather in Europe, thereby making "the weather in Europe" their common target. This case seems obviously different from cases like the one described by John Perry in which two persons acquire different beliefs about the same ship while mistakenly believing to be looking at two different ships (see Perry, 1993, 12–13). Whereas in this case it seems unproblematic to say that their ship-beliefs have the same target, this is not at all plausible in the case of beliefs about the local weather in Salzburg and Rome. It is difficult to say, however, what it is that guides our intuitions here.

It needs to be acknowledged, therefore, that the concept of a perspective *difference* is itself a perspective-relative notion, because it can be defined only relative to a fixed target, which is always fixed *from a certain perspective*, thus leaving open more than one way how the content/target distinction can be drawn. This relativity may explain why the concept of a perspective appears to be such a vague and elusive notion. Even if there is no absolute standard by which one can judge what is contained in a perspective and what belongs to its target, this concept, nevertheless, seems to us theoretically very useful. It helps to focus on a special problem in cognitive development to which we now turn.

2 What is a perspective problem?

Once we have the notions of "perspective" and "perspective differences" at our disposal, we can distinguish three different cognitive faculties for dealing with different perspectives (akin to levels 0–2 of role taking by Selman & Byrne, 1974). We use again the case of visual perception as an example:

1. *Switching perspective.*

When we look at a scene we see it in a particular way, when we move we see it differently. This can be done simply by taking in these experiences, one after the other, as they come along. We can look at something in a particular way and savour the full richness of this particular experience and then switch to a new viewing angle and savour the appearance from that angle.

2. *Integrating information from different perspectives.*

Evidently, just switching perspective is not the most effective way of using our perceptual apparatus. We want to integrate information from different viewing points to get a sense of the layout of the environment. In simple cases, we can achieve this by integrating the given information into a single "picture" of one object seen from different angles, or at different times, but only as long as our representational medium allows for this integration without any incompatibilities arising. More complicated cases arise when we see one kind of object in front of us at one time, and—perhaps after changing our own position—seeing a different kind of object shortly afterwards that could not possibly be the first object moving around in space or undergoing some change, we have to realise that our visual information comes from distinct objects. Integrating these pieces of information means to create a picture whose target is now more highly structured, a scene with different objects existing at different locations or at the same location at different times. The simpler targets of the earlier perceptions can be understood as parts of the complex target of the integrated representation.

3. *Representing different pieces of information as different ways of representing the same target*

Sometimes, however, integration by introducing a more highly structured target is not feasible. Then we have to realise that differences in our representations can also arise from the fact that different perspectives are involved. We then no longer accumulate information by taking one point of view—namely our own present point of view—for granted, but instead distribute different pieces of information to different positions that one might take on the same matter. This is when we need the concept of a perspective.

Crucial for understanding what a perspective problem is, is the difference between the faculties 2 and 3 in our list. Let us illustrate this point again with our example of Abe and Bea looking at the same scene from opposite

directions. If each of them just sees one of the two objects (Figure 2), their pictures can easily be integrated into a more highly structured target picture showing a scene with both objects (centre panel of Figure 2, this corresponds to faculty 2 above). If they see the whole scene of both objects in different ways (top panels of Figure 3), however, the content of their paintings cannot be incorporated into a single scene. What is needed in this case is a "meta-picture" representing not only the painted scene, but also the paintings made of it (lower panel in Figure 3):

Figure 2:

Using a picture with a more highly structured target for integration

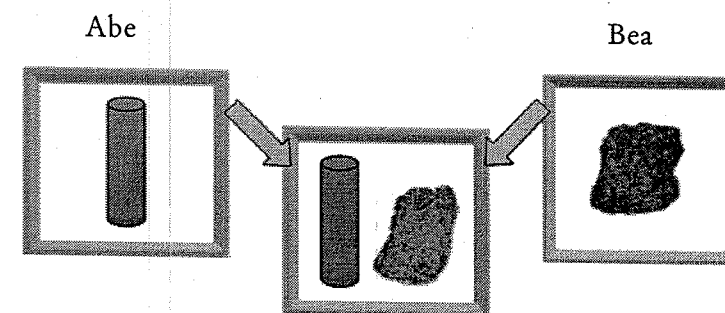
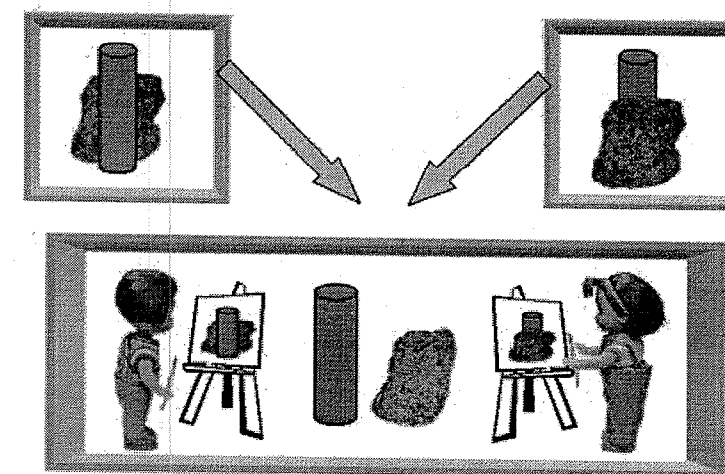


Figure 3:

Using a "meta-representational" picture for integration



With this distinction in mind, we can now define what we mean by a *perspective problem*. We reserve this term for problems of integrating information that can be solved only by relying on a meta-representational integration, i.e. on the third faculty in our list. Although switching perspectives and integrating information into a structured-target picture also pose considerable problems for a perspective taking agent, we do not call these problems “perspective problems”. Perspective problems in the strict sense are always perspective *understanding* problems (see also Perner, 2000).

But which problems do require that the agent understands what a perspective is? How can we determine when faculties 1 and 2 on our list are *not sufficient* for solving a given integration problem? This question is more difficult to answer than it might at first seem.

3 Detecting Perspective Problems

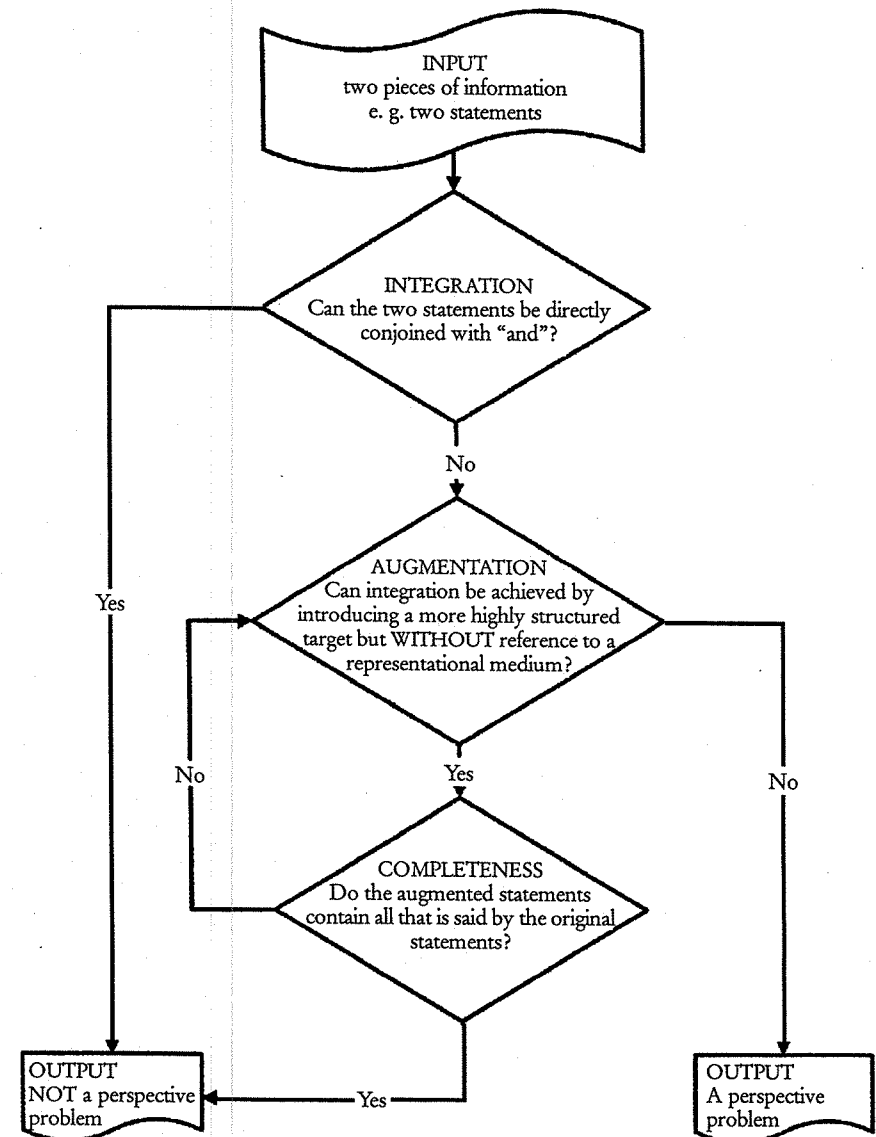
In order to decide which problems are really perspective problems in our sense and which problems can be solved on a lower level, so to speak, we want to introduce a general procedure that is applicable for a large variety of cases. For easier exposition, we will assume that two pieces of information are given in the form of two explicitly formulated statements. Our decision procedure will consist in answering the following three questions:

1. **The integration question:** Can the two statements be directly conjoined with “and”?
2. **The augmentation question:** If not, can integration be achieved by introducing more highly structured targets, but *WITHOUT* introducing reference to a representational fact?
3. **The completeness question:** If yes, does the proposed augmentation still contain all that is said by the original statements?

The decision procedure defined by these questions is summarised in Figure 4 and we now check with several examples whether its classification of problems into perspective versus non-perspective problems conforms to our intuitions.

Figure 4:

Decision Procedure for Identifying Perspective Problems



Example 1: Dalmatian

Let us assume that a biologist and an artist are looking at a beautiful Dalmatian. The artist exclaims, "It is beautifully spotted," whereas the biologist merely says, "It is a dog." These two statements clearly state different things. Question 1: Can they be directly conjoined without adding further information? Answer: Yes. We can do this by conjunction or by some other syntactic device. The result is a more complex statement of the form, "It is beautifully spotted AND it is a dog," or: "It is a beautifully spotted dog." Output: no perspective problem arises.

As this simple example should make clear, our decision procedure is not intended to decide what the representational target of these statements is, and whether they have the same target or not. This question can be left open here. One answer would capture the intuition that the different targets of the individual statements, i.e. (1) the fact that the individual is beautifully spotted and (2) the fact that it is a dog, can be seen as different parts of a more complex target, i.e. (1+2) the fact that the individual is a beautifully spotted dog.

Example 2: Weather report

Imagine you are listening to two radio programmes. From Radio NYC come the words "Today it is raining," while Radio Chicago pronounces, "Today it is not raining" (Barwise, 1986; Fodor, 1986). Taken at face value, we have here two contradictory statements. The answer to our first question will therefore have to be negative: these statements cannot be directly conjoined. But they can easily be integrated by introducing multiple targets. We solve the conflict by realising that both sentences contain a hidden indexical, "here," which refers to the location at which the speaker (or the radio station) is located. Making these hidden references explicit, we get two augmented statements about different locations that can now be directly conjoined: "Today it is raining in New York AND not raining in Chicago."

This way of solving the conflict meets the condition that integration can be achieved without making reference to a representational fact. The requirement is that in the augmented statements no reference be made to pictures, words, mental states or anything else that has a representational description. It also meets the third condition of completeness. It still contains all that the original statements said, namely that it is raining (in New York) and that it is not raining (in Chicago). Hence the decision chart classifies it as being not a perspective problem, in agreement with our intuition.

Example 3: False Belief

Maxi puts his chocolate into the drawer, and in his absence the chocolate is unexpectedly transferred to the cupboard. Maxi is then asked where the chocolate is. We as observers of the full event sequence answer, "It is in the *cupboard*," while Maxi, deprived of some crucial information, answers, "It is in the *drawer*." Assuming that both statements are about the same piece of chocolate and where it currently is, and assuming that the same piece of chocolate cannot exist in the drawer and the cupboard at the same time, we conclude that the answers to both the integration and the augmentation question are negative. The statements cannot be directly conjoined, and an augmentation that introduces different targets by taking the pronoun "it" to refer to different things is ruled out. Other attempts to find a difference in target also fail. For instance, one cannot attribute Maxi's belief to a difference in time since his belief is about the chocolate's present location, nor can we appeal to Maxi's "imagined world," which is different from the real world, since we could not explain Maxi's behaviour in the real world unless his belief is interpreted as a (false) belief about this world.

Thus we are forced to give a negative answer to the augmentation question in this case. The only way to integrate the conflicting statements is by moving one of them into the domain of a cognitive verb. Only if the false statement "it is in the drawer" is used as the content-clause in describing a cognitive state of Maxi's, e.g. "Maxi believes that it is in the drawer", can the two statements be conjoined. Therefore our decision procedure correctly identifies this situation as a perspective problem.

Understanding false belief is something that children master at roughly 4 years of age (Wimmer & Perner, 1983; Perner, Leekam & Wimmer, 1987; Wellman, et al., 2001). There are several other achievements that children attain at this stage, like the knowledge-ignorance distinction (Hogrefe, Wimmer, & Perner, 1986¹—which have been dubbed cases of "conceptual/cognitive perspective taking" by Marvin et al., 1976; Mossler, et al., 1976)—or the appearance-reality distinction (Flavell, Flavell and Green, 1983). Analysing such cases would lead to the same

1 This paper claimed that the ignorance-knowledge distinction is understood before false belief, but the difference that was found can be explained by a methodological difference in base rate of correct guesses. That is, the same argument that has been used against the claim that children can explain erroneous actions before they can predict such actions (Perner, 1995, pp. 252–253). This very argument also applies to the alleged difference between understanding ignorance and false belief.

result as the false belief task. Other achievements, like pretend play, are mastered by much younger children. This is why it has been suggested by Perner, et al. (1993) that, unlike false belief, pretend scenarios can be understood as merely acting in different possible worlds. Information coming from different pretend situations can be integrated by appealing to targets structured into different worlds (the real one and possible ones) without making any reference to a representational fact.

4 Perspectives beyond false belief

Attributions of false beliefs provide the clearest examples of what it means to solve a perspective problem. These cases are so persuasive that they may lead one to conjecture that perspective problems will arise only when a certain misrepresentation occurs. Only when things get misrepresented in a certain way, or so it may seem, will all the conditions identified in our decision procedure be satisfied. We now want to show, however, that these conditions also obtain in a typical visual perspective case in which misrepresentation plays no role.

Example 4: Visual Perspective

Let us consider now in more detail the example of Abe and Bea facing two objects, P (pole) and R (rock), located between them. Abe describes their spatial relationship by saying "P is in-front of R," whereas Bea claims "P is behind R." What we earlier said about the pictures that Abe and Bea might draw applies *mutatis mutandis* to these statements: they can be integrated into a single picture only by introducing a reference to a representational fact, in this case to the different statements they make in describing what they see. If this is true, this shows that here too we confront a genuine perspective problem. But is this analysis correct?

As Stephen Schiffer pointed out (in the conference discussion) visual perspective cases may be compared to the weather report example discussed earlier. Here, too, one might say the two statements can be integrated by evoking hidden indexicals, since the apparent incompatibility between Abe's claim "P is in-front of R" and Bea's claim "P is behind R" is not a real one. It only arises from their different spatial locations in relation to the two objects. By introducing a hidden indexical (like "here" in the raining example) it is possible to conjoin the two statements. Schiffer (personal communication) even goes as far as to suggest that identifying the hidden indexicals in these statements is *necessary* for solving the apparent conflict between them:

"Since both utterances are true, they aren't incompatible, and, again, the *only* coherent way of explaining this is to suppose that these sentences involve a hidden indexical requiring reference to the relative positions of the observers." (e-mail of 21 September 2001, our emphasis).

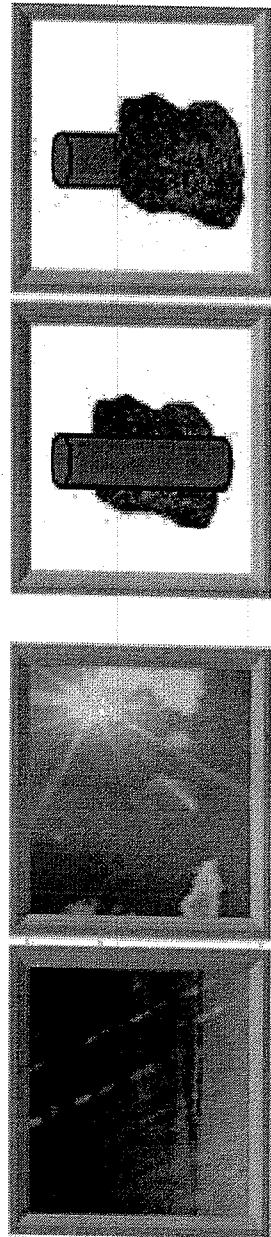
Following this suggestion we should say that the two statements here describe two distinct states of affairs: when Abe claims "P is in front of R", what he is saying is that his position is roughly co-linear with P and R, but closer to P than to R, while Bea's statement "R is in front of P" conveys the information that her position is roughly co-linear with P and R, but closer to R than to P. Like the two statements about the weather in New York and in Chicago, these statements now involve different representational targets, namely Abe's and Bea's spatial relations with respect to objects P and R and, therefore, the result should be the same in both cases: no perspective problem should arise.

This proposal is in line with the conjecture that only cases of misrepresentation pose a real perspective problem. Since no mistaken representation occurs, the two statements are not really incompatible, which seems to indicate that the conditions of a perspective problem are not satisfied. When psychologists classify such cases as problems of visual perspective taking, this would be misleading since these cases would be quite different from real perspective problems like the false belief task, and should rather be compared with the two conflicting weather reports that no one would normally classify as a problem of perspective taking.

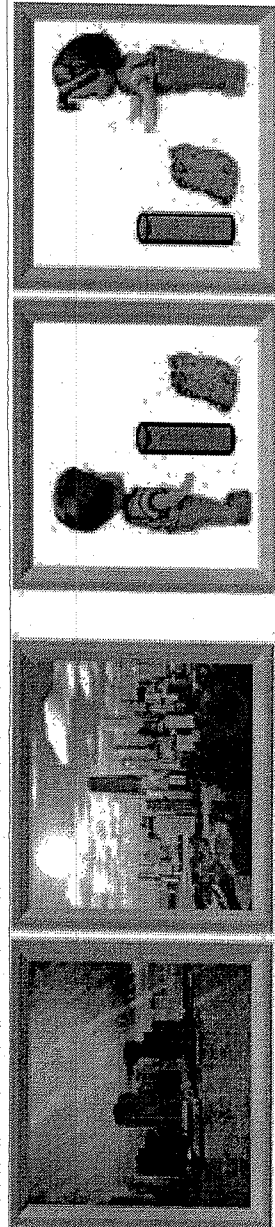
But the conclusion that visual perspective cases are not real perspective problems is premature. As the third question in our procedure reminds us, we also have to check whether the augmentation procedure is complete and preserves all that is said by the original statements. To help our intuitions let us consider the pictorial representations in Figure 5. The left pair of pictures in the upper row shows that it rains (photo taken in NYC) and that it doesn't rain (Photo taken in Chicago), respectively. In order to integrate both pieces of information within a single picture we would need to first augment them as shown in the corresponding pictures in the row below, which show that it is raining in NYC and not raining in Chicago. These can be integrated in a single larger picture (not displayed in Figure 5) showing both NYC and Chicago and the different states of the weather in the whole of that region. Importantly, the augmentation shown in the second row passes the completeness criterion, because it preserves what the original pictures above show, e.g., the left picture in the first row shows *that it is raining*, and so does the augmented picture beneath. It shows *that it is raining* and, in addition, that this event takes place in NYC.

Figure 5:

(a) Informational input



(b) Augmenting the given information without reference to a representational vehicle



In contrast, let us consider the necessary augmentation for the visual perspective case shown in the right picture pair. The two pictures in the top row show *that the pole is in front of the rock*, and *that the rock is in front of the pole*, respectively. In order to integrate both pictures within a single picture the original pictures would need to be augmented as shown by the picture pair in the lower row. (They can then be easily integrated in a picture showing Abe, the pole, the rock and Bea from left to right). In contrast to the weather example, however, the augmented pictures do not pass the completeness criterion, i.e., they do not preserve what the original pictures show, e.g., the right most picture shows *that the rock is in front of the pole*, but the augmented version of it does not show this any more, it shows *that the rock is to the left of the pole*. Consequently, because this attempt at augmenting the pictures fails the completeness criterion our decision procedure classifies this problem—according to intuition—as a perspective problem.

Our result is not just due to our reliance on pictorial representations. If we take the verbal statements: “It is raining” spoken in NYC and “It is not raining” spoken in Chicago, then the needed augmentation for successful integration of e.g., the first statement, “It is raining in NYC” preserves the meaning of the original statement, namely, that it is raining. So the weather example, again, passes the completeness test. In contrast the suggested augmentation of “The rock is in front of the pole” by saying, “The rock and the pole are placed in a line and Bea is closer to the rock than the pole” does not state any more *that the rock is in front of the pole*. Hence this example again fails the completeness criterion and is classified as a perspective problem. Although Schiffer is right that there must be some background information that makes “in-front” and “behind” statements compatible, it seems that without metarepresentational concepts our language (or our pictorial representations) do not provide the means for expressing the missing information without changing what was said. These cases, therefore, fail our completeness criterion, which serves a similar role as Schiffer’s (1992, pp. 512–518) appeal to meaning-intentions for ruling out the use of hidden indexicals for modes of presentation in the case of belief ascriptions.

5 Dual Identity

By using different words to say what something is, we cannot only predicate different properties to something—e.g. when in example 1 the same object is described as a dog and as beautiful—but we can also apply alternative sortals (words that determine what sort of thing

something is) and thereby individuate the very thing we are talking about in different ways (e.g., Hirsch, 1982). A classical example that brings out the problems created by the use of different sortals is the case of the statue made of clay (e.g., Perry, 1970). Let's say you gave me a piece of clay last week, which an artist friend of mine turned into a lovely statue yesterday. Now I have a statue that I can still refer to as the piece of clay I got from you last week. Hence it seems we have a single object that is a piece of clay as well as a statue²—just as it may be lengthy and brownish (two predicates easily to integrate). However this is not so straightforward. When asked, since when I have been in possession of it, the answer depends on what sortal I use to individuate it. If I use "piece of clay" the answer is "last week", if I use "statue" the answer is "yesterday."

One attempt at explaining what is going on here is to assume that there are actually two different things in existence, a piece of clay and a statue that temporarily overlap, i.e., there is a temporal 'stage' of the piece of clay which is identical with a 'stage' of the statue (e.g., Perry, 1970). This, of course, violates the common sense intuition that at a particular time there can only be a single object in a particular spatial location. There may be very good reasons to give up this principle in one's metaphysics. But philosophical theories that do are revisionary theories, deviating substantially from how we think and talk *about it*. For instance, when I explain to you, "Look at this! It is the piece of clay you gave me last week. Yesterday my friend made a statue out of it. Isn't it a fine statue?" it seems to me that with "it" I keep referring to one and the same object throughout.

According to the above suggestion, however, my "it" was not referring to the same object but to two different objects. Making the hidden duality of entities explicit, we might augment the two statements as follows: "I have had it, namely a piece of clay, since last week" and "I have had it, namely the statue, since yesterday". Following our decision procedure in Figure 4, this would lead to the result that no perspective problem arises in this case. But our intuition tells us, that something more is said with the original statements, something that is lost by making the pronoun "it" refer to two different objects. What is lost,

² One intuition is that it shouldn't be described as "piece of clay" at all any more. However, I practically have to refer to it as piece of clay if I want to point out that it is the thing I got from you last week. I can't very well say, "That's the statue I got from you last week." Perhaps I should properly say, "That statue, it is made from the piece of clay that you gave me last week." Does this imply that the piece of clay ceased to exist as it was formed into a statue?

thereby, is the fact that the object which I got one week ago, namely the piece of clay, was *transformed* into the statue. But what does it mean to say that an object has been 'transformed' in this way? It means that a different sortal term can be applied to it after the object was changed in a particular way. The object that could formerly be described—and thereby individuated—only as a piece of clay, can now also be described—and thereby individuated—as a statue. This is a *representational* fact that has to be acknowledged if the full information contained in the original statements should be preserved. One way to do this would be to say: "I got it, i.e. this object *conceived* as a piece of clay, last week", and "I got it, i.e. this object conceived as a statue, yesterday". This makes explicit that reference to a representational fact is needed, if we want to integrate these two statements without loss in informational value. The task is therefore a real perspective problem according to our definition.

Other problems with the overlapping stages solution are pointed out by Fine (1982) who, therefore, suggests that we think of the statue as a 'qua-object', i.e., as an object that owes its existence in some sense to the description that is being used. This would make the existence of objects created by alternative descriptions a perspective problem because the unifying perspective that allows something to be a piece of clay and a statue makes use of a difference in description (representational fact). In a similar vein Kutschera (1999) suggests as a solution for these identity problems to think of identity and difference as being defined only relative to a frame of reference. "Statue" and "piece of clay," therefore, belong to different frames of reference. This solution, however, also amounts to being a perspective problem (in our sense), since "a difference of frame of reference" refers to a representational difference. Also Bischof-Köhler (1998) likened perspectives to frames of reference in the sense of Gestalt psychologist Metzger (1954) and proposed that children around 4 years understand that other people can have a perspective that differs from the child's own and that this ability underlies children's acquisition of a theory of mind, their understanding of time frames and their understanding of changes in motivational set.

6 Alternative Naming

Definite descriptions individuate objects differently. So to individuate something as a *rabbit* or as an *animal* creates a different perspective or frame of reference. Therefore, when asked to specify what something is we either individuate it as a rabbit or as an animal. We are, of course, adept at switching perspectives from, say, it being a rabbit to it being an

animal, when our partner in conversation chooses to focus on it as an animal. We can also understand the claim that it is really both, an animal and a rabbit, since we can understand perspective differences. However a very young child incapable of even switching perspectives would see it only as, say, a rabbit and then deny that it is an animal (a phenomenon known as *mutual exclusivity*, Carey and Bartlett, 1978; Dockrell & Campbell, 1986; Markmann & Wachtel, 1988). A child capable of switching perspectives, may agree that it is a rabbit and that it is an animal provided that the course of the conversation induced the child to switch perspectives. If the child sticks to the initial perspective, the child will show mutual exclusivity and reject the other label. Only a child who can understand perspectives will be able to acknowledge that it is a rabbit and an animal at the same time.

The "alternative naming" task designed by Doherty and Perner (1998) forces children to do exactly this, i.e., acknowledge that something can be a rabbit and a bunny. In the original study children are first tested for their knowledge of word pairs that come close to being synonyms, e.g., bunny-rabbit, lady-woman, television-TV, etc. On different occasions children were shown the same object among 3 distractors and asked, "Which one is the bunny?" and later, "Which one is the rabbit?" Then they were given training on three training pairs. It was pointed out that the item could be called a bunny and a rabbit. So when a talking puppet (operated by the experimenter) says that it's a bunny, then the child's task is to call it a rabbit and the other way around. Then five test pairs followed. As one would expect, the younger children made more errors. They tended to repeat what the puppet had just said, while most of the older children correctly used the alternative expression. Performance on this "naming" task and the false belief task correlated strongly ($r = .71$ in Experiment 3 and $r = .65$ in Experiment 4) even when children's age and some measure of verbal intelligence (BPVS: British Picture Vocabulary Scale) were partialled out ($pr = .66$ and $pr = .60$, respectively). Because children had to produce a suitable alternative expression, this was called the *production* version.

The paradigm was also turned around, in order to check to what degree the difficulty of this task has to do with finding an alternative expression. The child names the item first (e.g., "a rabbit") and the puppet then has to produce the alternative expression. The child's task was to judge whether the puppet had conformed to the instructions in each of three trials presented in a random sequence (*judgement* version). The puppet either [1] correctly uses the alternative description ("a bunny", correct judgement: "yes, puppet said what he was supposed

to say"), or [2] repeats the child's label ("a rabbit", correct judgement: "no"), or [3] says something wrong ("an elephant", correct judgement: "no"). Again correctness of judgements was strongly correlated with passing the false belief task: $r = .83$ in Experiment 1 and $r = .82$ in Experiment 2, and stayed so even when the effects of a structurally similar control task and verbal intelligence in Experiment 2 ($pr = .70$) were partialled out.

These correlations between the false belief task and the judgement version of the synonyms task have since been replicated by Martin Doherty (1998): $r = .71$ and $pr = .55$ after BPVS was partialled out and by Garnham, Brooks, Garnham, and Ostensfeld (2000): after partialling out age and verbal intelligence $pr = .33$. In a particularly interesting study by Wendy Clements English children were taught 4 German colour words and then had to use the German word if puppet had used the English word and the other way around. Again the correlation with the false belief task was high: $r = .75$ and $pr = .73$ after memory for the German colour words was partialled out (Clements, Heider, Brooks & Garnham, 1998).

Subsequent studies (Stummer, 1997; 2001) confirmed children's difficulty with the naming task when sortals at different conceptual levels were used. To use "animal" when the puppet had said "dog" was as difficult as the original task and it, too, correlated highly with the false belief task. Essentially the same results came from another task using basic and subordinate categories, e.g., dog-poodle. Children again had a tendency to use the basic term (dog) or to repeat the term used by puppet. The ability to use the subordinate term after the puppet had used the basic term was as difficult as and correlated highly with the false belief task (See Experiments by Stummer in Table 1: The top panel shows the percentage of children passing each task for each experiment, e.g., the false belief task, synonyms task and categories task (synonyms and categories task can be characterised as "name/name" tasks). The lower panel shows the correlations between the name/name tasks and the false belief task.

Very importantly, Stummer also introduced an extremely similar task (colour/name) that posed hardly any difficulty at all. The task was to say what something is or what colour it has. If the puppet says one of them the child had to "say the other thing". Children performed almost perfectly on this task (the correlation with the false belief task is therefore practically meaningless). This makes it difficult to explain the developmental synchrony between the name/name tasks (synonyms or categories) and the false belief task in terms of mastery of language,

Table 1.

Results from Experiments by Stummer and from the Experiment Reported here.

Tasks	Stummer		Perner et al. (2002) (2;8-4;9, n = 2×24)	
	(1997) 3;0-6;1, n=36	(2001) 3;4-4;9, n=40	Production	Judgment
% CHILDREN CORRECT on all items				
False belief	61	73		19
Say-something-different				
Synonyms	67	—	38	33
Categories	64	73 ^a	42	21
Colour/Name	94	95	92	87
Part/Name	—	—	96	92
Colour/Colour	—	—	87	87
Part/Part	—	—	92	92
CORRELATIONS [with age and verbal intelligence partialled out]				
FB × synonyms	.64** [.45**]	—	.66** [.62**]	.72** [.72**]
FB × categories	.59** [.42*]	.77** [.65**]	.53** [.25]	.60** [.32]
FB × colour/name	.38* [.32]	.37* [.20]	.13 [-.10]	.17 [-.22]
FB × part/name	—	—	.11 [.27]	.15 [.24]
FB × colour/colour	—	—	.17 [.19]	.17 [-.08]
FB × part/part	—	—	.15 [.18]	.15 [.32]

^a Average of number of children passing all superordinate/basic tasks and of number passing subordinate/basic tasks.

** $p \leq .01$; * $p \leq .05$

working memory capacity, or logical complexity. In sum, children's difficulty seems to pertain only to tasks that require alternative individuation by different sortals (name/name tasks), not different predicates.³

Sprung (2001; Perner, et al., 2002) replicated these results by Stummer in the production as well as the judgement version of the tasks, as the three right columns in Table 1 show. Sprung also added some new tasks: a part/name task and a colour/colour and part/part

³ What matters is whether the grammatical form suggests that a particular is being individuated by alternative sortals, whether different sortals are in fact used or not. For instance, if "bunny" and "rabbit" were true synonyms (which is seriously contested) then these nouns would not be different sortals. However, we cannot expect children to have deep knowledge about when something is or is not a synonym. Their aversion against using different sortals is probably governed by the grammatical construction used: "this is a bunny" and "it is a rabbit," in contrast to: "this is a rabbit" and "it is — brown."

task. In the part/part tasks children had to name two parts of an object, e.g., head and tail of a rabbit, and then the usual game was played: if the child names one part then puppet has to name the other part—with variations just as in Doherty's original judgement task. In the colour/colour task items had two colours and puppet had to name the other colour than the one the child had named. The results confirm that children have great difficulty only with the name/name tasks in which alternative sortals are involved, and only these tasks showed a substantial correlation with the false belief task. Children's difficulties are minimal when alternative colours or parts are involved or a mix of sortal and colour or part.

In sum, these data show with impressive constancy that children's ability to play the alternative naming game is mastered at the same time as they become able to understand false belief. They also show that this developmental relationship relates specifically to the ability to naming and not to a common degree of complexity, working memory demands, or other such performance factors, because the very similar tasks involving the colour of objects or their parts do not pose any sizeable difficulty at this age. The only available explanation of this solid finding is the fact that both tasks, false belief and naming, are perspective problems and children can master both as they become able to understand perspectives at around the age of 4 years. Without the analysis of what constitutes a perspective problem, elaborated in this paper, we would have had no solid basis for claiming that alternative naming creates problems of perspective.

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