Intellectual Codes

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Commentary on David Premack, 'The Codes of Man and Beast', *Behavioral and Brain Sciences* 6 (1983), pp. 125–137.

Premack's data are striking; and his status as one of the philosophically most interesting and most valuable contemporary psychologists is confirmed by his caution in interpreting the data. He *stalks* the question of how to distinguish in general terms the difference between the problems which can and those which cannot be solved only by language-trained animals; this contrasts happily with the naive confidence and unteachability of some workers with chimpanzees.

His suggested explanation of the data is plausible enough in broad outline: there are intellectual capacities with which all chimpanzees are genetically endowed, and language training causes them to become better developed. To be confident of this, though, we would need not only problems that language-trained animals can solve and the others cannot, but also problems that the former can solve better and faster than the others can. In terms of Premack's specific explanation, that would involve finding problems that could fairly easily be solved with help from the abstract code but could not be solved purely through the imaginal code. The inquiry would concern whether all chimpanzees could solve such problems, the language-trained ones doing it faster and better.

The devising of such experiments would involve more conceptual work, even if everything Premack had done up to here were perfect. It is one thing to separate problems which can from those which cannot be solved without help from the abstract code; it is another to develop the account of the abstract code far enough to make it support a harder/easier grading within the latter class of problems.

I am afraid, however, that I am not convinced by what Premack has told us so far about the differences between the abstract and imaginal codes. My main purpose in the rest of these comments will be to air my doubts about the account.

Abstract Images. Premack rightly thinks that the hypothesized imaginal code must include abstracting devices of some kind. I remark in passing that Berkeley exaggerated the need for such devices, because he thought that an image of an F must be fully saturated with features—it must be as detailed and specific as any particular F—so that an image of a face, for instance, must contain the materials for an answer to every question about the imaged face. Is it smiling? Does it need a shave? and so on. We all know that that is wrong, and that images can lack detail, remaining silent (so to speak) about some aspects of the imaged thing; and in Bennett (1971) §§6 and 7 I show how that is possible and why Berkeley went wrong about it. Still, although an image need not be infinitely ambiguous, as Berkeley supposed,

the ambiguity problem is a real one and must be solved—if images are to be versatile intellectual aids—by some means of disambiguating, selecting, abstracting.

A point about the imaginal code that Premack would presumably accept but that needs an emphasis he doesn't give it is the following. Given that an animal forms an image of something red and tags it with respect to its color, we can't infer from that alone what other colored things he will associate with that tagged image. They may be restricted to items very close to the original one in color, or they may sprawl across half the spectrum; it is even logically possible that the animal may be so constituted that he groups together a small part of the red part of the spectrum and a large proportion of the blue. The general point is that each animal has what Quine has called a 'quality space'—a compendium of all the facts about which qualitative similarities are close, which distant, and which nonexistent for that animal (see Quine (l960), §17). Such facts about a given species would have to be known before we could properly describe its use of an imaginal code. Premack comes close to this matter when, in response to the claim that when pigeons recognize humans as such they cannot merely be spotting recurrences of 'simple features', he says that 'it is not clear what constitutes a "simple feature".' That is true, though I wish he had said '. . . what constitutes a "simple feature" for a pigeon': the relevant question concerns what similarities between things impress themselves on pigeons as simple or immediately graspable. My main point is that that kind of knowledge about quality spaces must also underlie any claim to the effect that a given species could or could not solve a given problem by such and such means. (For more on this, see Bennett (1976) §49.)

Returning now to the point that an imaginal code must involve abstraction: that implies that the broad difference between the two codes must be not that only the 'abstract' code is abstract, but rather that only the 'imaginal' code uses images. But then we ought to be cautious about admitting the existence of the abstract code, for how could we have good evidence that any means of intellectual processing made no use at all of images? Premack sometimes gives the impression that he is putting some things out of reach of the imaginal code because they involve classifying things in terms of something other than how they appear, whereas images are confined to the appearances of things. But that cannot be right as it stands. He contrasts the question **(1)** Do x and y appear alike? with the question **(2)** Do x and y belong to the same class? apparently meaning **(2)** to be the question of whether x and y belong to a single class although they do not appear alike. Perhaps he would illustrate this with the class of toys: he seems to hold that two toys belong to a single class although they do not appear alike, and to regard this fact alone as putting the classification of toys beyond the reach of an imaginal code. But if an animal recognizes a toy as a toy, he must in some sense be going by how it appears: he would similarly recognize as a toy any object that was (relative to his quality space) sufficiently like this toy; and his recognition of it as a toy would not have survived its being made (from his viewpoint) sufficiently unlike the way it was when he saw it being played with. Thus, even the problem-solving that Premack assigns to the abstract code involves paying attention to the appearances of things. So why shouldn't we conjecture that in solving those problems the animal does after all use images?

Relations. Premack' s repeated stress on the importance of relations, as against properties, has impeded my attempts to grasp the supposed difference between the two codes. He says that although each instance of *opening* can be

represented in the imaginal code, 'the invariance common to the individual cases cannot be so represented'. If that is true, its source is not the special fact that opening is a relation, but only the more general fact that opening is a universal. Consider *openness*: this is monadic and not dyadic, a property and not a relation, but 'the invariance common to individual cases' of openness cannot be represented in the imaginal code either. Objection: it *can* be so represented if there is a suitable tagging system, for then the animal can form an image of an open lock and can tag its openness as the feature which is 'meant' by the image. But then why could he not put a suitable tag on an image of a key opening a lock, making this image 'mean' the relation of opening, abstracted from all other details?

The over-emphasis on relations also occurs in Premack's discussion of the class of toys. He plausibly predicts that most animals would have difficulty solving a problem that depends on co-classifying things as toys, and he explains this by saying that toys are essentially things that are played with and that *plays with* is a relation. I cannot see that the relationality of playing is of much importance here. There are, at any rate, two other reasons why an animal might find such a problem hard to solve. **(1)** A thing's being a toy *now* depends on what relations it enters into *customarily*—not necessarily right now. Whether that is a source of difficulty could be tested for in the absence of any distraction about relations, as follows. Let the animal have plenty of experience of a variety of things that are usually green, though on rare occasions they turn some other color; then give him problems that involve co-classifying things that are not green, although they are ordinarily green. If such problems were soluble by language-trained animals and not by others, that would suggest that Premack has mislocated what is special about the 'toy' example. I would add that the 'customarily green' problem seems soluble in the imaginal code: the animal has only to form an image of each thing in its customary (not its present) state, and then tag the color represented in that image. And that reminds us that the 'toy' problem could be solved similarly: the animal forms an image of the toy in its customary state, namely as being played with, and tags the playing relation. **(2)** There may be another difficulty in the 'toy' example. If the animal has only to recognize toys that he plays with himself, and is supposed to recognize his own playing as such without help from either the abstract or the imaginal code, then this further difficulty does not arise. But if his ability to recognize toys as such depends on his recognizing observed episodes as *play*, then he is confronted by the further difficulty that an activity's being play depends in part on the state of mind of the agent. One might test an animal for ability to recognize such things, in abstraction from any supposed difficulty about relations and also from difficulty **(1)** above, by investigating whether he can learn to classify behavioral episodes together on the grounds that they are all exhibitions of *boredom*.

With those two possible sources of difficulty in solving problems that involve co-classifying toys, it is implausible to put much weight on the relationality of playing as the source of difficulty. In any case, I am puzzled by the stress on relations and the repeated hints that only the abstract code can handle them, when Premack also says (rightly) that *order*—which is relational if anything is—'could be represented nicely in the powerful imaginal code'.

Same/different. Some of what Premack says about the difference between problems that can and ones that cannot be solved without help from the abstract code is tied to things he says about an animal's grasp of the same/different distinction; so the latter should be looked at first.

An animal may be given a problem that requires a judgment about whether **(1)** two synchronously presented items are similar in appearance, or a problem requiring it to judge whether **(4)** a presented item is one that it has encountered before—I use '4' to stay with Premack's own numbering. Of these, **(1)** involves synchronic similarity, while **(4)** involves diachronic identity. (I am not using 'identity' as Premack does; his usage is bad because it conflicts drastically with how 'identity' is used by the competent experts in this area, namely the philosophers.)

Now, there are higher-level problems that could be erected on the basis of **(1)** and **(4)**. A problem might require an animal to judge (1*) whether the similar/dissimilar relation between x and y is the same as or different from the similar/dissimilar relation between z and w, where x-y is one synchronously presented pair and z-w is another. The answer is yes if and only if: x is like y and z is like w, or x is unlike y and z is unlike w. And an animal might have to judge whether **(4*)** one pair of successive presentations was the same as or different from another pair, with respect to whether they were re-presentations of the very same object. The answer is yes if the first pair were presentations of a single thing and so were the second pair, or if the first pair involved two distinct things and so did the second pair.

In a very confusing passage, Premack writes as though judgments about **(1)** synchronic similarity were harder for animals to make than judgments about **(4)** diachronic identity, and he offers a conjecture to explain this. But the evidence he produces does not support that at all. As Premack himself virtually says, a problem of type **(1)** may be just a routine match-to-sample problem, which lies within the scope of many animals and certainly does not require special training such as Sarah received. What does prove to be difficult and to require special training is **(1*)** a higher-level problem requiring a judgment about sameness or difference of *sameness and difference relations*. But then the analogous problems **(4*)** about sameness and difference of diachronic identity relations are presumably difficult too. I'll bet they have never been inquired into by workers with chimpanzees.

The four questions. The indication of a systematic difference between **(1)** and **(4)**, which really holds only between **(1*)** and **(4)**, may not matter much, because a little later Premack seems to drop that idea. He puts questions that might be thought to involve same/different, in some sense, into four groups:

(1) Do x and y appear alike?
(2) Do x and y belong to the same class?
(3) Do x and y instantiate the same relation as z and w?
(4) Is x something you have encountered recently?

In saying that **(1)** and **(4)** can both be handled through the imaginal code, Premack is now separating **(1)** from **(1*)** and backing off from the suggestion that there is anything specially intractable about synchronic similarity.

Let us attend now to the important claim that **(2)** and **(3)** could not be handled purely through an imaginal code. If anything in Premack's paper will tell us what the difference between the codes is, it should be this. Unfortunately, I still don't know what he means by 'belong to the same class'; but I have nothing to add to what I have already said about this, giving my reasons for doubting that **(2)** does pick out a kind of question that cannot, in principle, be answered with help from images. All that remains is **(3)**, a kind of question that Premack expresses in the form: Do the items instantiate the same relation?, which I think means Do these two items instantiate the same relation as those two items? This is one of the places where relations are implied to be peculiarly in need of the abstract code; but Premack brings out clearly

that at issue here are not merely relation-involving judgments ('x is above y') but rather judgments *about relations* ('x is to y as z is to w'), and this prompts the question of whether there are equal difficulties in the solving of problems requiring judgments *about properties*. I have not been able to invent such problems in a form in which they could be put to chimpanzees; but until they are devised and put to the test, we cannot know whether the difficulty of judgments about relations is just one part of a larger difficulty over judgments about universals.

Differences of level. So far I have been conceding that there are special difficulties about problems requiring judgments about relations, such as that x relates to y as z does to w; my challenge has been only to the assumption that this is true for relations only and not for properties as well. I now question whether it is always true for relations.

Suppose an animal is given a routine match-to-sample test using the sample

(WR) is a white disc with red dots on it,

with the animal having to choose among

(B) a uniformly blue disc,

(G) a uniformly green one, and

(YP) a yellow one with purple dots.

I would love to know whether this could be solved, without much help, by chimpanzees who had not undergone language training. My guess is that it could; and I think that anyone who was content with the 'abstract'/'imaginal' contrast in Premack's form of it would guess that this problem could be solved without recourse to the abstract code; for all that is needed is images of spotted things, 'tagged' with respect to their feature of being spotted. But distinguishing spotted surfaces from uniform ones does involve making judgments about relations, which Premack says need the abstract code. In grouping the sample WR together with the disc YP, and not with either B or G, the animal is judging that **(1)** WR and YP are spotted whereas G and B are uniform, which is to judge that **(2)** in WR and YP there are dissimilarities between some parts of the surface and others whereas in G and B there is similarity between every part and every other. Thus, the animal is judging, 'In these two there is some dissimilarity; in each of these others there is only similarity.' According to Premack, this ought to require the abstract code.

Perhaps Premack would agree, and would judge that this sort of problem—classifying surfaces according to whether they are spotted or uniform—does require the abstract code; and perhaps it will further turn out that this is a kind of problem that can be solved by language-trained animals and not by others. If so, I'll bet I can devise other examples well within the reach of non-language-trained animals that can nevertheless be described as requiring judgments about relations.

This points to yet another need for a proper treatment of the given animal's quality space. We need to know about its quality space not only in order to make sound conjectures about what goes on in its imaginal code but also in order to decide what, if anything, cannot be handled in that code. For this particular animal, does that feature of that surface present itself as the low-level *spotted* or rather as the higher-level *having a surface some of which is unlike the rest*? This is presumably an empirical question. It and many others like it should be answered before we try to do much with any division between imaginal and abstract codes.

Final remarks. I wish this were not all so negative, but in the time available I am not able to offer any other sort of help. The general tenor of my remarks is that I am quite unpersuaded that there is any clear line between the imaginal and abstract codes, and that if Premack's data are to be satisfactorily explained in anything like this manner there will have to be a lot more foundational conceptual work. The entire problem is so beautifully philosophical that one cannot help wondering why Premack doesn't more freely turn to philosophers for collaborative help. Over the years I have found his writings well worth reading and thinking about. I wish he could be persuaded to reciprocate.

References

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