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Why is it difficult to put names to faces?

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Two experiments tested the hypothesis that recall of names would be more difficult than recall of other personal identity information because names are meaningless and lack semantic associations. In both experiments subjects were shown photographs of 12 unfamiliar faces and asked to learn information about each person. Three types of information were supplied: names, occupations and possessions. Experiment 1 manipulated the meaningfulness of possessions. Recall of names was no better than recall of meaningless non-word possessions and poorer than recall of meaningful possessions or meaningful occupations. Experiment 2 varied the meaningfulness of names and occupations, and showed that, when names were meaningless, name recall was inferior, but if names were meaningful and occupations were meaningless, the deficit in name recall disappeared. Conditional dependencies between recall of different types of information showed that occupations were normally accessed before either names or possessions, but when meaning was manipulated, meaningful items were accessed before meaningless ones.

In everyday life it is a fairly common experience to be confronted with someone you recognize as familiar but cannot name. In this situation you may often be able to remember many biographical details about the person, but still be unable to put a name to his or her face. The frequency of this kind of name retrieval failure was documented in a diary study by Young, Hay & Ellis (1985). The converse type of incident, in which the name is known but the biographical details cannot be recalled, appears to be extremely rare. This pattern of recall difficulty was experimentally confirmed by Cohen & Faulkner (1986), who compared recall of names, occupations and hobbies. Recall of names was poorer than that of either occupations or hobbies and the same cueing asymmetry was evident. It was easier to recall the biographical details when the name was supplied than vice versa. Naturally occurring retrieval blocks are also much more frequent for proper names than for other kinds of words (Reason & Lucas, 1984).

McWeeny, Young, Hay & Ellis (1987) attempted to discover what makes names so difficult to remember, and succeeded in eliminating several possible explanations for the relative difficulty in retrieving names, as opposed to other biographical information such as occupations. In their experiment subjects were asked to learn the names and occupations belonging to unfamiliar faces. They ensured that the words for occupations did not have any advantage in terms of frequency. They removed from the photographs any background details that might give clues to the person's

occupation; and the same word (e.g. *Baker* or *Potter*) was sometimes presented as a name and sometimes as an occupation, so that imageability and meaningfulness were equated for the name recall condition and for the occupation recall condition. In spite of these manipulations, name recall was still much poorer than recall of occupations. The most puzzling aspect of these results was the *Baker–baker* paradox – the finding that a word like *Baker* presented as a name was harder to recall than the same word (*baker*) presented as an occupation. Since explanations in terms of factors such as frequency, contextual clues and imageability were ruled out, McWeeny *et al.* concluded that the difficulty in retrieving names should be interpreted in terms of the model developed by Bruce & Young (1986).

According to this model, as shown in Fig. 1, person recognition is achieved by a set of functional components that are accessed in sequence. Perceptual information activates a face recognition unit which, in turn, activates a person identity node where biographical and contextual information is stored. Names are stored within a further, terminal, node and can only be accessed via the person identity node. There is no direct link from face to name. Thus biographical and contextual information in the person identity node is necessarily always accessed first and fastest, and the model predicts that it should be impossible to remember a name without also recalling person identity information. Consistent with this prediction, McWeeny *et al.* noted very few instances when subjects recalled a name, but were unable to recall the occupation.
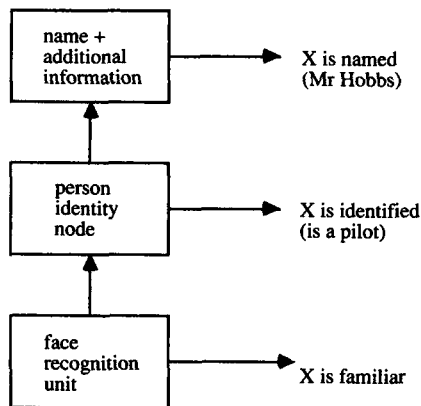
Figure 1. Successive stages of person recognition (as in Bruce & Young, 1986).

Both reaction-time studies (Young, Ellis & Flude, 1988; Young, McWeeny, Ellis & Hay, 1986) and cued recall paradigms (Hanley & Cowell, 1988) have produced results consistent with Bruce & Young's model of successive states of person recognition. Different kinds of person recognition errors in everyday life also reflect this sequence of stages. We fail to recognize a familiar person if the face recognition unit is not activated. We recognize someone as familiar, but cannot remember who it is, when the face recognition unit fires but the person identity node is not activated. We know who someone is, but cannot remember the name, when both face recognition and person identity stages have been activated but not the name node.

However, some aspects of name retrieval are not wholly explained by the model. Although there is good evidence that faces are only linked with names indirectly through an intermediate node containing biographical information, the model does not explain why this should be so. Why should names not be stored at the person identity node along with other biographical information?

McWeeny *et al.* recognized that the model does not supply a complete explanation, and noted that their findings were also consistent with 'the idea that names are learned in a quite different way to other semantic information' (1987, p. 148). The experiments described here take up their suggestion that further studies should be able to throw more light on this difference. The major difference between proper names and other kinds of person identity information is that names are relatively meaningless, arbitrary and difficult to image. These three characteristics are necessarily related because if something is meaningless it is also arbitrary and is also likely to be difficult to image. Although the analysis of proper names is philosophically controversial, Kripke (1980) has emphasized the weakness of the link between a name and its referent, and Katz (1972) argued that proper names have only token reference and not type reference. Other biographical information about a person, such as occupation, hobby, social background and so on, is rich in connotative meaning and is linked to an elaborate semantic network of interconnected items so that multiple routes to retrieval are available. But proper names like 'John', or 'Mr Jones', for example, having no semantic attributes other than 'male', and 'British', are relatively meaningless and detached from the semantic network. The present experiments explored the hypothesis that names would be difficult to remember because they have little, if any, meaning. The meaningfulness of names and of other kinds of person identity information was manipulated so that the effects on recall could be assessed.

Experiment 1

If the difficulty in retrieving proper names is due to the fact that they are not meaningful, it follows that name retrieval should resemble retrieval of other meaningless information about a person. If a name, an occupation and a meaningless non-word are associated with a person (e.g. 'This man is called Mr Collins; he is a teacher; he has a wesp'), the name and the non-word should be equally difficult to recall, and the occupation should be recalled more easily. The name and the non-word should both be represented in memory in outlying nodes separate from, and accessed via, the semantically associated network containing person identity information such as occupation. Thus, the name and the non-word should only be recalled if some other person identity information, such as occupation, is also recalled. When a meaningful real word denoting a possession is substituted for the non-word (e.g. 'This man is called Mr Collins; he is a teacher; he has a boat'), the pattern of recall should change. If semanticity is the key factor that determines the order and ease of access, memory for meaningful possessions should resemble memory for occupations and differ from memory for names. This experiment tested these predictions using a version of the paradigm developed by McWeeny *et al.*

(1987). Subjects viewed a series of faces and learned to associate a surname, an occupation and either a non-word or a real-word possession with each face. The aim was to examine the pattern of recall and the conditional dependencies between recall of different items.

Method

Subjects. Thirty subjects, aged between 28 and 42 years, participated in the experiment. They were graduate students, and secretarial or administrative staff. They were allocated to one of two groups in such a way that the groups were matched for forward digit span.

Materials and procedure. Twelve black and white photographs of unfamiliar men's faces were selected. The photographs were uniform in style: each showed the whole head in a full-face pose with no background. None of the men were very similar to each other in appearance. Subjects were tested individually. They were shown the 12 photographs one at a time for 30 seconds in a fixed order, and given three facts about each man as each photo was presented. The facts were printed on a card which accompanied the photo and were also read aloud by the experimenter. Group 1 received the non-word condition in which each set of facts consisted of a surname, an occupation and a possession which was a non-word as in the following example, 'This man is called Mr. Hobbs. He is a pilot. He has a blick'. Group 2 received the real-word condition in which each set of facts consisted of the surname and occupation as for Group 1 but, instead of the non-word, a real word denoting a possession (e.g. 'This man is called Mr. Hobbs. He is a pilot. He has a dog'). The order in which the three facts appeared was varied in a balanced fashion. Potentially meaningful surnames like *Baker* or *West* were avoided, but the names used were fairly familiar ones. Names, occupations, non-word and real-word possessions were matched for length and number of syllables.

The subjects were instructed to study and try to memorize each face and the accompanying facts as they were presented. They were told that all three facts were equally important. After the complete set of 12 faces had been shown and studied, the first set of recall trials was initiated. The same 12 faces were re-presented, again one at a time, but in a different order, and the subject was asked to try to recall the three facts about each man. Guessing was encouraged. Following each recall attempt, whether it was successful or not, the facts were re-presented. Three further sets of recall trials continued in the same way, so that, in all, there were four recall trials for each face.

Scoring. The number of names, occupations and either non-word or real-word possessions correctly recalled by each subject on each recall trial was recorded and summed across the four sets of recall trials.

Individual trials were classified according to the pattern of correct responses for each kind of fact: name (N); occupation (O); and either non-word or real-word possession (P). This classification resulted in eight response types:
(1) no correct responses, $N-O-P-$
(2) all correct responses, $N+O+P+$
(3) occupation and possession correct but not name, $N-O+P+$
(4) possession correct but not occupation or name, $N-O-P+$
(5) occupation correct but not name or possession, $N-O+P-$
(6) name and occupation correct but not possession, $N+O+P-$
(7) name correct but not occupation or possession, $N+O-P-$
(8) name and possession correct but not occupation, $N+O-P+$.

Results

The scores for the total number of names, occupations and possessions correctly recalled by each subject were summed across all the recall trials. Table 1 shows the means of these scores for the real-word and non-word conditions.

Table 1. Mean numbers of each type of information recalled in each condition (max. = 48)

		Type of information	
Conditions	Names	Occupations	Possessions
Non-word	18.6	37.1	16.5
Real-word	23.6	37.0	30.4

An analysis of variance was carried out with conditions (non-word or real-word) as a between-subjects factor and type of information (name, occupation or possession) as a within-subject factor. There were significant main effects of condition ($F(1, 28) = 4.01$, $p < .05$) and of type of information ($F(2, 56) = 108.27$, $p < .001$). The interaction of condition × type of information was also significant ($F(2, 56) = 16.81$, $p < .001$). *Post hoc* comparisons by the Newman–Keuls test showed that, in the non-word condition, names and possessions did not differ from each other, but they were both significantly poorer than occupations. In the real-word condition, occupations and possessions did not differ significantly but were both superior to names. The differences were significant at $p < .01$. A simple effects analysis revealed that the two conditions differed for possessions ($F(1, 56) = 17.10$, $p < .001$) but not for occupations or for names.

There were also differences between conditions and between types of information as regards the amount of forgetting that occurred. In the non-word condition, 14 per cent of the names and 15 per cent of the non-word possessions that were recalled successfully on one trial were forgotten on a later trial. Only 4 per cent of the occupations were forgotten. In the real-word condition, 10 per cent of the names were forgotten but only 3 per cent of occupations and 5 per cent of possessions, and this difference between the conditions was marginally significant ($\chi^2(2) = 4.7$, $p < .10 > .05$). There was also a clear and stable pattern in the order of recall. On trials when all three items of information were correctly recalled they were reported

Table 2. Percentage of trials with different patterns of recall in each condition

	Condition		
Type of trial	Non-word	Real-word	Difference
N−O−P−	20	20	0
N+P+O+	22	42	+20
N−O+P+	12	21	+9
N−O−P+	0.7	1.3	+0.6
N−O+P−	28	12	−16
N+O+P−	16	2	−14
N+O−P−	1.8	1.6	−0.2
N+O−P+	0.3	0.8	+0.5

in the order O N P on 87 per cent of those trials; N O P on 10 per cent of the trials; and P O N on the remaining 3 per cent. The data from both conditions were combined to produce these percentages because the two conditions showed no differences in order of recall.

Individual trials were classified according to the pattern of recall and Table 2 shows the percentage of each type of trial for each condition. As shown, the probability of recalling names without occupations (N + O − trials) or possessions without occupations (O − P + trials) is very small for both conditions. The difference between the conditions lies in the increased probability, for the real-word condition, of recalling the possession if the occupation is also recalled (i.e. an increase in O + P + trials and a decrease in O + P − trials).

Discussion

The results for the non-word condition show clearly that names and non-words are equivalent in terms of ease of recall and in terms of their relationship with the recall of occupation. For the non-word condition there was no significant difference in the numbers of names and non-words recalled. On the basis of the well-established effects of familiarity and frequency, superior recall of names would be expected since the names were all familiar words, whereas the non-words were completely unfamiliar. However, names failed to show any advantage over non-words. Occupation was remembered most easily, reported first, and forgotten less frequently. Remembering occupation is virtually a precondition of remembering either names or non-words.

When real-word possessions were substituted for non-words, the pattern of recall changed very markedly. Recall of real-word possessions was better than that of either names or non-words, and not significantly different from that of occupations. As shown in Table 2, the probability of recalling possession, if occupation was recalled, increased dramatically, but the probability of recalling possession without occupation, or of reporting possession before occupation, remained miniscule. Information about real-word possessions is rich in semantic associations and is recalled nearly as well as information about occupation. However, it cannot be accessed unless occupation is recalled first. Name recall is unchanged when real-word possessions are substituted for non-words. Access to the name is still conditional on occupation recall, and name information is harder to access than possession information.

The findings of this experiment are consistent with the view that names are treated like meaningless words. However, this view is difficult to reconcile with the results obtained by McWeeny *et al.* since they found that using names like *Baker* which do have meaning and could therefore be encoded semantically, produced no improvement in name recall. Experiment 2 explored a possible explanation for this anomaly and examined the effects of varying the meaningfulness of both names and occupations. If meaningfulness is the critical factor that determines memorability, it should be possible to change the relative difficulty of recall for the two kinds of information.

Experiment 2

Further consideration suggests possible reasons why the subjects in the McWeeny *et al.* experiment failed to take advantage of the potential meaning of names like *Baker*. The experiment compared performance on sentences like 'Mr Baker is a lawyer' with those like 'Mr Higgins is a lawyer'. They found that memory for the name *Baker* was poorer than memory for the occupation *lawyer*; memory for the name *Baker* was no better than for the name *Higgins*; and memory for the name *Baker* was poorer than for the occupation *baker* (the *Baker–baker* paradox). However, if the name in the first of these sentences is encoded meaningfully, this produces a conflicting representation of an individual who is both a baker and a lawyer. Subjects might be avoiding this conflict by not treating the name *Baker* as a meaningful word. Furthermore, in the McWeeny *et al.* experiment, meaningful names like *Baker* and meaningless ones like *Higgins* were mixed in the series of presented stimuli. This might have discouraged subjects from developing the strategy of encoding the meaning of the names on those occasions when it was possible to do so.

The second experiment varied the meaningfulness of both names and occupations and compared a condition in which the meaning of name and occupation conflicted with conditions in which there was no conflict of meaning.

Method

Subjects. Thirty-six subjects aged between 24 and 50 years were recruited from among Open University students. They were allocated to three groups so that the groups were matched for forward digit span.

Materials and procedure. The same 12 photographs of men's faces used in Expt 1 were also used in this experiment and the procedure was the same, except that only two facts were presented about each man, his name and his occupation. Each group was tested in a different condition. For Group 1 (condition MN – meaningful name) each pair of facts consisted of a meaningful name and a meaningless occupation, as in 'This is Mr Baker. He is a ryman'. For Group 2 (condition MO – meaningful occupation) this was reversed. The same words were reassigned to different slots so that each pair of facts consisted of a meaningless name and a meaningful occupation, as in 'This is Mr Ryman. He is a baker'. For Group 3 (condition MNMO) the facts presented were analogous to those in McWeeny *et al.*'s experiment. Both the name and the occupation were meaningful but the meanings were different and potentially conflicting, as in 'This is Mr Baker. He is a lawyer'. All subjects were again instructed that both facts were equally important to remember. A full list of names and occupations used is given in the Appendix.

Results

The mean numbers of names and occupations correctly recalled in each condition are shown in Table 3. An analysis of variance was carried out with conditions (MN, MO or MNMO) as a between-subjects factor and slot (name or occupation) as a within-subject factor. The difference between conditions was not significant ($F = 1.02$) and the difference between slots was also not significant ($F = 0.02$), but the interaction of slot × condition was significant ($F(2, 33) = 13.96$, $p < .001$). A series of planned comparisons was carried out on pairs of means by Newman–Keuls tests, with results as follows:

(1) In condition MN the meaningful name (e.g. *Baker*) was recalled better than the meaningless occupation (e.g. *ryman*) ($p < .01$).

(2) In condition MO this result was reversed. The meaningful occupation (e.g. *baker*) was recalled better than the meaningless name (*Ryman*) ($p < .01$).

(3) The name (e.g. *Baker*) in condition MN did not differ from the occupation (e.g. *baker*) in condition MO.

(4) The meaningful name (e.g. *Baker*) in condition MN was recalled better than the meaningless name (e.g. *Ryman*) in condition MO ($p < .05$).

(5) The meaningful name (e.g. *Baker*) in condition MNMO did not differ from the meaningless name (e.g. *Ryman*) in condition MO.

(6) In condition MNMO the occupation (e.g. *lawyer*) was recalled better than the name (e.g. *Baker*) ($p < .01$).

(7) The occupation (e.g. *baker*) in condition MO was recalled better than the name (*Baker*) in condition MNMO but this difference failed to reach significance.

(8) The meaningful name (e.g. *Baker*) in condition MN was recalled better than the meaningful name (e.g. *Baker*) in condition MNMO ($p < .05$).

(9) The meaningless name (e.g. *Ryman*) in condition MO did not differ from the meaningless occupation (e.g. *ryman*) in condition MN.

Table 3. Mean number of items recalled in each slot in each condition (max. $= 48$)

Condition	Name	Occupation
MN		
Example	This is Mr Baker	He is a ryman
Mean	29	17
MO		
Example	This is Mr Ryman	He is a baker
Mean	21	28
MNMO		
Example	This is Mr Baker	He is a lawyer
Mean	23	32

In each condition the percentage of trials on which name was recalled without occupation (N + O −) and occupation without name (O + N −) was calculated and is shown in Table 4. The frequency of these different patterns of recall differs significantly between the conditions ($\chi^2(2) = 115$, $p < .0001$).

Discussion

The results of Expt 2 show that it is the meaningfulness of an item, rather than the slot it occupies, that determines how easy it is to recall. Names can be remembered as well as occupations, if they are meaningful and if they do not conflict. In the comparison of conditions MN and MO the *Baker–baker* paradox disappeared. The name was remembered as well as the occupation and the meaningful name was remembered better than the meaningless name. But in the comparison of conditions MO and MNMO, when the meanings of name and occupation conflicted, memory

Table 4. Percentage of trials with different patterns of recall in each condition

	Type of trial	
Condition	N+O−	O+N−
MN	26	2.4
MO	2.4	19.4
MNMO	5.5	18

for the name *Baker* was poorer than for the occupation *baker*, although this difference was not quite significant. Memory for the name *Baker* was poorer than memory for the occupation *lawyer*, and no better than memory for a meaningless name.

In everyday life it is clear that names are almost always treated as meaningless. People habitually ignore whatever meanings names may have (e.g. *Baker*, *Green*, *Swift*) because these meanings are irrelevant, nonsensical or conflict with actual person identity information. The real-life situation is represented by conditions MO or MNMO, where people remember occupations better than names. However, the results in condition MN showed that, when people have the opportunity to encode names meaningfully, the relative difficulty of name recall is removed.

Previous experiments and reports of retrieval failures in everyday life have shown that occupations are frequently recalled without names, but names are hardly ever recalled without occupations. However, comparison of conditions MN and MO in Table 4 shows that, when meaningfulness is manipulated, this result can be reversed. Recall of the meaningless item, whether it is a name or an occupation, is relatively more dependent on recall of the meaningful item. These findings suggest that, in terms of the Bruce & Young model, meaningful information is stored at the person identity node and is accessed first; meaningless information is stored at outlying nodes and can only be accessed from the person identity node. The reason why names are hard to recall is that they are normally meaningless or treated as meaningless.

General discussion

Taken together, the results of Expts 1 and 2 show that names, occupations and possessions are all difficult to recall if people do not, or cannot, encode them meaningfully. In normal circumstances, occupations and possessions are both meaningful and easily imaged, but Expt 1 showed that recall of possession was dependent on recall of occupation. Occupation is clearly the key feature in person recognition, defining the person's identity and providing the access point for further information. Subjects' comments underlined the importance of the fact that occupations and possessions have pre-existing semantic associations with other personal characteristics. They frequently mentioned the compatibility of face and occupation (e.g. 'He looks just like a postman'; 'He's not my idea of a banker') and also, though less often, the compatibility of face and real-word possession ('He looks like someone who'd have a dog'). These remarks reveal the existence of mental stereotypes and pre-existing semantic associations between character traits, as

revealed by facial features, and occupations or possessions. This kind of stereotyping was noted by Baddeley (1982) and underlies the concept of a visually derived semantic code (Bruce & Young, 1986).

Subjects also reported constructing images incorporating face, occupation and possession (e.g. the pilot with a dog in the cockpit of a plane). These strategies confirm that person identity information is richly elaborated and linked to previously acquired semantic information, and that imagery is used to form compound representations. There was no evidence of any such links between names and faces, names and occupations, or names and possessions. People can be trained to use image-based mnemonics for names effectively (Morris, Jones & Hampson, 1978) but this usually involves converting a name to a similar-sounding word that is meaningful and imageable, for example, converting *Gordon* to *Garden*. In the present experiment no subjects reported making use of this strategy.

The results reported here provide further confirmation of the broad outlines of the Bruce & Young model, and indicate that memory for information in the person identity node is superior because it is integrated with general knowledge stored in semantic memory. The relative inaccessibility of the name node is because names are not linked to the semantic network. It is difficult to put names to faces for the same reason that it is difficult to put non-words to faces. Both are lacking in the semantic associations that allow other kinds of person identity information to be related to stored knowledge.

Acknowledgements

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Appendix

List of stimulus material in Expt 2

	Name	Occupation
Condition MN	Mr Baker	ryman
	Mr Farmer	dabner
	Mr Driver	brockman
	Mr Cook	rimmer
	Mr Porter	walden
	Mr Carpenter	harman
	Mr Brewer	zalman
	Mr Sergeant	talmer
	Mr Gardener	bateman
	Mr Priest	setter
	Mr Barber	sloman
	Mr Butler	saunder

	As above with names and	
Condition MO	occupations reversed	
Condition MNMO	Mr Baker	lawyer
	Mr Farmer	banker
	Mr Driver	policeman
	Mr Cook	soldier
	Mr Porter	doctor
	Mr Carpenter	actor
	Mr Brewer	farmer
	Mr Sergeant	miner
	Mr Gardener	vet
	Mr Priest	painter
	Mr Barber	postman
	Mr Butler	pilot