Designing a government form: a case study

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This paper describes a case history of the design of a government form. In particular, three kinds of problem are identified and discussed: contextual problems of relevance and interpretation; problems of reading sequence and conditional branching instructions; and a range of typographic problems. Typography is seen as a particularly important way of signalling the information structure of forms, and typographic techniques are discussed in some detail.

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Introduction

Administrative forms are an unfortunate side effect of the state's involvement in the lives of its citizens and businesses. To the civil servant they are an essential part of the administrative process. Among the general public they are caricatured as an obstacle course of gobbledygook, small print and impenetrable procedures.

From time to time efforts are made to reconcile the two views. The most recent resulted in the publication in February 1982 of Sir Derek Rayner's report on government forms (Rayner, 1982), and a related White Paper (United Kingdom, 1982) which declared the Government's intention to reduce the burden which forms impose on citizens and businesses (reviewed by Waller, 1982). As a result, special forms units have been established in a number of departments, and it is hoped that forms of all kinds will receive more careful attention from those responsible for their drafting. However, there are clear problems in implementing this aim. Forms have to administer extremely complex legislation and regulations in a way which even the least able citizen can cope with. Although there have been some substantial advances in research on forms and related issues, experience shows that good form design does not just result from the correct application of guidelines about individual problems. The context and purpose of each form is so distinct that even those guidelines that are valid can be swamped by problems which are not predictable by guideline writers and researchers.

This paper presents a case study of one particular form, in order to highlight general aspects of the design process and provide insights into the sort of factors that contribute to the success or failure of forms—both general factors concerning the management of the process, and also those detailed aspects of presentation which are often left to technical staff but which can, if mishandled, result in the breakdown of communication between the civil servant and the citizen.

The background to the project

During 1982 the Department of Health and Social Security (DHSS) developed a form to be used by unemployed persons claiming Supplementary Benefit (SB). By any standards this is an important form—it has already been used to distribute many millions of pounds to millions of people. More crucially, though, they are people in need, to whom the payment of a correct and full entitlement is vital.

The introduction of the form in December 1982 was preceded by a lengthy development process, starting with a pilot scheme in several areas of the country. This threw up a range of problems which were addressed by a second phase of development and testing undertaken by a team from the Institute of Educational Technology at the Open University (OU)*. More detailed outcomes of the pilot scheme and of the testing carried out by the OU team are available elsewhere (Lefrere, Macdonald-Ross and Waller, in preparation). Briefly summarised, an OU test form increased the percentage of returned forms that could be used without further enquiry from around 25% to around 75%. In actual use this result has held up quite well—on average just over 60%—although there is considerable variation between local DHSS offices—perhaps reflecting differences in attitude to the new administrative procedure whose introduction was resisted by the civil service trade union. More importantly, those filling in the form a second time (many claimants come in and out of the system as their circumstances alter) have very few problems. The project can therefore fairly be regarded as successful in most respects.

The unemployed form the largest category of claimants of SB. It is a means-tested benefit—the amount you get depends on a complex assessment of your income, capital and expenditure—which was previously claimed at an interview (and this will continue to be the case for many categories of claimant). The interview was expensive for both the DHSS and the claimant (many of whom had to travel, often far, to the Social Security Office and queue for quite a while), and our research indicates that a majority of those who have previously experienced the interview much prefer claiming by post. Informal feedback from claimants was that many of them found the interview somewhat traumatic. It is obviously essential, of course, that the form is in no respect worse than the interview, that it gives every opportunity for claimants to describe their circumstances fully. Over the years the legislation relating to SB has grown into a substantial and complex body of regulations and conditions, and it is fair to say that few people can claim to understand it thoroughly. One of the problems encountered during the project reported here was that even the experts disagreed about the rules governing the payment of SB.

The complexity of the SB regulations results in a large number of extremely detailed questions about claimants' personal circumstances. While the interview system hides the amount of the information required from public view, the form displays its full extent for all to see. Of course, because circumstances vary so much, no claimant actually has to answer every question—for example there is a section for home-owners and another for tenants. Even so, the scale and the detail of the questioning surprised many observers when the form was announced in late 1982. Estimates of the number of questions ranged from 60 to 120. It is important to emphasise, though, that the length of a form is no indicator of its difficulty: a long form is certainly offputting and tiresome, but there were many occasions when it was necessary to lengthen the document to remove ambiguity and give extra opportunity for people to claim special entitlements.

The prototype form

The prototype form used in the pilot scheme was small in format (165 x 204mm), with eight pages organised as a three fold concertina (See Figure 1). On the first encounter most people like it. The green tinted background with brown and green overprinting is cheerful and unintimidating, and the decorative border enclosing the title is also appreciated by some. To many claimants, the initial impression is better than that of the plainer and larger form eventually produced by our OU team.

Unfortunately this first impression does not last, and considerable problems were experienced with the form in practice. When it was used in the pilot scheme at several local DHSS offices, an unacceptably high proportion of returned forms had to be returned or followed up in some way before an assessment of benefit could be made. The results of the pilot scheme were confirmed by our own testing of the prototype, and by a separate evaluation carried out by the Research Institute for Consumer Affairs. A detailed breakdown of the results was not ready until a later stage of our work, but it was clear early on that the errors fell into three categories:

• *Problems of relevance and contextual interpretation:* the form did not elicit enough information for an assessment to be made, and appeared to be irrelevant to a large number of claimants. In particular, young people living at home with their families could find very few questions to answer and were frustrated that they could not properly describe their situation. A number of questions, while simply worded, were understandably misinterpreted: for example, 'Do you have any savings?' was taken by most people to exclude the cash in their pockets and money in current bank accounts. Again, the question 'Do you have any other income?' is clear enough linguistically, but few people considered social security benefits or retirement pensions to be 'income'—after all, they are what you get if you have no income!

• *Problems of reading sequence:* any individual claimant will find that many sections or questions on the form do not apply to him or her. However, the prototype form gives inadequate directions around the irrelevant parts. For example, the question is asked 'Have you worked in the last six weeks?' The next question is prefixed 'if yes', and there is nothing to tell you what to do if you answered 'no'—some people skip the next question and others skip the whole section. A more careful examination shows that the first question of each section is an implicit branching direction (that is, you should skip the rest of the section if you answer 'no'), but that if you answer 'no' to subsequent questions you simply ignore the supplementary question and move to the next one. The problem is caused by, first, inadequate and cryptic verbal instructions and, second, poor typographic signalling. Even with clearer typography the OU team encountered a similar problem on their first draft, and it is discussed in more detail below.

• *Other graphic design issues:* forms, like other documents, are constrained by the practicalities of production and the ergonomics of use. Decisions must be made about the format, typefaces, the design of response formats, and the use of typography to display the information structure. Good design can contribute to the solution of the contextual and sequencing problems described above; poor design can aggravate such problems and introduce new ones besides.

We will return to each of these broad categories later. The individual problems range in significance from the fairly obvious to the subtle and debatable. As with so many problems of document design, it would not be easy to isolate each of them in an experimental study to conclusively prove the point one way or another. Indeed, even if it were possible, the argument would not be settled. Very few typographic experiments result in large differences between conditions, but although a particular factor cannot be shown to have much effect upon readers, the combination of several slightly substandard features can be serious. The presence of the more serious errors, and the consequent loss of confidence in the document by the reader, may also exaggerate the effect of the smaller problems. And problems which appear to be rather inconsequential may be signs of a systematically poor approach to form design which on another occasion could be serious.

It should also be remembered, of course, that committees are responsible for most government forms, and this one was no exception. Many of the problems we found were compounded by an ill-conceived design procedure in addition to the simple lack of skill or knowledge. Design advice about forms is typically sought too late to influence key decisions, and designers are often excluded from discussions of the verbal and logical content of forms (although many seem content with this arrangement). It is sometimes easier for external consultants whose position in the organisational hierarchy is traditionally ambiguous.

Testing

The testing of all aspects of the form was part of the design philosophy from the start of the project (and was part of our brief). In addition to the initial pilot scheme organised by the DHSS, the OU team subjected the form to four cycles of testing. The first test was of the prototype green-and-brown form (Figure 1), in order to gain our own insights into the problems encountered in the large-scale pilot scheme and to collect data against which our redesigned form could later be directly compared. In the next two tests we used black-and-white versions of our redrafted form, and in the final test we used a fully typeset two-colour form similar to that now in use.

Earlier tests were with small groups of unemployed people; they were asked to fill out the form without assistance from the interviewer; their comments were noted, and their forms assessed as for a real SB claim. To ensure that all optional paths were tested, a number of subjects were given fictitious case study information and each was asked to make an application on behalf of the person described in their particular case study. The final test was a more realistic simulation of the actual conditions of use. Subjects (SB claimants already registered with the DHSS) were given the form and a reply-paid envelope and were asked to mail the form back to us when completed. A small financial incentive (£2) was offered if the form reached us by a specified date

Our working method was to leave detailed decisions about typography and format until the logical and linguistic issues had been ironed out. In this way we could test preliminary drafts of our form without the extreme constraints of space and typography that the prototype laboured under. We therefore 'idealised' the typography temporarily in order to concentrate on logical and verbal issues. This was not to discount its importance—rather the opposite, in the sense that we were able to use as much space and typographic signalling as we needed (see Figures 3 and 4). This is in contrast to the clumsy and unergonomic typescripts which are so often used for test drafts and which quite probably introduce new uncertainties into the data.

It should be emphasised that this postponement of layout decisions was only possible because we had made a decision to treat the form as a strictly sequential document—users must systematically work through from beginning to end, only skipping sections when directed to. The role of typographic layout was therefore to display this relatively simple linear structure. We would not recommend the practice in cases where the layout is expressive of more complex structures or where selective reading strategies are anticipated.

Not unexpectedly, we eventually had to make some changes to the language and order of the form when we reached the typographic design stage. By that time, however, we had developed a good feeling for the likely effects of such minor changes without feeling the need to retest every alteration. This last point is important. Our experience shows that testing is a vital part of the design process, not only to alert the designer to specific problems but also to develop an objective and user-oriented approach to the task in hand—to develop a good feel for the job. It is tempting for designers and editors to imagine an ideal world in which the content and purpose of every document is finalised in advance and remains stable. In such a world, changes would only be made when testing revealed a problem; thus the form would smoothly evolve into one fully validated on every point. Many behave as if this is actually the norm, and profess surprise when copy is changed or new ideas suggested. In practice, this is almost never the case in the design of significant or complex information. Indeed, if it were, the designer's job would be a functionally trivial one.

Forms typically have to satisfy the needs of a number of different divisions of an organisation and so the politics of decision-making are as complex as the information itself. New issues come to light, policy is changed, and new people become involved with projects. In addition, the involvement of designers itself generates new ideas—not just from the designers but through the distancing and objectifying effect that typesetting can have on familiar scripts.

Because the materials used for development and testing are constantly shifting in this way, it is impossible to be dogmatic about the use of test results. Over the four months of the SB form's development the OU team was dealing with a moving target: items were introduced at quite late stages and it is not possible to claim that the form which worked in our tests is exactly the same form that went into use. However, the tests did give those involved an objectivity that they would not otherwise have had.

Problems of relevance and contextual interpretation

Because problems of relevance are by definition context-dependent and so not generalisable to other design tasks, there is little point in relating specific instances here beyond the two described earlier (relating to the interpretation of the terms 'savings' and 'income'). Indeed, such context-related problems can never be the subject of general guidelines—except those about design methods and management. Instead, the problems we found in our first cycle of testing (with the green-and-brown prototype) can mostly be traced to poor communication links between the designers responsible for a form's production, its potential users (whose views can become more accessible through testing) and the officials responsible for the procedures administered by the form (who should be accessible through consultation and full design team membership). Poor forms thus often reflect conflicts of purpose and a confused division of responsibility among their originators.

Conflicts of purpose: A form-generating organisation usually has a number of different purposes for any individual form. These may include the following:

1 encouraging respondents to use the form and guiding them in doing so;

2 establishing the identity of the respondent;

3 eliciting detailed information relevant to the transaction in hand;

4 cross-checking the accuracy of responses;

5 transcribing responses into another format (eg, a computer database);

6 making an administrative decision on the basis of the responses (eg, determining the amount of benefit to be paid);

7 the detection of fraudulent responses and the incorporation of legal safeguards;

8 the collection of social statistics for other administrative or policy-making purposes.

Each of these purposes makes its own demands on the form designer, and each is typically identified with different departments of the organisation. As a result the design process is complicated by the usual dynamics (or politics) of committees and other institutional structures. One example is the conflict that can arise between purposes 1 and 7—between those who wish to see the form widely used (in this case, SB distributed to all those eligible) and those whose job it is to prevent fraud. While the former are unwilling to include anything that may frighten off potential claimants, the latter need them to sign a water-tight declaration and to be warned about the consequences of giving inaccurate information. In the case of the SB claim form, this led to considerable discussion of the wording of the declaration, and the inclusion of a warning of spot checks at the beginning of the form. (In the final version this warning simply says 'We may visit you later'. It was hoped that ordinary claimants would hardly notice or be worried by this, but that fraudulent claimants, if any, would be immediately alerted to its significance and deterred.)

Another common conflict is that between purposes 3 and 5. Many forms are designed more for the computer operators who have to process them than for the users. In the case of the SB form, the DHSS accepted from the start that the users were to come first, and this policy was adhered to in an exemplary way. For instance, questions had previously been coded with letters which were confusing to users but which helped the DHSS staff; these now appear discreetly in white in the coloured border. And certain debates about the sequence of questions were resolved in the users' favour.

Purpose 8 can be particularly intrusive but often hard to spot. Most form designers take it for granted that the information elicited by a proposed form is actually needed to make an administrative decision (for purpose 6). On closer examination, though, it can emerge that someone would simply like to know the information, that it is there for the compilation of statistics (an unofficial census, in a way) or that it is there for a reason no-one currently in the organisation can explain. In the case of the SB form, the DHSS were properly restrained in this respect, but the application forms of my own institution, the Open University, are a good example: courses are available to anyone, regardless of education or personal circumstances, and so in theory very little information is needed other than name, address, choice of course and one or two other simple questions. In practice, however, the application form is several pages in length and contains numerous questions which are there solely to collect statistics on our students for policy-making purposes.

Division of responsibility: Because purposes can clash in these ways, it is important that responsibility for relatively detailed matters is taken at a reasonably senior level. This has not always been the case in many organisations where the need for a form may be determined by a senior manager or committee but its production is delegated to others. But unless those who write and design forms have free access to someone in a position to make decisions (or unless they have the required level of authority themselves) they cannot react to the contingencies of production or to unforeseen problems. Forms, then, must be recognised as the public face of an organisation, and a major influence on its effectiveness (and, indeed, this is a central theme of the Rayner report).

Coordination is important, too, within the production process. The interaction of verbal, graphic and logical factors is such that methods may have to be devised to overcome the traditional divisions between editors and designers. In an ideal world, forms would be an appropriate subject for that ideal person, the transformer, whose qualifications were outlined by Macdonald-Ross and Waller (1976). In the real world, though, there may be other ways of ensuring that management structures, staff development and training, conditions of employment, and even the layout of office space contribute to effective cooperation and teamwork.

Problems of reading sequence

Problems of reading sequence are both linguistic (instructions must be clearly understood) and logical (branching questions must be ordered to achieve the most economical flow), as well as graphic (the designer must display the pathway through the form clearly so that irrelevant questions are skipped and all relevant questions answered).

Figure 2 shows a section from the prototype form. The key question, clearly signalled in bold ('Do you rent your home?') requires the user to tick a box marked 'yes' or 'no'. The section continues with the line 'if yes' and further subsidiary questions (differentiated from the first by a lighter, smaller type) follow. Those who have answered 'no' to the first question are thus left up in the air. They are supposed to leave section G altogether and move on to the next one, but could easily be distracted by the 'if no' which appears in the right-hand column almost parallel to the 'if yes'. The problem is threefold:

- the directions are cryptic—inadequately spelled out;
- the directions are inconsistent—in most questions the correct strategy if the 'if...' does not apply is to leave the question, but questions *f* and *g* contain both an 'if yes' and an 'if no';
- the subsections (lettered *a* to *j*) are inadequately signalled—no extra space is provided between them, and the 'if...' directions which appear in bold type in the middle of subsections become the apparent dividers.

The first OU preliminary draft (Figure 3) was typeset on an IBM composer using a single column of Univers type on an A4 format. Questions were clearly differentiated with horizontal rules and bullets (but no numbers or letters), and sections were signalled by bold rules and large bold numbers in the margin.

In this draft (and in all subsequent OU designs) the 'if...' directions were reversed. That is, respondents who were not to attempt further questions in a section were explicitly directed to the next one, and it was assumed that everyone else would carry on with the section without needing a special instruction. This released us from the need to place a key qualifying question at the beginning of each section—it was less restrictive to be able to filter respondents off at various points in a section.

As Figure 3 shows, our 'if...' instruction simply said 'go to 3' (or whichever section number was appropriate) next to the relevant tick box. However the results of our first tests showed this to be totally inadequate. Almost every subject (members of the Milton Keynes Unemployed Workers' Centre) failed to leave the second section when directed and attempted to answer inappropriate questions. A number of detailed points also arose at this testing stage (and others), but since they mainly concern context-specific matters they are not reported here; they explain certain other differences between drafts illustrated in this paper. The problem of branching instructions and reading sequence, though, is likely to be a general one.

The dilemma we faced at this point is also a general one faced by all evaluators. Our test had clearly identified a problem, but had not diagnosed it or suggested a solution. If time had not been limited it would have been possible to devise a controlled experiment to compare a range of alternative solutions and produce a result which could be generalised across a range of similar design tasks. In practice, it is impossible to fit a properly organis-

Claim for Supplementary Benefit

Please complete this form and send it to your local social security office without delay.
Use the addressed envelope you have been given. It does not need a stamp.

Make sure you sign the declaration at the end.

You can get help at your social security office to complete this form but please do your best to complete it before you ask for help.

The information you give on this form will be kept private.

A About yourself

Fill-in in BLOCK LETTERS
Tick boxes which apply

Surname Mr/Mrs/Miss/Ms

Other names HELEN RUTH

Address Moorfield
Harlow
Essex

Telephone number 0279 36283

Date of birth 28/3/57

Are you?

single ☐ married ☐ widowed ☐
married but living apart ☑ divorced ☐

Form B1(PC)

B Other claims

Have you claimed Supplementary Benefit before?

yes ☐ no ☑

if yes

a When did you last claim?

b Where did you claim? (Give address if you can)

c What was your address then? (if different from now)

Figure 1

F Board and lodgings

Do you live as a paying boarder?

yes ☐ no ☑

if yes

a How much do you pay a week? £

b What meals do you get for this money? (for example 7 breakfasts, 2 mid-day and 7 evening meals)

c Is your landlord or his wife related to you? yes ☐ no ☐

if yes

What is the relationship?

Now go on to box K

G Rent

Do you rent your home?

yes ☑ no ☐

if yes

a How much do you pay (before rebate/allowance)? £ 80-00

b How often is it due to be paid?

weekly ☐ monthly ☑ quarterly ☐ other ☐

If other, how often?

c How many rent free weeks do you have each year? None

d Does the amount you pay include general rates? yes ☑ no ☐

if no How much general rates do you pay in a year? £

e Does the amount you pay include water charges? yes ☑ no ☐

if no How much water charges do you pay a year? £

f Do you get a rent rebate/allowance? yes ☐ no ☑

if yes How much do you get a week? £

if no Have you applied for one? yes ☐ no ☑

g Do you get a rates rebate? yes ☐ no ☑

if yes
How much and for what period? £ from to

if no
Have you applied for one? yes ☐ no ☑

h Does the amount you pay for rent include any of these items?

			Amount	Tick if amount not known
Heating	yes ☐	no ☑	£	☐
Light	yes ☐	no ☑	£	☐
Cooking	yes ☐	no ☑	£	☐
Hot water	yes ☐	no ☑	£	☐

i Does the amount you pay in rent include charges for anything else? yes ☑ no ☐

if yes for what? Garage Amount £ ?

j Are you the only tenant of your home? yes ☑ no ☐

if no Give the names of the people who share the tenancy

Figure 2

ed experiment into a production schedule; one can simply note the problem for later investigation, back a hunch and retest new versions until the problem disappears.

In this case several diagnoses and solutions were suggested, and we decided to combine them in a single design. The possibilities were that:

- The wording might still be too cryptic—reminiscent of a line of a BASIC computer program—and should be rewritten into more conversational English.

- It may not be clear that the user should go straight to the new section, and miss out the rest of the section. This could be made explicit in the direction.

- The identity of the destination might be unclear. The section headings used in the prototype form should therefore be revived, and the word 'section' included in the direction (as distinct from the number or heading alone).

- The branching structure of the form might be unfamiliar. Attention could be drawn to it in a special note.

Figure 4 shows the next version that was successfully tested (in this respect, at least), combining these suggestions. The 'if...' direction now reads 'If you ticked "no", go straight to section 2 "Your job".' The new section is more clearly signalled, and a special instruction appears on the first occasion when such a direction is encountered.

As a result of this test, we resolved the issue, but cannot be sure exactly how. It may have been that some of the altered factors had no effect at all, that it was the combination which was important, or that each factor independently helped a certain percentage of users. It would, of course, be wrong to recommend that combining possible solutions is the only approach to this type of problem. In other cases it may be better to back one particular hunch. However, the complex interaction of variables in form design means that it is rarely possible to change only one variable and leave others untouched: one is almost always comparing coherent *whole* solutions to multiple problems.

Other graphic design problems

Format: The small format chosen for the prototype green form (see Figure 5) led to a number of problems.

First, for economy of space it seems not to have been possible to maintain a consistent column width. Each section of the form is displayed across the full width of the page, often divided into two narrow columns. However, the multi-column structure of many of the response spaces prevents any clear overall grid or structure from emerging—there is often more horizontal space within a column than between columns. There is consequently no clear path for users to follow.

Second, the use of a small format to display a considerable number of questions results in an eight page concertina which is hard to refold. The complex folding may also make it hard to establish a visual memory of the whereabouts of particular sections.

Third, there is an excessively uneven use of space caused by large unsplittable units (sections D and E). Thus Section C on the preceding page is consequently followed by over three column inches of wasted space, while section G on the following page is crammed into much too small an area. This type of problem is inevitable in all forms, but is less disruptive in a larger page size.

The main constraint on the format was the size of the standard document wallets used in local offices. These are unusually small, and their proportions ruled out the use of the international standard sizes (A4 or A5) which have become something of an automatic choice for information designers and for which there are good arguments (eg Hartley,

1

- **Have you claimed Supplementary Benefit before?**
  - ☐ no (go to section 2)
  - ☐ yes
- **When did you last claim?**
  - ☐ over two years ago
  - ☐ less than two years ago

  Give date if you can
  day month year
- **Which social security office did you claim at?**
  Give address if you can
- **What was your address then?**
  (if different from now)

2

- **Do you have any job now?**
  - ☐ no (go to section 3)
  - ☐ yes
- **weekly take-home pay and number of hours worked**

  £ p hours
- **weekly work expenses**

fares to work	£	p
union dues	£	p
child minding	£	p
cleaning of overalls	£	p
meals at work (if no Luncheon Vouchers)	£	p
other (give details)	£	p

- **Are you self-employed?**
  - ☐ yes (go to section 3)
  - ☐ no
- **Name and address of employer**

Figure 3

1 Other Social Security Claims

- **Have you been paid Supplementary Benefit before?**

  no ☐
  yes ☐

  If you ticked 'no', go straight to section 2 'Your job'

You will find lots of instructions like this one in this form.

If it applies to you, go straight to the new section. You can skip all the questions between.

If it doesn't apply to you, just carry on and answer the other questions.

A new section is shown by a large number and a heading.

- **When did you get your last benefit payment?**

  over two years ago ☐
  less than two years ago ☐

  Give date if you can
  day ☐ month ☐ year ☐
- **Which social security office paid you it?**
  Give address if you can
- **What was your address then?**
  (if different from now)

2 Your Job

- **Do you have any full-time or part-time job now?**

  no ☐
  yes ☐

  If you ticked 'no' go straight to section 3 'Your partner's job'
- **How often are you paid?**

  weekly ☐
  every four weeks ☐
  every calendar month ☐
  other ☐
  If 'other', how often?
- **Your take-home pay**

  £ p

Figure 4

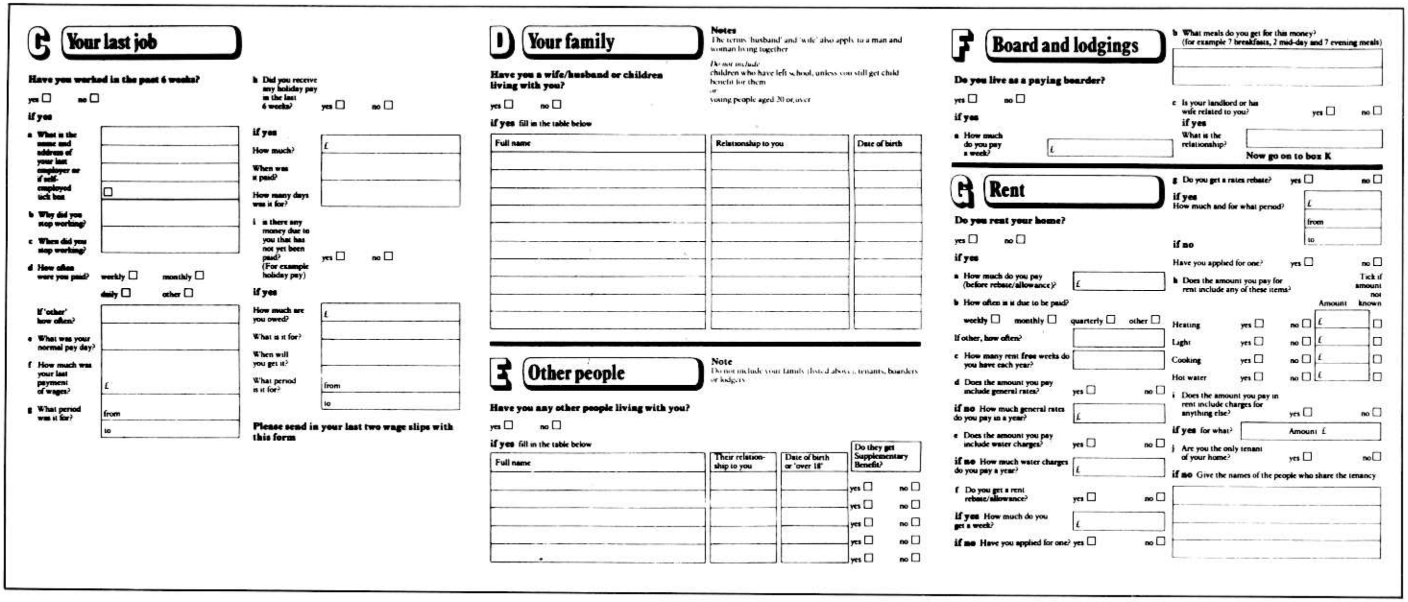


Figure 5

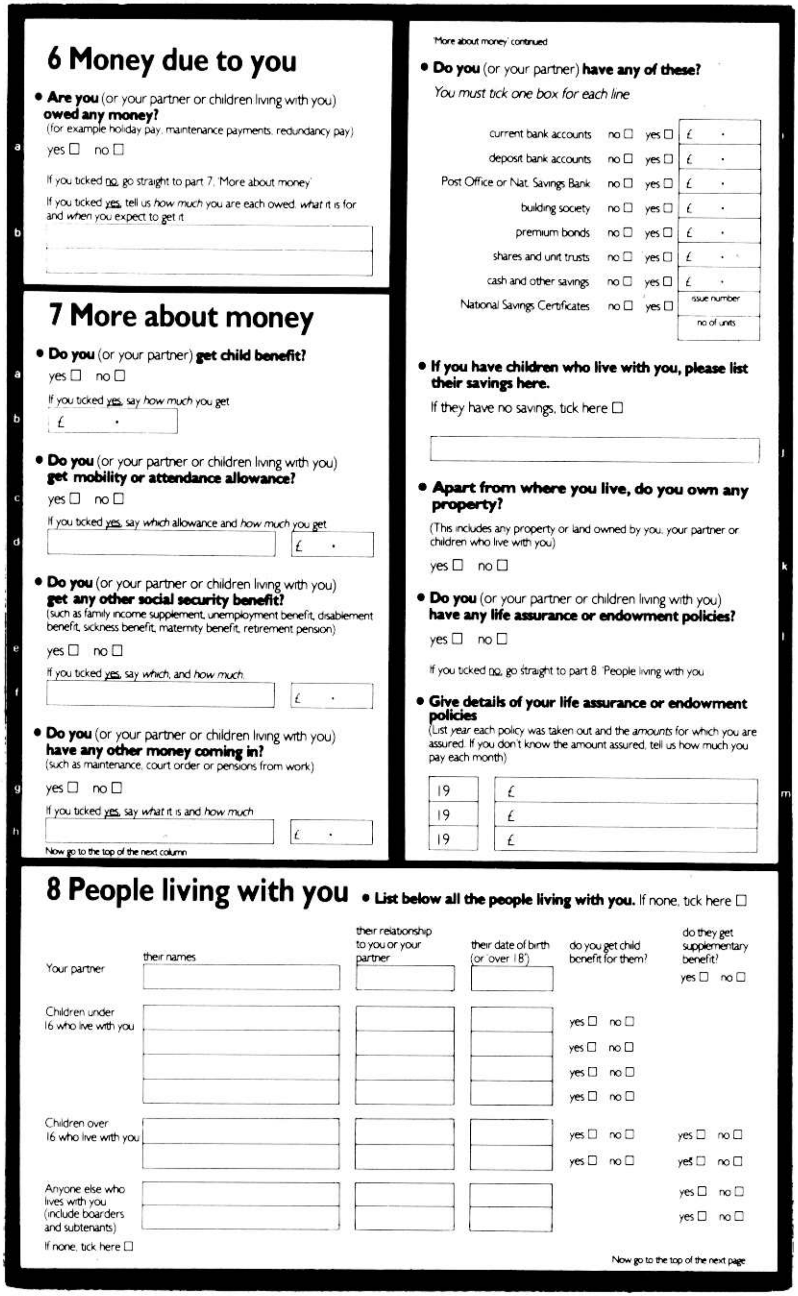
1978). To avoid the problems detailed above we chose to double the size of the prototype form, requiring officials to fold it before filing it. The new form measures just under 13 x 8 inches (see Figure 6).

The larger format allowed us to use a two column arrangement more coherently. Where the prototype form uses two 17.5 pica columns with less than a pica between, the new form uses two 20 pica columns with generous intercolumn spacing (over three picas). (A 'pica', containing 12 'points', measures 4.216mm.)

As we have seen, the prototype form displays each section in a horizontal block structure taking the full width of the page, within which questions are arranged in two columns. (Several two-column sections are thus stacked on the page). However, observations of readers of two column pages (Waller and Schumacher, in preparation) have shown that a proportion will always read straight down the page, often missing whole chunks of text altogether—for example, a reader might move from the left-hand column of one section straight into the left-hand column of the second, ignoring the right-hand column of the first altogether. These observations are consistent with the findings of Hartley (1978) who reported that tables or other full-page-width interruptions of two-column grids led to errors in comprehension.

In contrast, with the exception of part 8 (D in the prototype form) we were able to stay within a single column at all times. Our aim with the typography, as with the wording of the form, was to provide an unambiguous and systematic path for the user to follow. We used coloured rules and the tinted background to reinforce this vertical path for the user. Thick (one pica) rules were used as a border around the whole page and between the two

Figure 6



6 Money due to you

a
- **Are you** (or your partner or children living with you) **owed any money?**
(for example holiday pay, maintenance payments, redundancy pay)
yes ☐ no ☐

If you ticked no, go straight to part 7 'More about money'

b
If you ticked yes, tell us *how much* you are each owed, *what* it is for and *when* you expect to get it

7 More about money

a
- **Do you** (or your partner) **get child benefit?**
yes ☐ no ☐

b
If you ticked yes, say *how much* you get
£ .

c
- **Do you** (or your partner or children living with you) **get mobility or attendance allowance?**
yes ☐ no ☐

d
If you ticked yes, say *which* allowance and *how much* you get
£ .

e
- **Do you** (or your partner or children living with you) **get any other social security benefit?**
(such as family income supplement, unemployment benefit, disablement benefit, sickness benefit, maternity benefit, retirement pension)
yes ☐ no ☐

f
If you ticked yes, say *which*, and *how much*
£ .

g
- **Do you** (or your partner or children living with you) **have any other money coming in?**
(such as maintenance, court order or pensions from work)
yes ☐ no ☐

h
If you ticked yes, say *what* it is and *how much*
£ .

Now go to the top of the next column

'More about money' continued

i
- **Do you** (or your partner) **have any of these?**
You must tick one box for each line

current bank accounts	no ☐	yes ☐	£ .
deposit bank accounts	no ☐	yes ☐	£ .
Post Office or Nat. Savings Bank	no ☐	yes ☐	£ .
building society	no ☐	yes ☐	£ .
premium bonds	no ☐	yes ☐	£ .
shares and unit trusts	no ☐	yes ☐	£ .
cash and other savings	no ☐	yes ☐	£ .
National Savings Certificates	no ☐	yes ☐	issue number / no of units

j
- **If you have children who live with you, please list their savings here.**
If they have no savings, tick here ☐

k
- **Apart from where you live, do you own any property?**
(This includes any property or land owned by you, your partner or children who live with you)
yes ☐ no ☐

l
- **Do you** (or your partner or children living with you) **have any life assurance or endowment policies?**
yes ☐ no ☐

If you ticked no, go straight to part 8 'People living with you'

m
- **Give details of your life assurance or endowment policies**
(List *year* each policy was taken out and the *amounts* for which you are assured. If you don't know the amount assured, tell us how much you pay each month)

19	£
19	£
19	£

8 People living with you

- **List below all the people living with you.** If none, tick here ☐

	their names	their relationship to you or your partner	their date of birth (or 'over 18')	do you get child benefit for them?	do they get supplementary benefit?
Your partner					yes ☐ no ☐
Children under 16 who live with you				yes ☐ no ☐	
				yes ☐ no ☐	
				yes ☐ no ☐	
				yes ☐ no ☐	
Children over 16 who live with you				yes ☐ no ☐	yes ☐ no ☐
				yes ☐ no ☐	yes ☐ no ☐
Anyone else who lives with you (include boarders and subtenants)					yes ☐ no ☐
					yes ☐ no ☐

If none, tick here ☐

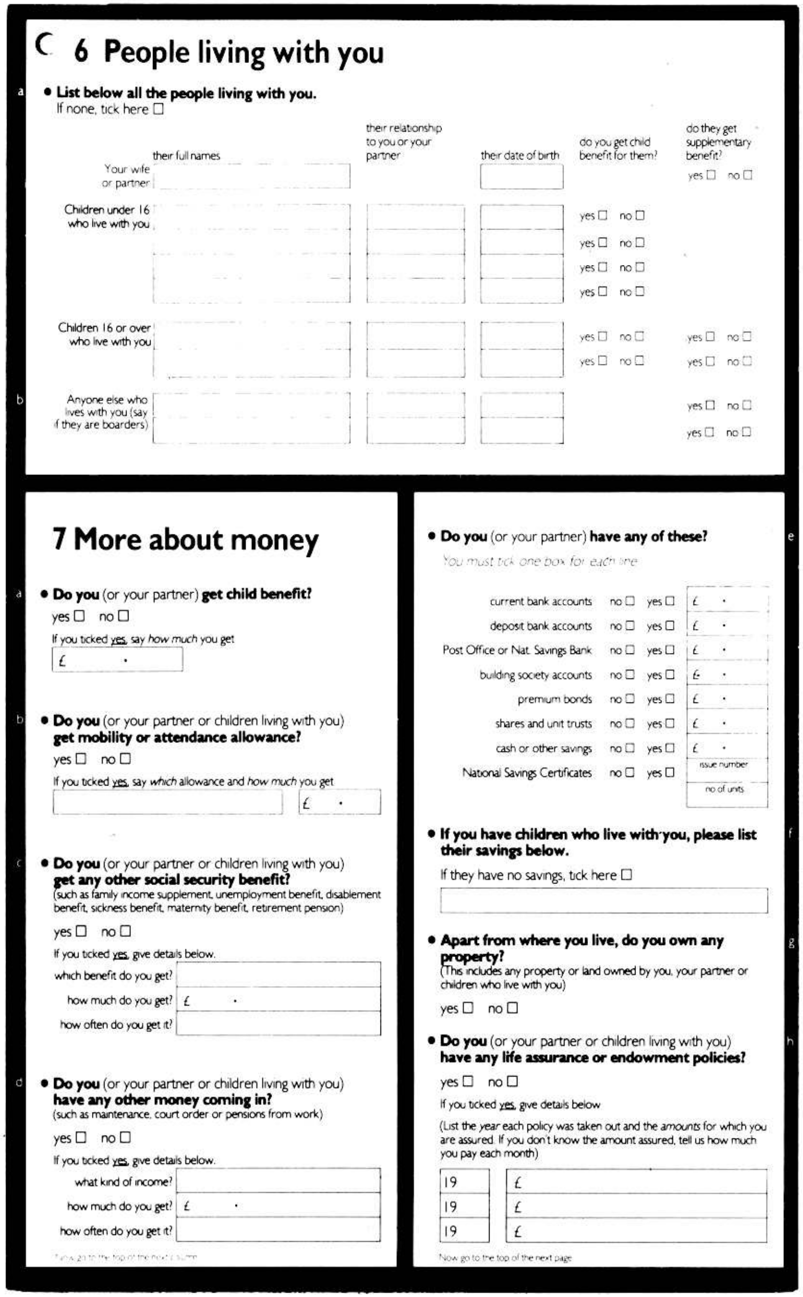
Now go to the top of the next page

columns. Horizontal rules between the sections were narrower (5pt) to avoid disrupting this vertical stress.

The unwisdom of stacking two-column sections was reinforced by the testing of our first two-column version. Figure 6 shows that the one full-width section fell at the foot of the page. Users were expected to complete the two columns above it before progressing to this single column section. In practice, though, a significant number failed to complete the right hand column, but progressed from the left-hand column directly to the bottom section. As Figure 7 shows, we changed the order of the sections to overcome the problem. However, the full-width section is still the pivot around which the rest of the form must be designed. It continues to cause trouble whenever the form has to be revised.

Questions and response formats: Many questions use an interrogative pronoun to specify the type of answer that is required—which, when, who etc. Others use word order to implicitly demand a yes/no answer. Whichever is the case, the archetypal question is certainly recognisable by its grammatical construction, and, in print, by a question mark at the end (in speech, by tone of voice). It is therefore interesting to note just how far forms have removed themselves from everyday language by using graphic and spatial devices—questions are no longer just a linguistic and cognitive issue, but a design problem as well. For example, Wright (1981) shows an example of a holiday booking form which uses at least six different question formats, none of which uses a normal interrogative sentence. All are bound by logical and graphic conventions that are special to forms—for example 'INSURANCE delete YES if not required' (followed by the word 'YES' next

Figure 7



6 People living with you

a • **List below all the people living with you.**
If none, tick here ☐

	their full names	their relationship to you or your partner	their date of birth	do you get child benefit for them?	do they get supplementary benefit?
Your wife or partner					yes ☐ no ☐
Children under 16 who live with you				yes ☐ no ☐	
				yes ☐ no ☐	
				yes ☐ no ☐	
				yes ☐ no ☐	
Children 16 or over who live with you				yes ☐ no ☐	yes ☐ no ☐
				yes ☐ no ☐	yes ☐ no ☐
b Anyone else who lives with you (say if they are boarders)					yes ☐ no ☐
					yes ☐ no ☐

7 More about money

a • **Do you** (or your partner) **get child benefit?**
yes ☐ no ☐
If you ticked yes, say *how much* you get
£ .

b • **Do you** (or your partner or children living with you) **get mobility or attendance allowance?**
yes ☐ no ☐
If you ticked yes, say *which* allowance and *how much* you get
£ .

c • **Do you** (or your partner or children living with you) **get any other social security benefit?**
(such as family income supplement, unemployment benefit, disablement benefit, sickness benefit, maternity benefit, retirement pension)
yes ☐ no ☐
If you ticked yes, give details below.
which benefit do you get?
how much do you get? £ .
how often do you get it?

d • **Do you** (or your partner or children living with you) **have any other money coming in?**
(such as maintenance, court order or pensions from work)
yes ☐ no ☐
If you ticked yes, give details below.
what kind of income?
how much do you get? £ .
how often do you get it?

Now go to the top of the next column

e • **Do you** (or your partner) **have any of these?**
You must tick one box for each line

current bank accounts	no ☐	yes ☐	£ .
deposit bank accounts	no ☐	yes ☐	£ .
Post Office or Nat. Savings Bank	no ☐	yes ☐	£ .
building society accounts	no ☐	yes ☐	£ .
premium bonds	no ☐	yes ☐	£ .
shares and unit trusts	no ☐	yes ☐	£ .
cash or other savings	no ☐	yes ☐	£ .
National Savings Certificates	no ☐	yes ☐	issue number / no of units

f • **If you have children who live with you, please list their savings below.**
If they have no savings, tick here ☐

g • **Apart from where you live, do you own any property?**
(This includes any property or land owned by you, your partner or children who live with you)
yes ☐ no ☐

h • **Do you** (or your partner or children living with you) **have any life assurance or endowment policies?**
yes ☐ no ☐
If you ticked yes, give details below
(List the *year* each policy was taken out and the *amounts* for which you are assured. If you don't know the amount assured, tell us how much you pay each month)

19	£
19	£
19	£

Now go to the top of the next page

to each row of a matrix). It is probable that if you only rarely have to fill in a form, or if you have literacy problems then these conventions are likely to present a barrier to the successful completion of an important transaction.

Both the prototype and the final form are careful to avoid over-cryptic question wordings, although both occasionally use fairly straightforward abbreviations: 'Name' for 'What is your name', for example. Occasionally, supplementary notes or explanations are provided—for example, where the technical distinction between boarders and subtenants is not generally known, or to make it clear that you own your home even if it is mortgaged. In other places it was found necessary to divide up vaguely worded questions, leading to a longer but clearer form.

The form uses both open-ended questions (eg 'Why did you stop working?') and response-cued ones with 'tick boxes'. The size of answer spaces for open-ended questions was used to cue the extent of the required response. For example, the question quoted above was given a single line to indicate that a simple answer was preferred to a long explanation. In contrast, quite generous space was given at the end of the form to express the need for extra money for special problems—in tests this space tended to be filled fairly exactly, suggesting that its size was a strong response cue. The size of tick boxes was determined by what was available on the typesetting machine. Because boxes are included in the regular 'character set' of the machine (its repertoire of letters, numerals, symbols and so on), no special operation is necessary at the make-up stage to incorporate them in the text—a process which would normally be expensive and error-prone. They extend from the base-line to the cap-height of the alphabet, thus varying in size with the type. Intuitively it was felt that a larger size might have been better for the user, but no problem was experienced in testing and they remained the same size. However, problems have emerged since the launch of the form in actual operation, and the boxes have been slightly enlarged.

Research (eg, Clark and Clark, 1977, cited by Wright, 1981) indicates that questions to which a positive response can be given are preferable to those where the answer is 'no'. The reason for asking a question, however, is that the answer is unknown. It is easier to accommodate the findings of Barnard, Wright and Wilcox (1979) who recommended that users should be able to respond to the answers which apply to them, rather than having to delete those which do not. The response-cued questions in the SB form therefore display a range of options with tick boxes. The tick box convention is assumed to be that one ticks the box corresponding to the answer to the question and leaves the other ones blank—a brief instruction to this effect is given on the first occurrence of tick boxes. This appears to be accepted by the majority of users, but some seem unfamiliar with it or confused by the need to put a tick (traditionally a positive sign) to a negative response. Some individuals therefore use a cross when their answer is 'no' and a tick when it is 'yes'. Others put a tick against the answer which does apply and a cross against the one which does not. In most cases there is no serious difficulty in processing the form.

One 'yes/no' problem still persists. At one point, claimants are required to declare their savings. A number of categories are listed as a check list (such as bank accounts, building society accounts etc) and claimants must tick 'yes' or 'no' against each. Most people only tick the 'yes' boxes that apply to them, and fail to tick the 'no' boxes of the categories that don't apply. This seems to be perfectly reasonable behaviour, since their answer is clear; but they are not aware (and cannot be expected to be) of the motive for asking the questions in this way—it was thought by legal advisers that blank tick boxes would not count as evidence of a misdeclaration in a court of law. The special linguistic demands of the legal profession can cause a number of other comprehension difficulties in documents to be used by the general public (Wright, 1980).

Typeface: The main typeface (Plantin) used for the prototype form is one of the more regularly-featured of the seriffed faces. Even so, it is not well suited to the rough treatment of form typography. 'Serifs' are the small cross pieces at the corners and ends of the letter; typefaces without them are known as 'sans serifs', and being mostly modern in design they tend to be more regular and systematic in appearance. While seriffed faces produce a well textured and readable surface for continuous reading (and are regarded as slightly more legible in those circumstances), it can be argued that sans serif faces work better for isolated words and phrases (research has shown individual sans serif letters to be less easily confused and so more suitable for applications such as signing). They are robust enough to stand up to the tabular setting and unorthodox punctuation demanded by forms. The regular and systematic word-shapes they create are thought to be a positive disadvantage for continuous reading, but contribute the visual order of a typographically complex form. However, there are a number of postwar seriffed designs (Melior is an example) which also meet these criteria, but they are not widely available among the British jobbing printers who are typically employed on forms work. If seriffed types are used it is important to ensure that 'ranging' numerals are used rather than 'old style' numerals. (Ranging numerals, like capital letters, are all the same height and are thus aligned at the top and bottom. Old style numerals are of different heights, some protuding below the base line.)

Our choice of typeface for the new form was Gill

Sans. Although a number of alternative choices would have been just as acceptable, Gill is regarded as one of the most legible of the sans serifs because it retains the proportions of traditional seriffed types; the letters vary in width, adding to the ease with which they are differentiated. It is one of the older of the sans faces, and was used for government printing for many years before falling out of favour during the sixties when new continental typefaces found favour (Helvetica and Univers are the best known). With the introduction of phototypesetters which allow tighter letter-spacing, Gill has come back into use in recent years and is widely available within the printing industry. We chose to use the light and bold weights to achieve maximum contrast. For this form we had the type condensed by 10%, saving space while retaining the same character height; this is done optically or digitally (according to the equipment used) by the typesetter and is a feature available on the latest generation of typesetting machinery. There is no available data known to us on the legibility implications.

In practice, the choice of a typeface also has to be made pragmatically—there are often organisational or economic reasons for using a particular printer, and he may not offer a wide choice. In addition, the variety of equipment in use today means that there is no longer a 'standard product' (eg, Monotype) available from every printer, and consequently the quality of typesetting can vary enormously. The variety of equipment also makes the task of detailed type specification a hazardous one, since each typesetting machine has different facilities. Unacceptable standards are a real possibility and organisations should consider quality alongside price when ordering print. Problems that can arise include:

- poorly drawn characters: some smaller manufacturers, or those new to this market, offer type designs crudely copied from established firms. The specification problems are exacerbated by the habit of changing the name of the typeface in order to avoid copyright or trademark problems.

- uneven letter-spacing: cheap or poorly maintained equipment can produce uneven letter-spacing.

- uneven 'colour': most typesetting uses photographic paper or film to receive the image. Since the temperature and freshness of the chemicals affects the speed of development, it is very common for correction lines, developed on a different day, to appear darker or lighter than the original setting. The effect can be so severe that the distinction between bold, medium and light type variations is confused. The only way to avoid this is to insist on a computerised system which produces a completely new draft whenever corrections are made.

- poorly trained operators: some compositors have not found the transfer to computerised technology easy. Although many machines can achieve sophisticated effects, they need complex instructions which may not have been mastered by the operator. For example, our typesetters operated a digital system which can set vertical as well as horizontal rules, but the job was delayed for many days while they tried to set our rectangular response boxes. In the end, the vertical rules were drawn in the normal way by hand. Their problem was in part that complex coded instructions had to be entered; the newest generation of machines display an interactive visual simulation of the page and make this task easier.

Signalling the information structure

Most documents display information (loosely defined for the purpose of this discussion) structured in a number of ways. For example, there are lexical signals of structure ('first', 'next', 'finally'), and syntactic ones (for example particular kinds of sentence construction can signal the approach of a conclusion or a new point). These linguistic cues can be extremely subtle, allowing authors to build persuasive arguments and express complex networks of ideas. Graphic cues, on the other hand, work more on the perceptual than the cognitive level. While verbal argument makes *finely qualified* distinctions, typography *emphasises* differences. It is thus particularly suited to staged documents such as forms, instructions and regulations where information is typically broken down into smaller segments for the sake of step-by-step interpretation. Research has consistently confirmed that explicitly formatted complex texts are more efficiently processed than their continuous prose equivalents (see, for example, Lewis, Horabin and Gane, 1967; Wright and Reid, 1973).

An alternative way of displaying the structure of such documents is to use numbering or lettering systems. These can make the structure logically explicit, but work poorly at the perceptual level. The DHSS prototype form used upper-case letters for main sections, and lower-case letters for individual questions. In our testing of the prototype form we observed some people having difficulty obeying instructions such as 'Now go on to section K'. One possible cause is that while few people are ignorant of the order of numbers (1,2,3...), the order of the alphabet (A,B,C...) is more confusing. The use of an alphabetic system also led to some uneasy juxtapositions of coding letters and the initial capitals of section headings, so we used numbers instead. There are some general objections to numbering systems (see Waller, 1980) which can seem cryptic and bureaucratic, so since there was rarely a need to refer users to individual questions we confined numbering to the main sections. Individual questions were signalled with 'bullets' (bold black dots the size of a lower-case 'o') and discreet letter codes were provided for DHSS staff, in white on the coloured outside border of the form.

Printers have traditionally used variations in typeface and typesize to distinguish between different categories or levels of information in a document. The use of bold type for headings, for example, is a familiar sight. In the case of some text types it is possible to refer to a publisher's style guide for rules governing the assignment of typographic variants to categories of information. Many complex documents, including forms, are not covered by such guides—indeed it is debatable whether they ever can be (this question is discussed further below under the heading 'Conclusion and guidelines'). In these cases, each document must be treated as unique. It will often, of course, be possible to borrow techniques and conventions from other circumstances, or to set up a style to cover recurring conditions. But the validity of these must always be tested against an analysis of the content, context and purpose of the document in question.

Typography can usefully be thought of as having a similar function to punctuation (Waller, 1979). Marks such as the comma and the full stop delineate text segments of different status; similarly, typographic and spatial means can be used to divide larger segments. Besides this simple function of delineation, both punctuation and typography are used to create series or hierarchies of text components, to interweave or interpolate separate or parallel series (by using parentheses, footnotes, boxed insertions etc), or to identify the genre or 'voice' of a component (in punctuation, by using question or exclamation marks; in typography, by varying the typeface).

Like punctuation, typography is a blend of system and art, grammar and style. It is possible to classify the different punctuation marks, and also the different roles of punctuation in written language, but there is no one-to-one correspondence between them. Each mark can be used for several purposes, and each purpose can be achieved in a variety of ways. The use of punctuation is a subtle one, and is subject to fashion and personal taste; for example, in recent years it has become more usual to punctuate lightly or openly, without feeling the need to signal every grammatical turn in every sentence.

Unlike punctuation, though, there has been no attempt to incorporate typography into the formal rules of grammar. Consequently, designers cannot rely on the readers' shared knowledge of a system of conventional marks, but must to a greater degree 'diagram' the text (Waller, 1982). While punctuation marks have no intrinsic visual relationship to their function but are conventional or denotative in effect, typographic features must visually connote their status. For example, typographers typically create groups or clusters of related items by isolating them in space or boxes; they organise hierarchies of items using larger, bolder types for the most important, ranging down to smaller and lighter ones—both examples constitute a kind of visual metaphor. Because of the lack of grammar, both diagrams and typographic pages must create their own internal rules of consistency.

Kinds of information structure in forms: A major problem facing those who wish to systematise the typography of forms is that no terms exist to describe the different components. A quick analysis of the SB form reveals over a dozen distinct categories for which a case could be made for special typographic treatment. Many are difficult to name, and it is often debatable whether they form a discrete category at all or would be best grouped within another:

Form title
Form code number
Initial instructions
Part headings
'Write clearly' and similar reminders
Primary questions
Supplementary questions
Question qualifier/explanation
Tick boxes and their labels
Response space labels
Special notes next to response spaces to deal with typical errors predicted by pre-testing
Conditional user directions ('if you ticked *yes...*')
'For office use' area
Page break guides ('[section name] continued', 'Now please turn the page' etc)
Declaration

This list is, of course, limited to the content of the SB form. If the intention were to construct a style guide or standard to cover every form, then the list would undoubtedly be longer and its classification more difficult.

Having identified the document components, the typographer's task is to assign a typographic treatment to each. This should not necessarily be a unique treatment—important, this, when there are so many categories of information. To assign a completely distinct and unrelated treatment to each component would obviously create visual chaos. But, equally, to treat every item as of the same category would create conceptual chaos. There needs, then, to be an argument behind every visual link and every visual discrimination. On what basis are things to be linked and separated? Here, a useful distinction may be drawn between *hierarchies* and *voices* of information.

Hierarchies: everything above the level of the individual character can be considered as a component (that is, a lower level) of a larger ensemble (and usually several). Words, sentences, paragraphs, chapters, sections and books are all components at various levels which are distinguished graphically. Complex forms contain hierarchical structures, and in such cases the components need to appear nested inside one another graphically. This is normally done by exploiting the relative prominence of letter forms, ranging from larger bolder to smaller and lighter type variants; space and rules are also used. In the SB form, for example, primary questions appear in 12pt Gill Bold, response cues (yes/no etc) in 12pt Gill Light—that is, in a lighter type—and ensuing secondary questions in 10pt Gill Light—both smaller and lighter. These components are spaced apart evenly and thus form an identifiable unit with an internal hierarchical structure. The 'question units' themselves are spaced evenly apart within the superordinate grouping of the section; the sections represent the highest level in the hierarchy of the form as a whole.

Voices: Many components or features of a page have an additional stylistic characteristic which we may call 'voice'. Most will be of the same 'standard' voice, but some components of a document are expressed distinctively so that they may appear within or in parallel to the main hierarchical structure without disrupting it. Thus occasional instructions, such as 'tick one box' or 'please write clearly', appear in the SB form; they do not form part of the main hierarchy, so are printed in italic in a second colour.

The typographic armoury

The typographic signalling of such hierarchies or voices is achieved by a variety of means, most of which are represented in the SB form.

• *Type families:* typefaces are designed and marketed in 'families'. As described above, the Gill family was used for the SB form. Each family consists of a standard or 'medium' character set (a term used to describe the alphabet, numerals, punctuation marks and various special characters), plus a minimum of an italic and a bold version. It may also include one or more extra bold versions, condensed, expanded, light and outline versions, each with their own italic and, where appropriate, bold equivalents. Although these 'extended families' are guaranteed to align correctly, their visual compatability is not always good—care should be taken when combining condensed and standard-width variants, for example.

Text components which are linked in a hierarchy are normally printed in types from the same family (although an important exception is the common use of a different but visually harmonious display type for headings). Components which are to appear as in an alternative voice normally appear in a contrasting type family. It is common to use seriffed and sans-serif types in this way; the combined use of two different sans-serifs (or seriffed faces) is not recommended since the differences are usually too subtle to act as an explicit signal but prominent enough to be disturbing.

• *Rules:* rules (lines) and decorative borders may be used to divide, to enclose and to link. Divisions of different force can be simply achieved with rules of different weight (gradations of colour and tint can also be used). Groups of items may be enclosed by boxes or by pairs of rules arranged to imply a box. Using rules to link is a slightly more subtle matter: the repeated use of the same rule to separate a number of items can imply an equal status for each, and the occasional use of unusually bordered boxes links their contents by a distinctive voice.

• *Space:* The extent of the space between items is another way of expressing their connectedness. In fact, some commentators have recommended that we largely abandon typographic variation (which is often used to excess) in favour of the use of space alone (Hartley, 1978). However, while it is true that space is an important means by which sequential text components (words, lines, headings and so on) can be grouped and sorted, it seems artificial to discard other methods for the sake of such a formal principle.

A major problem in the use of space stems from the uneasy relationship (present to a degree in all typographic techniques) between intentional, meaningful effects and artefactual by-products of the print medium. When a journalist writes an article which takes up exactly one column of space, the length of the piece is as much a result of the page size as it is an innate characteristic of the message content. The page size exercises a similar tyranny over the typographer: inter-line (or inter-component) space cannot be an effective signal if it spans a page break.

The problem is compounded by the common practice of printers who distribute left-over space equally over the page. In the same way that lines are traditionally justified by distributing the end-of-line space equally among the word spaces, pages are justified vertically. As Hartley points out, this practice makes a nonsense of attempts to use space consistently and meaningfully. In form design, however, the unused space at the foot of a page that results from consistent spacing between questions can unintentionally signal the end of a section. In the SB form, therefore, we used a limited kind of vertical justification: space was varied slightly between sections, but, where possible, not between questions.

• *Colour:* A second colour (Waller, Lefrere and Macdonald-Ross, 1982; Forms Information Centre, 1983) is a further signalling technique to be used if the budget allows. It needs to be justified more carefully than most other graphic features since it increases not only the pre-production costs (typesetting and page make-up) but also the cost of machining. Colour can be used for the type itself, or as a background. Used for type, it can in theory double the range of available typographic variants, but in practice this would be overcomplicated and unwise. It is more often used to add prominence to certain items (such as the headings in the SB form, for instance), or to alter the voice of special features (like our instruction on branching questions, described above). We also used a 10% coloured tint for the background of the form, following the increasingly common (and, we believe, effective) practice of highlighting the response spaces in white. This also had the benefit of minimising the show-through of type from the other side of the paper.

The choice of colour is restricted by perceptual, aesthetic and technical constraints. A perceptual constraint is posed by the occurrence of red-green colour-defective vision among a significant percentage of the male population. This rules out combinations of those colours. In addition, subtle distinctions of hue become harder to discriminate when the colour temperature is altered by artificial light.

Aesthetic (or emotional) problems are harder to predict or measure, but some felt that our use of red for a prototype layout might have alarming associations for those in financial difficulty! Our choice was determined by showing a range of technically and perceptually acceptable shades to a range of people to find the most popular (mauve).

The technical constraints are relatively minor. Although a 15% tint of a light-toned shade produces much the same effect as, say, a 5% tint of a dark shade, the lighter colour produces a more even effect when printed as a large area of tint. Errors (ink blobs, or small holes of white) contrast less with the paper and so are less noticeable. However, if type is to be printed in the second colour, it must be dark enough in solid to be legible. The combination of these two factors means that there is a comparatively small range of mid-tones which are acceptable in practice.

Conclusions and guidelines

How can general guidance about form design best be presented (or even generated in the first place)? Referring back to the punctuation analogy, it would probably not be desirable even it were possible to identify a rule for every circumstance; to do so would be to restrict the scope of the language and its future development. Good punctuation manuals identify the most common sentence constructions, the best-bet rules to apply, and the most common exceptions to those rules. Above all, they emphasise the stylistic dimension of language and its dynamic and responsive nature. In the cases of some types of document, those where the content falls into predictable categories, it has been possible to standardise presentation to a considerable degree—bibliographic references, for example. Elsewhere, though, the state of knowledge about typography is rather limited—public knowledge, that is, in the form of guidelines or grammar-like systems. Publishers use 'house styles', but these are mainly limited to editorial aspects of book design. Can general guidelines be produced by the empirical approach? It is possible to compare two coherent alternatives (generated through the tacit skills of a designer and differing on numerous dimensions) using simple tests of quality such as comprehension or readers' preference; this tells you which works best in those particular circumstances, but little more for certain. It is also possible to apply empirical research techniques to aspects where simple criteria exist, such as legibility. But so little of the basic spadework of classification and description (natural history, if you like) has been done that it is not yet possible to identify the key hypotheses for empirical work of a deeper kind. Here the sort of descriptive and analytic work being undertaken by Twyman (1982) is a prerequisite to sensible progress. It is also hard to say to what extent guidelines suggested by any particular design experience (eg, this form) are generalisable. In the absence of a more systematic way of assessing the similarities between documents (and their contexts), that judgement must be left to the reader.

However, guidelines are useful to many, and are quite valid when presented within a wider argument, a contextual description (examples or case studies) and adequate qualification—the form in which the guidelines of Felker and his colleagues are presented are exemplary in this respect (Felker, Pickering, Charrow, Holland and Redish, 1981). This paper therefore concludes with a summary of points made in the context of this case study which may be of some general interest and application. They are presented in the order of appearance in the paper:

- *Short documents are not necessarily easier than long ones;* there is a trade-off between ambiguity and economy. Similarly, longer instructions can be easier to follow than cryptic short ones—our branching directions had to be considerably lengthened before they were successful.

- *The interpretation of questions is highly context-dependent* in unpredictable ways. Always test, however informally: considerable insight can be gained, for example, taking on the role of a user yourself to get personal experience from the other side.

- *The combined effect of several slightly substandard features can be serious;* although individual criticisms can appear niggling or petty, in combination they may add up to a real problem.

- *The cause of poor form design is an ill-coordinated design procedure as much as simple lack of skill or knowledge;* conflicts of purpose in the form-producing organisation can present obstacles to a user-centred approach.

- *It may be possible to delay facing certain constraints (eg difficult formats) while more basic issues are settled;* although it should be remembered that almost all textual variables interact.

- *Fundamental changes in content and purpose must be expected during the production process;* it is in the nature of the writing and design processes that as the product takes physical shape it enables objective reassessments to be made.

- *Test results require careful interpretation;* they can sometimes resolve design problems neatly but they also serve simply to extend the process of objectification and enhance the personal skills of form producers.

- *Small formats offer less design flexibility when sections of the document cannot be split.*

- *Full-width items can disrupt the reading of two-column pages;* they are best placed at the top of the page, but never in the middle.

- *Two-column arrangements of tabular or irregular matter should include a strong graphic contrast between the columns;* generous white space or a strong rule will usually do the trick.

- *The size of answer space can cue the length of answer given to open-ended questions.*

- *Use a typeface with regular proportions and features;* a sans serif is often the best choice, although a few seriffed faces also fit this criterion.

- *The quality control of typesetting is as important as the choice of typeface.*

- *Explicit graphic signalling of hierarchical or conditional information structures is more effective than prose.*

- *Distinguish graphically between text matter of different 'voices';* use different weights of the same type family, or a seriffed in contrast to a sans-serif—never combine two different type families of the same kind.

- *Use space systematically, but don't rely on it.*

- *If colour is used, use mid-tones which are both legible and conspicuous.*

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