



No conference, seminar or meeting at No 10 Downing Street on 'Crime and design' has been quite the same since the publication of Alice Coleman's book, *Utopia on trial*. In fact some say the book's promotion and reception has been instrumental in bringing the subject to the forefront of ministerial attention. Critics of her research findings and proposals are regularly silenced by Coleman's claims on the scientific quality of her research work. Bill Hillier, reader in architecture at the Bartlett, puts Coleman's science on trial.

CITY OF ALICE'S DREAMS

Alice Coleman's book, *Utopia on trial*, presents a serious problem to a fellow academic. Shoddy research is usually criticised and eliminated before publication. In this case it has not been and we are faced with the embarrassing task of having to discuss it in front of a wide audience. Unfortunately, the public interest her claims have received and the prospect of large sums being spent in pursuit of her 'remedies', leave no alternative but to expose her 'scientific' claims to the criticism they ought to have received already.

Coleman claims to have shown scientifically that certain design features on housing estates—numbers of dwellings in the block, number of storeys, number of interconnected exits and so on—lead to 'social malaise', as indicated by litter, graffiti, vandal damage, fouling and households with children in care.

To show this scientifically she has first to quantify design features and malaise indicators, show that the two are correlated statistically (that one rises when the other does) and then

make sure that the correlations between a design feature and a malaise indicator are not produced by a third factor. In this case the obvious third factors would be social, such as concentration of children and problem families, which may in turn depend on the range of dwelling types, allocation policies and so on.

Vacuous arguments

On the evidence provided by her book, Coleman has accomplished none of these. Her method of quantification of malaise is flawed, her correlations largely illusory and her attempt to test for social factors desultory. In fact, her failure to solve the first problem is such that most of the subsequent argument is vacuous. We cannot tell whether what she claims is true, because the basic quantitative evidence she uses to show malaise does not seem to show any such thing. It is what scientists call an 'artefact': it results only from the way she has chosen to measure things.

To be fair, the 'flaw in the foundations' does originate in a

genuine difficulty. How do you quantify the malaise indicators, such as litter or graffiti? Do you count occurrences? Or area covered? Or nastiness? How Coleman 'solves' this undermines her entire argument.

First, she gives up any attempt to quantify how much litter or graffiti, and instead turns it into an on-off switch. She asks only whether there is any litter or graffiti at all in a block, distinguishing litter as being only either 'clean and casual' or 'dirty and decayed', and graffiti as being only either inside or outside entrance areas. She then divides up her blocks according to their score on a particular design feature—so many dwellings per block, so many storeys and so on—and then counts the percentage of blocks at each level that either have or do not have her malaise indicators. These percentages are then used as the quantitative indexes of the degree to which malaise is present: the higher the percentage of blocks with the indicator, then the more it must be caused by the design feature.

Now this is open to an obvious objection. Surely if there are more people in the block in the first place then there is more likely to be at least some litter or graffiti. If, say, 5 per cent of people are litter louts, then the chances of finding at least one will increase with the number of people in the block. And, of course, this turns out to be the case. The first diagram that she uses in her 'case for the prosecution' (p57) shows that most of her percentages do increase with the number of dwellings in the block. It would be surprising if they did not. Her use of the on-off switch as the measure virtually guarantees that blocks with more people in them are more likely to have at least some litter in them than those with fewer people.

More means more

Coleman treats this 'finding' as though it were evidence for the effect of design on social malaise, when all it seems to show is that the more people there are around, the more likely it is that someone will drop litter. But it gets worse. She goes on to show suspiciously similar 'trend lines' for all of her 'guilty' design features without asking the obvious question: are these design features more likely to be present in larger blocks than in smaller blocks because, to the extent that they are, all that is happening is that the same underlying flaw in the measurement technique is showing itself again and again.

On the face of it, most design features seem likely to vary with size to some extent. How many small blocks, for example, have upper level walkways? Or large number of vertical circulation channels or interconnected exits? What is clear is that without this information none of her trend lines has the slightest value and could be misleading. It looks as though they are artefacts of the same underlying error. Since her scientific argument is

erected entirely on these 'trend lines', we are forced to conclude that she has no argument at all.

Refuting the critics

Coleman shows she is aware of this potentially destructive criticism at several points in her text, yet, quite impermissibly, she continues to present her 'trend line' evidence as though this were not an intrinsic problem. What she does is try to refute the criticism in a general way. Unfortunately, when she does so, she digs the hole deeper. The main example she uses is the one case where quantification of the malaise indicator presents no problem: the number of households with children in care.

It is worth looking carefully at this, since it is the one part of the argument where there is enough data for the reader to do a little further analysis. Table I is taken from her Appendix 1 (p196). The key column is the one on the right which shows the percentage of blocks at each size range with *any* (again the on-off switch) households with children in care. This seems to show—quite falsely, it turns out—that the worst cases are in the largest blocks.

Sheer numbers

Coleman (p81-82) tries to answer the 'sheer numbers' criticism by arguing that the average size of blocks without children in care is 21 dwellings, whereas the average for blocks with one household affected is 35 dwellings. This she says is an increase of one household as block size increases by 14 dwellings. She then extrapolates this and shows—or so she believes—that the trend accelerates and that the mean size of blocks is lower than expected for a given number of affected households.

This is a blunder. In working out her trend line she has, in effect, counted only the blocks with affected households and forgotten about those without. As a result, she completely misrepresents the actual numbers of households with children in care. For example, she says in the caption to her Figure 22 (p82) that 'Blocks having 50 dwellings have either three or four families with children in care', obviously believing that this is the same as saying that the mean size of block with three or four households with families in care is 50 dwellings. Of course it is not, since she has not counted the much larger number of 50 dwelling blocks without any affected households. The actual figure is about one household affected in 50, which is close to the average for the whole sample. She has exaggerated the figure by at least a factor of three.

Doing the sums properly

When these sums are done properly, in fact, a quite different picture emerges. The relevant figure is not the percentage of blocks affected but the proportion of households affected as block size increases. Table II (based on

her data and using averages of her block sizes) shows the real picture.

What the figures in table II show is virtually the opposite of Coleman's claims. Whichever way it is measured, the largest blocks come out best (having the lowest proportion of children in care). If we take column six of table II—Coleman's own measure corrected for block size—we find a strong and consistent negative correlation between block size and households with children in care. In other words, the bigger the block, the lower the proportion of children in care. But we have to remember that this deals, Coleman-style, only with the percentage of blocks affected, so I doubt the realism of even this corrected figure.

The true picture is probably given in column seven which shows that it is very difficult to say anything about the figures, except that the biggest blocks are by far the best—but we would expect these figures to be susceptible to a *social* interpretation in terms of allocation policies. Even then we have to ask ourselves what value any of the figures have, since one crucial piece of information is missing: what is the proportion of households at each size range with families in them in the first place?

Null and void

These are only the most elementary criticisms of this work, confined to the first stage of the argument. On their own they are enough to render the whole argument null and void, because they show that Coleman has no *scientific* evidence: the proper analyses have not been carried out and the proper precautions have not been taken. But if we do go on to the next two stages, we find flaws which are hardly less damaging. For example, most of the correlation coefficients are very weak. A conscientious scientist would think of them as showing little if any relationship at all between design and malaise, and certainly none when the distortions caused by the numbers factor was taken into account. Coleman gets around this embarrassment by a trick of the trade: she presents in tabular form (p98) not her weak correlation coefficients, but a table of statistical significances—presumably expecting readers to think that statistical significance means the same thing as a strong correlation. It does not. Statistical significance is a measure of the chance that a given result could occur randomly given the size of the sample. Coleman's sample is so large that the threshold of significance is very low indeed. To make the reader believe that weak correlations show a strong relationship because they are statistically significant is utterly misleading.

Significantly insignificant

Nor do things improve when we begin to explore the little social data she presents in the appendix. It turns out

that the strongest single factor affecting her social malaise indicators is the percentage of pensioners living in the block (a negative correlation, of course) closely followed by the percentage of children (a positive correlation). The first of these is mentioned in the text (p86) but not explored at all.

Children are discussed briefly—indeed she can hardly avoid this, since the earlier Home Office study showed that this was the major factor. What she does is aggregate all of her design features into a single measure of 'design disadvantage'—together with all the concealed numbers effects we have already discussed—and argues that *jointly* they correlate more strongly than any *individual* social variable. So where, one might ask, is the study of the joint effects of the social variables?

Newman vs Jacobs vs Coleman

Showing that the research is flawed does not necessarily imply that the design remedies she proposes are not to be taken seriously. On the contrary, it is important that they should be properly understood quite independently of the research. There are two sources for her ideas. One is the Jane Jacobs argument that streets are safe and civilising because there are people about, including a good leavening of strangers. She kindly quotes my own 'space syntax' research (AJ 30.11.83 p47) at some length, showing how street systems can be structured so as to be intelligible and generate patterns of movement which makes some spaces more used than others, but never leaves any space empty for long.

The second is the 'territoriality' based 'defensible space' concept of Oscar Newman which argues, apparently contradictorily, that space only works socially if most people—and all strangers—are kept out, whether by physical or symbolic means. There is no contradiction between these two points of view, argues Coleman (p147), because the first applies to public streets, the second to residential space.

Her remedies are influenced by both. At a broad level, she wants to break up blocks to be as house-like as possible and to organise estate space to be as street-like as possible. Unfortunately, her practical suggestions are dominated by a single, much less complex idea.

All 'confused space'—her term for all space that is not garden, street or semi-public, in other words, under the control of a group of residents—must be broken up by walls and assigned to individual blocks to create single block, single entrance 'territories', as small as possible, in the expectation that people will identify with these territories as groups and become better citizens by taking control of them.

Infamous fallacies

But, give or take the form of words, this is exactly the design philosophy that created the problem in the first place. However varied their geometry, most modern estate housing divides people up into 'group territories', whether this is a court, an access deck, a staircase or a cul de sac. These territories are typically segregated from each other—you must pass through many interstitial spaces to go from one to another—and segregated from the main interfaces of everyday public life, which usually occur outside the estate, if anywhere at all.

The idea that people interact and form sociable groups in these territories is the most infamous of all architectural fallacies and one which architects, it seems, are managing to unlearn more quickly than social geographers.

The actual effect of this design principle is to create zones in our

urban environment where no one ever goes unless they have to. As a result, most space is empty for most of the time, since the passage of people to and from their homes is never enough to create a sense of space being used. In these circumstances, the sudden presence of a stranger, which in a street seems to enhance security, seems threatening. The 'territorial' behaviour which may prompt us to ask what the stranger is doing there is not the solution to the problem. It is *part* of the problem. In streets, this does not happen because anonymity, like interaction, is a useful aspect of everyday decency. Which behaviour we adopt depends on where we are: it is determined by the architecture.

'Colemanised' ghettos

Although Coleman may want to turn estates into streets, the effect of what she is proposing will be virtually the opposite. The essence of the street is

that the individual dwelling or garden entrance opens on to a space which is part of a public *system* of streets. A street that is isolated from its larger scale system is not a street at all. Nor is a street that loses its relation to dwelling entrances. A 'Colemanised' estate will break both of these relations, and break them radically.

Imagine what it will be like. The 'street' will be flanked by walls, only occasionally—and randomly, as far as can be seen from her design philosophy—penetrated by entrances to 'block territories'. Block entrances will be set well back from 'territory' entrances and dwelling entrances will be more remote still. At the same time, the so-called streets will not form an effective part of the larger public system of space, because all the spatial devices that originally made the estate discontinuous with its surrounding area will still be there. Indeed, the ghetto effect of the estate as a whole will be made even more potent, since her philosophy for relating estates to surrounding areas is, in spite of lip service to Jacobs and space syntax, only one of sealing up as many ways in and out as possible.

From the point of view of the dwelling, the 'block territories' will create a more rigorous segregation than ever and the even greater fear that when the boundaries are penetrated there will be danger indeed. And, as she points out on p137, 'youths' on the Mozart estate have learnt 'to scramble over 7ft walls in their stride'. This is the permanent paradox of segregation. The more you have, the more you are in trouble when it is overcome.

Kill or cure?

In short, a 'Colemanised' estate could be very much like the very worst estates we have now. Certainly it will generate everywhere the fear that arises when *some* people have to pass through a series of spaces that are devoid of people for most of the time. 'Colemanism' is, it turns out, nothing less than the disease for which it claims to be the cure.

The only way to rehumanise estates is to gradually re-integrate them into the public realm. But this is a serious and difficult design problem in itself and one to which Coleman gives no attention. It will not be solved as a by-product of piecemeal changes aimed at 'territorialising' blocks. On the contrary, this will make the problem worse. 'Colemanism' will isolate people from the public realm even more radically and do so in the name of the same failed theory which gave rise to the problem in the first place. It really is time to move on.

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Table I Frequency tables, design values by abuse classes (from Coleman p196)

No of dwellings in the block	Total No of blocks in survey	No of households per block with children in care							Percentage of blocks with children in care
		0	1	2	3	4	5	6	
1-4	95	95	—	—	—	—	—	—	0.0
5-9	441	415	20	5	—	1	—	—	5.9
10-14	274	233	33	7	1	—	—	—	15.0
15-19	229	181	35	7	5	1	—	—	21.0
20-29	377	262	72	25	10	6	—	2	30.5
30-39	221	128	53	27	9	3	1	—	42.1
40-49	122	71	27	9	7	5	2	1	41.8
50-59	56	33	8	10	5	—	—	—	41.1
60-69	39	16	10	4	3	1	4	1	59.0
70-79	29	13	7	7	1	—	—	1	55.2
80-89	25	9	6	3	1	3	1	2	64.0
90-99	14	3	2	4	4	—	—	1	78.6
100-199	25	13	5	3	4	—	—	—	48.0
200-317	8	2	4	1	—	1	—	—	75.0

(Low values are irregularly spread and have been grouped in fives.)

The key column is the one on the right which shows the percentage of blocks at each size range with *any* households with children in care. This seems to show—quite falsely it will turn out (see table II below)—that the worst cases are the largest blocks.

Table II How Coleman's data should be read, when the sums are done properly

Mean block size	No of blocks	No of affected blocks	Total No of households	Total No of households with children in care	Coleman's block % corrected for size	Rate affected 1 household per
(2)	(95)	(0)	(238)	(0)	(0)	—
7	441	26	3087	34	21.7	91
12	274	41	3288	50	32.0	66
17	229	48	3893	68	31.6	57
25	377	115	9425	194	31.3	49
35	221	93	7735	151	31.6	51
45	122	51	5490	105	23.8	53
55	56	23	3080	43	19.2	72
65	39	23	2535	60	23.1	42
75	29	16	2175	33	18.9	66
85	25	16	2125	50	19.3	43
95	14	11	1330	31	21.2	43
150	25	12	3750	23	8.2	163
260	8	6	2080	10	7.4	208

The first column shows the mean block size (mean number of dwellings); the second, the number of blocks; the third, the number of affected blocks (Coleman's figures [from table I, column 10 above] result from dividing column three into column two while ignoring column one); the fourth, the total number of households (an approximation based on the average); the fifth, the number of affected households; the sixth, Coleman's percentages of blocks affected, but corrected for block size (column three divided by column two, multiplied by the actual block size divided by the mean block size for the whole sample) and the seventh, the rate at which affected households are found at each size, ie, one per so many, so a high number counts as good.

Table II brackets the sample of very small blocks (one to four dwellings) because the total number of dwellings is an order of magnitude less than all the other size ranges (around 238, as opposed to several thousand) and, with a mean occurrence of affected households of one per 61 households over all blocks sizes, this sample is far too small for anything to be said statistically.