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Marketing Communications Research Centre

THRESHOLDS AND WEAROUT

AN OVERVIEW

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Part three of a three part study

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1. INTRODUCTION

This report is the third in a series of three on Thresholds and Wearout in Advertising. The first report summarised the literature and practitioners' initial views on the topics: it attempted to clarify the main issues and problems. The second report presented the results of a survey of current practice and opinions carried out by questionnaire on the advertising management of 23 products or services. The survey attempted to further clarify and quantify some issues and explore some hypotheses on the causes of different levels of thresholds and wearout.

This third report attempts to summarise what we have found out so far. Further, it attempts to:

- i) describe what should be considered when thinking of threshold and/or wearout in advertising
- ii) enumerate the factors that may influence the occurrence of threshold or wearout in advertising
- iii) suggest what advertising situations are most at risk as far as encountering threshold or wearout situations
- iv) suggest what should be examined/measured/monitored if it is felt that either, or both, are a potential risk
- v) give guidelines, for different situations, on the levels of threshold and wearout in advertising.

The following sections aim to deal with the above tasks.

2. WHAT IS A THRESHOLD? WHAT IS WEAROUT?

The very wide disparity between levels of expenditure claimed to be the 'threshold' for sensible advertising for products and services covered in our survey (Report No.12(ii)) indicates:

different circumstances are believed to demand different levels of effort to obtain a "worthwhile" response.

This is only to be expected. However, one must ask what do 'level of effort' and 'worthwhile' mean and to what do they relate?

Similarly, wearout is often thought of as being in some way associated with consumers' boredom with the advertising. In some cases it is the theme of the advertising that is thought important not to become boring, in others it is the individual treatments that are kept 'fresh' to avoid the boredom. Different products and services experience widely different practices as far as the replacement of themes or treatments are concerned.

The actual opinions and practices for different product/service groups regarding thresholds and wearout are tabulated in Report No.12(ii).

One can explain the wide differences in practice as being due to two, interrelated influences:

- i) products or services in different market situations set different advertising objectives (i.e. different advertising needs are perceived and decided), and
- ii) the market size and competitive environment is different across the range of products and services studied.

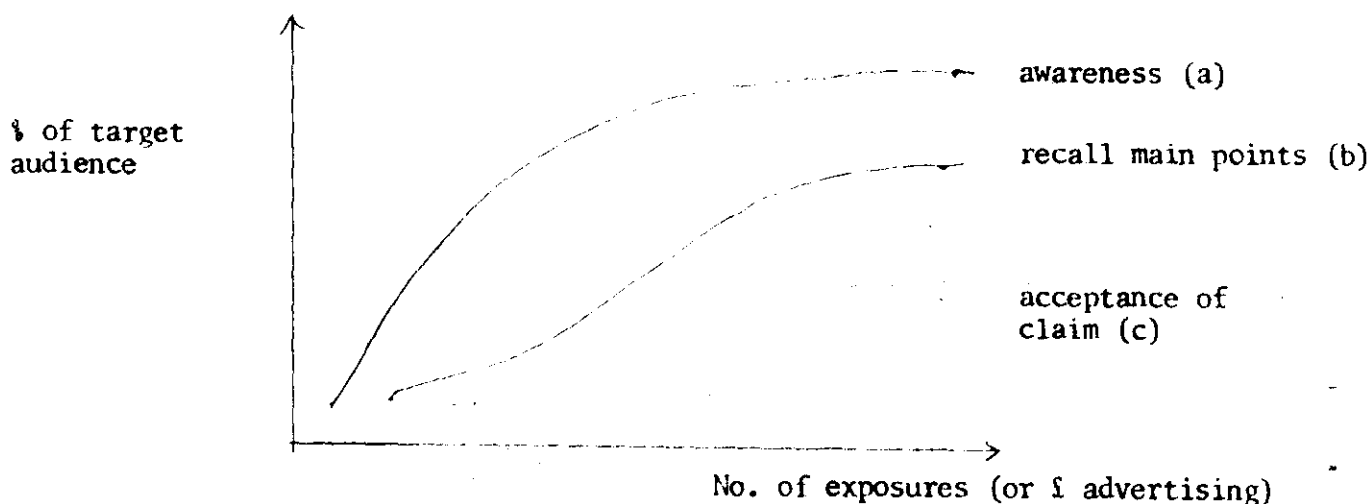
It is therefore particularly difficult to generalise about what should be a threshold level of advertising or when advertising will wearout. It depends upon, at least:

- what one is trying to convey (objectives/theme)
- how one is trying to convey it (treatment)
- what medium is being used
- what competitors are trying to convey and how they are conveying it
- the size of the audience (target market)
- the expected and/or required response (e.g. rate of change of awareness, attitudes, purchase)
- the marketing environment

Advertising Objectives

Hence to obtain specific guidelines for thresholds and wearout one should look at individual advertising objectives and track the responses to them. Some will gain a 'worthwhile' response easily, others not. Some will be seen to eventually fail to maintain a level of worthwhile response and maybe be deemed to be wearing-out. The circumstances giving rise to each case must be understood and detailed and then generalisations made, if possible.

As indicated in Report No.12(ii) we observed some cases where an advertising campaign had several objectives and these objectives exhibited apparently different levels of thresholds and wearout. For example:



In the above example objectives (a) and (b) do not 'wearout' over the life of the advertising, while (b) does need more advertising to achieve a growth in response beyond an initial point. Objective (c) seems to exhibit a threshold situation and then a diminution of response, or 'wearout'. In the case of (c) one can observe the apparent 'wearout' but one would need to know much more in order to have some understanding of the likely causes in order to extrapolate to some other similar circumstance. For example, in the above case, is growing rejection of objective (c) due to the product, competitive advertising claims or something that can be traced to the advertising itself?

Priority of Objectives

Given that one may know the individual response to different objectives it raises the problem of the priority of the objectives.

It is possible, as in the example depicted above, that some objectives are being sustained in their response while another is declining - or the advertising is wearing out as far as this objective is concerned. Does one change the advertising to try to boost the response on the objective which is declining? It depends what the objective is and how important it is. In the example above, if it were felt that the achievement of objective (c) were paramount to the marketing success and nothing else could be changed in the market place then one might argue for the need to change the advertising.

Similarly one might find that the apparent threshold for some objectives was low (in exposure or expenditure terms) while that for an 'important' objective was higher. Does one advertise more, knowing that it is not necessary for some of the objectives? Again, it depends on the priority one places on achieving different objectives.

Themes and Treatments

Advertising objectives are usually embodied in an advertising theme which is present throughout a campaign. Different versions of a theme may have different threshold levels and some may wearout sooner than others. Individual treatments of the theme may provoke different responses than others and therefore different treatments may have different thresholds and wearout points.

In monitoring whether any threshold effect or wearout is occurring one must be clear to specify whether one wants to check the theme, a particular treatment, or both. For example, it is insufficient to claim that people are 'bored with' or 'annoyed with' the advertising without knowing whether it is the overall theme or just a particular treatment. Again there is evidence that campaigns embodying the same theme, over many years, experience individual treatments that have problematic responses that can be seen as examples of either threshold or wearout effects. The overall campaign theme is not rejected usually (although it sometimes is) in this situation.

Rates and Quantity of Advertising

As well as having to think about specific objectives, their relative priorities and responses evoked by the overall theme or individual treatments one must consider how one measures the 'extent of advertising', or 'advertising input', that may cause the response.

In Report No.12(i) we drew attention to the need to be clear on this point when attempting to define thresholds and wearout.

The importance of this issue has been further explored and emphasised in correspondence and discussion with Geof Bowstead (1). The rest of this section is based on his exposition of this issue.

"I believe there is a minimum amount of exposure that is worth giving to a campaign. I also believe there is a minimum rate at which it is worth exposing the advertising.

I believe advertising can wear out both if there is too much of it in total and also if it is exposed too frequently".

Hence one must consider advertising response - and its possible threshold and/or wearout - against the cumulative amount of advertising delivered to an audience or the rate of delivery. For example, an advertisement shown five times in one evening on TV might well overcome any threshold after two showings but would risk wearout by the end of the evening. The same advertisement shown once every two days might not risk the same 'overkill' result but equally might not ever really break through any threshold.

Different ways of measuring advertising input and response may be useful for making different advertising decisions.

Firstly, let us consider quantity of advertising - expressed in pounds (£), which is the usual measure.

Let us suppose that for every £10,000 we spend on advertising from £0 to £400,000 during a campaign we can determine the extra sales revenue generated. We can then construct Diagram 1, which shows cumulated advertising spend against a) cumulated extra sales revenue, and b) the extra sales revenue per £10,000, after we have already spent various amounts on advertising. As will be seen, the cumulative response line begins to decline when the extra sales revenue per £10,000 goes below zero. It could be suggested that the cumulative response curve helps an advertiser to decide when to change the campaign and is relevant to wearout.

Secondly, let us consider the rate of advertising (£ per unit of time). Diagram 2 depicts the average response at various rates of advertising for the same campaign as before. It is assumed in this example that a campaign lasts a year and that rates of advertising are expressed in £-equivalent expenditures per year. The response curve, being an average, has a different shape to the previous ones in Diagram 1. It could be suggested that this average response curve helps an advertiser to decide how much money to spend in a year, since he is interested in the overall average response to his total campaign expenditure. It is also particularly relevant to considerations of threshold.

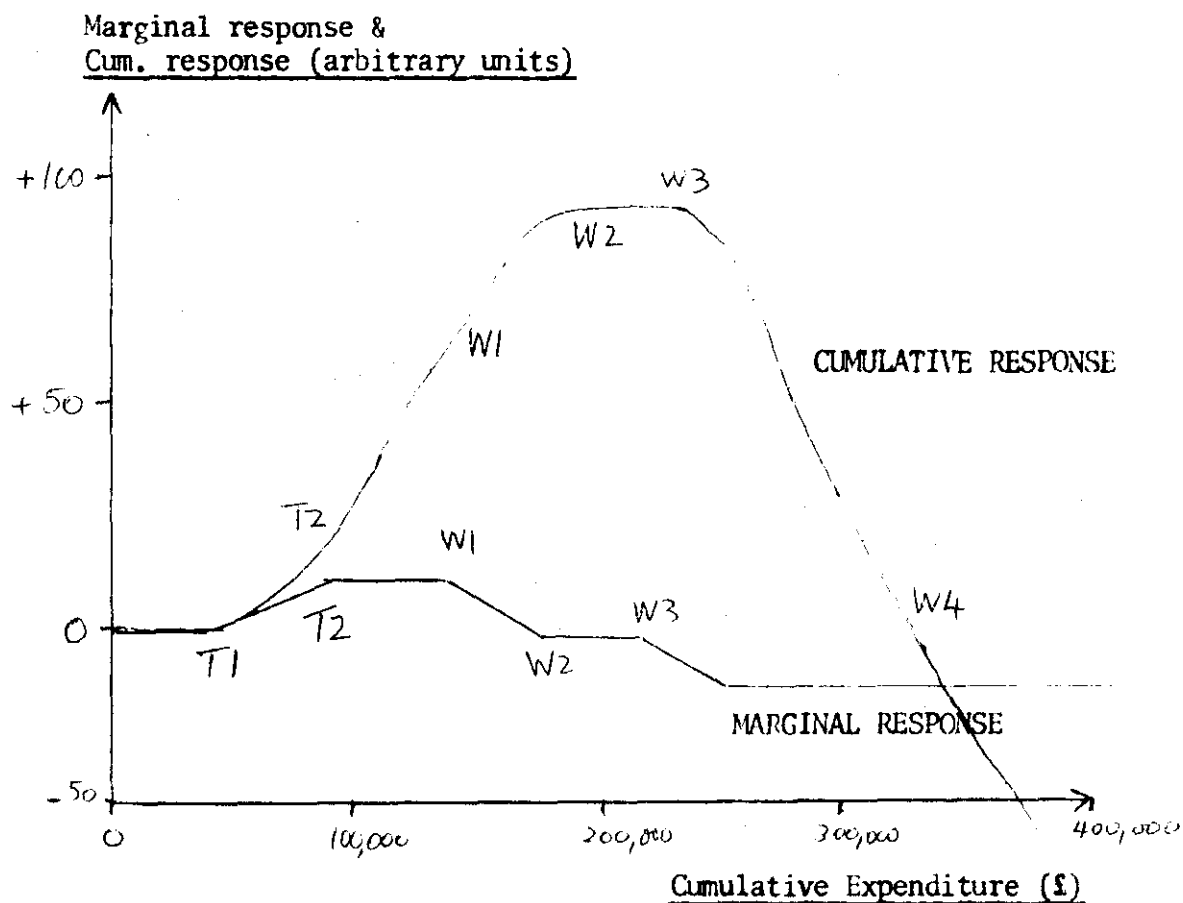


Diagram 1. Cumulative Advertising and two response curves

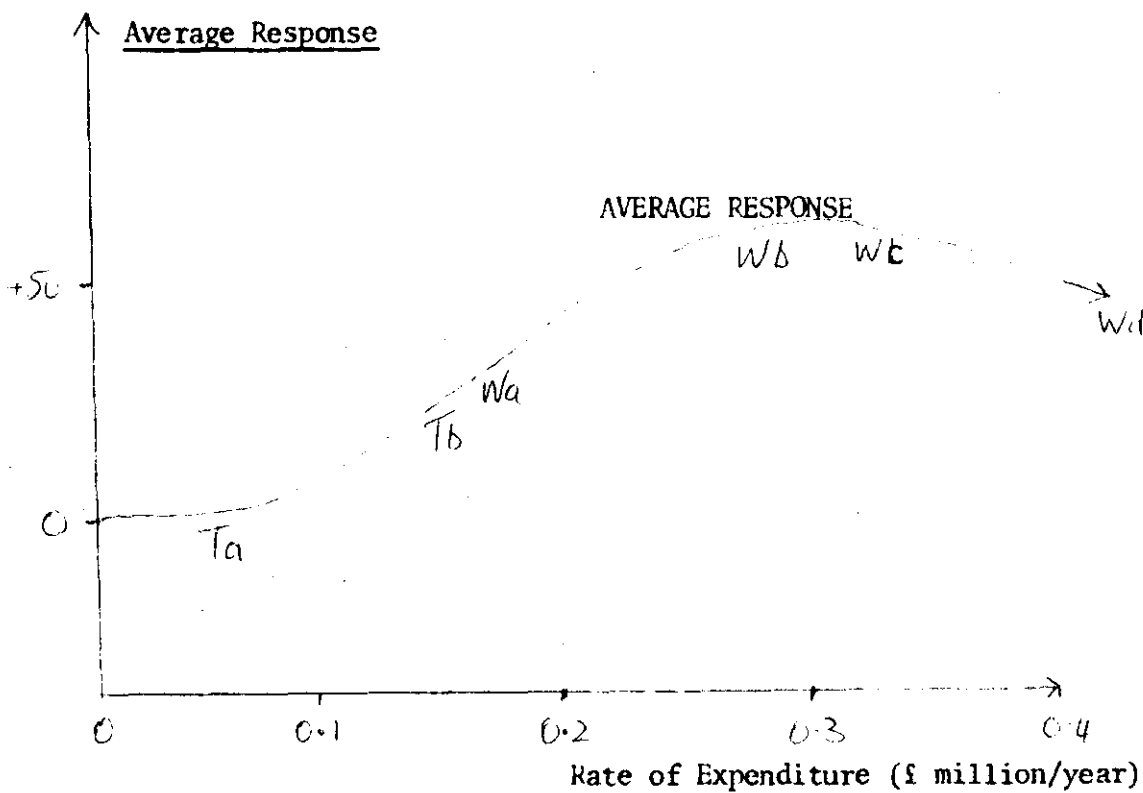


Diagram 2. Advertising rate and Average response

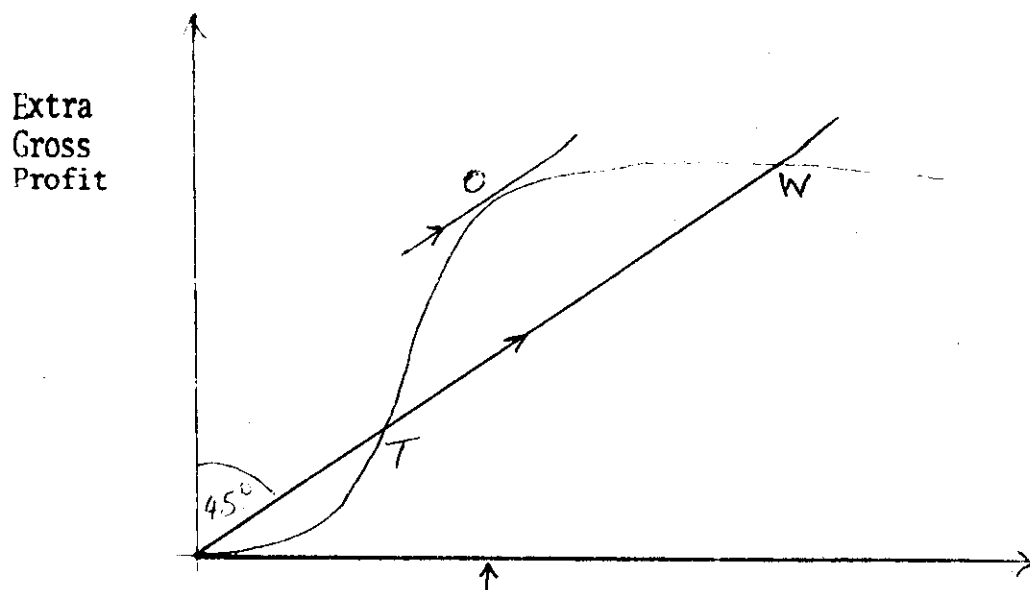
The hypothetical data used to construct these two diagrams is given in Appendix 1.

Two important observations emerge from these diagrams:

- i) one will observe different threshold and wearout points - if they are present - depending on how one expresses advertising input and response. One can express input as cumulative expenditure (or cumulative OTS, TVR, audience etc.) or as a rate of expenditure, e.g. £ per week (or OTS, TVR per week).
- ii) one can define a variety of points at which the threshold occurs or at which wearout commences. These are indicated on the diagrams by the letters 'T' and 'W'. They are further elaborated in Appendix 2.

Although many advertisers are not able to plot such diagrams as they do not have response measures, nevertheless Geof Bowstead's analysis is a contribution to clear thinking about the underlying principles.

A further observation suggests a goal to which we might strive. If we could measure the response to advertising in terms of additional gross profit we could then envisage having money on both axes of the sort of diagrams we have shown earlier, viz:



Reminding and Forgetting

In Report No.12(i) the difference between the forgetting of advertising and wearout was examined. However, forgetting could have a consequence on thresholds as suggested below. As Geof Bowstead (1) hypothesises:

"the more frequently people are reminded, the slower their rate of forgetting. If they are rarely reminded, they forget quickly and have usually forgotten by the time they are in the buying situation. Above a threshold frequently they usually remember enough for the memory to influence their behaviour. There is a maximum possible level of response, and once the advertiser has raised the recipient to that level further advertising messages ... are wasted. In fact as the maximum is approached it becomes harder to increase the response".

It is stressed that these are just one set of possible hypotheses but they do indicate that for some types of advertising the need to consider reminding and forgetting could be important to thresholds in particular. These ideas can be incorporated into a relatively simple mathematical treatment to show how the average response may be related to the rate of advertising. This is shown in Appendix 3 and is due to Bowstead (1).

Interest/involvement and Credability

Among many potential influences on the way people may respond to advertising is the interest, or involvement, they may have in the products or services advertised. Consequently it might be expected that the threshold will be higher for advertising for uninteresting products than for interesting ones. Also it might be expected that the advertising for uninteresting items might wearout more easily since people could find it tiresome if it were exposed too much.

From the MCRC's survey, Report No.12(ii), some small support for these suggestions was found. On average 'interesting' products were believed to have lower threshold expenditures than uninteresting products. In press advertising practice, though, interesting products seemed to change their advertising treatments more often than uninteresting products. On TV, however, the reverse was the case.

Interest and involvement in products, or services, were thought to be most associated with purchase or use - just like attitudes. If somebody does not buy or use a product, or service, and are not interested in it the generation of interest and attention to advertising will be difficult, hence the threshold and possible wearout problems.

A possibly related issue is that of the credibility of advertising claims. The advertising for the majority of products surveyed by the MCRC was thought by respondents to suffer some credibility barriers for some of the advertising claims. Consequently some advertising objectives may be more difficult to achieve than others within the same overall advertising platform. They may, therefore, have higher threshold levels and be more

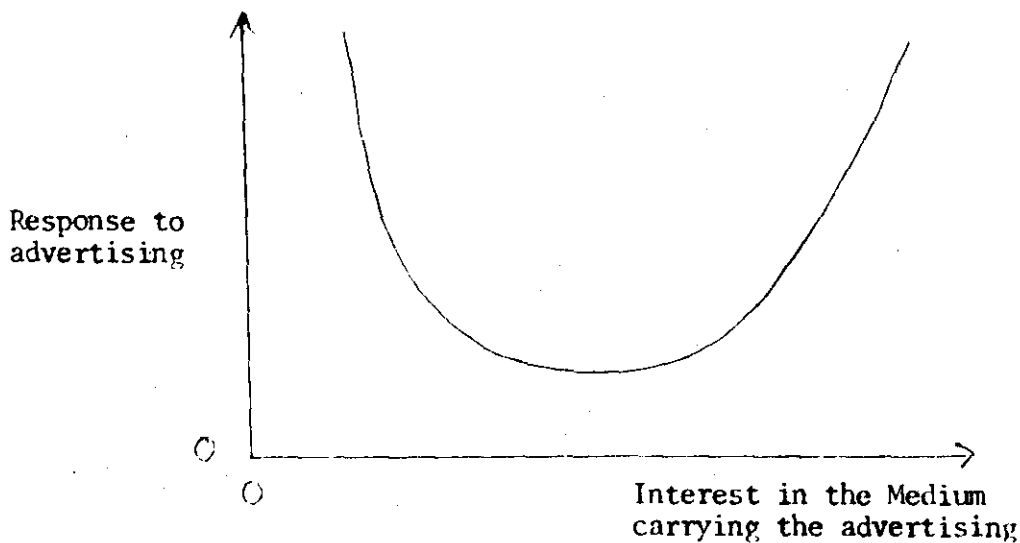
susceptible to wearout: if people are not convinced of a claim they may positively reject it and the advertising theme or treatment associated with it. A framework that was developed in Report 12(ii) to depict the possible consequences of interest and credibility was:

		INTEREST IN PRODUCT	
		HIGH	LOW
EXISTENCE OF CREDABILITY BARRIERS	YES	LOW THRESHOLD WEAROUT RISK	HIGH THRESHOLD HIGH WEAROUT RISK
	NO	LOW THRESHOLD	HIGH THRESHOLD

One example was observed where three levels of 'interest' could be discerned with different levels of response to advertising.

Those who were interested in the activity associated with the advertising responded well; those that were uninterested in the activity also responded fairly well to the advertising, as it provided a change to that which they were watching and in which they were not very interested. The poor responders to the advertising were those who were slightly interested in the activity in which the advertising appeared.

Hence one must realise that the division of an audience into two groups, interested and uninterested in the product, is not only an over simplification but that the response of those in the middle may not be half way between the two extremes. One might, as in the example above, have a response of the form:



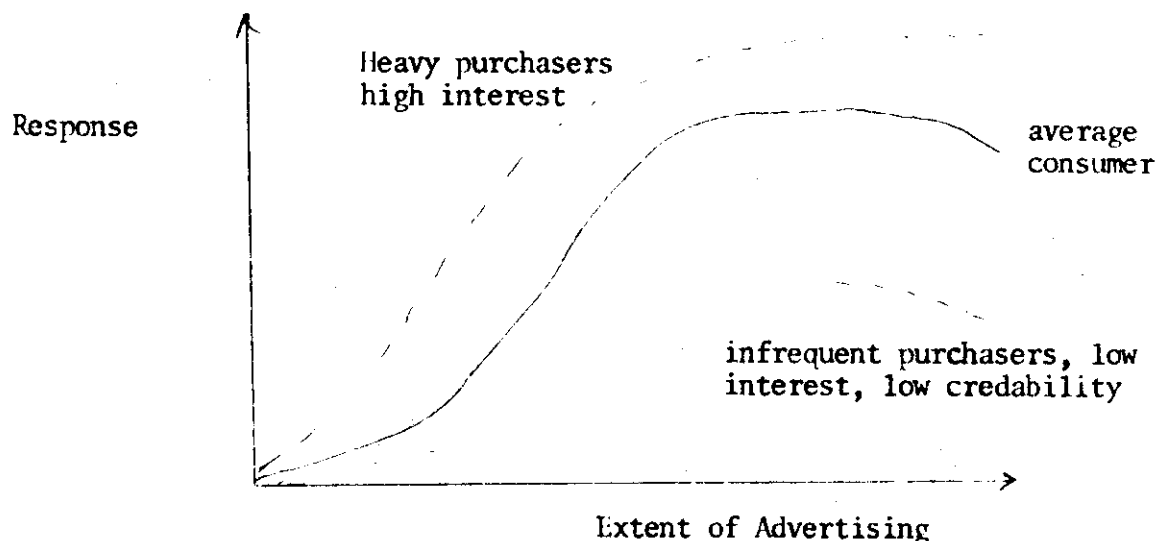
Individual Differences and Market Circumstances

Interest/involvement in the product category and credibility of the claims of the advertising are just some of the potential factors that may cause an individual to respond to advertising in some way. Interest and acceptance of claims may well be positively interrelated.

In a population there will be those who are interested and who may readily accept advertising claims and hence have low thresholds and high wearout points. There will be those at the other extreme for whom the advertising may never 'wear in'.

When drawing 'response curves' or doing surveys to monitor advertising response one must not forget that such curves or overall survey findings are aggregated responses. That is, they contain a variety of individual responses.

Consequently any statement of threshold advertising expenditure, or frequency of exposure, is an average. There may be segments of the audience who have very different thresholds than the average, depending on such things as their purchase/use of the products or services, interest and credibility. Strictly, then, a diagrammatic representation of responses to advertising could look like, for example:



Hence, for some target segments there may be a threshold, while for another segment there is none. Similarly wearout may occur for some audiences but not for others.

It was observed from the MCRC's survey that the sort of advertising thought unlikely to suffer wearout included that of a corporate-image nature and that which was low volume and/or highly seasonal. These types of advertising and all advertising is determined by the nature of the market place and the composition of the target audiences. These conditions are not readily changed and so some advertisers have more adverse conditions than others and are, perhaps, more subject to potential problems of thresholds and wearout. To judge what is necessary to overcome a threshold these advertisers can calculate what is the minimum necessary to reach their audience - this

is a minimum threshold. However there are other criteria that must be satisfied, not least of which is what competition are doing and how much "noise" there is in their chosen communication channel. Judgements have to be made about the most suitable creative treatment to convey the messages; they also have to be made about the necessary minimum frequency of delivery of the message to the audience, given the creative treatment and the other factors in the market place. Operationally the decision on the average frequency of advertisements delivered per week would seem to greatly influence threshold levels of expenditure or so it seemed from the MCRC survey. To further clarify thresholds we need to know more about the frequency effects of advertising.

For those in market situations of potential wearout of the advertising it seemed, from our survey, that memorable or well-liked themes and slogans helped prolong the advertising. It would seem that the creative platform and its careful nurturing and sensitive keeping-up-to-date is important in these situations. The basic marketing situation does not often change radically so why should the advertising, if it were 'right' in the first place?

3. FURTHER POINTS ON THRESHOLDS AND WEAROUT

During the course of our study it has become apparent that many factors can and do have an influence on the occurrence of thresholds or wearout. Some of these are peripheral to the main issues but are summarised in this section so as to bring them to everyone's attention since many would be important in particular circumstances.

THRESHOLDS

Awareness for New Products

One of the conclusions from the 'Diffusions of Innovations' studies of Rodgers and Shoemaker was that in order to gain acceptance a new product must gain between 20 and 30% awareness in the population to which it is addressed. This could be considered as a threshold. Good estimates can be made as to what is necessary, in advertising expenditure and effort terms, to achieve this level of awareness.

A fairly well tested formula for representing the growth in awareness is (X2):

$$A_n = A_0 + (A_{\max} - A_0)(1 - e^{-n})$$

where A_n = level of awareness after n repetitions

$A_{\max}$ = maximum level of awareness expected

A_0 = initial level of awareness before advertising

n = number of repetitions

e = constant (2.718)

The threshold level of advertising required for a new product is likely to be heavily influenced by the existing level of effort in advertising by existing products in the market. Often there is, more or less, an advertising 'entrance fee' into a market. If the existing products are collectively heavy spenders a new product will have a high threshold on advertising to enter the market.

Distribution Channels

The trade, or distribution channels, may have an influence on threshold levels of advertising in that they may demand, or expect, a minimum level of support for a new, or even, an existing product.

Media Change

There could well be a change in threshold level for a product being advertised in a new medium where it has not been advertised before. Either, the threshold would be higher because the advertising would have to 'establish itself' and consumers would have to 're-learn' to recognise the advertising in its new format; or, one could argue, the threshold would be lower because of the 'newness' and 'surprise' of the new media. Probably some objectives would be achieved more easily if the normal medium was changed while others would be hindered perhaps because of confusion. So, it comes back to considering objectives, their relative importance and how best to achieve them, when considering the effect of a change of medium.

Market Segments

Stress was placed earlier on the importance of considering that different segments of the population may respond differently and therefore have different threshold levels.

Those that have low thresholds i.e. those that respond quickly or easily to advertising, may not be very worthwhile customers. If they respond easily to your advertising they may respond easily to that of a rival. Perhaps the most worthwhile segment is that which has a high threshold: once they are persuaded they may stay customers for a long while.

Reductions in advertising effort

The MCRC's survey (Report No.12(ii)) showed that the majority of advertisers would follow much the same strategy if forced to reduce advertising for a product. Some demonstrated that they did advertise below their avowed thresholds. The claimed common preferred strategy was to withdraw from some regions in order to keep others above the threshold. However, large advertisers could reduce all round initially until they were approaching the threshold so the advised strategy for reducing probably depends on the normal levels of advertising.

WEAROUT

New products, relaunches

Some advertising campaigns have 'built-in' wearout in that one can only say 'new' in advertisements for just so long. It is important that this is realised well in advance so that the launch campaign and its treatment is such that it can be evolved and the post-launch advertising can be related to it. Advertising should be planned more than one year ahead so that wearout, if it is probable can be avoided.

Special Events

The advertising for special events also has built-in wearout. Once the event is over the advertising is redundant. It is suggested by some that advertising for special events should be of a concentrated burst nature to avoid premature wearout. A long, drawn out campaign advertising an event in which people might not be all that interested would run the risk of premature wearout.

Negatives

Several case studies have been observed where advertising stressed negatives, in the product or service being advertised, while attempting to refute them. This is usually unsuccessful and risks rapid wearout of a negative response nature. The refuting of negative aspects of a product or service e.g. this is not poisonous, we are not old fashioned, has to be treated so carefully not to prompt undesired responses.

Additional wearout signs

Earlier, it has been stressed that in considering both thresholds and wearout one must monitor the specific advertising objectives rather than surrogates like 'liking'. However there are some necessary ingredients to long-lasting advertising but their importance will vary from circumstance to circumstance. 'Liking' and 'Entertainment' are aspects of advertising that may affect wearout if they decline, particularly in media that are expected to entertain. If the audience begin to feel they are being 'coerced' they may react undesireably and the result would be as if the advertising had worn out. Complaints and expressions of annoyance may be signs of wearout but one must stress that it depends on what the advertising objectives are. If they are solely to gain attention to the product name then the provoking of annoyance may have the desired result of gaining in saliency.

Media

It was expected by the MCRC that the frequency of change of advertising treatments in the press would be higher than that for TV. It is technically cheaper and to some degree might be expected by the audience since the newspaper or magazine is different in content each time. However this was not really shown to be the case in our survey which probably demonstrates that advertising practices are very varied and depend on individual circumstances in the market place.

Hence, repetition is desirable and doesn't risk wearout where the product category or the medium is of low interest or involvement to the audience. Variety, and repetition, are the ingredients of good communications since people need and use 'redundancy' and that which is redundant is often not consciously perceived anyway.

Segments

Much of what was said about the importance of different responses in different segments to thresholds is also true of wearout. Maybe those who respond to advertising quickly will also tire of it quickly, or be attracted to, and respond to, other, rival advertising.

Seasonality

The seasonality of a market and its advertising may affect the repeatability, or lack of wearout, of a theme or treatments. Something that is only advertised for a short while with a long break in-between seems a low wearout risk.

4. MONITORING AND MEASURING

The key to monitoring threshold and wearout points would seem to be the possession of advertising objectives and expected responses for the various segments in a market. Surveys can then be mounted to assess the degree to which the desired responses, and their magnitude, are being achieved.

Other factors are involved in that they may influence the response to advertising. However, it is the achievement of the underlying advertising objectives that is important - this must be monitored. It is no good having 'entertaining' advertising which only entertains and does not convey its underlying purpose of maintaining attitudes or conveying product information or whatever. Hence these other factors - liking, entertainment, etc. - should be monitored as well, but should not be the criteria for judging threshold or wearout points.

It is useful to remember that it is the response to the advertising by individuals in the audience that either fails to achieve a particular threshold level or which wears out.

Wearout

A definition of the wearout point could be that at which actual advertising response begins to differ, negatively, from that expected. Hence, if a response to advertising has been forecast, the existence of wearout could be detected when a deviation from planned response starts to emerge.

As stated above, advertising objectives are the things to be monitored; if they are still being achieved at a satisfactory level then advertising has not worn out.

The secondary factors for consideration are such things as:

liking, annoyance, entertainment, boredom, complaints

These could be tracked over time. If they begin to change adversely it may be an early warning of wearout. It must be remembered that they are secondary factors, though. Questions that are used to monitor these secondary factors include, for example "Would you like to see more of this type of advertisement?"

Any advertisements that do not seem capable of achieving their objectives when pre-tested are candidates for early wearout.

An interesting question to include in pre-tests for TV is: "Could you estimate how long that advertisement lasted (in seconds)?" Advertisements which people do not like, find boring, are not interested in or have seen too often before etc., are said to last longer than they actually do. Advertisements in which people are interested and to which they respond positively often are claimed to be shorter than they really are.

Thresholds

Much of what has been said regarding wearout also applies to the monitoring of thresholds.

It should be remembered that many quantities that are required to be measured after some advertising will not initially be at a zero level. The awareness of a non-existent product, or its advertising, but supposedly made by a well known manufacturer could be, typically, 8% of a target audience.

Some companies might be seen as having a built-in low threshold for their advertising because of this 'artificially' high initial awareness or attitudes towards its products.

Some difficulties of measurement

Low interest/involvement.

It can be difficult to gain meaningful answers to questions involving products, or services, of low interest to consumers. It can be particularly difficult if there is one well known product in a market and several minor ones - to monitor advertising effects on the minor ones requires special

effort. Minor products may have their advertising effects swamped by the major one. It may be best to try to split the market in the mind of the respondent into major and minor products and their advertising, to gain anything like realistic measures of advertising effects on the minor ones.

Recall and Recognition (3)

Sometimes some of the objectives of advertising are to prompt people to recall or recognise features of a product or service. When monitoring the degree of achievement of these objectives one must realise that, in general, 'recall' is more difficult for respondents than the 'recognition' of something shown to them. If the context in which something was learnt changes then, often recognition is impaired more than recall. This could have a bearing on apparent threshold and wearout levels if the medium for an advertising campaign is changed. Common words and symbols are more easily recalled after learning (exposed to advertising) than uncommon ones. Hence the creative treatment of advertising could effect thresholds for this reason, among others. It could also affect the degree of response picked up via a survey.

5. CONCLUSIONS

Thresholds and wearout are believed to exist in advertising: advertisers appear to behave as though they are operational risks to be avoided.

It is possible to define quantitatively the minimum amount of advertising necessary to reach members of an audience, on average once, via a particular channel, or combination of channels. It is possible to monitor the response to such advertising or to estimate it and so to define a minimum 'threshold' level. Whether such a response is 'worthwhile' is the difficult question. To similarly calculate a wearout level is not so possible.

It has been stressed that it is individual's response to advertising which causes thresholds and wearout. Such response is likely to be influenced by many factors, not just other advertising. An attempt has been made in this report to summarise some of the many, potential influences on thresholds and wearout.

Further research

Two avenues would seem open for further exploring the levels of advertising at which thresholds and wearout are likely to occur in differing circumstances.

Firstly, the MCRC would gather together many more examples of current advertising practice to compare and contrast this for similar products and marketing circumstances to try to understand the causes of variations.

Secondly, some form of experimentation would be undertaken to examine the effects of repetition and repetition rates on the response to advertising. In many ways it would seem that understanding repetition effects and the way these effects are modified by other advertising and marketing factors lies at the heart of understanding thresholds and wearout. The MCRC's proposal for conducting research to clarify the 'missing link' between advertising and behaviour would also allow further clarification of thresholds and wearout. Essentially it is proposed that advertisements be 'pre-tested' to try to determine the hierarchy of responses to the advertisements. Allowance for repetition of advertisements would be built into the research design.

(Please see 'Advertising and Purchase Behaviour: Research to find the missing link' - an MCRC discussion paper).

REFERENCES

1. Bowstead, G M, Rowntree Mackintosh. Private correspondence.
2. Light, L. "An experimental study of the effects of repeated persuasive communication on attitudes and awareness"
Unpublished Dissertation. Ohio State Univ. 1967
3. Brown, J. ed "Recall and Recognition" Wiley 1971.

Appendix 1

<u>Cumulative Expenditure</u> (£10,000)	<u>Marginal Response</u>	<u>Cumulative Response</u>	<u>Average Annual Response/yr.</u>
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	2	2	0.4
6	4	6	1.3
7	6	12	2.9
8	8	20	5.0
9	10	30	7.8
10	10	40	11.0
11	10	50	14.5
12	10	60	18.3
13	10	70	22.3
14	8	78	26.3
15	6	84	30.1
16	4	88	33.7
17	2	90	37.1
18	0	90	40.0
19	0	90	42.6
20	0	90	45.0
21	0	90	47.1
22	-2	88	49.0
23	-4	84	50.5
24	-6	78	51.7
25	-8	70	52.4
26	-10	60	52.7
27	-10	50	52.6
28	-10	40	52.2
29	-10	30	51.4
30	-10	20	50.4
31	-10	10	49.0
32	-10	0	47.5
33	-10	-10	45.8
34	-10	-20	43.8
35	-10	-30	41.7

Appendix 2

Further explanation of threshold or wearout points

Cumulative Expenditure (Diagram 1)

The Threshold occurs when:

	<u>Marginal Response</u>	<u>Cumulative Response</u>
EITHER (T1)	becomes non-zero (or non-negligible or detectable?)	becomes non-zero (or non-negligible or detectable?)
OR (T2)	reaches maximum	reaches maximum rate of increase

Wearout occurs when:

EITHER (W1)	drops below maximum	drops below maximum rate of increase
OR (W2)	becomes zero	becomes constant
OR (W3)	becomes negative	decreases
OR (W4)	-	becomes negative

Rate of Expenditure (Diagram 2)

The Threshold occurs when the average response:

EITHER (Ta)	becomes non-zero (or non negligible or detectable?)
OR (Tb)	reaches maximum rate of increase

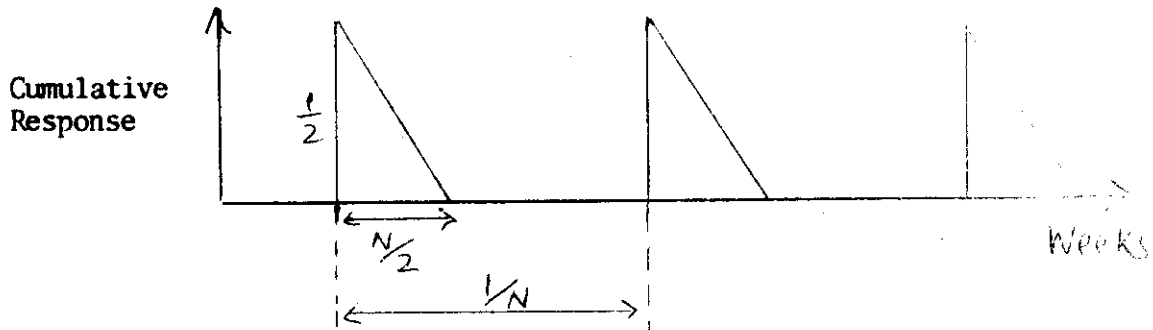
Wearout occurs when the average response:

EITHER (Wa)	drops below maximum rate of increase
OR (Wb)	becomes constant
OR (Wc)	decreases
OR (Wd)	becomes negative

Appendix 3

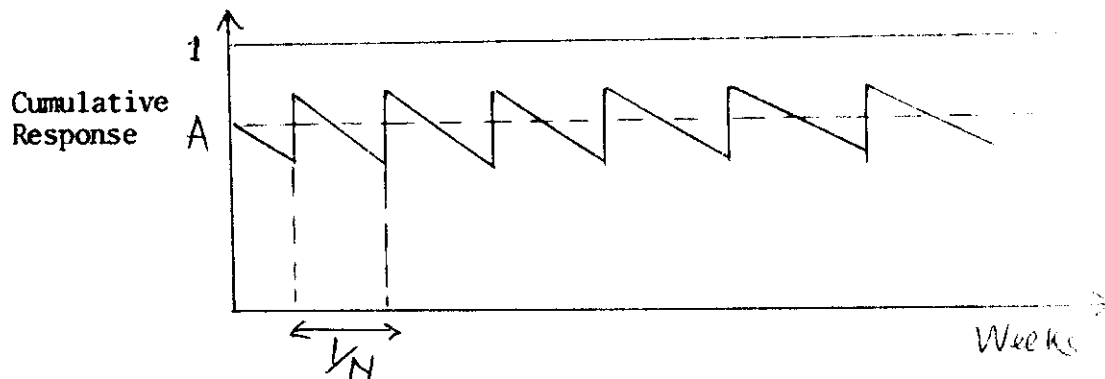
Take the maximum possible response arbitrarily as unity. Assume each advertisement moves the consumer half-way from his present cumulative response towards the maximum. Assume that between advertisements he forgets at a rate of $\frac{1}{N}$ per week when N = No. of ads per week. Then:

- (a) If N is less than N_2 , the advertising is completely forgotten between advertisements.



$$\text{The average response} = \frac{\frac{1}{2} \cdot \frac{N}{2}}{\frac{1}{N}} = \frac{N^2}{8}$$

- (b) If N is greater than N_2 , an equilibrium level is reached where the gain at each exposure equals the loss between exposures.

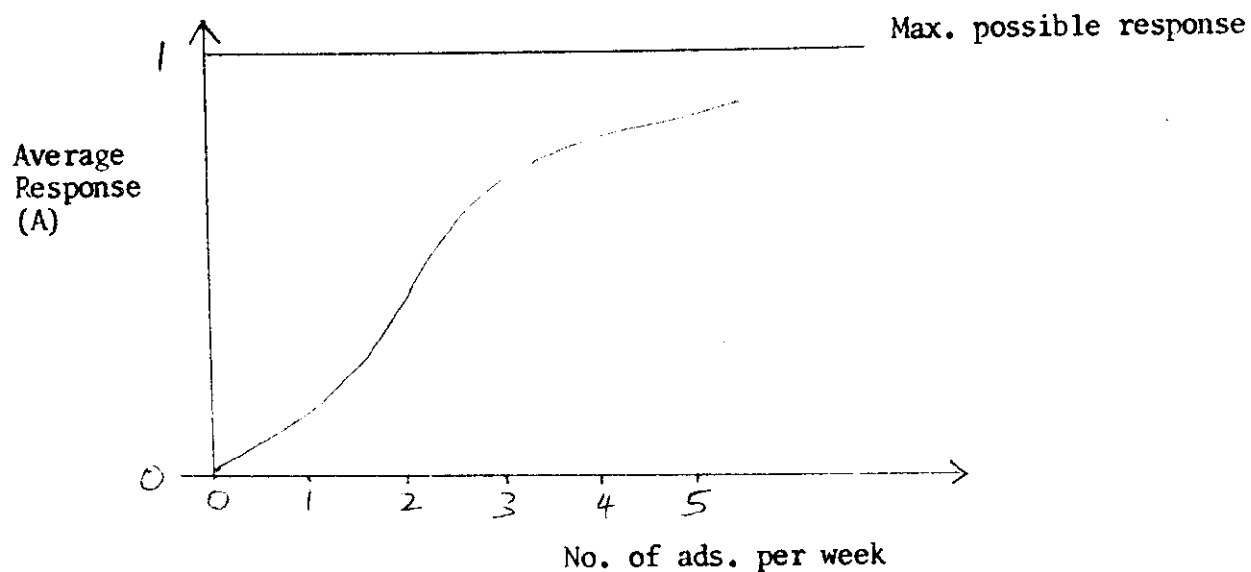


If the average response is A , then the response varies between $1 - \frac{2}{3}(1-A)$ and $1 - \frac{1}{3}(1-A)$ - since each exposure halves the distance below the maximum possible level. The loss between exposures = $\frac{1}{N^2}$ (i.e. a rate of $\frac{1}{N}$ per week for $\frac{1}{N}$ weeks) which must equal $\frac{2}{3}(1-A)$. Simplifying, we get

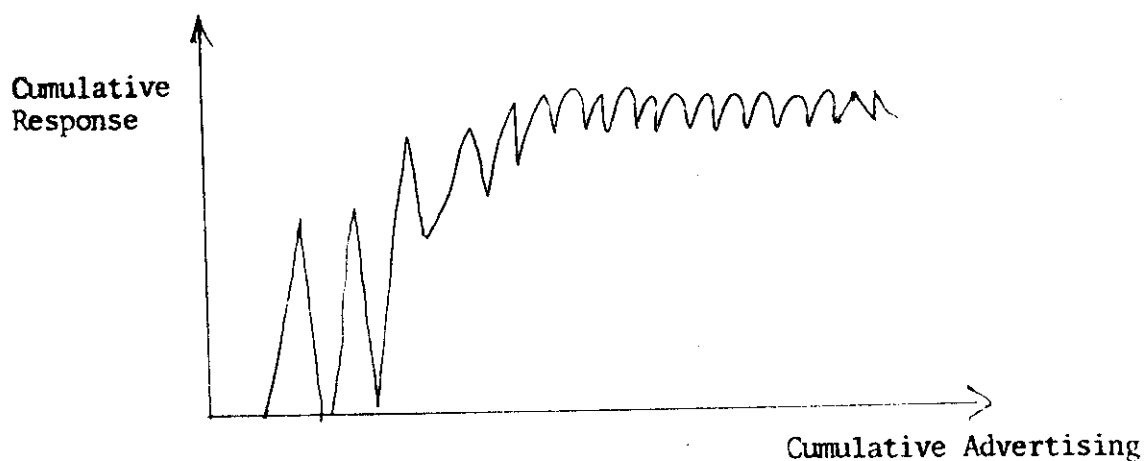
$$A = 1 - \frac{3}{2N^2}$$

Plotting (a) $A = \frac{N^2}{8}$ for $N \leq 2$, and

(b) $A = 1 - \frac{3}{2N^2}$ for $N \geq 2$ we obtain the curve below which demonstrates the threshold and wearout effects.



Note that, from a cumulative response function which is, in general, of the form:



we have derived a function relating average response to rate of advertising.