

A SHORT NOTE ON QUESTIONNAIRE FORM DESIGN AND THE LIMITS OF HUMAN PROCESSING CAPACITY

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Navorsers maak dikwels met die beste bedoelings die fout om die mens se kapasiteit om inligting te prosesseer, uit die oog te verloor. Die gemiddelde individu kan, volgens studies deur George A Miller, '2,5 stukkies' inligting gelyktydig behartig. Die stuk verwys ook na ander navorsing wat duidelik aantoon dat die mens se vermoë om inligting te prosesseer en tussen prikkels te onderskei, afneem soos die aantal prikkels toeneem. Hierdie begrip in verband met die mens se reaksie teenoor stimuli is van belang vir bemarkers, en ook veral vir navorsers wat vraeboë opstel. 'n Te groot verskeidenheid prikkels of alternatiewe kan dikwels resultate verswak.

It seems astounding that many well-meaning and highly intelligent researchers could make the fundamental error of ignoring man's information processing capacity, yet they do.

Anyone who has read the highly informative book, *The Psychology of Communication*, by George A. Miller (Pelican 1970) will know of his article 'The Magical Number Seven, Plus or Minus Two', an article which has received wide publicity in academic books, journals and articles.

What George A. Miller tried to point out, and did so convincingly, was that there are severe limitations in man's capacity to transmit and receive information. He shows, in fact, that the amount of information the average individual can absorb is to the order of '2,5 bits'.

INFORMATION THEORY

In case any readers are not familiar with information theory, this word 'bit', or 'bit of information' needs explaining. One 'bit' of information is the amount of information that we need to make a decision between two equally likely alternatives. If we must decide whether a man is more than 1,75 meters tall, or less than 1,75 meters tall, and the chances are fifty-fifty either way, we need one 'bit' of information to help us make a decision. Two 'bits' of information enable us to decide among four (2×2) equally likely alternatives. Three 'bits' of information between eight ($2 \times 2 \times 2$) equally likely alternatives. Four 'bits' of information between sixteen ($2 \times 2 \times 2 \times 2$) equally likely alternatives. And so on.

We can stop there because few researchers ask individuals to choose between more than sixteen alternatives. But most certainly, many researchers do design their questionnaires so that the individual has to rank his preferences between ten or twelve choices, or more. The question is: can this be done, and if so, with what validity? Is the individual really capable of deciding (ranking) his eighth, ninth, or tenth preferences?

MAN'S INFORMATION-PROCESSING LIMITATIONS

What George A. Miller took pains to point out was that confusions will appear in the individual once we approach his information processing 'channel capacity'; that individuals are simply not capable of making absolute judgements of the kind 'this is better than that . . . ' when faced with a range of unlimited possibilities.

Miller quotes many examples of research to show that man is very poor at processing information and discriminating between different stimuli. These include:

- * Pollack (1) showed that while listeners never confused two or three notes of different frequency in a range from 100 to 8000 cps., when asked to identify a note out of *five* possibilities, confusions were frequent.
- * Garner (2) assessed how well the individual could differentiate between different degrees of loudness. Again, once there was a choice of more than *five* possibilities, confusions occurred.
- * Beebe-Center, Rogers and O'Connell (3) showed that absolute judgements for taste was even less discriminating than for hearing. Most individuals can only distinguish about *four* distinct concentrations of salt in solutions ranging from 0,3 to 34,7 g NaCl per 100 cc tap water.
- * Hake and Garner (4) asked observers to judge lengths of makers. Observers managed to differentiate between *ten and fifteen positions*.
- * Eriksen (5) discovered that as far as colour was concerned, man could distinguish about *seven to nine* colour hues and brightness under a wide range of experimental conditions.

These experiments into man's information processing capacity can easily be verified by the reader. Try writing down on a scrap piece of paper the names of as many soft drinks, or washing powders, or brands of coffee as you can think of. You'll find that after about 2,5 bits of information, say six or seven selections, you

start slowing right down and "get stuck" at that magic number of seven, plus or minus two.

SIGNIFICANCE FOR MARKETERS

Man's inability to perceive differences between stimuli, his tendency to 'generalise', is a phenomenon well-known to marketers, of course. Brand proliferation is based upon this principle. Marketers recognise all too well the importance of 'positioning' their products high up in the consumers 'evoked set' of products that are easily recallable to mind. They know full well that if, in terms of 'preference ordering', their product is fourth, fifth or sixth in line, (or worse), in the consumer's recall memory, they'll have a darned hard job influencing that customer because there is just too much 'noise' and competing information in the communication system distracting the consumer's attention away from their product.

Indeed, the well-known weakness of the 'economic man' theory is that there are just too many products and too much information for the consumer to be aware of all purchase possibilities, or to rank the product's relative strengths and weaknesses.

What's more, as Peter Gould and Rodney White have shown in their book, *Mental Maps* (Pelican 1974), where the individual is faced with a number of decisions requiring value-judgements, he compresses conflicting information into one residue surface. Which means, that if an individual is asked to rank a product, or service, in terms of its relative social, economic, cultural, physical and other benefits, that individual will be unable to make objective judgements concerning, say, physical appearances, if the basic criterion that is *relevant* to him is, say, the social benefit.

SPECIFIC CRITICISM

However, my criticism of the researchers is not *quantitative* (that there is too much information for the human being to be able to make value-judge-

ments) but *qualitative* (that consumer's information processing capacity is just too limited for the tasks set him by the researcher). The consumer cannot without a fair measure of guesswork, make that 'sixth', 'seventh', and 'eighth' choice, let alone the 'ninth', 'twelfth', or 'fourteenth'.

Many researchers intuitively recognise this, of course. Likert with his Likert scales asks respondees to make an assessment along a five- or seven-point scale, and not more. And that choice from among seven possibilities is about the best we poor humans are capable of ($7 = \pm 2.5$ bits of information).

In short, the problem is that researchers, in their desire for more information and greater degrees of accuracy, are designing questionnaires which ask the individual to do more than he is capable of. One such research, on my desk as I write, has a thirteen-point ranking system. I flunked out after six and stabbed guesses at the rest. The researcher's intention of pinpoint accuracy thus incurs a 'scatter effect' as my choices after the first six are virtually random selection — presumably not what the researchers intended.

So, let's get back to basics by considering the fundamentals — man's information processing capacity — and keep within the limits of that magical number 7.

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