A note concerning a BASIC display generator for search tasks

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Stimulus materials for visual search experimentation of the sort performed by Neisser (1963) and later by Kristofferson (1972) often take the form of lists of, or matrices containing a number of background elements and a number of targets. In this context, elements and targets might well be numbers, letters, words, or other characters or character strings. In such experiments, an important variable underlying search or scanning time is the serial position of the target(s), that is, the number of earlier items (see Neisser, 1963).

A BASIC program is presented below which can conveniently prepare stimulus materials of this type. The user is able to determine the number of matrices and their size as well as the elements to be used as targets and background. These may be any characters or character strings. The program randomly generates a matrix of background elements and then allocates the target(s) to random positions within it. For each target, a count is made of the number of preceding elements, while a count is also made of the frequency of each nontarget; these details are output after each matrix.

Program Input. At Line 30 the number of matrices required (M) and the number of rows and columns required in each matrix (R and C) are input. Note that C is the number of elements in each row, where each element might occupy more than one character position as determined by the user. At Line 40 the number of targets (T) and the number of background elements (S) are input. Finally, the targets and then the background elements are input stepwise.

Table 1
A BASIC Display Generator for Search Tasks

```
10   REM SEARCH MATERIALS PROGRAM
20   DIM A£(50,50),T£(20),S£(100),T(20),S(100)
30   INPUT M,R,C
40   INPUT T,S
50   FOR I=0 TO T-1
60   INPUT T£(I)
70   NEXT I
80   FOR J=0 TO S-1
90   INPUT S£(J)
100  NEXT J
110  FOR U=1 TO M
120  MAT S = ZER
130  FOR K=0 TO R-1
140  FOR L=0 TO C-1
150  LET X=INT(S*RND(0))
160  LET A£(K,L)=S£(X)
170  LET S(X)=S(X)+1
180  NEXT L
190  NEXT K
```

```
200  FOR N=0 TO T-1
210  LET Y1=INT(R*RND(0))
220  LET Y2=INT (C*RND(0))
230  LET Z=0
240  IF A£(Y1,Y2)<>S£(Z) THEN 270
250  LET S(Z)=S(Z)-1
260  GOTO 300
270  LET Z=Z+1
280  IF Z=S THEN 210
290  GOTO 240
300  LET A£(Y1,Y2)=T£(N)
310  LET T(N)=Y1*C+Y2
320  NEXT N
330  FOR 0=0 TO R-1
340  FOR P=0 TO C-1
350  PRINT A£(0,P);
360  NEXT P
370  PRINT
380  NEXT 0
390  IF T=0 THEN 440
400  PRINT "TARGET","NO. OF EARLIER ELEMENTS"
410  FOR Q=0 TO T-1
420  PRINT T£(Q),T(Q)
430  NEXT Q
440  PRINT "NONTARGETS","FREQUENCY"
450  FOR Y=0 TO S-1
460  PRINT S£(Y),
470  IF S(Y)>=0 THEN 490
480  LET S(Y)=0
490  PRINT S(Y)
500  NEXT Y
510  NEXT U
520  STOP
530  END
```

Program Limitations. Apart from the DIM restrictions in Line 20, T may be any value $\geqslant 0$ provided that $R*C \geqslant T$, as each target must be found a location in the matrix. S may be any value > 0, subject to the same DIM statement. If the BASIC compiler used is unable to execute Line 120, this may be replaced by:

```
120  FOR A = 0 TO S - 1
122  S(A) = 0
124  NEXT A
```

Computer and Availability. The program was developed on an ICL 1902S computer. Sample output and program listings are available (at no cost) from the author at the School of Psychology, Manchester Polytechnic, Gaythorn Annexe, River Street, Manchester, England M15 5FG.

REFERENCES

KRISTOFFERSON, M. W. Types and frequency of errors in visual search. *Perception & Psychophysics*, 1972, **11**, 325-328.

NEISSER, U. Decision-time without reaction-time: Experiments in visual scanning. *American Journal of Psychology*, 1963, **76**, 376-385.

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