THE EFFECT OF CLIMAX AND ANTICLIMAX ORDER OF PRESENTATION ON MEMORY

By HENRY FOSTER ADAMS, University of Michigan

In previous papers,¹ the memory efficiency of size of advertisements, of their frequency of presentation with both duplication and variation, and of mixed sizes of advertisements, have been discussed. In the last paper mentioned, it was found that the memory value of the same total amount of space varied as it was made up of different combinations of sizes. For instance a series made up of 3 half and 1 quarter page advertisements of the same commodity was found to have a greater memorability than a similar series composed of 1 full and 3 quarter pages, yet the total area is the same in both cases, 1.75 pages, and the number of presentations is 4 in each case.

But a question which was left unsolved in that experiment was whether the order in which the mixed sizes were presented to the subject had any effect upon the memorability of the series. For example, if a firm advertises 4 times with mixed sizes of advertisements, is it more effective upon memory to present the larger sized advertisements at the beginning or end of the series.

To test the point 3 dummies were prepared, as follows. In dummy A, for instance, each firm advertised 4 times, the different insertions being variations and at least two sizes of advertisements being included in the 4 insertions. Each different arrangement of sizes was likewise represented by four different firms. With two of the firms, the larger sizes appeared first, followed by the smaller ones and with the other two firms for the same combination of sizes, the advertisements of smaller area appeared first, followed by the larger ones. In all, the following combinations were presented:—

¹ The Relative Importance of Size and Frequency in Forming Associations, *J. of Phil., Psy., and Sci. Meth.*, Vol. XII, 1915, pp. 477-491.

The Relative Memory and Values of Duplication and Variation in Advertising, *ibid.*, Vol. XIII, 1916, pp. 141-152.

The Memory of Mixed Sizes of Advertisements, *J. of Exper. Psychol.* Vol. II, 1917, pp. 448-465.

Dummy	A	B	C
FFFH	2	2	2
HFFF	2	2	2
FFFQ	2	2	2
QFFF	2	2	2
FFHH	2	2	2
HFFF	2	2	2
FFQQ	2	2	2
QOFF	2	2	2
FFHQ	2	2	2
QHFF	2	2	2
FHHH	2	2	2
HHHF	2	2	2
FQQQ	2	2	2
QOOF	2	2	2
FHHQ	2	2	2
QHFF	2	2	2
FHOQ	2	2	2
QOHF	2	2	2
HHHQ	2	2	2
QHFF	2	2	2
HHQQ	2	2	2
QOHH	2	2	2
HQQQ	2	2	2
QQQH	2	2	2
	48	48	48 144

In the experiment, part of the subjects began reading the dummy at page 1 and went along progressively to the end; others began at the end and read back to page 1. This was easily accomplished by turning the dummy upside down. Therefore, to those subjects who read the dummy through in the forward direction, the advertisements of a certain firm would be seen in the order FFFH; while to those who read it through in the reverse direction, the same advertisements of the same firm would appear in the order HFFF. In this way each series of advertisements was seen by the subjects in both the climax and anti-climax order. For the sake of convenience of expression, the series of advertisements is said to be in the climax order if the smaller spaces appear first followed by the larger ones; in the anti-climax order if the larger spaces are seen first followed by the smaller ones.

With dummy A, 93 subjects were used in the direct or forward order of reading, 68 in the reverse order; in dummy B 95 in the direct order, 58 in the reverse; in dummy C 79 in the forward order and 70 in the reverse order. This makes a total of 463 subjects.

Since the results of the experiments may be considered in several ways and the conclusions to be drawn from the experiment depend in part upon the method of treatment, the original data will be presented. It is given in Table I.

TABLE I

Order of Ads.	Dummy A				Dummy B				Dummy C			
	D	R	Ant	Ch	D	R	Ant	Ch	D	R	Ant	Ch
FFFH	137	103	137	103	53	29	53	29	92	76	92	76
HFFF..	78	64	78	64	48	21	48	21	48	52	48	52
	70	65	65	70	49	30	30	49	72	71	71	72
	70	53	53	70	58	34	34	58	69	92	92	69
	333			307	165			157	303			269
FFFQ.	74	56	74	56	49	26	49	26	76	81	76	81
QFFF... ..	121	82	121	82	38	18	38	18	84	71	84	71
	104	86	86	104	36	11	11	36	32	34	34	32
	51	37	37	51	53	28	28	53	52	49	49	52
	318			293	126			133	243			236
FFHH.... .	55	42	55	42	44	22	44	22	66	81	66	81
HFFF.. ..	71	62	71	62	50	22	50	22	17	35	17	35
	91	66	66	91	83	50	50	83	22	37	37	22
	110	91	91	110	23	11	11	23	87	89	89	87
	283			305	155			150	209			225
FFQQ.....	23	22	23	22	57	15	57	15	87	101	87	101
QQFF.. . .	115	87	115	87	57	29	57	29	95	81	95	81
	28	39	39	28	33	22	22	33	107	113	113	107
	32	38	38	32	100	61	61	100	35	47	47	35
	215			169	197			177	342			324
FFHQ	77	51	77	51	27	5	27	5	22	22	22	22
QHFF.	57	45	57	45	114	54	114	54	36	57	36	57
	76	61	61	76	30	15	15	30	89	95	95	89
	36	30	30	36	37	17	17	37	55	67	67	55
	225			208	173			126	220			223
FHHH.	60	41	60	41	59	26	59	26	18	27	18	27
HFFF.	65	36	65	36	101	61	101	61	118	110	118	110
	88	57	57	88	18	7	7	18	106	91	91	106
	60	63	63	60	55	27	27	55	61	53	53	61
	245			225	194			160	280			304
FQQQ.....	70	68	70	68	65	30	65	30	25	23	25	23
QQQF... ..	24	10	24	10	45	10	45	19	59	61	59	61
	81	28	28	31	74	43	43	74	44	65	65	44
	50	36	36	50	52	21	21	52	96	87	87	96
	155			159	174			175	236			224
FHHQ.....	27	26	27	26	24	10	24	10	59	62	59	62
QHFF.....	33	26	33	26	105	43	105	43	41	50	41	50
	50	49	49	50	63	34	34	63	104	83	83	104
	9	12	12	9	13	8	8	13	35	46	46	35
	121			111	171			129	229			251
FHQQ... ..	42	38	42	38	37	21	37	21	77	78	77	78
QQHF.	60	40	60	40	97	48	97	48	92	88	92	88
	91	84	84	91	29	17	17	29	52	70	70	52
	35	40	40	35	66	28	28	66	12	15	15	12
	226			204	179			164	254			230

TABLE I—*Continued*

Order of Ads.	Dummy A				Dummy B				Dummy C			
	D	R	Amt	Ch	D	R	Amt	Ch	D	R	Amt	Ch
HHHQ.	72	54	72	54	16	4	16	4	64	50	64	50
QHHH. . . .	58	40	58	40	20	14	20	14	66	62	66	62
	21	22	22	21	79	30	30	79	62	65	65	62
	24	15	15	24	33	19	19	33	31	51	51	31
	167 139				85 130				246 205			
HHQQ.....	5	10	5	10	8	6	8	6	39	52	39	52
QQHH.. . .	71	46	71	46	71	23	71	23	30	45	30	45
	11	10	10	11	48	16	16	48	86	79	79	86
	11	10	10	11	16	8	8	16	36	28	28	36
	106 78				103 93				166 219			
HQQQ... . .	9	12	9	12	18	5	18	5	18	22	18	22
QQQH	17	8	17	8	87	47	87	47	15	25	15	25
	12	23	23	12	18	9	9	18	65	37	37	65
	5	10	10	5	83	46	46	83	17	22	22	17
	59 37				160 153				92 129			

The column of initials at the left gives the order of presentation of the advertisements, F standing for full page, H for half page and Q for quarter page. The second, labeled D, gives the gross credits received by the various series of advertisements when the subjects read in the forward or direct order, starting at page 1. The third column, labeled R gives the gross credits received by the advertisements when the dummy was read through in the reverse direction. The fourth column, headed by Amt. gives the credits for the advertisements which were read through in the anti-climax order; and in the fifth column, headed Cli. the credits for those advertisements which were read through in the climax order. The other columns gives the same data for dummies B and C.

TABLE II

	Dummy A		Dummy B		Dummy C		Total	
	Anti	Ch	Anti	Ch	Anti	Ch	Anti	Ch
FFFH.....	333	307	165	157	303	269	801	733
FFFH.....	318	293	126	133	243	236	687	662
FFHH.....	283	305	155	150	209	225	647	680
FFQQ.....	215	169	197	177	342	324	754	670
FFHQ.....	225	208	173	126	220	223	618	557
FHHH.....	245	225	194	160	280	304	719	689
FOQQ.....	155	159	174	175	236	224	565	558
FHHQ.....	121	111	171	129	229	251	521	491
FHQH.....	226	204	179	164	254	230	659	598
HHHQ.....	167	139	85	130	246	205	498	474
HHQQ.....	106	78	103	93	166	219	375	390
HQQQ.....	59	37	160	153	92	129	311	319
	2453	2235	1882	1747	2820	2839	7155	6821
							105	100

In Table II, a summary of the climax and anti-climax effects

is given, indicating that the anti-climax order of presentation is somewhat more effective as far as memory is concerned.

But it must be remembered that these are gross figures and furthermore that unequal numbers of subjects were used in the forward and backward turning of the pages of the dummy. To compensate for this the credits for each advertisement were put into percentages which were multiplied

TABLE III

Order of Ads.	A				B				C			
	D	R	Ant	Ch	D	R	Ant	Ch	D	R	Ant	Ch
FFFH . . .	529	494	529	494	218	244	218	244	332	262	332	262
HFFF . . .	302	306	302	306	198	176	198	176	174	179	174	179
	270	312	312	270	201	252	252	201	259	245	245	259
	270	254	254	270	238	286	286	238	248	318	318	248
	1397 1340				954 859				1069 948			
FFFQ. . . .	286	268	286	268	202	218	202	218	275	280	275	280
	466	393	466	393	156	151	156	151	304	245	304	245
	402	412	412	402	148	92	92	148	108	118	118	108
	198	177	177	198	218	235	235	218	187	170	170	187
	1341 1261				685 735				867 820			
FFHH... . .	213	201	213	201	181	185	181	185	238	280	238	280
HHFF... . .	275	296	275	296	206	185	206	185	61	121	61	121
	352	316	316	352	341	420	420	341	79	128	128	79
	425	435	435	425	94	92	92	94	314	308	308	314
	1239 1274				899 805				735 794			
FFQQ . . .	89	102	89	102	235	126	235	126	314	350	314	350
QQFF . . .	445	415	445	415	235	244	235	244	344	280	344	280
	104	187	187	104	135	185	185	135	385	390	390	385
	124	182	182	124	410	512	512	410	126	163	163	126
	903 745				1167 915				1211 1141			
FFHQ... . .	298	244	298	244	106	42	106	42	79	76	79	76
QHFF . . .	221	215	221	215	469	454	469	454	130	196	130	196
	293	293	293	293	123	126	126	123	320	338	338	320
	149	144	144	149	152	143	143	152	199	232	232	199
	956 901				844 771				779 791			
FHHH	232	198	232	198	243	218	243	218	65	93	65	93
HHHF	251	172	251	172	420	511	420	511	426	380	426	380
	340	264	264	340	74	59	59	74	381	315	315	381
	232	302	302	232	226	227	227	226	219	183	183	219
	1049 942				949 1029				989 1073			
FQQQ	270	325	270	325	268	251	268	251	90	80	90	80
QQQF	93	48	93	48	185	159	185	159	214	210	214	210
	119	134	134	119	304	362	362	304	158	224	224	158
	193	172	172	193	214	177	177	214	345	301	301	345
	669 685				992 928				829 793			
FHHQ... . .	102	124	102	124	99	84	99	84	214	213	214	213
QHHF	128	124	128	124	431	362	431	362	148	172	148	172
	193	234	234	193	259	285	285	259	374	287	287	374
	35	58	58	35	53	67	67	53	126	159	159	126
	522 476				882 758				808 885			

TABLE III—Continued

Order of Ads.	A				B				C			
	D	R	Ant	Ch	D	R	Ant	Ch	D	R	Ant	Ch
FHQQ	162	182	162	182	152	176	152	176	278	269	278	269
QQHF	232	191	232	191	398	403	398	403	332	303	332	303
	351	403	403	351	119	143	143	119	187	242	242	187
	135	191	191	135	271	235	235	271	43	52	52	43
	988 859				928 969				904 802			
HHHQ	279	258	279	258	66	33	66	33	231	172	231	172
QHHH	224	191	224	191	82	117	82	117	239	213	239	213
	81	103	103	81	324	252	252	324	223	225	225	223
	93	72	72	93	135	160	160	135	111	176	176	111
	678 623				560 609				871 719			
HHQQ	20	48	20	48	33	50	33	50	141	179	141	179
QQHH	274	220	274	220	292	193	292	193	108	155	108	155
	42	48	48	42	197	135	135	197	300	273	273	301
	42	48	48	42	66	67	67	66	129	97	97	129
	390 352				527 506				619 764			
HQQQ	35	57	35	57	74	42	74	42	65	76	65	76
QQQH	66	38	66	38	358	394	358	394	54	86	54	86
	46	110	110	46	74	76	76	74	234	128	128	234
	19	48	48	19	340	387	387	340	61	76	76	61
	259 160				895 850				323 457			

by 100 to avoid the use of decimal points. This data is presented complete in Table III, and in summarized form in Table IV. Again we have a suggestion that the anti-climax order is somewhat more efficient than in the climax.

TABLE IV

	Dummy A		Dummy B		Dummy C		Total	
	Anti	Ch	Anti	Ch	Anti	Ch	Anti	Ch
FFFH	1397	1340	954	859	1069	948	3420	3147
FFFO	1341	1261	685	735	867	820	2893	2816
FFHH	1239	1274	899	805	735	794	2873	2873
FFQQ	903	745	1167	915	1211	1141	3281	2801
FFHQ	956	901	844	771	779	791	2579	2463
FHHH	1049	942	949	1029	989	1073	2987	3044
FQQQ	669	685	992	928	829	793	2490	2406
FHHQ	522	476	882	758	808	885	2212	2119
FHQQ	988	859	928	969	904	802	2820	2630
HHHQ	678	623	560	609	871	719	2109	1951
HHQQ	390	352	527	506	619	764	1536	1622
HQQQ	259	160	895	850	323	457	1477	1467
							30677	29339
							105	100

But again a difficulty of interpretation creeps in and this time it comes from the sheer magnitude of the figures themselves. The difference between 66 and 33 for instance is 33 or 100%; the difference between 540 and 507 is again 33 but only about 6%. There is to be found in the figures a dif-

TABLE V

	A	B	C	Total	Sum	Av.
FFFH.....	1071 988 1155 942	895 1131 1253 1201	1268 973 947 1281	3234 3092 3355 3424	13105	3276
FFFQ.....	1068 1188 1025 895	928 1032 621 1079	982 1241 1092 910	2978 3461 2738 2884		
FFHH	1060 930 899 1022	978 1113 1232 980	850 504 1621 983	2888 2547 3752 2985		
FFQQ.....	874 1072 1800 1469	1866 965 1370 1249	897 1228 1012 1292	3637 3265 4182 4010		
FFHQ.....	1221 1028 1000 967	2528 1034 1023 941	1040 664 1058 1165	4789 2726 3081 3073	13669	3417
FHHH.....	1171 1460 778 1301	1114 822 798 1004	700 1121 827 837	2985 3403 2403 3142		
FQQQ.....	832 1939 1127 892	1069 1164 1191 827	1125 1020 1419 873	3026 4123 3737 2592		
FHHQ.....	823 1032 1213 1655	1180 1190 1100 1265	1005 861 767 1261	8008 3083 3080 4181		
FHQQ.....	889 1214 1150 1413	865 987 1200 866	1031 1095 1292 1210	2785 3296 3642 3489	13212	3303
HHHQ.....	1080 1172 1274 3574	2000 700 778 1186	1342 1122 1010 1586	4422 2994 3062 3546		
					14024	3506

TABLE V—*Continued*

	A	B	C	Total	Sum	Av.
HHQQ.....	417	660	788	1865		
	1245	1510	697	3452		
	1142	685	907	2734		
	1142	1015	750	2907		
					10958	2739
HQQQ.....	614	1760	855	3229		
	1736	910	629	3275		
	2390	1028	548	3966		
	2522	1138	1246	4906		
					15376	3844
Sums and Av. of Averages					1100	3301
					1100	1100

ference between the absolute amount and the relative amount of influence resulting from the changing order of presentation.

Table of Ratios. The climax order is given an arbitrary value of 1,000 and the anti-climax a relative value. Since the climax order has always the value 1,000, it is omitted from the table. Table V was prepared, in which the anti-climax values are given in ratios, the climax order of presentation

TABLE VI

Anti-climax ratios put in the form of a frequency table.

V	F	
40-59	3	
60-79	15	
80-99	37	
100-119	49	Av. = 111 11
120-139	23	A. D. = 22 67
140-159	6	n = 144
160-179	4	P. E. = 1 6-
180-199	3	
200-219	1	
220-239	1	
240-259	2	

having an arbitrary value of 1,000. This table in summary indicates that the anti-climax order is 10% more effective than the climax order, and this fact is emphasized by throwing the anti-climax values into a table of frequency as is done in Table VI. This method of presenting the data gives the anti-climax order a value of 11 + % advantage over the climax. The probable error is very low, only 16, approxi-

mately 1-7 of the significant difference. It may be concluded then, that the anti-climax order is more effective than the climax order.

GRAPH DRAWN FROM TABLE VI