VARIABLES CAUSING INCONSISTENCIES BETWEEN RADIO PROGRAM AUDIENCE RATINGS OBTAINED BY THE DAY-PART RECALL AND BY THE COINCIDENTAL METHODS. *

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I. THE PROBLEM AND THE NATURE OF AUDIENCE "RATINGS" FOR COMMERCIAL RADIO PROGRAMS

The course of commercial radio broadcasting is guided, in large part, by monthly survey figures which go by the name "program ratings." Program rating studies are made by most commercial research organizations, the methods used depending upon the clients requirements. The methods most widely used for obtaining program "ratings" are the "coincidental," "day-part recall," and "roster. A newcomer in the field, used on a limited scale, is the mechanical recorder of radio set tuning.

Currently, only two organizations conduct services for reporting monthly on a wide range of commercial programs. These two are the Cooperative Analysis of Broadcasting and C. E. Hooper, Inc.

Because these two organizations furnish monthly figures which each calls "program ratings" and because each attempts to sell its service to satisfy similar needs, the belief has arisen that the "ratings" furnished by one service should agree with those furnished by the other; or if they are not in perfect agreement, at least there should be some constant margin of difference between them — some definite relationship such that, given the rating of one service, a simple correction could be applied to obtain the other.

There is, of course, no apriori reason to make such an assumption. The two services could furnish ratings which bear a constant relation to each other only if the one method were influenced by no variables which did not also influence the other, and to a like degree. This is far from the condition which obtains in fact.

As a result, men interested in the audience size of specific programs who are not thoroughly familiar, and few are, with the characteristics of the day-part recall and coincidental methods of obtaining program ratings are thoroughly confused. The ratings for a given program obtained by the two services may agree well in May, the coincidental being appreciably higher than the day-part recall rating in February, and the day-part recall rating appreciably higher than the coincidental in August. Or again, the two ratings for a given program may agree well in the North Central geographic area, while its day-part recall rating may be higher than the coincidental on the Pacific Coast and the reverse may hold in the East.

Such conditions lead to wide spread confusion and even doubt. In fact, some members of the radio industry have developed a conviction that the results of radio research in general and of the rating services in particular are highly capricious.

Chart I

DISTRIBUTION OF "AT HOME" AND "NOT AT HOME"

IN THE TELEPHONE HOME POPULATION
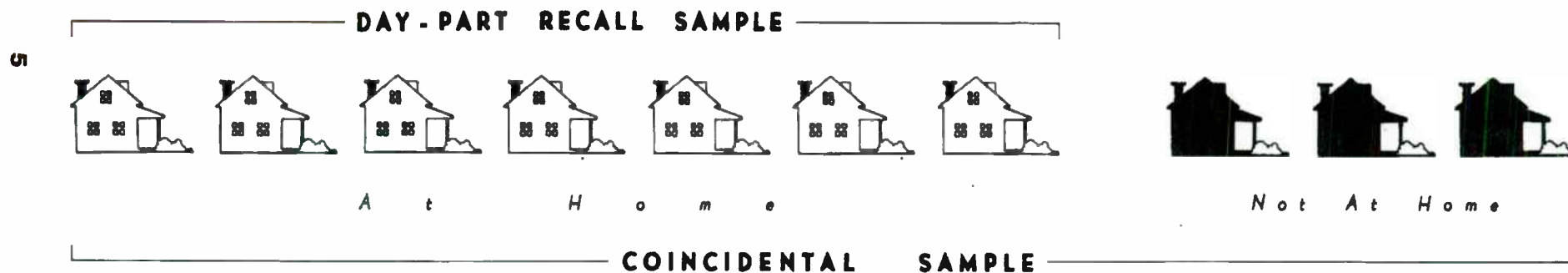
The object of this study is to aid in removing the confusion by showing that the variations between the ratings furnished by the two commercial services result, not from caprice, but from the differences in the method and sample used by each.

The Methods

There are numerous differences between the procedures used by the Cooperative Analysis of Broadcasting and by C. E. Hooper, Inc., but most of them are of a fixed nature which would tend to produce a constant margin of difference between their findings. The characteristics of the two methods are discussed in detail in Section A of the Appendix. Two differences between them constitute variables capable of causing marked inconsistencies.

The method of gathering data used by the Cooperative Analysis of Broadcasting is the 'day-part recall." As the name implies, this method is based on memory. Telephone interviewers call homes at 2 hour periods between 9:05 a.m. and 9:05 p.m. and ask respondents if they have listened to the radio during the preceding 2 hours and if so what programs they remember having heard.

The method used by C. E. Hooper, Inc. is called the "coincidental." As this name implies, program information is obtained by making telephone calls to homes coincidentally with the broadcast. Interviewers ask the respondents if their radio is turned on now and if so, what program and station are being heard. Only data collected during the broadcast of a given program are used in determining its coincidental rating.

The fact that the coincidental method involves(no memory) and the day-part recall method does, introduces a variable which may cause marked inconsistencies between the ratings obtained by the two methods. The second source of variation is the difference in the manner of calculating the two ratings. It is apparent that when an interviewer from either service dials a number of homes, the conditions found are those represented in Chart I. In some of the homes, someone is at home. In others, no one is at home.

In calculating the coincidental rating the data from all homes are used. Those homes in which no one is at home are included in the base and are classed as non-listening homes.

In the calculation of the day-part recall rating only that part of the total sample in which someone is at home is used. The segment of homes in which no one is at home is disregarded.

In view of the fact that "no answers" or not at homes" are included in the calculation of the coincidental rating but are not included in calculating the day-part recall rating, the day-part recall ratings would tend to be inflated in comparison with the coincidental.

Chart II

DISTRIBUTION OF RESPONSES

IN THE TELEPHONE SAMPLE IN DIFFERENT SEASONS

A. IN WINTER

DAY - PART RECALL SAMPLE

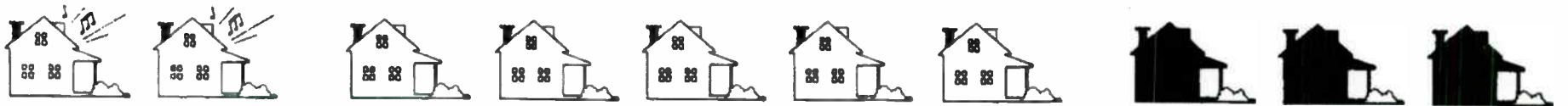At Home - Listeners   At Home Non - Listeners   Not At Home

COINCIDENTAL SAMPLE

B. IN SUMMER

DAY - PART RECALL SAMPLE

At Home - Listeners   At Home Non - Listeners   Not At Home

COINCIDENTAL SAMPLE

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Furthermore, "not at home" varies from time to time and place to place, and within rather wide limits. Thus its inclusion in calculating the coincidental rating and omission in calculating the day-part recall rating becomes an important source of inconsistencies between them.

II. INCONSISTENCIES
ARISING FROM VARIATION IN "NOT AT HOME"

A. Influence of Seasonal Variation in "Not at Home"

There is no one at home in approximately 50% more homes in July and August than in January and February. This condition is shown in Chart II which shows that out or each ten homes someone is at home in 8 and no one is at home in 2 in the Winter, and in the Summer someone is at home in 7 and no one is at home in 3. This variation in the size of the "not at home" segment has a definite influence on ratings.

Suppose, as is indicated in the chart, that 2 of the 10 homes were listening in both the Summer and Winter. The program's coincidental rating, based on the total sample including the "not at home" segment, would be 2 divided by 10 or 20% in both Summer and Winter.

The day-part recall rating is based, not on the total homes, but only on those in which someone is at home. Under conditions in which 2 of the total 10 homes report having listened, the day-part recall rating in the Winter would be 2 divided by 8 or 25%. In the Summer, the day-part recall rating would be 2 (listened) divided by 7 (at home) or 28.6%.

It would appear from these considerations that the day-part recall ratings for a given program would be inflated in comparison with its coincidental and that the degree of inflation would vary with variation in the size of the "not at home segment" of the population. This possibility together with the fact that no one is at home in the evening in 50% more homes in the Summer than in the Winter, suggests the following:

> Hypothesis I. - In comparison with their coincidental ratings, the day-part recall ratings obtained by programs in the Summer months will be inflated appreciably over the day-part recall ratings obtained by the same programs during the Winter months.

The validity of this hypothesis was tested by analysis of the coincidental and day-part recall national ratings of all evening programs which were checked by both services and which were broadcast both during the Winter months of January and February and during the Summer months of July and August. That is to say, exactly the same programs were used for Summer and for Winter. The total number of evening programs which conform to these conditions is 46. All were used.

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Chart III

EFFECT OF SEASONS

Summer
131.3 %

Winter
109.2 %

100 %

100 %
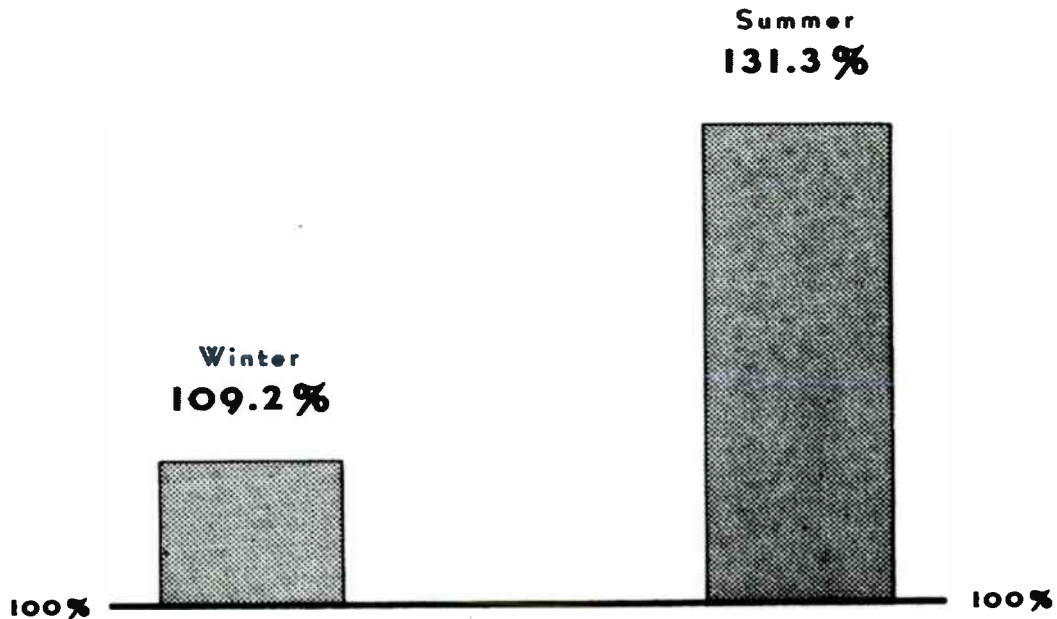
Effect of Seasonal Variation in "Not at Home"
on
Average Day-Part Recall Ratings for Evening Programs

The average day-part recall rating for programs in January-February
and July-August are compared with the coincidental rating for
January-February and July-August respectively by expressing the
average day-part recall rating as a per cent of the coincidental rating.
The findings are based on National Ratings for 46 programs broadcast
in both January-February and July-August, 1941.

Chart IV

DISTRIBUTION OF RESPONSES

IN THE TELEPHONE SAMPLE IN DIFFERENT GEOGRAPHIC AREA

A. IN THE EAST

DAY - PART RECALL SAMPLE

At Home - Listeners   At Home Non - Listeners   Not At Home

COINCIDENTAL   SAMPLE

B. ON THE PACIFIC COAST

DAY - PART RECALL SAMPLE

At Home - Listeners   At Home Non - Listeners   Not At Home

COINCIDENTAL   SAMPLE

The average rating obtained by each method for each two months' period was obtained, and the comparison made by expressing the average day-part recall rating for each period in per cent of the average coincidental rating for the same period. The results of this analysis are represented in Chart III. They show the following:

1. During the Winter months, the average day-part recall rating is 9.2% higher than the average coincidental rating.

2. During the Summer months, the average day-part recall rating on the same programs is 31.3% higher than their average coincidental rating.

These findings serve to verify Hypothesis I and appear to necessitate the following:

Conclusion I. - Seasonal variation in "not at home," is a major cause of inconsistency between day-part recall and coincidental ratings.

Conclusion Ia. The same seasonal variation causes nearly as great inconsistency among day-part recall ratings themselves for different seasons.

B. Influence of Geographic Differences in "Not at Home"

If, as was demonstrated in the above analysis, seasonal differences in "not at home" give rise to inconsistencies between day-part recall and coincidental ratings, it seems probable that geographic differences would have a similar influence.

"Not at home" varies widely from one section of the country to another. During the months, January through July, 1941, the number of homes in which no one was at home in the evening was 34% greater on the Pacific Coast than it was in the East.

The conditions found in the East and on the Pacific Coast during the Summer when "not at home" is maximum, are indicated approximately in Chart IV. Out of each ten homes in the East, no one is at home in 3; while on the Pacific Coast, no one is at home in 4 out of each 10 homes.

Assume, as is indicated in the diagram, that 2 of the 10 homes report having listened to a given program in each of the two geographic areas. The coincidental rating which is based on total homes, including "not at home," would be 2 (the number listening) divided by 10 (the total homes) or 20%. It should be the same for both areas.

"Not at Home" is omitted in the calculation of the day-part recall rating, only those homes in which someone is at home being used. The day-part recall rating for the East would be 2 (the number that listened) divided by 7 (the number in which someone was at home) or 28.6%; while that for the Pacific Coast would be 2 (the number that listened) divided by 6 (the number in which someone was at home) or 33.3%.

It seems probable from these considerations that omission of the "not at home" segment in the calculation of the day-part recall ratings would give rise to magnification of the day-part recall rating as compared with the coincidental ratings.

Chart V

EFFECT OF GEOGRAPHY

Pacific
129.1%

North Central
111.4%

South
105.7%

East
102.5%

100%   100%
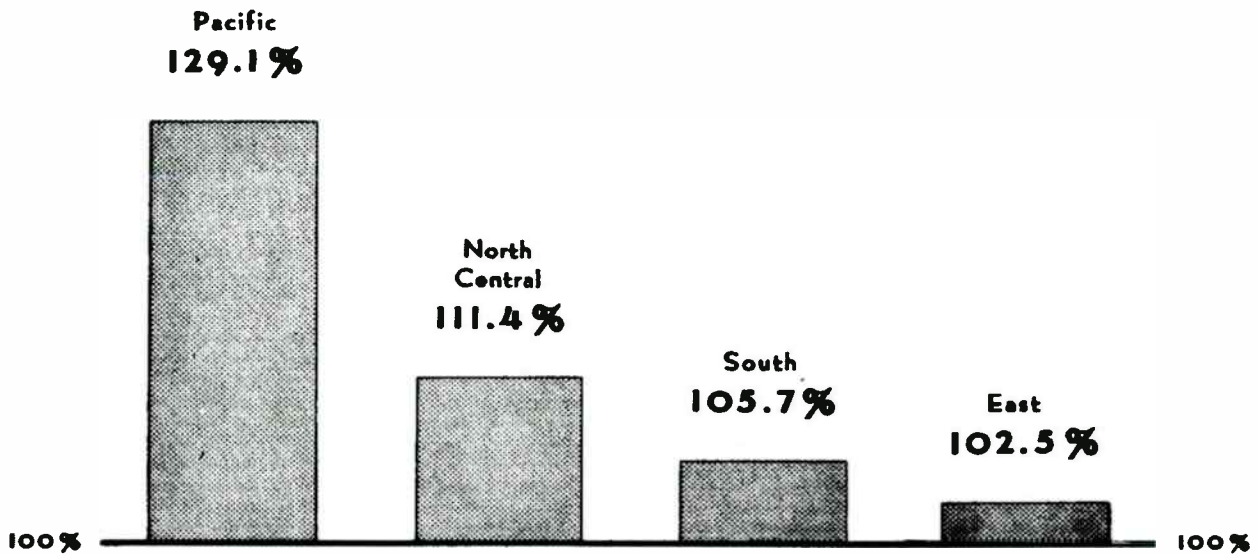
Effect of Geographic Variations in "Not at Home"
on
Average Day-Part Recall Sectional Ratings on Evening Programs

The average day-part recall ratings for programs in each section are compared with the coincidental rating for that section by expressing the average day-part recall rating as a per cent of the coincidental rating. The findings are based on 7 month's average sectional ratings for 82 Evening Sponsored Network Programs.

which would vary in size from one locality to another depending upon the number of homes in each in which no one is at home. The following seems possible:

> Hypothesis I L - Transcontinental programs obtain day-part recall ratings on the Pacific Coast which are appreciably higher, in comparison with their coincidental ratings, than those obtained by the same programs in the East.

The test of this hypothesis was made on all evening programs which meet the following criteria:

1. Were broadcast during six months of the seven months period, October, 1940 through April, 1941.

2. Were checked by both the day-part recall and the coincidental methods throughout the period.

3. Were reported to clients in terms of ratings for each individual geographic area. (These are called "Sectional" ratings.)

There were 82 such sponsored network programs. All were used in this analysis. The data on which the sectional ratings for each program was based represents an accumulation of not less than 6 months for any program and a 7 months accumulation for most.

The average day-part recall and coincidental ratings were found for programs in each of the geographic areas: East, North Central, South Central and Pacific Coast. As in preceding comparisons, the average day-part recall for each category was expressed in per cent of the average coincidental rating for the same group of programs.

The results obtained are presented in Chart V. They show the following:

1. On the Pacific Coast, day-part recall ratings for transcontinental programs average 29.1% higher than their coincidental rating.

2. In the North Central area, day-part recall ratings for transcontinental programs average 11.4% higher than their coincidental rating.

3. In the South, day-part recall ratings for transcontinental programs average 5.7% higher than their coincidental rating.

4. In the East, day-part recall ratings for transcontinental programs average 2.5% higher than their coincidental rating.

These findings verify Hypothesis II and necessitate:

> *Conclusion II.- Geographic variation in "not at home" is a major cause of inconsistency between day-part recall and coincidental ratings.*

>> *Conclusion IIa. The same geographic variations cause nearly as great inconsistency among day-part recall ratings themselves for different geographic areas.*
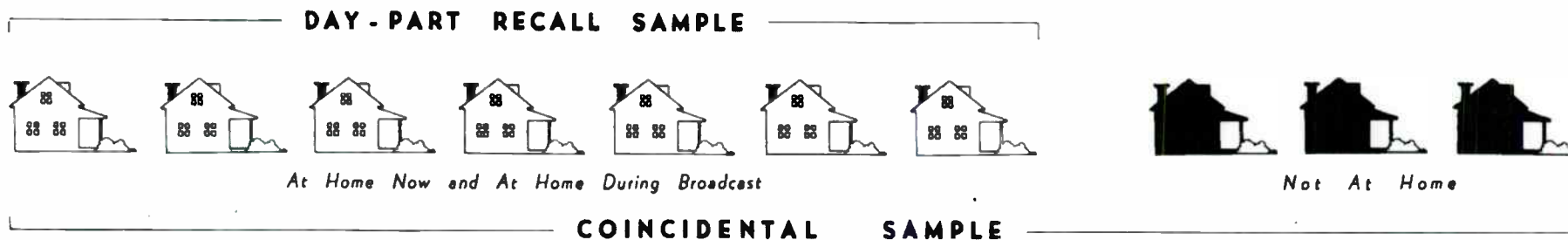
C. Influence of Variation in "Not at Home Then"

It has been shown above that omission of the "not at home" segment of the population from the day-part recall sample results in an inflation in day-part recall ratings, in comparison with the coincidental ratings, which varies seasonally and geographically.

Chart VI

VARIATION OF "NOT AT HOME THEN"

IN THE DAY-PART RECALL SAMPLE

A. PROGRAM CHECKED IMMEDIATELY AFTER BROADCAST

DAY-PART RECALL SAMPLE

At Home Now and At Home During Broadcast

Not At Home

COINCIDENTAL SAMPLE

B. PROGRAM CHECKED 2 HOURS AFTER BROADCAST

DAY-PART RECALL SAMPLE

At Home Now and At Home During Broadcast

Not At Home
During Broadcast

Not At Home

COINCIDENTAL SAMPLE

There is still another source of variation arising out of the omission of "not at home" in the calculation of the day-part recall rating. This factor, which may be called "not at home then," varies in magnitude with variation in the length of time that elapses between the broadcast of programs and their subsequent check by the day-part recall method. This interval varies from 5 minutes to 2 hours in each evening checking period. That is to say, when the day-part recall interviewer calls at 9:05 p.m. and asks about programs broadcast between 7:00 and 9:00 p.m., some of the programs checked were concluded only 5 minutes earlier, whereas others were concluded an hour earlier and still others, those broadcast from 7:00 to 7:15 p.m., about 2 hours earlier.

Supposing that in the 9:05 p.m. checking period the day-part recall interviewer finds someone at home in 7 homes and no one at home in 3. Of the 7 who are at home now, the number who were not at home 5 or 10 minutes earlier, when the 8:45-9:00 programs were being broadcast, approaches 0. Therefore, the degree of inflation of the day-part recall rating would be very large.

But some of the people who are at home at 9:05 p.m. were not at home 2 hours earlier. Perhaps in one of the seven homes in which someone is at home now no one was at home between 7:00 and 7:15 p.m. That is to say, a "not at home then" element is involved in the reports on these programs whereas no such element was involved in the reports on the 8:45-9:00 p.m. programs which were checked immediately after they were broadcast.

Obviously, "not at home then" in the sample would tend to compensate, in part, for omission of "not at home now" in calculating day-part recall ratings; and the larger this former element became the more nearly would the day-part recall ratings approach the coincidental ratings for the same programs. "Not at home then" will vary in every day-part recall checking period of the day from a minimum of 0 for programs checked immediately after they are broadcast to as much as 20% of the total sample, in some seasons of the year, for programs broadcast 2 hours earlier. This fact in itself may be an important source of inconsistency between day-part recall and coincidental ratings.

It is apparent then, that the presence of a "not at home then" segment in the calculation of the day-part recall rating will operate to reduce the inflation of these ratings; the magnitude of this reduction will be related to the increasing magnitude of the "not at home then" segment. This segment, in turn, will vary directly with the length of the interval of time between the broadcast and the subsequent day-part recall checking period.

Chart VI illustrates how "not at home then" varies in the day-part recall reports. Part A shows the conditions that would hold for programs broadcast just prior to the day-part recall interviewer's call. Practically all the homes which are occupied at the time of the telephone call were also occupied during the broadcast which ended 5 or 10 minutes earlier. There is no "not at home then" segment in the sample for such programs. Part B shows the conditions that would exist for programs

Chart VII

EFFECT OF TIME LAPSE

0 - ½ Hour
128.0%

½ - 1 Hour
111.5%

1 - 1½ Hours
107.6%

1½ - 2 Hours
101.6%

100%   100%
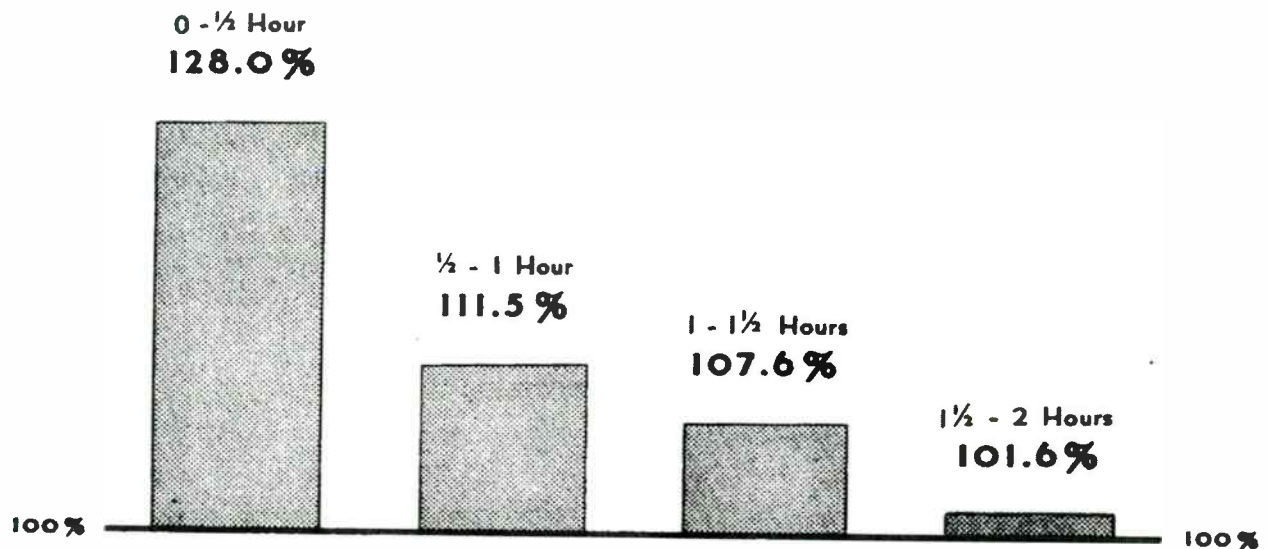
Effect of Variations in Elapsed Time Between Broadcast and Checking Period
on
Average Day-Part Recall Sectional Ratings for Evening Programs

The average day-part recall rating for programs checked at various intervals
after the broadcast are compared with the coincidental rating of the same
programs by expressing the average day-part recall rating as a per cent
of the coincidental rating. The findings are based on sectional ratings
for 82 Evening Sponsored Network Programs.

broadcast two hours prior to the day-part recall checking period. Of the respondents reached by the day-part recall interviewer, 15% to 20% were not at home during the broadcast of the programs presented two hours earlier. This condition is represented in the diagram by the shaded house in which some one is "at home now but not at home during the broadcast." The larger this "not at home then" segment becomes in the day-part recall reports, the smaller will be the inflation caused by omission of "not at home now" in the calculation of the day-part recall rating.

It will also be recalled that there is a second factor which tends to reduce the inflation of day-part recall ratings. This factor is forgetting. As in the case of "not at home then," the magnitude of forgetting also varies with the length of the interval of time between the broadcast and the subsequent day-part recall checking period.

Therefore, we have two deflationary elements, each of which would be expected to exert a minimum effect on the day-part ratings of those programs checked immediately after they are broadcast and which would be expected to exert a maximum of effect on programs broadcast $1\frac{1}{2}$-2 hours prior to the day-part recall program checking period.

These considerations suggest the following:

Hypothesis III. - A maximum of inflation occurs in day-part recall ratings for programs checked immediately after they are broadcast, and a minimum of inflation occurs in day-part recall ratings for programs broadcast $1\frac{1}{2}$ to 2 hours before they are checked by the day-part recall method.

The 82 programs used in studying geographic inconsistencies were used to test the present hypothesis. Since time changes from one geographic area to another, a program broadcast in the East at 10:00 p.m. reaches the Central zone at 9:00 p.m. and the Pacific Coast at 7:00 p.m. In order to find the influence of the elapsed interval between the end of the program broadcast and subsequent day-part recall checking period, it is necessary to use, not National, but Sectional ratings.

Four categories of programs were used in the analysis: Programs checked by the day-part recall method (1) 0-$\frac{1}{2}$ hour after broadcast, (2) $\frac{1}{2}$-1 hour after broadcast, (3) 1-1$\frac{1}{2}$ hours after broadcast, (4) 1$\frac{1}{2}$-2 hours after broadcast. The average of the sectional ratings for programs in each category were found for each method.

In order to obtain the size of the day-part recall ratings for each category in comparison with the coincidental ratings on the same group, the average day-part recall rating for each category was divided by the average coincidental rating for those programs.

The results obtained in this test are represented in Chart VII which shows the following:

1. The average day-part recall rating for programs checked 0-$\frac{1}{2}$ hour after broadcast is 28.0% higher than the average coincidental rating on the same program;

2. The average day-part recall rating for programs checked $\frac{1}{2}$-1 hour after broadcast is 11.5% higher than the corresponding coincidental rating.

3. The average day-part recall rating for programs checked 1-1½ hours after broadcast is 7.6% higher than the corresponding coincidental rating;

4. The average day-part recall rating for programs checked 1½-2 hours after broadcast is 1.6% higher than the corresponding coincidental rating.

It appears that these results amply validate Hypothesis III and necessitate the following:

> *Conclusion III.- Variation in the length of the interval between the broadcast of programs and their day-part recall check is a major cause of inconsistency between day-part recall and coincidental ratings.*

> *Conclusion IIIa. The same variation of length of interval causes approximately as great inconsistency among day-part recall ratings themselves, for programs checked after different intervals.*

Relative Weight of Influence
of "Not at Home Then" and Forgetting

It should be noted that the 26.4% difference between ratings for programs checked immediately after broadcast and those for programs checked 1½ to 2 hours later may not be attributed entirely to variation in "not at home then." As was remarked above, another factor, forgetting, also varies with the length of the period elapsing between broadcast and recall.

The difference of 26.4% is the result of these two factors operating in the same direction. It is impossible from these data alone to determine how much of the difference is attributable to "not at home then" variation and how much to variation in forgetting. However, by analyzing similar data for October, 1939 - April, 1940 and comparing it with that for October, 1940 - April, 1941, it is possible to obtain an approximation of the relative influence of each of these factors which tend to reduce the inflation of day-part recall ratings. The discussion of the procedure and results will be found in Section 3 of the Appendix. These results show that the relative influence of "not at home then" and forgetting, over a 2 hour period, is approximately in the order of 2 to 1 respectively. That is to say, of the 26.4% difference found above, approximately 17.6% is attributable to variation in "not at home then" and 8.8% to forgetting.

III.   INCONSISTENCIES ARISING FROM MEMORY VARIABLES

The second general source of variation between the ratings obtained by the day-part recall and the coincidental methods is the fact that the former is subject

to fluctuations of memory from one program to another and from one time to another while the latter is not.

The coincidental interviewer asks the respondent if his radio is turned on now, and if so, what station and program is tuned in. The memory required is that of knowing what one was doing 1 to 5 seconds earlier. In the day-part recall method, on the other hand, the respondent is asked what he has listened to during a previous period of two hours. The influence of variation in memory, other than forgetting, from program to program on the day-part recall ratings has been widely over-looked.

The listener's ability to remember different programs which he has heard varies widely from one program to another, depending upon the characteristics of the programs. It is readily apparent that programs which have been on the air for years will probable be remembered better than those which are new. Similarly, it seems probable that hour programs would be remembered better than quarter-hour programs. These two factors are external, or adherent, to the material presented in the program. It is also possible that memory variations arise as a result of inherent differences in program content.

In the analysis which follows each of these factors, the adherent memory variables: age and length, and the variables inherent to the programs themselves, are considered in turn.

A. Influence of Age of Program

The ability to remember any event depends, in part, upon the breadth of experience one has had with it. The listener has had more opportunity to develop broad experience with a program which has been on the air for many years than he has had in connection with a new program. And since radio programs are of all ages, it seems probable that the wide range of this memory variable would result in measurable variations in the day-part recall ratings; they would not be expected to influence the coincidental ratings, which do not depend upon memory.
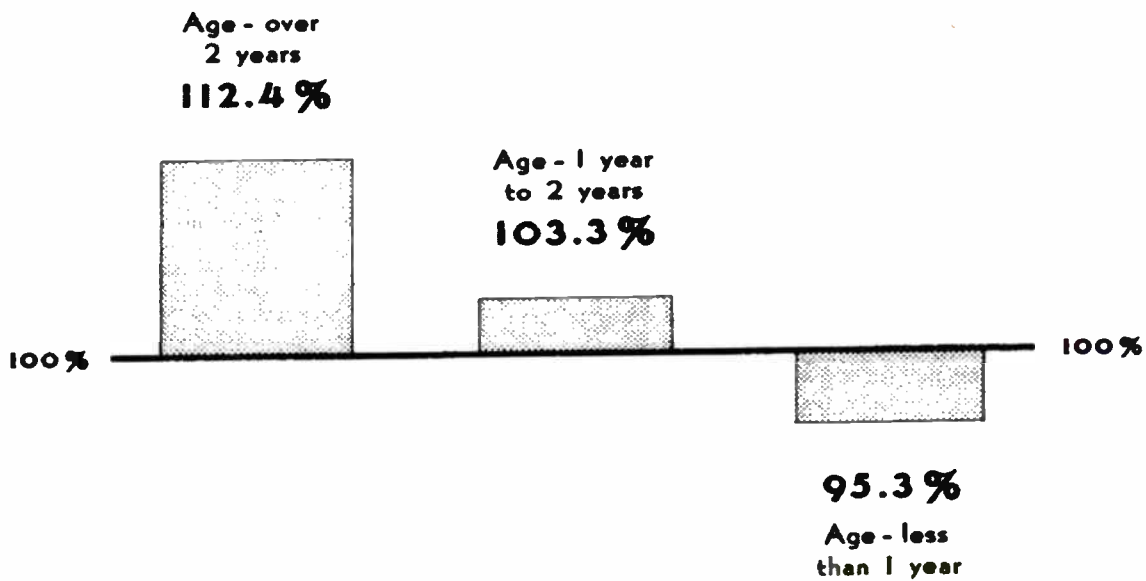
This condition suggests the following:

Hypothesis IV. - Programs which have been broadcast for a period of years will obtain day-part recall ratings which are appreciably higher, in comparison with their coincidental ratings, than will programs which have been broadcast less than a year.

To test this hypothesis, 106 programs were used. These were divided into 3 groups: programs which, prior to March, 1941, were broadcast for (1) less than 1 year, (2) more than 1 and less than 2 years, (3) two years or more. As in the previous charts, the average day-part recall rating for each category is expressed in per cent of the average coincidental rating.

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Chart VIII

EFFECT OF PROGRAM AGE

Age - over
2 years
112.4%

Age - 1 year
to 2 years
103.3%

100%   **100%**

95.3%
Age - less
than 1 year

Effect of Program Age
on
Average Day-Part Recall Rating for Evening Programs

The average day-part recall rating for programs of different ages are
compared with the coincidental rating for those different ages respectively,
by expressing the average day-part recall rating as a per cent of the
coincidental rating. The findings are based on National Ratings for 106
Evening Sponsored Network Programs.

The results are shown in Chart VIII. They reveal the following:

1. Programs over 2 years of age obtain average day-part recall ratings which are 12.4% higher than their average coincidental ratings.

2. Programs between 1 and 2 years of age obtain average day-part recall ratings which are 3.3% higher than their average coincidental ratings.

3. Programs less than 1 year of age obtain average day-part recall ratings which are 4.7% lower than their average coincidental ratings.

These results serve to verify Hypothesis IV and necessitate the following:

Conclusion IV. - Variation in the age of programs is a major cause of inconsistency between day-part recall and coincidental ratings.

Conclusion IVa. The same variation in age causes even greater inconsistency among day-part recall ratings themselves, for programs of different age.

B. Influence of the Length of Programs

There are two reasons why variation in program length might be expected to give to inconsistency between the two types of rating.

First, the length of the program would be expected to operate much as age of program does. The longer the program the greater the breadth of associations that will be developed in connection with it. Other things being equal, this would result in variation of day-part recall ratings in accordance with program length.

Secondly, the tendency to tune in and out on a program is greater for long programs than for short. The coincidental method measures "average audience" which is strictly comparable from one program to another, while the day-part recall method measures "total rememberers." (See Appendix, Section A, for discussion.) The quantity "total rememberers" would be expected to expand for longer disconnected programs, such as Major Bowes in which tuning in and out might be great, and contract for shorter programs directed towards a single climax.

The possible operation of these two factors suggests the following:

Hypothesis V. - Short programs will obtain day-part recall ratings which are appreciably lower, in comparison with their coincidental ratings, than will long programs.

It has been shown above that age of program is one memory factor causing inconsistencies between the two types of ratings. It is clear, therefore, that if the influence of program length is to be determined, uninfluenced by the age variable, it is necessary to eliminate those variations which may be attributable to age alone.

This has been done in the present analysis by using programs from only one age category, the "over 2 year" age group which contains 54 evening programs for all of which 7-month average ratings were available.

Of these 54 programs, 7 were 1 hour in length, 42 were ½ hour in length and 5 were ¼ hour in length. While the number of programs in the hour and ¼ hour categories are small, the reliability of the findings remains high because of the fact

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Chart IX

EFFECT OF PROGRAM LENGTH

1 Hour
Programs
134.2%

Half-Hour
Programs
110.5%

100%   100%
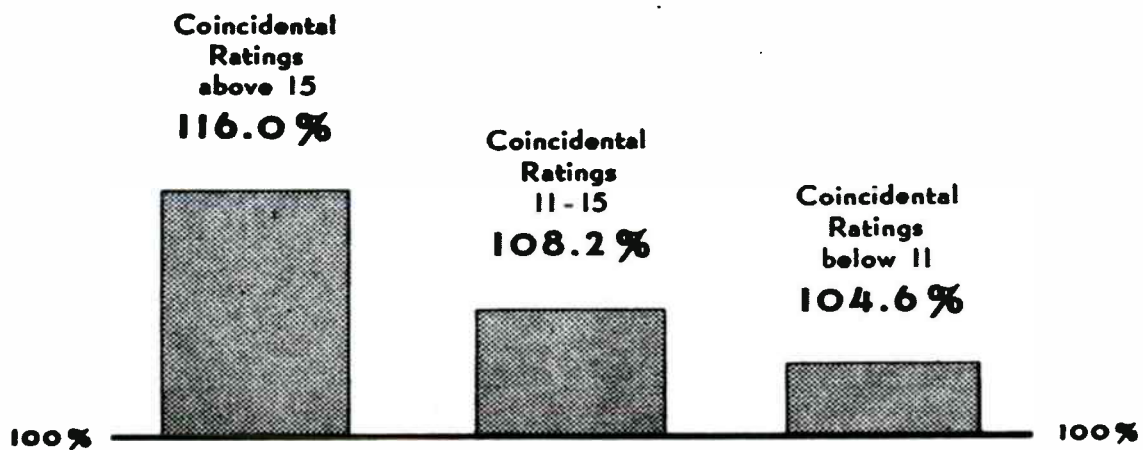
88.1%
Quarter-Hour
Programs
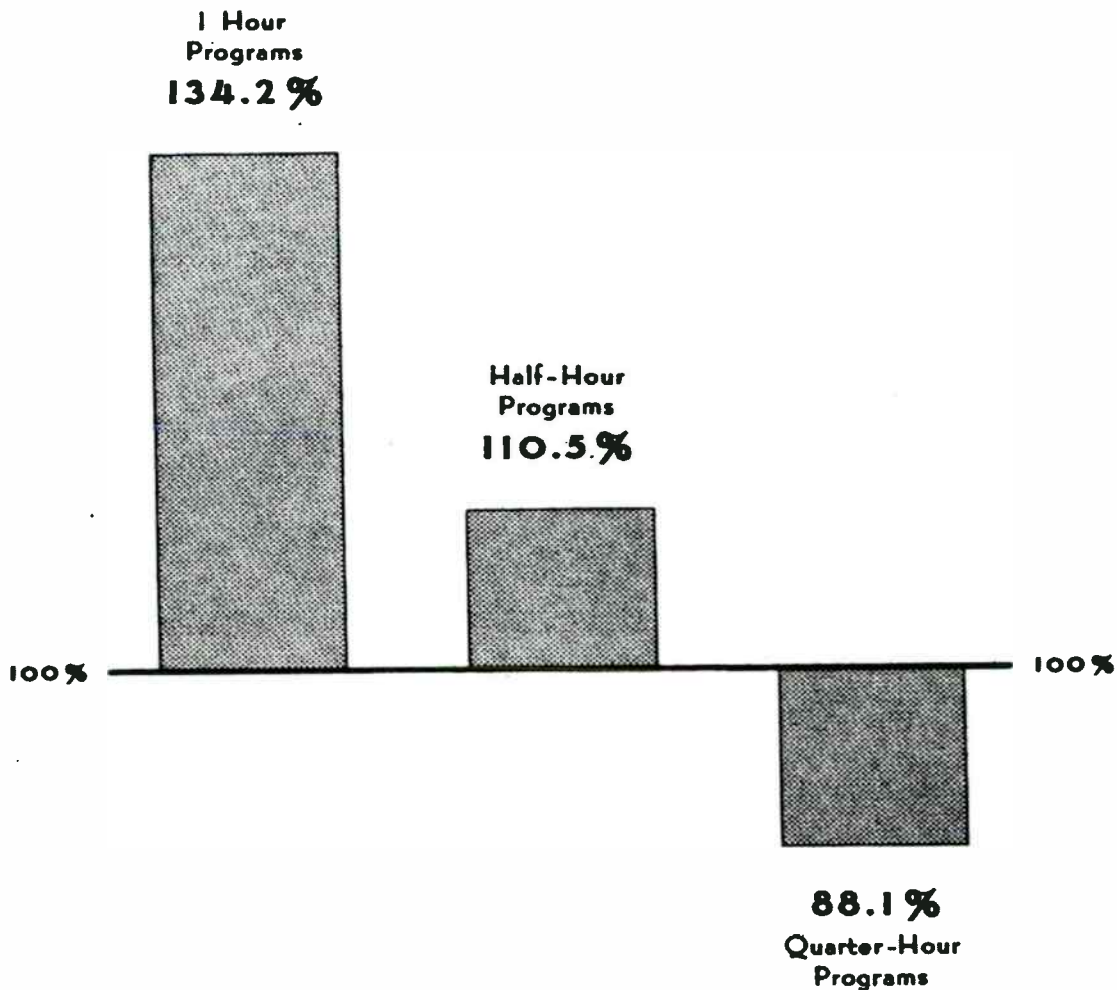
Effect of Program Length
on
Average Day-Part Recall Ratings for Evening Programs

The average day-part recall ratings for programs of different lengths are
compared with the coincidental ratings for those different lengths
respectively, by expressing the average day-part recall rating as a per cent
of the coincidental rating. The findings are based on National Ratings for
54 Evening Sponsored Network Programs over 2 years of age.

Chart X

EFFECT OF POPULARITY DIFFERENCES

**Coincidental
Ratings
above 15
116.0 %**

**Coincidental
Ratings
11 - 15
108.2 %**

**Coincidental
Ratings
below 11
104.6 %**

100%   100%

Effect of Popularity Differences
on
Average Day - Part Recall Ratings for Half-Hour Evening Programs

.The average day - part recall rating for programs of each rating category
are compared with the coincidental rating for that category by expressing
the average day - part recall rating as a per cent of the coincidental rating.
The findings are based on 42 Evening Half - Hour Sponsored Network
Programs over 2 years of age.

that the ratings for each program are based on an accumulation of 7 months' data,
October, 1940 through April, 1941.

The comparison between the coincidental and day-part recall results for each
category of programs was made as in preceding analyses. The results are represented
in Chart IX. They show the following with regard to programs 2 or more years of age:

1. Programs 1 hour in length obtain an average day-part recall rating which is
    34.2% higher than their average coincidental rating.

2. Programs ½ hour in length obtain an average day-part recall rating which is
    10.5% higher than their average coincidental rating.

3. Programs ¼ hour in length obtain an average day-part recall rating which is
    11.9% lower than their average coincidental rating.

The difference between day-part recall ratings for hour and for ¼ hour programs,
in terms of their coincidental ratings, is 46.1%. These findings demonstrate the
validity of Hypothesis V and necessitate the following:

> *Conelusion V. - Variation in program length is a major cause of inconsistency
> between day-part recall and coincidental ratings.*

> *Conclusion Va. The same variation in length causes appreciably greater
> inconsistency among day-part recall ratings themselves,
> for programs of different lengths.*

C. Influence of Inherent Memory Variables

Two factors, age and length, both external to the programs themselves, have been
shown to cause marked inconsistencies between day-part recall and coincidental
ratings. It seems probable, however, that quite apart from age or length there are
memory variables, resulting from content differences of the programs themselves
which also vary within wide limits. The rating also depends in large part, upon
the program content.

These possibilities suggest the following:

Hypothesis VI. - The day-part recall ratings for high rating programs are ap-
preciably higher, in comparison with their coincidental rat-
ings, than are those for low rating programs.

In order to test this hypothesis, it is necessary to eliminate the variations
caused by both program age and by length of the broadcast period. This was done
in the following analysis by using only evening programs which have been broadcast
for more than two years and which are one-half hour in length. There were 42 pro-
grams which fall in this class. These were divided into 3 categories: programs
obtaining a coincidental rating 1) above 15; 2) 11-15; 3) below 11.

Chart X represents the results obtained. It shows the following with regard
to half-hour programs broadcast for 2 or more years:

1. Programs obtaining coincidental ratings over 15.C obtain day-part recall
    ratings which average 16.0% higher than their coincidental ratings.

2. Programs obtaining coincidental ratings from 11.0 to 15.0 obtain day-part
    recall ratings which average 8.2% higher than their coincidental ratings.

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Chart XI

EFFECT ON NETWORKS

Red
113.3%

Columbia
108.7%

100%

100%

96.2%
Blue

66.5%
Mutual
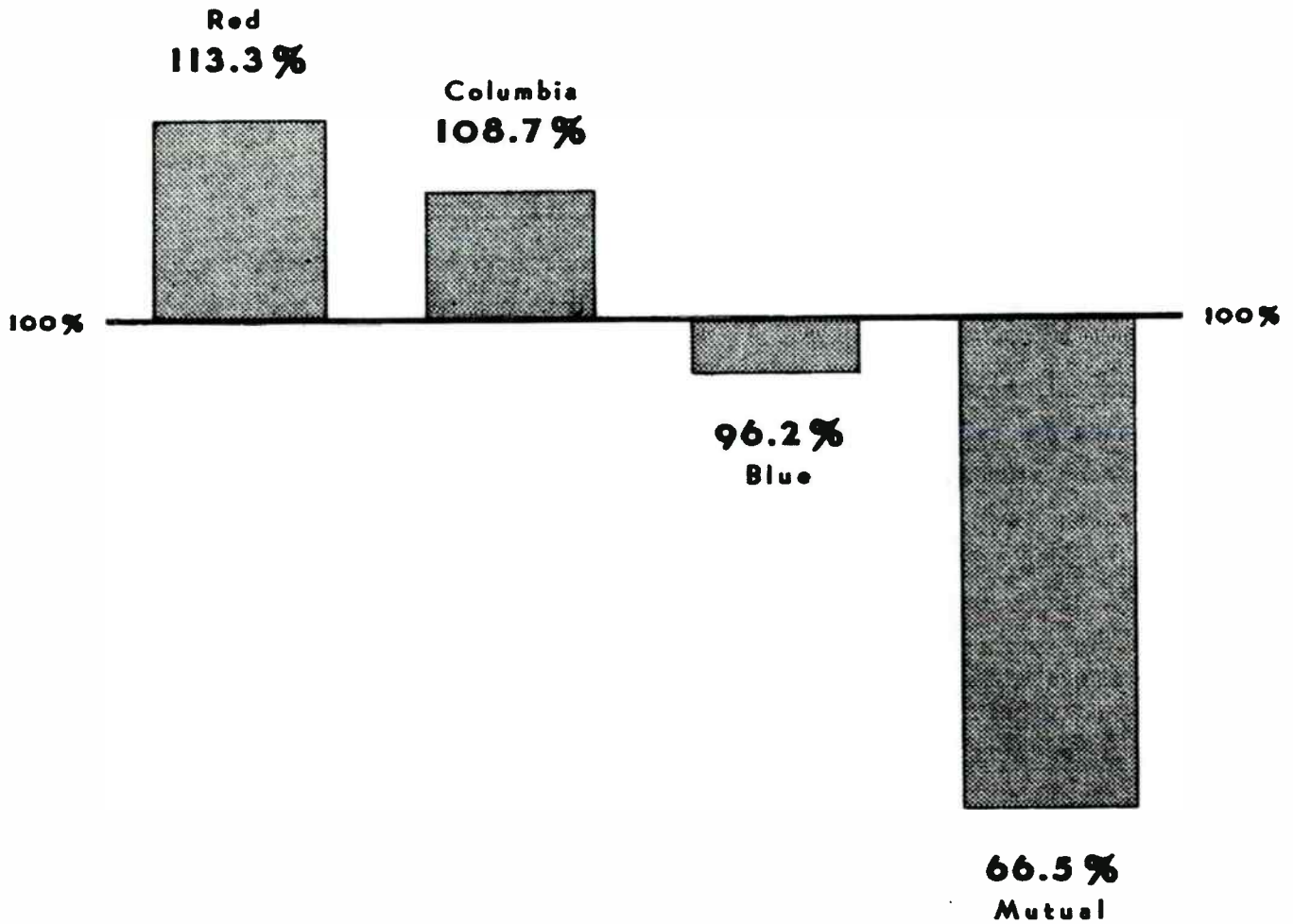
Effect of Memory Variables
on
Average Day-Part Recall Ratings for Evening Programs on Each Network

The average day - part recall rating for programs on each network are
compared with the coincidental rating for that network by expressing the
average day - part recall rating as a per cent of the coincidental rating.
The findings are based on 7 month's average National Ratings for 82
Evening Sponsored Network Programs.

3. Programs obtaining coincidental ratings below 11.0 obtain day-part recall ratings which are 4.6% higher than their average coincidental ratings.

These findings appear to verify Hypothesis VI and necessitate the following:

Conclusion VI. - *Memory variables arising from differences in program content are a major cause of inconsistency between day-part recall and coincidental ratings.*

Conclusion VIa. *The same memory variables cause approximately as great inconsistency among day-part recall ratings, themselves, for programs of different popularity.*

D. Influence of Memory Variables
on Day-Part Recall Ratings for Networks

It has been shown above that the day-part ratings tend to penalize new, shorter and lower rating programs as compared with the older, longer and higher rating programs.

It is a well recognized fact that networks vary from each other in the inherent and adherent characteristics of their programs. The longer, older and more pretentious shows are, for the most part, presented on the Red and Columbia networks, while programs presented on the Blue and Mutual Networks are commonly newer and more modestly produced.

This condition suggests the following:

Hypothesis VII. - The average day-part recall rating for programs presented on the Red and Columbia Networks are appreciably higher, in comparison with their average coincidental rating, than the average day-part recall for programs presented on the Blue and Mutual Networks.

This hypothesis was tested by using the 82 evening network programs described in Section II, B above. Of the 82 programs, 33 were Red, 30 were Columbia, 16 were Blue and 3 were Mutual. While the number of Mutual programs is small, it should be noted that the ratings for each are based on 7 months data. This fact insures high statistical reliability even when 3 programs are used in a group.

The results of this analysis are represented in Chart XI. This shows the following:

1. Day-part recall ratings for Red network programs average 13.3% higher than their coincidental ratings.

2. Day-part recall ratings for Columbia network programs average 8.7% higher than their coincidental ratings.

3. Day-part recall ratings for Blue network programs average 3.8% lower than their coincidental ratings.

4. Day-part recall ratings for Mutual network programs average 33.5% lower than their average coincidental rating.

Chart XII

EFFECT ON PROGRAM TYPES
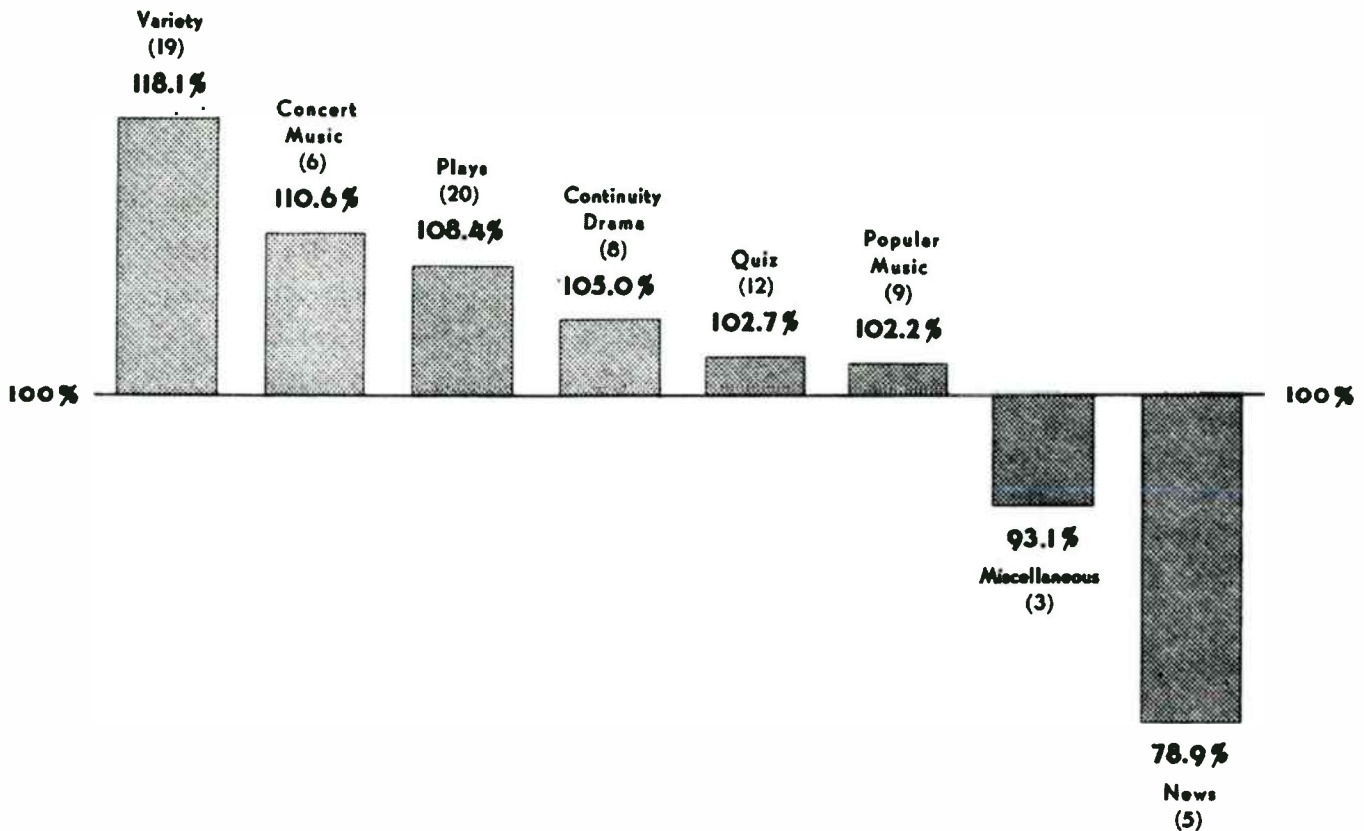
Effect of Memory Variables
on
Average Day-Part Recall Ratings for Programs of Different Types

The average day-part recall rating for programs of each type are compared with the coincidental rating for that type by expressing the average day-part recall rating as a per cent of the coincidental rating. The findings are based on 7 month's average National Ratings for 82 Evening Sponsored Network Programs.

These findings serve to verify Hypothesis VII and necessitate the following:

Conclusion VII. - Differences in programs carried by each network result in inconsistencies between day-part recall and coincidental ratings.

 Conclusion VIIa. The same differences in programs cause appreciably greater inconsistency among average day-part recall ratings themselves for different networks.

E. Influence of Memory Variables on
Day-Part Recall Ratings for Programs of Different Types

  It has been shown above that the influence of memory variables which affect the day-part recall method are reflected in ratings obtained for different networks. It might be expected, also, that their influence would be reflected in day-part recall ratings for programs of different types.

  This possibility suggests the following:

Hypothesis VIII. - The average day-part recall rating for programs of certain types is appreciably higher, in comparison with their coincidental ratings, than the average day-part recall rating for other types of programs.

  This hypothesis was tested by analyzing, in terms of type, the 82 programs used immediately above. The results obtained are represented in Chart XII. They show the following with regard to evening programs:

1. Variety programs obtain day-part recall ratings which average 18.1% higher then their coincidental ratings.

2. Concert music programs obtain day-part recall ratings which average 10.6% higher than their coincidental.

3. Plays obtain day-part recall ratings which average 8.4% higher than their coincidental ratings.

4. Continuity drama programs obtain day-part recall ratings which average 5.0% higher than their coincidental ratings.

5. Quiz programs obtain day-part recall ratings which average 2.7% higher than their coincidental ratings.

6. Popular music programs obtain day-part recall ratings which average 2.2% higher than their coincidental ratings.

7. Miscellaneous programs obtain day-part recall ratings which average 6.9% lower than their coincidental ratings.

8. News programs obtain day-part recall ratings which average 21.1% lower than their coincidentals.

These findings serve to validate Hypothesis VIII and necessitate the following:

Conclusion VIII. - Memory variation from one type of program to another results in inconsistency between the average day-part recall and coincidental ratings for the different types.

 Conclusion VIIIa. The same memory variation among program types causes appreciably greater inconsistencies among average day-part recall ratings themselves for different types.

IV. SUMMARY OF FINDINGS

The major inconsistencies between day-part recall and coincidental ratings for radio program audiences appear to be attributable to two elements of difference which constitute variables: difference of treatment of "not at home" in calculating ratings, and difference in the degree to which the memory variables affect the results obtained by each method.

Omission of "not at home" in the calculation of the day-part recall rating and its inclusion in the calculation of the coincidental rating results in inflation of the day-part recall rating in comparison with the coincidental rating. The extent of this inflation varies directly with the size of the "not at home" segment of the population.

Three dimensions of variation in the size of the "not at home" segment were analyzed. They are:

      1.   Seasonal
      2.   Geographic
      3.   Methodological (caused by variation in the length of the interval between the end of a program's broadcast and its subsequent check by the day-part recall method.

The conclusions drawn from these analyses are:

Conclusion I. - Seasonal variation in "not at home" is a major cause of inconsistency between day-part recall and coincidental ratings.

Conclusion Ia. The same seasonal variation causes nearly as great inconsistency among day-part recall ratings themselves for different seasons.

Conclusion II.--Geographic variation in "not at home" is a major cause of inconsistency between day-part recall and coincidental ratings.

Conclusion IIa. The same geographic variations cause nearly as great inconsistency among day-part recall ratings themselves for different geographic areas.

Conclusion III.-Variation in the length of the interval between the broadcast of programs and their day-part recall check is a major cause of inconsistency between day-part recall and coincidental ratings.

Conclusion IIIa. The same variation of length of interval causes approximately as great inconsistency among day-part recall ratings themselves, for programs checked after different intervals.

The day-part recall is a memory method and the coincidental is not. Memory variables therefore cause great inconsistencies between the two types of ratings.

and also between one day-part recall rating and another. Five dimensions of memory variation were analyzed. They are:

1. Program age
2. Program length
3. Program rating
4. Network used
5. Program type

The conclusions drawn from these analyses are:

Conclusion IV. - *Variation in the age of programs is a major cause of inconsistency between day-part recall and coincidental ratings.*

    Conclusion IVa. *The same variation in age causes even greater inconsistency among day-part recall ratings themselves, for programs of different age.*

Conclusion V. - *Variation in program length is a major cause of inconsistency between day-part recall and coincidental ratings.*

    Conclusion Va. *The same variation in length causes appreciably greater inconsistency among day-part recall ratings themselves, for programs of different lengths.*

Conclusion VI. - *Memory variables arising from differences in program content are a major cause of inconsistency between day-part recall and coincidental ratings.*

    Conclusion VIa. *The same memory variables cause approximately as great inconsistency among day-part recall ratings themselves, for programs of different popularity.*

Conclusion VII. *Differences in programs carried by each network result in inconsistencies between average day-part recall and such coincidental ratings for different networks.*

    Conclusion VIIa. *The same differences in programs cause appreciably greater inconsistency among average day-part recall ratings themselves, for different networks.*

Conclusion VIII. - *Memory variation from one type of program to another results in inconsistency between the average day-part recall and coincidental ratings for the different types.*

    Conclusion VIIIa. *The same memory variation among program types causes appreciably greater variation among average day-part recall ratings themselves, for different types.*

V. APPENDIX

Section A - The Methods

1. DAY-PART RECALL METHOD:

The first radio program audience measuring service to make its appearance was the Cooperative Analysis of Broadcasting. This organization was sponsored by the Association of National Advertisers, and controlled by a governing committee currently consisting of the following men well known in the field of advertising: Dr. D. P. Smelser, Chairman, Procter & Gamble Company; Dr. George Gallup, Young & Rubicam, Inc.; Robert B. Brown, Bristol-Myers Company; Mr. F. B. Ryan, Jr., Ruthrauff & Ryan, Inc.; Dr. L. D. H. Weld, McCann-Erickson, Inc.; Mr. A. Wells Wilbor, General Mills, Inc.; Mr. A. W. Lehman, Manager.

The procedure used by the Cooperative Analysis of Broadcasting for obtaining program audience data is called the "day-part recall" method.

During the week in each half of each month, interviewers in 33 cities hold telephone conversations with from 375 to 750 respondents at intervals of 2 hours, from 9:00 a.m. to 9:00 p.m. The number of calls made varies with the time at which they are made. At 9:00 a.m., the respondents are asked what programs they heard after 9:00 p.m. the previous evening. In each subsequent period, they are asked what they have heard during the preceding 2 hour period. For example, day-part recall interviewers calling after 7:05 p.m. would ask respondents what programs they had heard between 5:00 p.m. (5:05 p.m. was the previous checking time) and 7:00 p.m.

Recognizing that the random telephone sample may not yield results on all programs which are strictly representative of the total population of which the telephone homes are a part, the governing committee has adjusted the sample in an attempt to make it equivalent to a normal cross-section. To this end, all of the homes in a given section of each city are designated as belonging to one economic group, such as D, while all of the calls made in another section of the city are designated as A. Sections of each city are divided into four economic categories which include the following percentages of the city population:

> A - 6.6%
> B - 13.3%
> C - 26.7%
> D - 53.4%

It is somewhat unusual in polling research to consider that the "D" or lowest economic group contains over half of the population. It is probable that such an all-inclusive definition is necessitated by the telephone distribution. If, as is more frequently the case, the "D" group was defined as the lowest 25-30% of the population, it seems probable that few or no telephones would be found in the "D" group.

The "ratings" are computed on completed telephone conversations only. The homes in which the telephone is not answered (and in which, presumably, no one is at home) are not included in the computation.

Day-part recall "ratings" are reported twice a month. Each "rating" is based on a "moving average" in which the data of the two most recent checking weeks are combined.

2. THE COINCIDENTAL PROCEDURE

The second "rating" service, that of C. E. Hooper, Inc., made its first appearance in the field in 1934 under the name of Clark-Hooper. It became C. E. Hooper, Inc., early in 1938. This organization is a private enterprise under the direction of a president. It has no organization sponsorship and like any other business, research or otherwise, is operated for profit.

The method on which the Hooper radio audience reporting service is based is the telephone "coincidental" which obtains its name from the fact that the audience size is measured coincidentally with the broadcast of each program.

During one week out of each month, coincidental interviewers in varying number in each of 32 cities make telephone calls continuously from 8:00 a.m. until 10:30 p.m., at the rate of about 1 call per interview per minute. Only cities having local outlets for at least 3 of the 4 major networks are used.

The interviewer asks respondents if they were listening to the radio when the telephone rang, and if so, to what station and program and what the name of the program sponsor is.

A random sample of telephone homes in the 32 cities is employed. No attempt is made to obtain a differentiation by economic levels. That is to say, the coincidental sample is designed only to represent telephone homes in large cities. It is believed in the Hooper organization that the telephone sample cannot be made to represent a normal cross-section of the population since the lowest 25-30% of the population cannot afford telephone service; and that a random cross-section of telephone homes is a known quantity while an inaccurately adjusted telephone sample is meaningless and misleading.

All telephone homes are included in the sample. Homes in which the telephone rings and is unanswered are included. In calculating the "rating," the "no answers" are put in the category of "homes not listening."

3. DIFFERENCES BETWEEN THE TWO SERVICES

It is apparent that where two services survive and grow healthy in the commercial world, each has certain factors of advantage over the other for specific purposes.

a. The day-part recall method, being based on a moving average of two seperate checking periods (neither of which is alone based on sufficient sample to yield high reliability) yields results less susceptible to unusual influences occurring within a specific week than does the coincidental. The latter, on the other hand, gives a sharp picture of one week per month. This permits the "one-a-week" advertiser to measure influences operating in specific programs.

b. The quantity which is measured by the day-part recall method is the per cent of homes, where someone is at home when the interviewer telephones, in which the respondents remember having listened to a given program. That is to say it measures the "program rememberers" in the "at home now" segment of the telephone home population of large cities. The figure approaches, subject to certain variations, an enumeration of gross listening of this part of the population, regardless of the length of listening. Concerning an hour program, a two-minute listener's report of previous listening obtains equal weight with that of a 60 minute listener. The only factor which may limit this operation is memory. A two-minute listener may not subsequently remember his listening as well as does the hour listener

The day-part recall procedure, covering as it does, the whole previous broadcast period, is not susceptible to analysis of listening to different parts of the program. The coincidental calls which, except for the first 2 minutes of each 15 minute time period, are made continuously during the time each program is broadcast, gives a minute-by-minute count of listeners. These added together in the calculation of the rating, yeild an average listening throughout the entire broadcast period. In this method, length of listening automatically obtains its correct weight. A listener who listens to a given program for 2 minutes has only 1/30 as much chance of being called while he is listening to it as does a person who listens for 60 minutes.

Since the time of the telephone calls are recorded in the coincidental interviewing, it is possible to analyze the listening pattern of a program by 2, 3, 4 or 5 minute intervals, depending upon the amount of data at hand. This enables the broadcaster to study the effectiveness in building and holding the audiences of the various elements in his program.

The purpose of a sponsored broadcast is to provide a vehicle adequate for carrying the "commercial" or advertising message. The audience at the time the commercial is presented is, therefore, a primary concern of the advertiser. The coincidental method, susceptible as it is to analysis by short time intervals, enables the sponsor to determine the extent to which his commercial holding the audience.

c. There is a little difference in the cities used by the two services for sampling. Currently, the coincidental ratings are based on data from 32 cities and day-part recall ratings on data from 33. Of these, 28 cities are used in common. As a result of changes in broadcasting facilities, C. E. Hooper, Inc., added three cities to the sample and dropped one in October, 1941. Therefore, the data presented in this study were obtained when the coincidental enumeration was made in 30 cities, 26 of which were used in common with the Cooperative Analysis of Broadcasting. This is a constant difference.

d. Not all calls in all cities are made within the political limits of the cities by either service, but the areas used by each are relatively constant from month to month

e. The size of the samples are widely divergent. By obtaining data covering a two hour period from each respondent, the day-part recall method requires a

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relatively small sample. The coincidental, since it obtains listening data on the moment only, necessarily requires a large sample. The coincidental method requires so extravagent a sample that it cannot be used economically for continuous year-round sampling of small localities.

Representatives of each of the two services have in the past expressed armchair criticisms of the size of the other's sample. In regard to the data presented here there can be no question of size of the sample, since with the exception of a few programs used in two of the analyses, the rating on each program is based on an accumulation of 7 months' data (October, 1940 - April, 1941.) Size of the samples is not, therefore, a factor causing variation between the results obtained by the two services so far as the present study is concerned.

The sources of inconsistency between the ratings furnished between the two services must be sought, not in those elements of difference between them which are constant, but rather in the elements of difference which are variable. The factors which represent variables are two: differences in the method of calculating the rating and difference in the mental processes tested by the two services.

The variable nature of the first of these — differences in the method of calculating the rating — has not been clearly appreciated in the radio industry. Nor has the variable nature of the second factor — differences in the influence of memory — been perceived in its entirety. With regard to the latter, it has been apparent that forgetting operates to obliterate memory or listening. It appears to have been believed in the past that the forgetting process alone accounted for the memory differences between the two methods. In an attempt to control this variable, the governing board of the Cooperative Analysis of Broadcasting has, from time to time, decreased the length of the interval between checking periods.

From a psychological standpoint, it seems probable that the forgetting variable is a comparatively minor element in the total memory differences between the two services. Rather, it would seem that variations in memory from program to program, attributable to differences in age, length and content, might be much more important.

Section B - Inconsistencies Arising From Differences In The Method Of Calculating Ratings

When the interviewer from either service dials a telephone number, the conditions found fall into the following three categories:

1. "Not at home now" (telephone is not answered)
2. "At home now, no listening reported"
3. "At home now, listening reported"

The coincidental rating would be obtained by dividing the number who report listening to a given program by the total number of calls, including "not at home now" as well as "at home now."

The calculation of the day-part recall rating is somewhat different. The day-part recall interviewer's telephone call is made anywhere from 5 minutes to two hours after the end of the program broadcast, depending upon the time period in which the program is presented. It is apparent that, of the people who are at home at the time the day-part recall interviewer calls, practically all of them were also at home during part of the broadcast 5 or 10 minutes earlier. But this is not true of programs broadcast 2 hours earlier. As many as 15% to 20% of the respondents may not have been at home two hours earlier in certain seasons of the year.

There is a variable factor, the "at home not but not at home during the broadcast" which fluctuates from about 0 for those programs broadcast immediatley before the day-part recall interviewer's telephone call to 15% to 20% for programs broadcast 2 hours prior to the call.

The presence of this variable presents a dilemma. In the calculation of the rating for programs broadcast immediately before the interviewers call, when "not at home then" approaches 0, it would be accurate to include "not at home now." But in the case of the program which was broadcast 2 hours prior to the checking period, 15% to 20% of the respondents who by definition are "at home now" were "not at home then." On the other hand, some of those who are "not at home now" were "at home" 2 hours earlier. If the "not at home now" were included in the calculation of the rating for those programs which contain a large "not at home then" element, the result would over-weight the "not at home" factor and thereby under-rate the program audience.
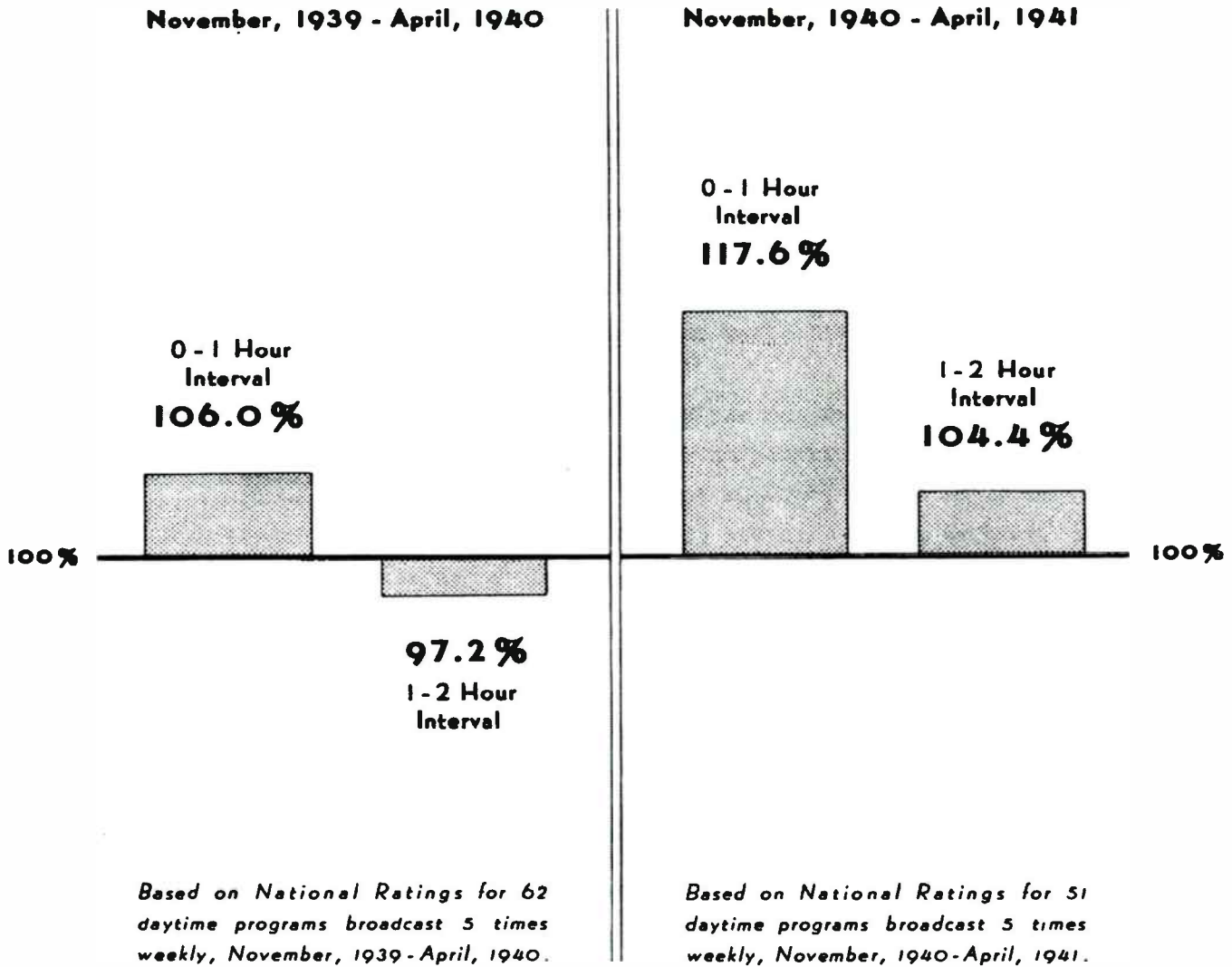
The alternative procedure in calculating the day-part recall rating would be to disregard entirely the "not at home now" segment of the population. This procedure would result in marked over rating of programs broadcast immediately before the checking period since no "not at home" of any kind, either at the time of the call or during some part of the broadcast, would be included in the calculation. This inflationary tendency would decrease as the length of the interval between checking and broadcast periods increases, but there would always be some inflation in comparison with the coincidental results in a 2 hour period. This is necessitated by the fact that the total "not at home now" includes "at home now but not at home during broadcast" and "not at home now and not at home during broadcast.

A choice between the two calculating methods, neither of which was completely satisfactory, had to be made. The one would tend to yield fairly accurate results for programs checked immediately after they are broadcast but under rate programs broadcast 2 hours prior to the checking period. The other would tend to over rate all programs, those checked immediately after they are broadcast being inflated most and those broadcast two hours earlier least.

The governing committee of the Cooperative Analyses of Broadcasting chose the latter. "Not at home now" is omitted entirely in the calculation of day-part recall ratings.

Chart XIII

EFFECT OF TIME LAPSE

November, 1939 - April, 1940   **November, 1940 - April, 1941**

0 - 1 Hour
Interval
117.6%

0 - 1 Hour
Interval
106.0%

1 - 2 Hour
Interval
104.4%

100%   **100%**

97.2%
1 - 2 Hour
Interval

*Based on National Ratings for 62
daytime programs broadcast 5 times
weekly, November, 1939 - April, 1940.*

*Based on National Ratings for 51
daytime programs broadcast 5 times
weekly, November, 1940 - April, 1941.*

Effect of Variation in Elapsed Time Between Broadcast and Checking Period
on
Average Day-Part Recall Rating on Daytime Programs

Expressed in terms of Average Coincidental Ratings for the same groups of programs.

Section C - Influence of Forgetting

It was remarked in Section III, A, that the progressive deflation of day-part recall ratings with increase in the length of the interval between program broadcast and day-part recall checking period probably is attributable to two factors rather than to one. It was shown that increase in the "not at home then" element in the day-part recall sample would have this effect. Furthermore, one of the best established principles in psychology is the fact that the amount of forgetting is related to the time lapse between the presentation of an experience and its subsequent recall.

In Chart VII, the total influence of the length of the elapsed interval is presented. Obviously, it is impossible from these data alone to determine the extent to which one or the other of the two variable factors contributes to the whole. With two variables, forgetting and "not at home, and only one set of data, such a determination is logically and mathematically impossible. A solution could be obtained, however, if two different equations including the same variables could be obtained which were based on two sets of data.

The fact that the number of checking periods used by the day-part recall method was increased in October, 1940 makes this second equation possible

The greatest inflation caused by "not at home" occurs in those programs broadcast just prior to the day-part recall checking period. Before October, 1940, there were 2 day-part recall checking periods during the daytime which were devoted to checking daytime programs alone. The average length of the interval between these checking periods was 4 hours.

Since October, 1940 there have been 4 checks daily devoted to daytime programs alone. The length of the interval between these checking periods is 2 hours.

If an equation for some period of months prior to the change in the day-part recall method could be developed, it could be used in conjunction with an equation for the period since the change, to determine, approximately, the relative influence of each of the two variables.

Daytime programs, which are highly similar in type from day to day and year to year, were used for this purpose.

Chart XIII shows the overall influence of the length of the interval between broadcast and day-part recall program check for daytime programs in October, 1939 - April, 1940 and October 1940 - April, 1941.

It will be seen from this chart that in the period October, 1939 - April, 1940 those programs which were checked by the day-part recall method 0-1 hour after they were broadcast were 8.0% higher, in comparison with the coincidental, than those checked 1 to 2 hours after they were broadcast. In that year the one group of programs was rated slightly higher than the coincidental and the other slightly lower.

In the period October, 1940 - April 1941, the day-part recall ratings for both groups were appreciably higher than they were in the previous year. The difference between the group checked 0-1 hours after broadcast and 1-2 hours after broadcast is also greater, being 13.2% for the current year.

With these two measurements and the difference in the day-part recall checking conditions in the two years, it is possible to set up two equations. With two equations and only two variables the value of each can be determined.

The omission of "not at home" in calculating day-part recall ratings exerts the greatest inflationary influence on those programs broadcast shortly before the day-part recall check. Under the method used prior to last October this inflating factor was introduced only twice a day, the average interval being 4 hours. Under the new conditions this variable factor operates on daytime program ratings 4 times daily. The interval is only half as long, 2 hours.

It is apparent then that if we let

Y = influence of omitting "not at home" under the new conditions,

then

$\frac{2Y}{4}$ = influence of omitting "not at home" under the former checking condition (only 2/4, or 1/2, as many daytime program checking periods then)

Further, we may let X = the influence of forgetting of daytime programs over a two hour period. Since daytime programs had much the same character in the both years studies, this quantity may be assumed to be about constant from one year to the next.

The conditions found for October, 1940 - April, 1941 may, therefore, be represented by the following equation:

$X + Y = 13.2$ (the difference between the 0-1 and the 1-2 hour intervals)

The conditions found for October, 1939- April, 1940, when (Y) occurred 1/2 as often, may be represented by the equation:

$X + \frac{Y}{2} = 8.8$

Solving for (Y) we get

$X = 13.2 - Y$

$X = 8.8 - \frac{Y}{2}$

$13.2 - Y = 8.8 - \frac{Y}{2}$

$13.2 - 8.8 = Y - \frac{Y}{2}$

$4.4 = \frac{Y}{2}$

$Y = 8.8$ = The influence of "not at home" variable.

$X = 13.2 - 8.8 = 4.4$ = The influence of forgetting variable.

It would appear from the results obtained in these two periods of months that in the daytime the influence of omitting "not at home" in the calculation of day-part recall ratings is about twice as great as the influence of forgetting. These results must, however, be accepted as rough approximations, since certain factors, such as the form of the curve for forgetting and that for "not at home" are not taken into account. It is assumed here that both of these curves are, mathematically speaking, straight line functions. Actually we know that even for a two hour period the forgetting curve is logarithmic; and that for "not at home" may also be. It is for reasons of this nature that the above ratio between the influence of "not at home" and of forgetting must be regarded as an approximation.