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Analysis of Result Code Disposition by Time in Field

· In a study where the research design allows only a fixed number of days to gather interviews, how long an interview period is long enough to ensure an adequate response rate? What response rate could one expect of a survey with interviewing periods of seven days or less? Is a longer interviewing period necessary to ensure an adequate response rate?

When it is possible to issue replacement coversheets for non-sample units during a field period, some coversheets will be eligible for calling for a greater number of days than others. How long an interview period is needed to ensure that the response rate is not significantly dampened by having a shorter period of eligibility for some coversheets than others?

The day on which an interviewing period starts might also influence response rate. There has been some discussion between NES staff and the telephone facility staff about the effect of the Wednesday start date on response rate. (Wednesday was chosen because Tuesday is a major primary and election day). One argument is that Wednesday is too late for effective CNA (Customer-Name-Address) calling to verify that a number is non-sample (non-residential, non-working, etc.). Did beginning the interview period on Wednesday influence response rate?

Data in the American National Election Studies 1984 Continuous Monitoring ("rolling cross-section") Control File provides information about the effect of a seventeen day interviewing period on the overall response rate. This data set contains records on over 10,000 coversheets — all the telephone numbers dialed in the course of administering the rolling cross-section including interviews, non-interviews and non-samples. For the

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interviews, we have detailed information about household composition (as well as tₗ information in the separate questionairre); for the non-interviews and non-samples, we have information about the result code (type of non-interview or non-sample), day of final disposition, cluster id and cluster replicate. The file also includes built variables for "Day of Interviewing Period" (the number of days elapsed between the start of the sample week and the day of final disposition of the coversheet) and "Days Alive" (the number of days elapsed between when a coversheet was issued and the day of final disposition of the coversheet).[1]

On the basis of Result Code, Day of Interviewing Period and Days Alive, one can provide initial answers to these questions. Initial evidence from these variables indicates that the seventeen day interviewing period did not substantially expand the total number of interviews, that the Wednesday starting day slightly inhibited turn-around of non-sample coversheets, and that additional "front-loading" of calls around the start of the interviewing period might increase the time available to gather interviews, but not do much to increase over-all response rate over the seventeen day period.

Figure 1 ("Percent of Disposition, by Days Alive") points to the apparent relationship between the number of days in the field and various dispositions. The majority of both interviews and non-samples are determined within the first seven days after a coversheet is issued. Nearly half of the non-samples are determined on the first

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[1]Both of these variables are derived from the day of final disposition and the starting day of the sample week. "Day of Interviewing Period" computes the day-of-the-year (e.g., 245th, 271st, etc) for both the starting day of the sample week and the day of disposition, reporting the difference between the two and adding one. The vast majority of interviews were completed within seventeen days of the start of the sample week. The "Days Alive" variable is computed on the basis of the "Day of Interviewing Period" and the cluster replicate/id information. Only one coversheet is issued within a cluster replicate for a cluster id; any coversheet that turns out to be non-sample (e.g., non-residential unit or non-working number) is re-issued from the same cluster id. Therefore, any coversheet which has the same sample week and same cluster id as the coversheet preceding it in the control file is a "re-issued" coversheet. For those coversheets which were not reissued, the "Days Alive" figure equals the "Day of Interviewing Period" variable; for those coversheets that were reissued, the "Days Alive" variable records the difference between the coversheet's day of interviewing figure and the day of interviewing figure for the preceding coversheet in the file.

Figure 1
Percent of Disposition, by Days Alive
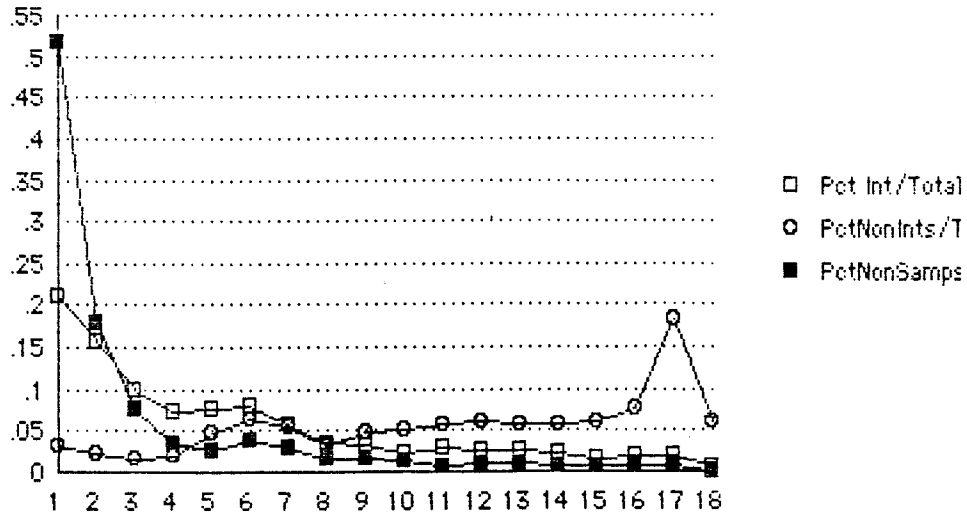
day a coversheet is issued. The percent of coversheets determined after the seventh day of the interviewing period is well under five percent a day, diminishing to under a percent a day for the last seven days of the maximum seventeen days a coversheet could be alive. As Figure 2 ("Cumulative Percent of Disposition, by Days Alive") illustrates, more than 90% of the non-samples were determined within a week, and more than 80% of the non-samples were determined within four days. Consequently, the seventeen day interviewing period had negligible effect on the number of non-samples determined, as long as new coversheets were issued within the first week of the interviewing period. (In a seventeen day interviewing period, 90% of non-samples can be re-issued in the first seven days, leaving at least ten days to determine non-sample or take an interview).

A similar story can be told for the number of interviews. As Fig. 1 points out, after seven days, each additional day a coversheet was in the field yielded less than an additional five percent. By the seventeeth day, the marginal increase in the number of interviews taken drops to less than a percent. As Fig. 2 shows, before nine days had elapsed after the day a coversheet was issued, more than 80% of the interviews had been taken. By fourteen days, more than 90% of the interviews had been completed.

Figure 2
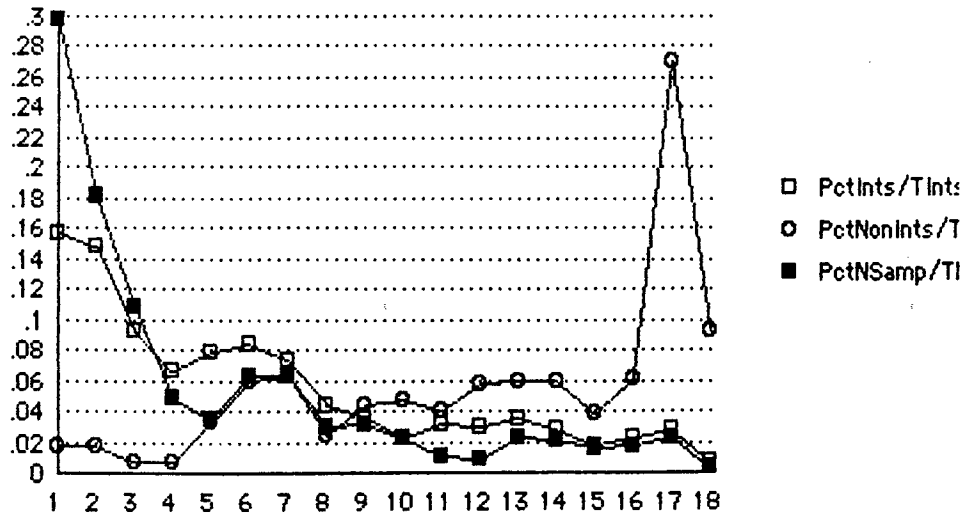Cumulative Percent of Disposition, by Days Alive
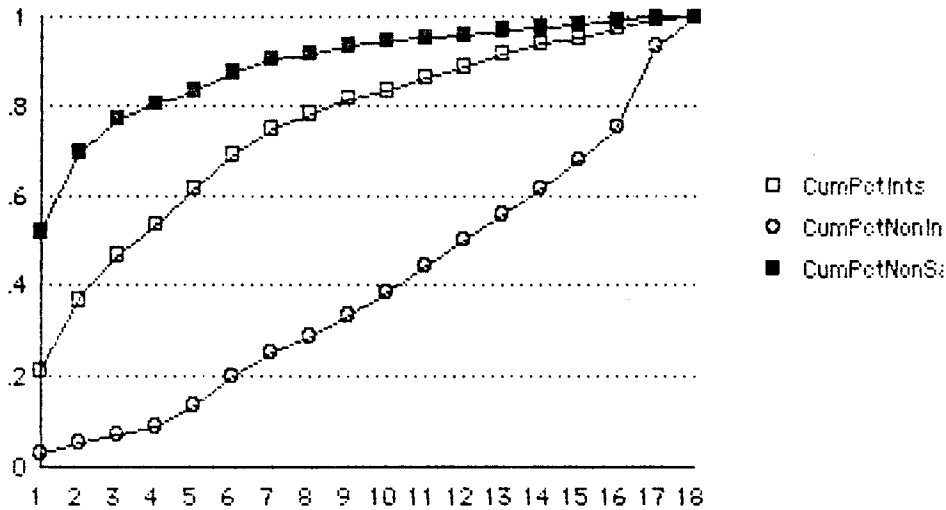
Non-interviews, however, rise steadily in number with each additional day alive (Fig. 1). The marginal increase in number of non-interviews for each day is under five percent for the first week, hovering around five percent for the second week. The exception to this pattern appears on day seventeen of the number of days alive — Fig. 1 points to a large spike, nearly 18% of the non-interviews were determined on the 17th day. The reason for this pertains to close-outs — after the seventeen day period elapsed, all coversheets not yet disposed of were deemed non-interviews.

Note that the preceding analysis pertains to the relationship between the number of days a coversheet is in field and the cumulative dispositions of the coversheets. Since 35% of the coversheets were re-issued, the day on which a coversheet was re-issued will affect the overall cumulative distribution for each disposition. That is, if a coversheet is re-issued on the sixth day of the interviewing period, that coversheet has eleven days left to stay "alive." Since coversheets are re-issued after a non-sample disposition, a more cyclical pattern to the relationship between "day of interviewing period" and the dispositions emerges. (Figs. 3 and 4).

In general, each additional day in the interviewing period yielded diminishing

Figure 3
Percent of Disposition, by Day of Interviewing Period

marginal percentages for Interviews and Non-Samples, following the relationship seen between number of days alive and the final dispositions. However, the pattern in Fig. 3 (Pct of Disposition, by Day of Interviewing Period) is far bumpier than the pattern in the equivalent Fig. 1, displaying a weekend damping effect. The number of interviews taken drops on weekends. Day 4 of the interviewing period (a Saturday) had smaller marginal percent gains in number of interviews than any other day of the first week. Day 10 (Saturday) had fewer number of interviews taken than any other day of the of the second week. The number of non-samples disposed of drops on weekends, too. Days 4 and 5 (Saturday and Sunday) had fewer Non-Samples determined than any other day of the first week. In the second week, Days 11 and 12 (also Saturday and Sunday) had fewer non-samples determined than any other day of the second week (days 8 through 14) of the seventeen day period.

A cross-tabulation of the result codes and the days of the week (Table 1) suggests that the overall effect of weekends on the number of interviews may be smaller than during any seven days of the seventeen day period. Although the percent of interviews taken on Saturday is lower than most days of the week, Tuesday had the fewest number

Table 1

Result Code Disposition by Day of Week

Result Code	N of Cases Pct of Total	Day of the Week							
		Missing	Sun	Mon	Tues	Weds	Thur	Fri	Sat
Pct of Total	10498	122	869	1057	1035	2566	2062	1857	930
			8.4	10.2	10.0	24.7	19.9	17.9	9.0
Interview	3498	8	394	411	352	761	721	496	363
Pct	33.3		11.3	11.7	10.1	21.8	20.6	14.2	10.4
NonInterview	2132	93	264	242	285	180	254	635	272
Pct	20.3		12.4	11.4	13.4	8.4	11.9	29.8	12.8
NonSample	4746	21	211	404	398	1625	1087	726	295
Pct	45.2		4.4	8.5	8.4	34.2	22.9	15.3	6.2

of interviews taken. The pattern of interviews taken over the seventeen days is a dampening cycle with lows on Saturday (as seen in Fig. 3). Tuesdays, being at the end of the cycle, show lower takes than the other days. Non-sample determination is lower on Saturday and Sunday, by hefty margins, than any other day of the week, overall (Table 1) as well as through the cycle of seventeen days.

Figure 4
Cumulative frequency of dispositions, by day of interviewing period

□ CumNSamps
○ CumNInts
■ CumInts
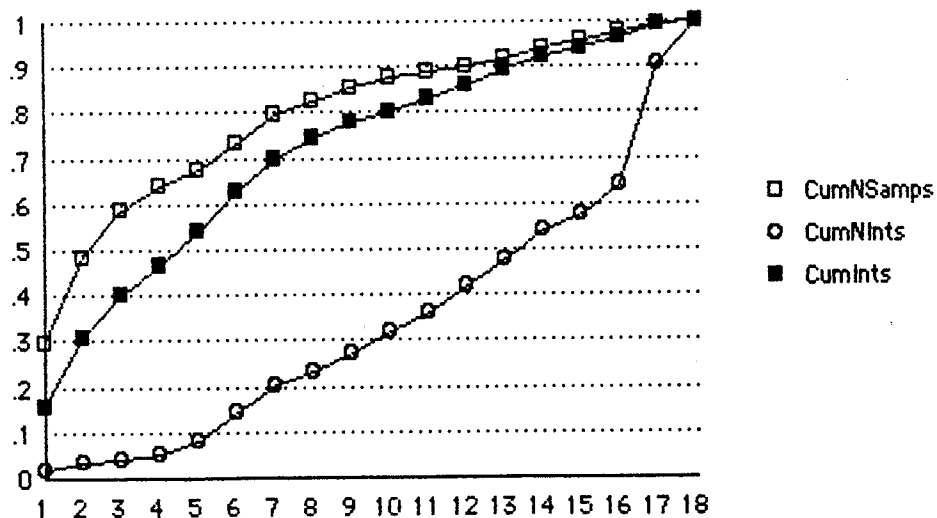
One could offer several guesses as to the cause of this "weekend" effect. Changes in the number of calls made on weekends would reduce the number of interview taken. This guess is consistent with the drop in both non-sample and interview dispositions. A second guess would be that respondents are less accessible on weekends. Respondents might be less willing to be interviewed on Saturdays, although why not Sundays? Non-samples may be less possible to determine on weekends by virtue of the inability to make CNA calls or by virtue of business closings on weekends. A third guess would be that the inability to determine CNA calls on weekends prevents re-issuing coversheets until Monday. Proportionally more interviews will be taken on days in which coversheets are re-issued than on days when coversheets aren't re-issued. A fourth guess, unrelated to weekends, may be due to re-issuing coversheets throughout the 17 day period. Each batch of re-issued coversheets would follow the days alive frequencies. In the first few days of re-issuing, these coversheets would yield greater returns on interviews and non-sample dispositions than the coversheets already in the field, thus creating lumps throughout the week.

Whatever the cause, the "weekend effect" is not so apparent for the cycles of non-interviews. While it is true (Fig 3) that the number of non-interviews determined on Saturday (day 4) is lower than the remaining days of the first week, Sunday has a larger number of non-interviews than the preceeding days. (The absence of an increase in the number of non-interviews determined on Day 4 bodes against the guess that the drop in interviews on Saturday is due to a higher rate of refusals). The weekend effect doesn't at all appear in the second week — Day 8 (Weds) has the lowest number of non-interviews determined in the second week.

The combination of agreement in the cycles of interviews and non-samples with disagreement with the cycles of non-interviews suggests that the drop in interviews on Saturday is either a product of different production levels (fewer calls made) or a product of the inability to re-issue coversheets for CNA calls until Monday.

One can gauge the effect of re-issuing coversheets on the overall cumulation of each disposition by comparing the "days alive" (Figure 2) and "day of interviewing period" (Figure 4) distributions. For both interviews and non-samples, there is very little difference (less than a percent) in the last seven days of the seventeen day period. For non-interviews, the spike on the seventeenth day is larger in the day of interviewing period distribution than the days alive distribution — this is sensible since many of the close-outs in the days alive distributions are scattered through the last days of the seventeen day period; on the day of interviewing period distribution, the non-interviews are properly concentrated on the last day.

One can convert these distributions into a crude estimate of the response rate given shorter interview periods. The number of non-interviews remains constant — the effect of closing out pending coversheets would be fixed on at least the number of non-interviews on day 18 (the end of the seventeen day period) for each shorter day of the interviewing period. The number of interviews accumulated on each successive day, of course, increases. One can compute a response rate as follows:

$$\text{Response Rate on Day N} = \frac{(\# \text{ Ints on Day N})}{(\# \text{ Ints on Day N}) + (\# \text{ NonInts Day 18})}$$

(Fig 5.) This measure, computed for both Days Alive and Day of Interviewing Period, is remarkably level after the tenth day of the seventeen day period. By the eleventh day, the response rate exceeds 60% in both calculations. Although it seems unlikely that we would consider a shorter interviewing period, a longer interviewing period would probably not gain much in terms of the response rate.

Starting the interview period on Wednesday may have affected the turn-around in non-sample coversheets. One possible reason for the drop in the number of non-sample dispositions over the weekend is that it is often not possible to make CNA calls on Saturday or Sunday. These dispositions wait until Monday when telephone company offices re-open. (Business closings on Sunday and occasionally on Saturday might also

Figure 5
Estimated Response Rate
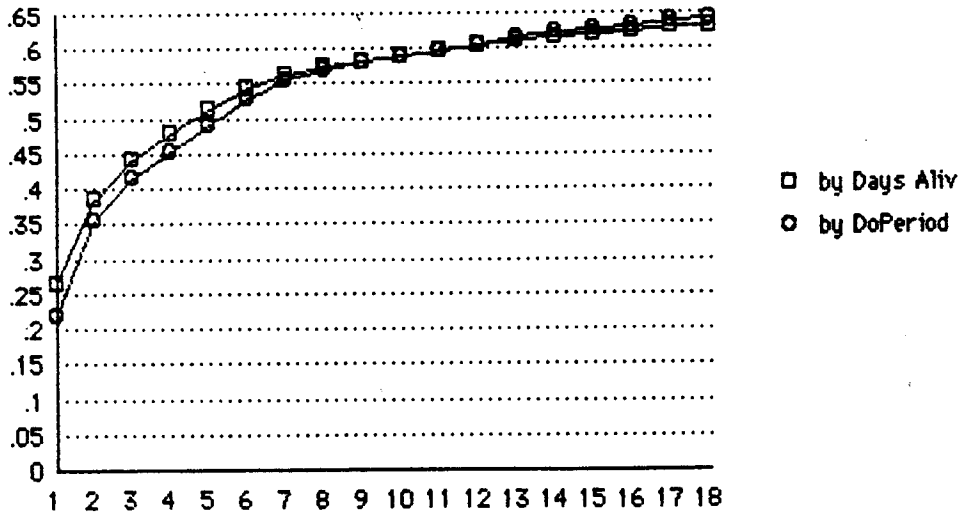
have reduced the number of non-samples disposed over the weekend). This delay, of

course, does not directly influence the response rate. However, delaying turnaround of

coversheets until Monday delays re-issuing new coversheets as well. The start of the

sample week on Wednesday might have reduced the maximum days alive for re-issued

coversheets, and damped the response rate accordingly. The maximum possible effect of

the Wednesday starting day, however, is probably quite small — the response rate

estimates for both day alive and day of interviewing period distributions are so similar and

the fraction of re-issued coversheets small enough that the probable effect of the delay is

also small.[2] Even if the coversheets were not re-issued until Monday, 90% of the

dispositions occur within seven days, meaning that 90% of the coversheets re-issued by

Monday would be determined by day 12.

What else would improve the response rate? By extension from an earlier starting

day, any moves which would increase the turn-around of non-sample coversheets would

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[2]The re-issued coversheets were slightly more likely to be non-sample (53.6% for re-issued CS vs. 41% for issued-once CS). One could probably produce a very small increase in the response rate by starting the interview period on Monday or Tuesday, but the yield from this change should be weighed against other adminstrative concerns.

increase the time available to administer successful interviews. The additional time might also prevent "first refusals" from automatically becoming "final refusals." Since the majority of non-interviews occured on the last day of the interviewing period (close-outs), additional time might allow for a better refusal conversion rate. (Only 27.3% of re-issued coversheets were successful interviews, vs. 33.4% overall). The additional time would also allow for an increase in the number of calls, which would probably distribute themselves into the same general pattern of dispositions, but not yield much of an increase in the number of interviews over non-interviews. Finally, an artificial increase in the response rate would be gained by removing apparent non-samples from the non-interview tally. The closed-out non-interviews include coversheets for which a final disposition had yet to be determined (e.g., "Never answered (NonInterview, RC=62)," "Lost (NonInterview, RC=63)," and "End of Study Replacements" (NonInterview-NonSample, RC=68). These dispositions might as well be considered non-sample as non-interview. Removing these from the denominator of the response rate would yield a 6% increase in the reported response rate. However this improvement in reported response rate would not really represent an improvement in the quality of the sample.