Analysis of Project Vote's Voter Registration Experiment

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Overview: Two voter-registration experiments were conducted by Project Vote in the cities of Detroit and Tampa during the spring of 2004. The intent of the experiments was to provide guidance in efficiently conducting voter registration campaigns in inner-city settings where voter registration rates are low. Two types of strategies were employed: a) a door-to-door registration campaign; and, b) a site-based registration campaign.

Five questions can be quickly answered from the experiment designed and implemented:

1) How cost effective are door-to-door and site-based voter registration efforts?
2) How many visits should a house receive on weekdays?
3) Does it make sense to visit houses on weekends?
4) Is it best to start with door-to-door registration or with site-based registration?
5) Are door-to-door and site-based campaigns registering the same people?

Methodology: Targeted areas of Tampa and Detroit were divided into units of analysis, hereafter referred to as "turfs." Each turf consisted of roughly 160 households and typically contained a single lengthy street. In Detroit, 63 turfs were drawn up and, only 48 were drawn in Tampa. Turfs were assigned to receive door-to-door visits before or after the site-based registration was underway. Turfs were randomly selected to receive weekday passes totaling 0, 2, 3, 4, or until zero cards are collected. Turfs could also be selected to receive no weekend visits, visits on Saturday, on Sunday, or on both Sunday and Saturday. Tables 1 and 2 report the number of turfs assigned to the various combinations of treatments in Tampa and Detroit.

Table 1 Detroit Assignment of Turfs to Treatment Conditions

Order	Before				After				Control	Weekend Totals
Weekday Visits	2	3	4	Saturate	2	3	4	Saturate		
None	1	1	4	1	1	1	4	1	28	42
Saturday	1	1	0	1	1	1	0	1	1	7
Sunday	1	1	0	1	1	1	0	1	1	7
Both	1	1	0	1	1	1	0	1	1	7
Weekday Totals	4	4	4	4	4	4	4	4	31	63
Timing Totals	16				16					

Table 2 Tampa Assignment of Turfs to Treatment Conditions

Order	Before				After				Control	Weekend Totals
Weekday Visits	2	3	4	Saturate	2	3	4	Saturate		
None	1	1	2	1	1	1	2	1	17	27
Saturday	1	1	1	0	1	1	1	0	1	7
Sunday	1	1	1	0	1	1	1	0	1	7
Both	1	1	0	1	1	1	0	1	1	7
Weekday Totals	4	4	4	2	4	4	4	2	20	48
Timing Totals	14				14					

The random assignment provides assurance that the number of new registration cards collected is the result of the registration tactic than the skill of the site coordinator. In the absence of random assignment, coordinators would send canvassers back to areas with high yields and away from areas with low yields, thereby confounding multiple passes with the yield of the neighborhood. It is possible that due to random chance a particular treatment group is more fertile ground for registration than other treatment groups, but on average the treatment groups will be comparable with regards to both observable and unobservable traits associated with voter registration (such as income and civic engagement). The random assignment provides an unbiased procedure for estimating registration tactics and a means of bounding the uncertainty associate with the estimate.

In order to test the comparability of the experimental turfs, one can examine the number of voters residing in each of the turfs prior to the beginning of the experiment. Since the assignment of treatments to turfs was random, there should be no systematic relationship between the number of registered voters in a turf and its assignment to a treatment in either city. Results from this quick randomization check can be seen in Appendix A. Unfortunately, there appears to be a correlation between assignment to the saturation condition in Detroit and the number of registered voters in the turf. Such a correlation might indicate that the turf also possesses more eligible unregistered persons. All other treatment conditions are statistically indistinguishable from the control group. Controlling for the number of voters in the turf may successfully correct for the unusual nature of the Detroit saturation group, but the results from the saturation group deserve some skepticism. It is important to emphasize that the experimental procedure remains unbiased, but the particular saturation sample may have been drawn from the tails of a distribution.

Description: The first round of door-to-door canvassing began in Detroit on March 1st and ended on March 20th. Voter registration at Detroit sites began on March 15th and continued through the end of the experiment on May 13th. The final round of door-to-door canvassing in Detroit began April 20th and ended May 13th. The time schedule for Tampa was very similar with the first round of canvassing beginning on March 2nd and ending March 19th. Site-based registration in Tampa ran from March 22nd to May 7th. The second round of door-to-door

registration began April 19th and ended May 8th. From the data provided by organizers, it appears that the site coordinators did an excellent job of adhering to the prescribed protocol.

Table 3 reports the number of cards collected for each city over the course of the study. Of the 13,521 cards collected by Project Vote, slightly less than 9% of the cards came from the door-to-door components. Even after taking into account that only one-quarter (27%) of the 4,844 hours in the field were spent on doors, it is clear that site-based strategies generate cards more efficiently than door-to-door registration efforts. Overall, the door-to-door campaign generated roughly 1 card per hour in the field (0.9) and sites generated 3.5 cards per hour. Therefore, site-based registration requires roughly one-fourth as much time in the field to collect each card as door-to-door activities.

Table 3 Description of Overall Experimental Activities

	Detroit	Tampa	Pooled
Registered during Experiment	9,590	3,931	13,521
Registered at Doors	818	352	1,170
Registered at Sites	8,772	3,579	12,351
Time in Field at Doors (hours)	744	565	1,309
Time in Field for Sites (hours)	2,341	1,194	3,535
Overall Cards per Hour for Doors	1.1	0.6	0.9
Overall Cards per Hour for Sites	3.7	3.0	3.5
Relative Efficiency of Door verses Site	1 to 3.4	1 to 5.0	1 to 3.9

We can now answer our first question about the relative cost-effectiveness of the two tactics for voter registration. In order to register 100 voters, it would require 111 hours of door-to-door activity and 29 hours of site-based efforts. If field workers are paid $10 an hour, registering 100 voters costs $1111 via doors and $286 via sites. In the absence of other external benchmarks it is impossible to determine how cost-effective each strategy is in absolute terms. However, these numbers provide a useful benchmark in budgeting registration campaigns.

A couple of qualifications are in order. First, the site-based registration campaign did not generate many cards in the targeted area of the experiment. Only 398 of the 12,351 registration cards collected at sites (3%) were located in one of the experimental turfs. The remaining registration cards drew from a diffuse geography. So, while site-based strategies may be more effective at generated cards in total, it is not an efficient way to register voters in select neighborhoods. For campaigns that focus upon small geographic units, such as city council or state legislatures, door-to-door campaigns are likely to prove much more efficient. Site-based registration should be used in situations where the geography of the voter is largely irrelevant.

Second, door-to-door canvassing was twice as efficient at generating cards in Detroit as in Tampa. There are multiple possible explanations for this finding, but one that strikes the author as extremely likely is population density. The turfs in Detroit had more people more closely packed together than Tampa. As a consequence, canvassers can move from door-to-door more quickly, thereby increasing the efficiency of the operation. Door-to-door voter registration campaigns are more cost-effective in areas where canvassers can move one household to another quickly.

The inefficiency of door-to-door canvassing efforts is not hard to pinpoint. Most residents either are already registered, don't want to be registered, or cannot be reached. Table 4 reports the dispositions of households contacted by the people on the ground. At only 6% of the doors reached by workers was a registration card signed. More often, workers discovered that every person in residence was already registered or there was no answer at the door. Admittedly, residents may have claimed to be registered in order to bid rid of the worker, but the bottom-line is the same since no one was registered at that address.

Table 4 Types of Households Encountered Door-to-Door

	Detroit	Tampa	Pooled
Household where at least one card was collected	449	238	687
Household with everyone already registered	2,867	1,422	4,289
Households with only some residents registered (but refusing to register)	375	107	482
Households refusing to answer the door	252	328	580
Households either moved or never answering	4,276	784	5,060

One interesting descriptive point that Table 4 illuminates is the difference between Detroit and Tampa with regards to how often no one answered the door in Detroit or the house appeared vacant. Over half (52%) of the households attempted by workers were found to be vacant and/or with no answer. In contrast, no answer could be obtained in only one-quarter of the households in Tampa. There are numerous possible explanations for the discrepancy (e.g., high vacancy rate; residential mobility; mismatch between canvassing times and resident workdays), but doors with no answer represent a source of inefficiency. Finding a way of diminishing the number of unanswered doors through the selection of neighborhoods or timing of canvassing would increase the efficiency of the overall voter registration campaign.

Experimental Findings: The power of randomized experiments stems from the ability of the experimenter to manipulate the variables of interest (e.g.,, the number of times a neighborhood is canvassed). The door-to-door component of the registration campaign was capable of targeting very narrow bands of residential neighborhoods and easily orchestrated by site coordinators. In contrast, the site-based registration efforts met geographically disperse individuals, thereby making experimental manipulation difficult. As a result, the experimental results focus almost entirely with door-to-door registration and deal with site-based tactics only peripherally.

How many times should a house be visited on weekdays? The first point that should be made is that it is obvious from the data that the door-to-door canvassing campaign was successful in registering people to vote. Very few newly registered persons were found in turfs assigned to the "control" condition (i.e., receiving no door-to-door visits).[1] Over a longer period of time, it is possible that people registered by Project Vote would have registered another way, but during the three months the experiment was conducted, the door-to-door canvassing campaign certainly registered people to vote (see Table 5).

[1] "Control" and "treatment" turfs are different by roughly 19 cards on average across both cities. With a standard deviation of only 2.7 cards, the odds of such a result being due to chance are roughly 1 in a billion.

Table 5 Average Number of Cards Collected by Weekday Assignment

Treatment Group Assigned	Detroit	Tampa	Pooled
No weekday canvassing	3.5	3.5	3.5
Two visits	16.6	15.5	16.1
Three visits	24.1	19.3	21.7
Four visits	19.1	14.1	16.5
Saturation (6-8 visits)	53.5	15.0	40.7

All things being equal, one would expect the turfs assigned to receive more weekday knocks on the door to have more newly registered voters. By and large, that expectation is borne out in Table 5. The fact that the turfs with four weekday visits registered fewer voters than the turfs assigned only three visits is almost certainly due to random chance.[2] The enormous registration success in Detroit's saturation turfs is likely due to the abnormality noted above in the description of the randomization. The simple analysis presented in Table 5 is confirmed by the regression analysis in Appendix C (Table C1).

While it is useful to see that the treatment conditions assigned to the turfs comport with *a priori* intuitions, the primary concern is the cost-efficiency of each pass. Table 6 breaks down the number of cards collected for turfs in each treatment condition in both cities.

Table 6 Number of Cards Collected on Each Pass through the Turf

	Detroit				Tampa				Average
	Two Weekday Passes	Three Weekday Passes	Four Weekday Passes	Saturation	Two Weekday Passes	Three Weekday Passes	Four Weekday Passes	Saturation*	
First Pass	63 (100%)	77 (100%)	60 (100%)	110 (100%)	65 (100%)	62 (100%)	38 (100%)	19 (100%)	8.1 (100%)
Second Pass	23 (37%)	49 (64%)	22 (37%)	78 (71%)	26 (40%)	20 (32%)	27 (71%)	9 (47%)	4.2 (50%)
Third Pass		43 (56%)	32 (53%)	72 (65%)		14 (23%)	19 (50%)	6 (32%)	4.1 (48%)
Fourth Pass			17 (28%)	41 (37%)			2 (5%)	9 (47%)	2.4 (27%)
Fifth Pass				53 (48%)				0 (0%)	4.4 (32%)
Sixth Pass				19 (17%)				0 (0%)	1.6 (11%)
Seventh Pass				6 (5%)				2 (11%)	0.7 (7%)
Eighth Pass				18 (16%)				0 (0%)	1.5 (11%)

Numbers in parentheses were calculated as the number of cards collected in the pass divided by the number of cards collected in the first pass.

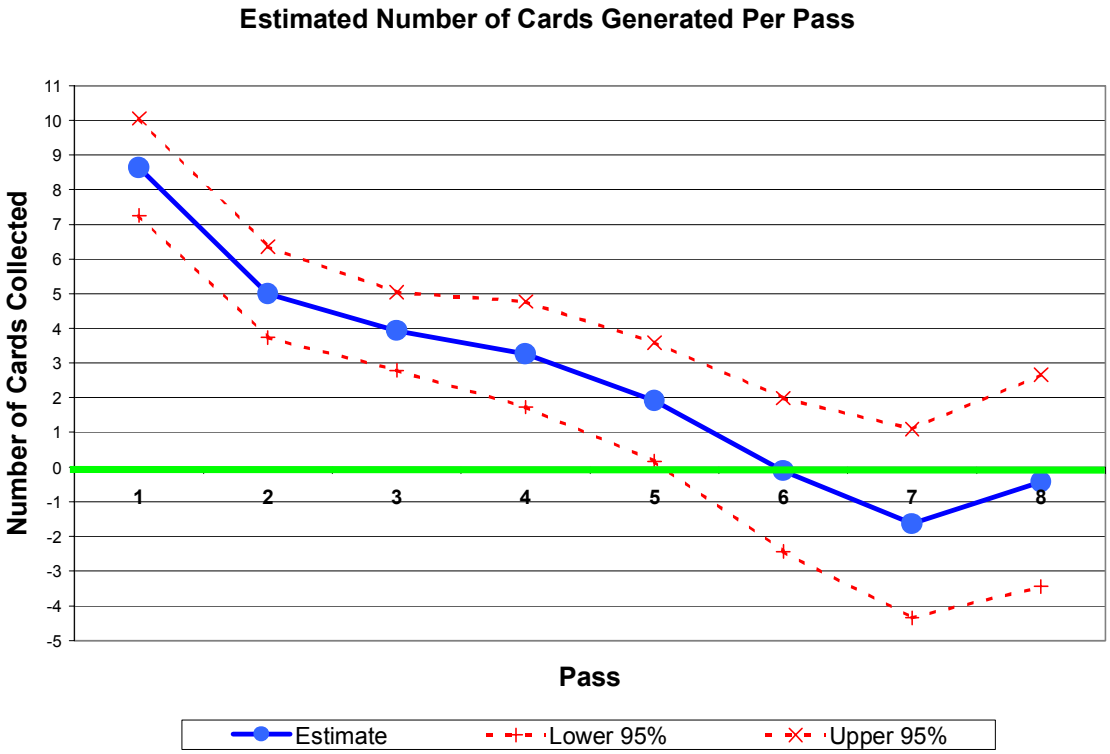
* Every treatment had 8 turfs assigned to it in every city, excepting "saturation" in Tampa, which had only 4 turfs assigned to it (see Tables 1 and 2)

[2] The only conceivable causal explanation would be if residents demanded the registration cards they signed a few days ago back from workers.

For almost every treatment condition in both cities, the trend is for each subsequent pass to collect fewer cards than the preceding pass. The column to focus upon is the rightmost column labeled "average." The average column pools together the results from all of the treatment conditions. The data suggests that the second pass typically collects only half as many cards as the first pass through a neighborhood. The second and third pass may be roughly comparable with regards to efficiency, but further passes trail off very quickly. Thus, we can conclude that the first pass through a neighborhood is a more cost-effective means of registering voters than the second or third pass.

The data can be analyzed more formally using the number of cards collected on each pass as the dependent variable and the number of passes as the independent variables. In order to accommodate a non-linear relationship between the number of passes and the number of cards collected, a higher order curve is fitted. It turns out that a linear function to the fourth power best describes the data.[3] Figure 1 depicts the estimated number of cards generated from each pass through a neighborhood and the associated 95% confidence interval (also see Appendix D).[4] Notice that the confidence intervals for high pass numbers are wider because of the smaller number of turfs assigned to receive high number of passes.

Figure 1



[3] An alternative specification was also carried out where a dummy variable for each pass was included in the analysis. The results are very similar. The results for the curve are reported because the smoothing function has desirable features in the current context.

[4] The confidence interval was calculated via a coefficient bootstrapping routine developed by Michael Tomz, Jonah Wittenberg and Gary King named "Clarify."

The expected number of cards decreases with each pass until so few cards are expected that the model predicts zero cards will be collected. Based upon the two cities studied, it is predicted that the first passes through a neighborhood will yield roughly 9 cards, the second pass 5, third pass 4, and fifth pass only 2 cards. Passes six, seven and eight do not appear to yield any cards on average. It is important to remember that the line presented in Figure 1 is an average of the two cities. Each turf in Detroit received on average 3 cards more during each pass than in Tampa. Each neighborhood will possess its own baseline level of cards available to be collected and the graph can be adjusted upwards or downwards accordingly.

In order to guide decisions in the field, rather than predict the absolute number of cards collected on each pass, it is also possible to examine the number of cards collected on a pass as a percentage of the first pass through a turf. Such an analysis yields a graph identical to Figure 1 in every important aspect. The second pass yields 58% of the first pass; the third pass 46%; the fourth pass 38%, and the fifth pass 22%. This way of thinking about the results provides a way of estimating the yield of multiple passes for particular cities. For instance, suppose that a door-to-door registration campaigns were conducted in Akron, OH and Grand Rapids, MI where 7 cards per turf were collected on the first pass through Akron and 16 cards per turf were collected in Grand Rapids. Naively looking at Figure 1, a person might mistakenly conclude that both cities will yield 5 cards per turf. However, it is more reasonable to expect the second pass to yield 9 cards in Grand Rapids and 4 cards in Akron. Similarly, the third pass would be expected to generate 7 cards in Grand Rapids and 3 cards in Akron. Such adjustments make it easy to project the cost-effectiveness of multiple passes. The same logic can be applied to neighborhoods within cities. It is reasonable to expect that some neighborhoods in a city have more unregistered voters than others. After site managers have targeted promising neighborhoods for the registration campaign, the first pass through the neighborhood will yield sufficient information to gauge the cost-effectiveness of further passes through the neighborhood.

Two causal mechanisms immediately present themselves to explain why each addition pass through a turf yields fewer cards. First, after each pass through a neighborhood, there are fewer eligible unregistered persons for workers to register to vote in subsequent visits to the neighborhood. Secondly, suppose that residents of a turf are composed of people who are easy to contact and those who are difficult to contact. After a couple of visits to a neighborhood, the majority of the people to be contacted by the campaign will be hard to contact (since those who were easy to contact have already been reached). Thus, the cost of contacting each remaining person to be registered will be higher.

On the other hand, it is much faster to cover a turf a second and third time than the first time, because many of the households have already been identified and do not need to be revisited. By the process of elimination, canvassers can start to hone in the households where potential registrants reside. The net result is that the cost effectiveness of later passes does not drop as rapidly as one might initially guess. The first pass through a neighborhood remains the most cost-effective run through a neighborhood, but the second pass is only 11% more expensive. Table 7 provides the hours required to complete each pass through a 160 household turf and its relative cost-efficiency (recall that it cost $286 to register 100 voters via sites).

Table 7 Hours to Complete a Pass through a Turf and Dollars per 100 Cards

	Hours to Complete*	Cards Collected	Cards per Hour	Dollars for 100 Registrations
Pass One	8.3	8.6	1.0	$1000
Pass Two	5.7	5.0	0.9	$1111
Pass Three	5.4	3.9	0.7	$1429
Pass Four	4.2	3.3	0.8	$1250
Pass Five	3.7	1.9	0.5	$2000
Pass Six	4.6	0	0	N.A.
Pass Seven	3.7	0	0	N.A.
Pass Eight	3.2	0	0	N.A.

* Hours in the field to complete a turf were calculated by regressing the number of hours to complete a turf on a set of dummy variables for each pass, city, and the treatment condition assigned to the turf.

The above analysis and numbers can be pulled together to derive the following policy prescription. When generating a large number of registration cards, regardless of geography, sites are the most cost-effective strategy. However, if location is important to the campaign and/or cost is not a serious constraint, then a campaign is advised to go door-to-door through neighborhoods once. Then, the campaign ought to return to the neighborhoods that yielded the highest number of cards a second or third time.

Does it make sense to visit houses on weekends? The site organizers were planning on canvassing only during weekdays, because past experience suggested that fewer people were home and recruiting canvassers is more difficult on weekends. On the other hand, weekends offer a campaign another opportunity to reach residents of a neighborhood not home during weekdays. Several turfs from each city were randomly selected to receive door-to-door visits on weekends (see Tables 1 and 2) in order to test the cost-effectiveness of canvassing on Saturdays and Sundays.

By comparing the number of cards collected in the randomly selected turfs not receiving attention to the randomly selected turfs where door knocking took place, we can determine whether weekend canvassing raises registration rates. Table 8 reports the differences between the two types of turfs and demonstrates that these turfs registered 11 more people on average. This increase is not attributable to chance (the standard error is 2.4) and is confirmed by the complete regression analysis in Appendix C (see Table C1).

Table 8 Registration Cards Collected by Weekend Canvassing

	Detroit	**Tampa**	**Pooled**
Average number of registration cards collected from non-weekend turfs	9.6 [42]	7.5 [27]	
Average number of registration cards collected from turfs canvassed on weekend	29.1 [21]	15.7 [21]	
Difference	19.5 (4.9)	8.1 (2.7)	10.8 (2.4)
P-Value (one-tailed)	<0.01	<0.01	<0.01

Numbers in brackets report the number of turfs in the treatment condition.
Number in parentheses represent standard errors.

With a larger experiment, it would have been possible to confidently compare the performance of turfs that were canvassed on Saturdays, Sundays, and both Saturday and Sundays. However, size constraints limited the precision of the experiment and such fine-grained analysis is not possible. The regression analysis in Appendix C suggests that Saturdays and Sundays are both effect times to register voters door-to-door, but visiting both days is of limited value. While it possible that visiting a turf twice on the weekend doesn't add much more than visiting it once, it is illogical to think that visiting twice would somehow register fewer people than visiting once. The experiment can establish with near certainty that weekend visits boost registration rates, but the standard errors are too large to differentiate between the specific weekend tactics.

Examining the cost-effectiveness of canvassing on weekends sheds a little light on the phenomenon. Table 9 reports the number of cards collected on weekend shifts, the number of hours worked on weekends, and the estimated cost effectiveness of weekend work. The numbers suggest that weekend visits are cheaper at $909 per 100 cards than the first pass during the weekday ($1000, see Table 7). Saturdays may even be cheaper than Sundays costing $714 for every 100 registrations completed, whereas Sundays are likely to be more expensive at $1667 for every 100 cards. However, the difference between the two days should be viewed with some skepticism. Fewer hours were worked on Sundays making the cost-estimates more uncertain. The fewer Sunday hours worked may also indicate that organizers sensed that few cards were being generated and moved resources elsewhere (note: since the turfs to be canvassed on Sundays were randomly assigned, there is no danger of organizers hand-picking the Sunday turfs).

Table 9 Cost Effectiveness of Weekend Canvassing

		Detroit	Tampa	Pooled
Saturdays	Number of cards collected on Saturday Shifts	160	43	203
	Number of hours worked on Saturday Shifts	98.5	42.7	141.2
	Cards per Hour on Saturday Shifts	1.6	1.0	1.4
	Dollars per 100 Cards Collected on Saturdays	$625	$1000	$714
Sundays	Number of cards collected on Sunday Shifts	48	6	54
	Number of hours worked on Sunday Shifts	61.2	22.9	84.1
	Cards per Hour on Sunday Shifts	0.8	0.3	0.6
	Dollars per 100 Cards Collected on Sundays	$1250	$3333	$1667
Weekend Totals*	Number of cards collected on Weekend Shifts	208	49	257
	Number of hours worked on Weekend Shifts	159.7	65.6	225.7
	Cards per Hour on Weekend Shifts	1.3	0.7	1.1
	Dollars per 100 Cards Collected on Weekends	$769	$1429	$909

* "Weekend Totals" simply adds up Saturday and Sunday canvassing for an average.

The bottom-line is that Saturdays appear to be the most cost-effective means of going door-to-door to register voters. In contrast, Sundays are likely to yield fewer cards and be proportionately more expensive. Registering door-to-door on Saturdays is more expensive than site-based registration schemes ($714 verses $286), but definitely should be added to the arsenal of door-to-door tactics.

Is it best to start with door-to-door registration or with site-based registration? Among the organizers of Project Vote, there was some discussion as to whether it was better to move into neighborhoods right off the bat or wait until after site-based registration was well under way. The experiment was designed to test these two possibilities by randomly selecting turfs to be canvassed prior to the site-based campaign and turfs to be canvassed after sites were well underway (see Tables 1 and 2).

Table 10 reports the comparison of the doors canvassed before and after the site-based campaign. In each city, the turfs knocked after the sites yielded more cards on average than turfs knocked prior to the sites. Pooled together (using precision weighted averages), it appears that the door-to-door areas knocks later generated 7 more cards on average. The simple t-test does not have sufficient power to achieve traditional levels of statistical significance, but the experiment is suggestive. Using the more efficient regression estimation in Appendix C, we find that a statistically significant difference of 6.5 cards between the early and late turfs. Thus, it appears that the later door-knocking campaign was more efficient than the earlier one.

Table 10 Comparison of Early Doors verses Later Doors

	Detroit	Tampa	Pooled
Average Number of Registration Cards Collected from Doors Before Sites	22.8 [16]	14.6 [15]	
After Number of Registration Cards Collected from Doors After Sites	33.9 [16]	17.6 [14]	
Difference	11.1 (7.9)	3.0 (3.7)	7.2 (4.5)
P-Value (two-tailed)	0.17	0.43	0.12

Numbers in brackets report the number of turfs in the treatment condition.
Number in parentheses represent standard errors.

The most likely explanation for this finding is that the canvassers became more practiced and better at their job as they walked through the neighborhoods. The later turfs may have yielded more registration cards because of better trained workers rather than anything inherent in the timing. However, one could imagine an explanation that relies upon branding to explain the timing difference. Perhaps the canvassers received more friendly reactions from residents of neighborhoods because of the work at the sites. If residents see and identify the work of Project Vote at their super market, bus stop, or shopping mall, then they might be more likely to speak with workers on their doorstep.

The author sees no reason that site-based registration should not be the first strategy employed by a voter registration campaign. It is much cheaper to register voters at sites than at doors and the name recognition generated cannot hurt canvassers when the door campaign begins.

Are door-to-door and site-based campaigns registering the same people? One purpose of the before and after was to detect competition between door-to-door and site-based registration strategies. If the two techniques were registering the same people, then the second round of door-to-door canvassing would yield fewer cards than the first round of turf based registration. As we saw in Tables 10 and C1, the second round of registration actually yielded MORE cards. Such a result suggests that site-based and door-to-door registration efforts are

COMPLIMENTARY rather than competitive. As noted above, there is good reason to believe that the increased production in the second round had to do with skill of the workers rather than timing, but at the very least, the data does not suggest competition between the two registration strategies.

A second piece of evidence can be brought to bear on the question. If site-based and door-to-door registration strategies were competing for the same set of eligible citizens, then one would expect to see more people registered at sites from control turfs receiving no door-to-door activity than treatment turfs. Admittedly, only 3% of those registered at sites live in the experimental turfs, but that still leaves nearly 400 individuals to examine. The rightmost column of Table C1 reports the regression analysis of where those individuals registered at site reside. The control turfs are the baseline for comparison, so competition between tactics would lead to negative coefficients on the dummy variables for the treatment categories. Instead, the coefficients for every one of the weekday treatment conditions are weakly positive. The numbers are indistinguishable from zero, so evidence for the site and door activity complimenting one another is very weak, but there is absolutely no evidence that the two tactics are in competition with each other on weekdays.[5]

Thus, it appears as if site-based and door-to-door registration strategies are not in competition. That is, they are reaching two different populations of people. Door-to-door registration may be more expensive than site-based campaigns, but it might be the best way of reaching a particular set of people.

Conclusion: Site-based registration is by far the most cost-effective means of collecting registration cards. Door-to-door registration techniques become cost-competitive only when the yield on sites drops to one card per hour per worker. A campaign should turn to doors when the geography of the residents is important, penetrating the entirety of a population is desired, or the registration sites have run dry. When a campaign does turn to door-to-door efforts, they should not eschew Saturdays, since they yield at least as many cards as weekday passes. Furthermore, second and third passes will yield a percentage of the first pass, so should take place only in those areas that generated many cards on the first pass through.

Table 11 Cost Effectiveness of Tactics Employed in the Experiment

	Cards per Hour	Dollars per 100 Cards
Sites	3.5	$286
Saturday Canvassing	1.4	$714
First Pass	1.0	$1000
Second Pass	0.9	$1111
Third Pass	0.7	$1429
Fourth Pass	0.8	$1250
Sunday Canvassing	0.6	$1667
Fifth Pass	0.5	$2000

[5] Interestingly, weekend might be another matter. Two of the three categories for weekend visits possess negative coefficients. The coefficients are all statistically indistinguishable from zero so no conclusions can be drawn, but it is possible that the people registered at doors on the weekend are the same type of people registered at sites. This interesting hypothesis could be tested in the future but is well beyond the scope of the current inquiry.

Appendix A

Table A1 Number of Voters Registered in Turfs Prior to Assignment

	Pooled	Detroit	Tampa
Two Weekday Passes	19.7 (29.1)	44.9 (50.7)	1.0 (24.2)
Three Weekday Passes	40.5 (29.1)	91.2 (50.7)	-3.6 (24.2)
Four Weekday Passes	-3.4 (25.7)	-1.6 (44.4)	-18.5 (21.9)
Saturate on Weekday	62.7* (31.1)	120.1* (50.7)	-10.0 (29.8)
Saturday Pass	-33.7 (27.0)	-54.4 (49.3)	-33.6 (22.3)
Sunday Pass	-22.8 (27.0)	-79.5 (49.3)	13.2 (22.3)
Pass on both Weekend Days	-26.4 (28.1)	-58.1 (49.3)	1.0 (23.1)
Doors After Sites	-1.9 (21.3)	-6.1 (36.0)	2.4 (18.0)
Detroit (Dummy)	192.1** (21.3)		
Constant	158.4** (15.8)	346.6** (18.7)	167.3** (11.4)
N	111	63	48
Adj-R-sq	0.57	0.00	0.00

* Denotes significance at $p<0.05$

** Denotes significance at $p<0.01$

Appendix B

Given the nature of the experiment, commenting upon the relative efficiency of various site-based tactics is difficult. Table A1 is offered as a description of the types of locations that organizers sent volunteers.

Table B1 Rate of Card Collection at Types of Site (cards per hour)*

	Detroit	Tampa
Government Buildings	7.2 [60]	3.5 [198]
Schools	2.5 [89]	2.9 [145]
Shopping Malls	3.0 [125]	3.1 [537]
Supermarket	4.1 [169]	2.8 [184]
Transportation	3.3 [300]	3.8 [46]

Top numbers report cards signed per hour.
Numbers in brackets report the number of hours work for a particular type of site.
* Note: The categories only include site types that were frequently used and clearly labeled by organizers.

Appendix C

The Latin-square nature of the experimental design allows for efficient and unbiased estimation via ordinary least squares regression. The dependent variable of interest is the number of cards collected[6] and the different treatment categories are captured by a series of dummy variables. In an attempt to control for the number of residents in each turf, control variables for the number of previously registered voters in the turf and the number of unregistered residents (taken from a consumer database) are included in the analysis.

Table C1 Regression Results for the Registration Experiment

	New Registration Cards	Cards Collected at Doors	Cards Collected at Sites
Two Weekday Passes	6.9* (3.9)	5.5 (3.7)	1.5 (1.3)
Three Weekday Passes	11.7** (3.9)	9.7** (3.8)	2.0 (1.3)
Four Weekday Passes	10.5*** (3.4)	10.0*** (3.3)	0.5 (1.1)
Saturate on Weekday	29.6*** (4.2)	28.9*** (4.1)	0.7 (1.4)
Saturday Pass	9.0** (3.6)	8.5** (3.5)	0.5 (1.2)
Sunday Pass	6.1* (3.6)	7.3** (3.5)	-1.2 (1.2)
Pass on both Weekend Days	1.7 (3.7)	2.5 (3.6)	-0.8 (1.2)
Doors After Sites	6.6** (2.8)	6.4** (2.7)	0.2 (0.9)
Number of Unregistered Residents	0.19* (0.09)	0.10 (0.09)	0.09*** (0.03)
Number of Prior Registered Voters	0.04*** (0.01)	0.03** (0.01)	0.01*** (0.004)
Detroit (Dummy)	-5.4 (3.5)	-0.2 (3.4)	-5.1*** (1.1)
Constant	-11.2*** (3.4)	-10.8 (3.2)	-0.4 (1.1)
N	111	111	111
Adj-R-sq	0.58	0.57	0.15

Numbers in parentheses represent standard errors.
* denotes $p < 0.10$
** denotes $p < 0.05$
*** denotes $p < 0.01$

[6] Alternatively, rather than view card counts as a normally distributed variable, one could conceive of it as counts of an event. To consider this alternative modeling possibility, all of the analysis was duplicated using Poisson Regression, which is designed to analyze count data. None of the findings change substantively.

Appendix D

Table D1 The number of cards collected on each pass through a turf

	Coefficient	Standard Error
Detroit (Dummy)	2.84**	0.70
Assigned 3 Weekday Passes	0.94	1.24
Assigned 4 Weekday Passes	-0.66	1.22
Assigned Saturation	2.85***	1.30
Number of Passes	-13.97**	5.70
Number of Passes Squared	5.17**	2.56
Number of Passes Cubed	-0.84*	0.44
Number of Passes^4	0.05*	0.03
Constant	15.52***	4.10
N	244	
Adj-Rsq	0.22	

* denotes $p < 0.1$
** denotes $p < 0.05$
*** denotes $p < 0.01$