Mailbox Experiment Results

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Overview

This memo documents results from the 2014-2017 SNCS mailbox experiments.

Terms

- Tract: A year 2000 (SNCS) census tract
- Experiment: An experiment refers to all trials in a given experimental **condition** (e.g., control) and tract.
- Conditions:
  - Control: The mailbox site was cleared of all litter, and a clean "Yard Sale" sandwich board was placed near the mailbox.
  - Treatment: Litter and a graffitied sandwich board were added to the mailbox site.
  - Graffiti Only: Only the graffitied sandwich board was added to the site. This was done to test if graffiti alone had an effect. Only a small number of trials were done with this treatment.
  - Super Graffiti: Litter, a graffitied sandwich board, and a graffitied littercam were added to the site. This was done to test if magnified graffiti had an effect. Only a small number of trials done with this treatment.
- Trial: A trial refers to everything occurring between an envelope being dropped at the mailbox and a participant either mailing or stealing that envelope.
- Participant: Any individual passing near the mailbox while an envelope is on the ground.
- Action: Walking by, mailing, or stealing of the envelope.

Codebook

Table 1: Mailbox experiment variables and descriptions

variable	unit	description
tract_number	tract	Year 2000 census tract
isc	tract	Empirical Bayes estimated informal social control. This is adjusted for respondent perceived deviance as in Matsueda & Drakulich (2015).
ce	tract	Empirical Bayes estimated collective efficacy. This is adjusted for respondent perceived deviance as in Matsueda & Drakulich (2015).

variable	unit	description
experiment_date	experiment	Date experiment was conducted
condition	experiment	Control or treatment (disorder) condition
condition_all	experiment	Expanded condition noting graffiti-only and super-graffiti trials
experiment_walkby_rate	experiment	Number of inactive participants per minute of trial duration. Note endogenous to action.
prior_disorder	experiment	Presence of litter prior to beginning experiment
control_was_cleanup	experiment	Prior disorder present and first trials were control trials, so initial treatment was a disorder removal
unique_envelope_id	trial	Unique identifier for envelope
envelope_id_number	trial	ID number written on envelope
addressee	trial	Address on envelope: Individual or Community Organization
start_time	trial	Hour and minute of day when trial began
end_time	trial	Hour and minute of day when trial ended
trial_duration	trial	Duration of trial in minutes
walkby_sum	trial	Number of inactive participants passing envelope during trial
letter_walkby_rate	trial	walkby_sum divided by trial duration; approximate rate of foot traffic during trial. Note endogenous to action.
action	participant	Action taken by participant: Walkby, Mailed, or Theft
sex	participant	Observer-perceived sex of participant: Male, Female, or Unknown
age	participant	Observer-perceived age of participant: Young, Middle-Age, Old, or Unknown. Members of groups recorded as Unknown due to record keeping limitations.
race	participant	Observer-perceived race of participant: White, Non-White, or Unknown
in_group	participant	Whether participant was walking in a group or not
group_size	participant	Number of persons in group, if walking in group

Cross-tabs

The first table shows counts and row-wise proportions of actions for each condition. Graffiti Only trials are excluded here as they were not done in many locations or across many trials (64 trials with 504 walkbys in 6 tracts for Graffiti Only). Graffiti Only trials were treatments using only the sandwich board with graffiti and no litter, making them a partial treatment. This leaves 3449 trials. See the appendix for more information on these special trials.

Table 2: Outcome by condition (n, row % of total)

condition	Walkby	Mailed	Stolen	Total
Control	1496 (88%)	176 (10.4%)	28 (1.6%)	1700 (100%)
Treatment	1617 (90.8%)	136 (7.6%)	28 (1.6%)	1781 (100%)
Total	3113 (89.4%)	312 (9%)	56 (1.6%)	3481 (100%)

Treatment heterogeneity

These tables examine treatment heterogeneity by stratifying on the presence of prior disorder. The first table shows results for locations with disorder present before running trials. Note there were many experiments where disorder was present before running trials. 192 trials are missing data on prior disorder, however, so they are omitted in these tables.

Table 3: Prior Disorder - Outcome by condition (n, row % of total)

condition	Walkby	Mailed	Stolen	Total
Control	714 (87.3%)	85 (10.4%)	19 (2.3%)	818 (100%)
Treatment	722 (90.6%)	58 (7.3%)	17 (2.1%)	797 (100%)
Total	1436 (88.9%)	143 (8.9%)	36 (2.2%)	1615 (100%)

The first table shows results for trials in locations without any prior disorder. Note overall theft is about half as common where there is no prior disorder. Treatment still has zero effect.

Table 4: No Prior Disorder - Outcome by condition (n, row % of total)

condition	Walkby	Mailed	Stolen	Total
Control	782 (88.7%)	91 (10.3%)	9 (1%)	882 (100%)

condition	Walkby	Mailed	Stolen	Total
Treatment	702 (92.4%)	52 (6.8%)	6 (0.8%)	760 (100%)
Total	1484 (90.4%)	143 (8.7%)	15 (0.9%)	1642 (100%)

The next two tables show results stratified by whether the control trial was a cleanup of existing prior disorder. An experiment was considered to have a "cleanup control" when the control trials occurred first and prior disorder was recorded. A treatment trial is still considered to be a "cleanup control" trial if it was preceded by a control trial and prior disorder was present. The first table shows results for these "cleanup control" trials. Note that the treatment effect of disorder on mailing is very strong where the control was a cleanup of existing disorder.

Table 5: Control was Cleanup - Outcome by condition (n, row % of total)

condition	Walkby	Mailed	Stolen	Total
Control	714 (87.3%)	85 (10.4%)	19 (2.3%)	818 (100%)
Treatment	514 (92.3%)	30 (5.4%)	13 (2.3%)	557 (100%)
Total	1228 (89.3%)	115 (8.4%)	32 (2.3%)	1375 (100%)

The next table shows results for the trials where the control was not a cleanup. Note the treatment effect on mailing is smaller here. This apparent interaction is not significant in a multinomial logit model.

Table 6: Control was not Cleanup - Outcome by condition (n, row % of total)

condition	Walkby	Mailed	Stolen	Total
Control	782 (88.7%)	91 (10.3%)	9 (1%)	882 (100%)
Treatment	1079 (90.5%)	99 (8.3%)	14 (1.2%)	1192 (100%)
Total	1861 (89.7%)	190 (9.2%)	23 (1.1%)	2074 (100%)

Models

The table below depicts logistic regression estimates from four model specifications. All models have tract-level random intercepts. The first is a simple bivariate model of Action by Treatment. The next steps in collective efficacy (CE). These are the basic models of interest for the paper. The third model swaps CE for individual characteristics of participants. The last adds CE to this. 47 trials were dropped in the latter two models due to missingness on individual characteristics.

Estimates displayed in tables are log-odds coefficients first, then standard errors in parentheses, then odds ratios in brackets. No standardized coefficients are presented because all covariates except CE are binary (and CE is standardized) and most folks (e.g., Long 1997) advise not x standardizing binaries.

Table 7: Primary logistic regression models

	M1		M2		M3		M4	
	Mailed	Stolen	Mailed	Stolen	Mailed	Stolen	Mailed	Stolen
(Intercept)	-1.85 (0.2) 0.16	-4.13 (0.39) 0.02	-1.86 (0.2) 0.16	-4.08 (0.34) 0.02	-2.27 (0.25) 0.1	-4.65 (0.47) 0.01	-2.27 (0.25) 0.1	-4.64 (0.45) 0.01
Treatment	-0.42 (0.13) 0.66	-0.09 (0.28) 0.91	-0.42 (0.13) 0.66	-0.1 (0.28) 0.91	-0.38 (0.13) 0.68	-0.1 (0.28) 0.91	-0.38 (0.13) 0.68	-0.1 (0.28) 0.9
CE			0.07 (0.15) 1.07	-0.43 (0.24) 0.65			0.02 (0.15) 1.02	-0.34 (0.23) 0.71
Male					-0.04 (0.13) 0.96	1.16 (0.32) 3.21	-0.04 (0.13) 0.96	1.15 (0.32) 3.15
White					0.55 (0.17) 1.73	-0.38 (0.3) 0.69	0.55 (0.17) 1.74	-0.32 (0.31) 0.72
In Group					0.12 (0.15) 1.12	0.25 (0.31) 1.28	0.12 (0.15) 1.12	0.26 (0.31) 1.3
BIC	2529		2544		2530		2544	
N	3449		3449		3402		3402	

Main thing we see here is that CE has a fairly substantial negative relationship with theft, but power is a bit low with only 20 tracts so this is not significant at the 95% level (p = 0.076).

Prior Disorder and Cleanup

Note that 192 trials are missing data on prior disorder, so the estimates with prior disorder are not directly comparable to those without.

Table 8: Logistic regression models of prior disorder and cleanup

	M1		M2		M3		M4		M5	
	Mailed	Stolen	Mailed	Stolen	Mailed	Stolen	Mailed	Stolen	Mailed	Stolen
(Intercept)	-2.07 (0.25) 0.13	-4.3 (0.41) 0.01	-2.11 (0.26) 0.12	-4.16 (0.39) 0.02	-1.91 (0.23) 0.15	-4.49 (0.44) 0.01	-2.04 (0.25) 0.13	-4.44 (0.42) 0.01	-2.08 (0.26) 0.13	-4.27 (0.41) 0.01
Treatment	-0.44 (0.14) 0.64	-0.15 (0.3) 0.86	-0.45 (0.14) 0.64	-0.1 (0.3) 0.91	-0.41 (0.14) 0.66	0.05 (0.32) 1.06	-0.5 (0.16) 0.61	0.05 (0.33) 1.06	-0.5 (0.16) 0.61	0.07 (0.33) 1.07
Prior Disorder	0.43 (0.26) 1.53	0.59 (0.47) 1.81	0.48 (0.27) 1.62	0.36 (0.47) 1.44			0.61 (0.35) 1.84	-0.04 (0.7) 0.96	0.63 (0.35) 1.89	-0.21 (0.71) 0.81
CE			0.12 (0.16) 1.13	-0.39 (0.2) 0.68					0.11 (0.16) 1.12	-0.38 (0.21) 0.69
Control was cleanup					0.11 (0.23) 1.11	0.83 (0.47) 2.28	-0.23 (0.31) 0.8	0.84 (0.67) 2.32	-0.22 (0.31) 0.8	0.72 (0.66) 2.06
BIC	2391		2405		2392		2405		2419	
N	3257		3257		3257		3257		3257	

Note that collective efficacy strongly predicts prior disorder [Std. Est. = -0.46, 95% CI: (-0.49, -0.43)]; prior disorder is likely a mediator for collective efficacy.

Appendix

Table 9: Trials per year

year	Control	Treatment	Graffiti Only	Super Graffiti	Total
2014	918	868	141	0	1,927
2015	204	182	363	0	749
2016	309	287	0	0	596
2017	269	412	0	32	713
Total	1,700	1,749	504	32	3,985

Table 10: Actions per tract

tract_number	Walkby	Mailed	Stolen	Total
1	62	17	0	79
26	78	16	1	95
27	269	37	2	308
28	257	35	3	295
56	51	16	0	67
61	66	20	1	87
63	121	14	1	136
68	513	35	4	552
74	106	15	1	122
75	433	12	10	455
78	73	16	0	89
88	174	22	10	206
89	32	6	4	42
90	146	7	7	160
91	405	20	8	433
92	411	14	2	427
97	158	11	3	172
100	58	12	4	74
103	21	16	1	38
104	77	12	4	93
106	42	13	0	55
Total	3,553	366	66	3,985

Table 11: Trial conditions per tract

tract_number	Control	Treatment	Graffiti Only	Super Graffiti	Total
1	28	51	0	0	79
26	51	44	0	0	95
27	137	85	86	0	308
28	109	132	54	0	295
56	26	41	0	0	67
61	36	19	0	32	87

tract_number	Control	Treatment	Graffiti Only	Super Graffiti	Total
63	37	99	0	0	136
68	262	236	54	0	552
74	62	60	0	0	122
75	88	156	211	0	455
78	38	51	0	0	89
88	107	87	12	0	206
89	28	14	0	0	42
90	79	81	0	0	160
91	188	158	87	0	433
92	231	196	0	0	427
97	66	106	0	0	172
100	47	27	0	0	74
103	14	24	0	0	38
104	26	67	0	0	93
106	40	15	0	0	55
Total	1,700	1,749	504	32	3,985

Results from Special Conditions

The following table depicts proportions of actions within each treatment condition (row-wise proportions) for all conditions including the two "special conditions" of Graffiti Only and Super Graffiti. Graffiti Only (sandwich board, no litter) appears very similar to Control trials. Super Graffiti (sandwich board, litter, and littercam) displays unusually high Mailed and Stolen outcomes. There were few trials of Super Graffiti however (32).

Table 12: Outcome by condition (n, row % of total)

condition_al	Walkby	Mailed	Stolen	Total
Control	1496 (88%)	176 (10.4%)	28 (1.6%)	1700 (100%)
Treatment	1593 (91.1%)	129 (7.4%)	27 (1.5%)	1749 (100%)
Graffiti Only	440 (87.3%)	54 (10.7%)	10 (2%)	504 (100%)
Super Graffiti	24 (75%)	7 (21.9%)	1 (3.1%)	32 (100%)
Total	3553 (89.2%)	366 (9.2%)	66 (1.7%)	3985 (100%)

Treatment Heterogeneity with Special Conditions

The following two tables show outcomes by condition with and without prior disorder. It seems some of the treatment heterogeneity seen in earlier memos is due to large differences within the special conditions. The first table is for trials with no prior disorder.

Table 13: No Prior Disorder - Outcome by condition (n, row % of total)

condition_a	Walkby	Mailed	Stolen	Total
Control	782 (88.7%)	91 (10.3%)	9 (1%)	882 (100%)
Treatment	702 (92.4%)	52 (6.8%)	6 (0.8%)	760 (100%)
Graffiti Only	238 (81.2%)	50 (17.1%)	5 (1.7%)	293 (100%)
Super Graffiti	24 (75%)	7 (21.9%)	1 (3.1%)	32 (100%)
Total	1746 (88.8%)	200 (10.2%)	21 (1.1%)	1967 (100%)

The second table is for trials with prior disorder. No Super Graffiti trials featured prior disorder, so that condition is omitted from the table.

Table 14: Prior Disorder - Outcome by condition (n, row % of total)

condition_a	Walkby	Mailed	Stolen	Total
Control	714 (87.3%)	85 (10.4%)	19 (2.3%)	818 (100%)
Treatment	722 (90.6%)	58 (7.3%)	17 (2.1%)	797 (100%)
Graffiti Only	202 (95.7%)	4 (1.9%)	5 (2.4%)	211 (100%)
Total	1638 (89.7%)	147 (8.1%)	41 (2.2%)	1826 (100%)

Interaction Models

The next table shows selected models with interactions to explore whether effects of treatment or CE appear conditional on each other or prior disorder. Nothing notable is seen here. Prior disorder is omitted from the model with an interaction between CE and treatment condition to retain observations with missing prior disorder. Including prior disorder has no effect on that model.

Table 15: Logistic regression models with interactions

	M1		M2		M3		M4	
	Mailed	Stolen	Mailed	Stolen	Mailed	Stolen	Mailed	Stolen
(Intercept)	-2.25 (0.12) 0.11	-4.36 (0.34) 0.01	-2.16 (0.08) 0.12	-4 (0.2) 0.02	-2.18 (0.11) 0.11	-4.54 (0.31) 0.01	-2.17 (0.11) 0.11	-4.48 (0.3) 0.01
Treatment	-0.47 (0.18) 0.62	-0.25 (0.53) 0.78	-0.38 (0.13) 0.68	-0.14 (0.29) 0.87	-0.45 (0.13) 0.64	-0.05 (0.29) 0.95	-0.57 (0.14) 0.56	-0.04 (0.31) 0.96
CE	0.13 (0.05) 1.14	-0.3 (0.13) 0.74	0.08 (0.06) 1.08	-0.33 (0.16) 0.72	0.03 (0.06) 1.03	-0.05 (0.18) 0.95	0.08 (0.06) 1.08	-0.18 (0.17) 0.84
Prior Disorder	0.15 (0.17) 1.16	0.59 (0.42) 1.81			0.09 (0.13) 1.09	0.59 (0.37) 1.8	0.72 (0.24) 2.05	0.57 (0.6) 1.77
Treatment:P Disorder	0.05 (0.25) 1.05	0.21 (0.63) 1.23						
Treatment:C			0.02 (0.09) 1.02	-0.1 (0.24) 0.9				
CE:Prior Disorder					0.24 (0.1) 1.27	-0.56 (0.29) 0.57		
Control was cleanup							-0.68 (0.24) 0.5	0.04 (0.58) 1.04
CE:Control was cleanup							0.14 (0.11) 1.15	-0.33 (0.29) 0.72
BIC	2500		2655		2490		2506	
N	3257		3449		3257		3257	

Independence of Irrelevant Alternatives Test

Hausman-McFadden tests indicate no IIA violation when omitting Walkby or Mailed outcomes, but significant parameter differences when Stolen is omitted. IIA violations are normally addressed using either nested multinomial logit or multinomial probit models. In the present case, any configuration of nests will result in a degenerate nest for the nested logit model. This requires using an unscaled model which produces ambiguous elasticity estimates. In the present case, no configuration of nests results in identified nest elasticities. Fixing nest elasticities results in the same parameter estimates as the original multinomial logit model.

Alternatively, one can estimate the computationally-demanding multinomial probit model. Results for this are depicted below. Treatment effects appear similar to before. I am unfamiliar with interpretation of the latter two parameters in the table. Searching around online was not illuminating.

IV	Mailed	Stolen
(Intercept)	-1.24 (0.27)	-1.33 (6.64)
Treatment	-0.18 (0.07)	-0.06 (0.52)
Mailed		0.46 (4.65)
Stolen		0.54 (2.08)