

How do Behavioral Approaches to Increase Savings Compare? Evidence from Multiple Interventions in the U.S. Army

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The views expressed are those of the authors and do not reflect the position of the US Military Academy, the Army, or the Department of Defense.

Motivation: Disparate and difficult to compare evidence

Participation
Rate (pp)

50

40

30

20

10

Intensity

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Behavioral Messages
Benartzi et al. (2017)



Targets
Goldin, Hominoff & Tucker (2018)



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Behavioral Messages
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Targets
Goldin, Hominoff & Tucker (2018)

Quick Enrollment
Beshears et al. (2013)

Active Choice
Carroll et al. (2009)

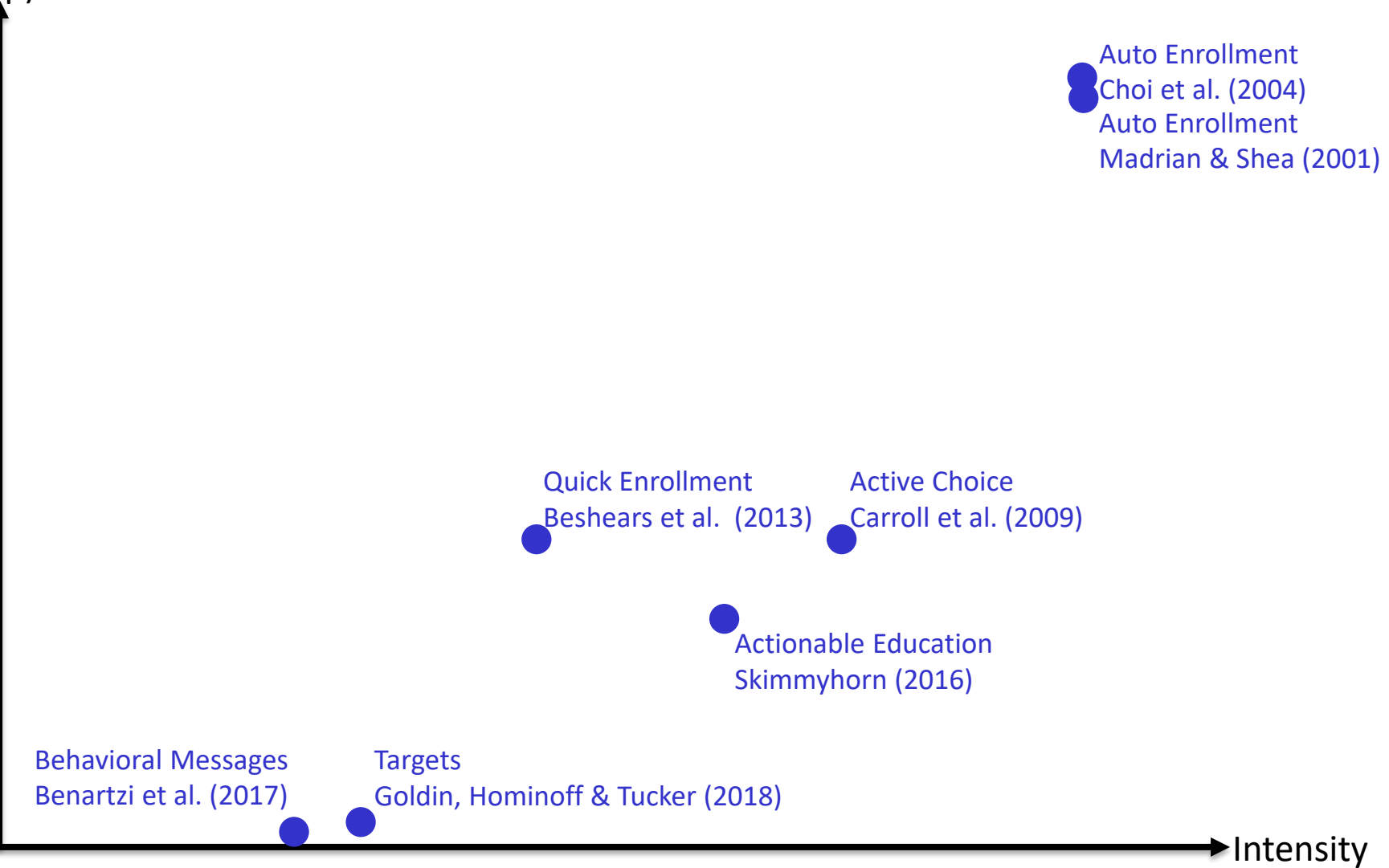
Actionable Education
Skimmyhorn (2016)

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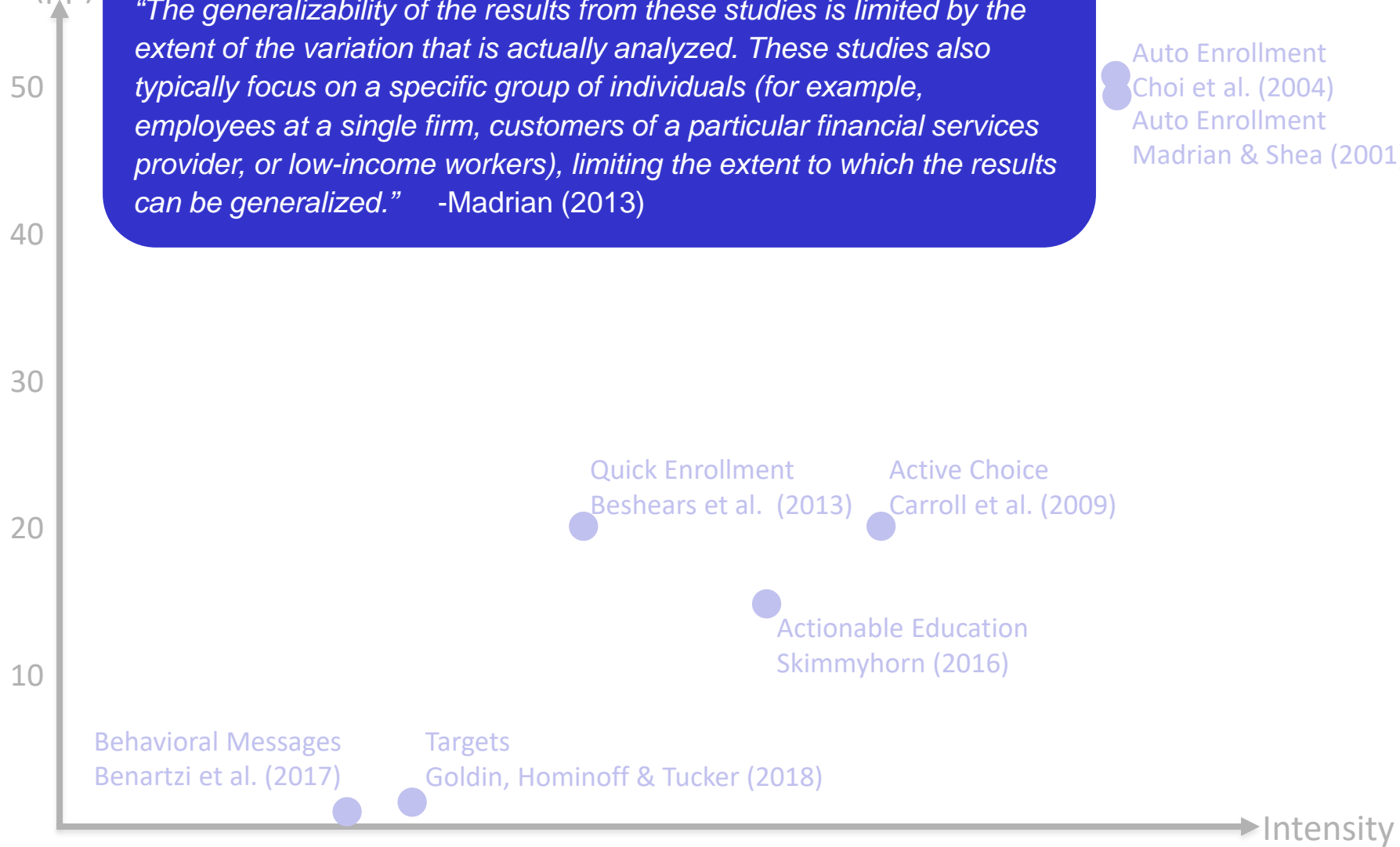


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Challenge 1: Study settings vary
“The generalizability of the results from these studies is limited by the extent of the variation that is actually analyzed. These studies also typically focus on a specific group of individuals (for example, employees at a single firm, customers of a particular financial services provider, or low-income workers), limiting the extent to which the results can be generalized.” -Madrian (2013)

Auto Enrollment
Choi et al. (2004)
Auto Enrollment
Madrian & Shea (2001)



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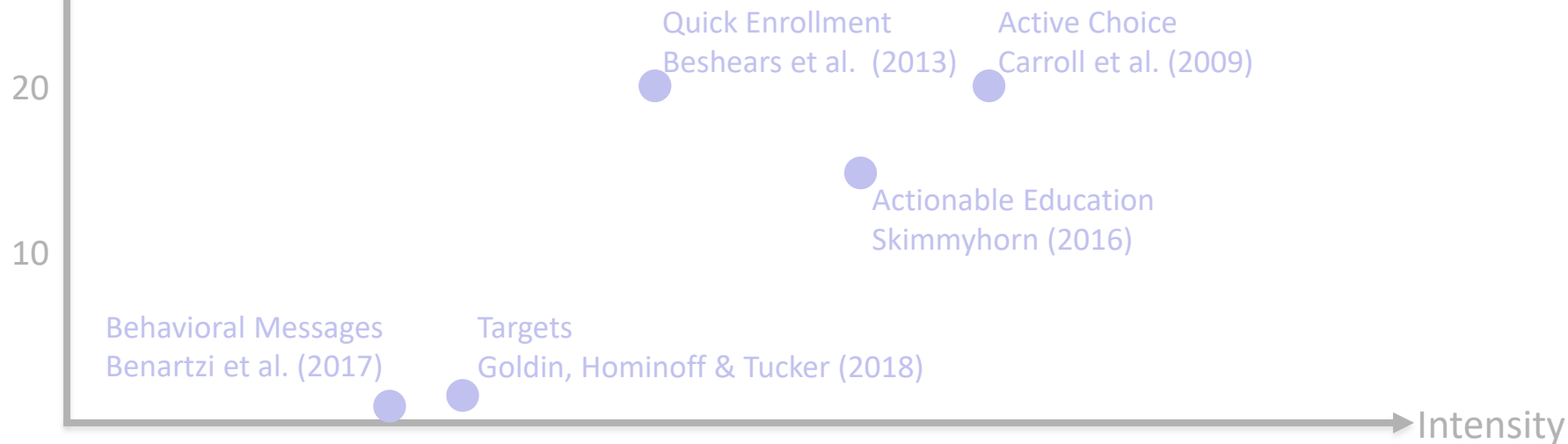
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Auto Enrollment
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Challenge 2: Measures of relative effectiveness

“We conclude that nudging is a valuable approach that should be used more often in conjunction with traditional policies but more calculations are needed to determine the relative effectiveness of nudging.” -Benartzi et al. (2017)



Our approach: Extend, Expand & Compare

- Over the past 5-6 years, the Department of Defense (DOD) has conducted multiple interventions designed to increase Thrift Savings Plan (TSP) savings by uniformed service members



Our approach: Extend, Expand & Compare

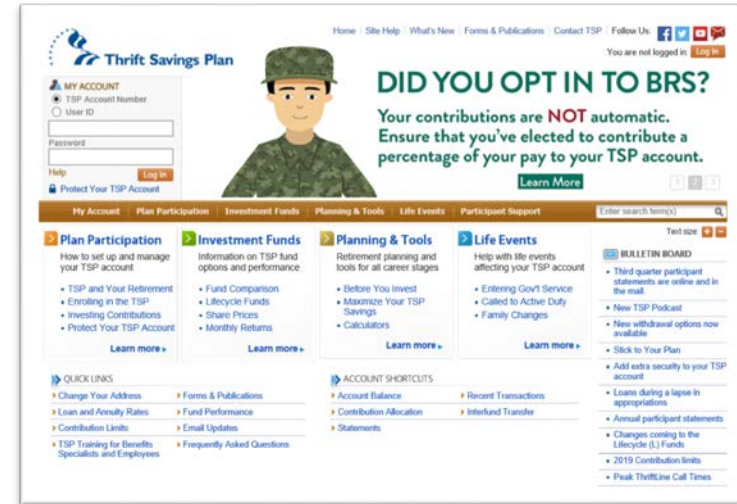
- Over the past 5-6 years, the Department of Defense (DOD) has conducted multiple interventions designed to increase Thrift Savings Plan (TSP) savings by uniformed service members
 - Interventions occurred via official email or in-person personnel meetings
 - Programs evaluated at very short (e.g., 1-2 months) outcome horizons
 - Results evaluated separately and typically posted in technical reports
- Relative to existing work, we:
 1. Combine several large scale interventions to replicate and extend existing studies in a common institutional setting (i.e., the Army)
 2. Compute and compare the effectiveness and cost-effectiveness of the interventions

Thrift Savings Plan (TSP)

- The TSP is a tax-advantaged (Roth or traditional) savings account available to members of USFG.

- The world's largest DC plan.

- Very low (e.g., ~0.038%) expenses.



- Individuals select a contribution level (% of base salary) and fund type (government securities funds, fixed-income, common stock, small capitalization stock, international stock, and lifecycle).
- Uniformed service members can contribute, but were not eligible for matching contributions during our study period.

Summary of Retirement Savings Interventions

Program	Treatment	Dates	Obs	Method
Information Email	TSP information and enrollment encouragement	Apr 2015 & Jan 2016	N~29,000	RCT
Action Steps Email	Email from above + concrete action steps + other “nudges” (Combined into 1 treatment)	Apr 2015	N~164,000	RCT
Target Rates Email	Email from above + contribution rate targets (e.g., 1%, 2%, ..., 8%)	Jan 2016	N~136,000	RCT

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$$y_i = \alpha + \beta Treatment_i + X_i\gamma + \varepsilon_i$$

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Active Choice	Individuals directed (WA) or required (NC) to submit TSP enrollment form	Mar-Apr 2016	N~38,000	DiD NC & WA vs. World, Pre vs. Post

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Active Choice	Individuals directed (WA) or required (NC) to submit TSP enrollment form	Mar-Apr 2016	N~38,000	DiD NC & WA vs. World, Pre vs. Post
Auto Enrollment	New service members defaulted in to the TSP at 3% of basic pay in a lifecycle fund	Jan 2018	N~52,000	DiD Jan-Mar 2018 vs. Oct-Dec 2017 accessions, 2017 vs. 2016

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Data & Summary Statistics

- We combine three sources of administrative data:
 - Army personnel data
 - DOD payroll data
 - TSP account data (quarterly)
- Primary sample is first-term service members
 - Results similar for a larger, more demographically diverse sample
- Outcomes are participation, contribution rates, & cumulative contributions at 6 months
- Cost data from previous studies, agency contacts, or estimated

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Table 1: Summary Statistics

Variable	Mean	Std Dev
Age	22.6	3.5
Female	0.15	0.36
Black	0.22	0.42
Hispanic	0.16	0.36
Other race	0.07	0.25
Married	0.27	0.44
Children	0.44	0.77
High school/GED	0.82	0.38
Some college	0.06	0.23
Bachelors or more	0.11	0.32
Enlisted	0.93	0.26
Officer	0.06	0.24
Total monthly pay	2,917	1,294
Total basic pay	1,873	702

Main Results: TSP Participation Rates

Table 3: Main Effects of Interventions on TSP Participation

	Information Email	Action Steps	Target Rates	Active Choice	Default
Treatment	(1) 0.0020 (0.0030)				
N	29,361				
R ²	0.0083				
Control Group Mean	0.069				
RCT	Y				
Difference in Difference	N				
P-values for equality of treatment effects					
Information Email	–				
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3%

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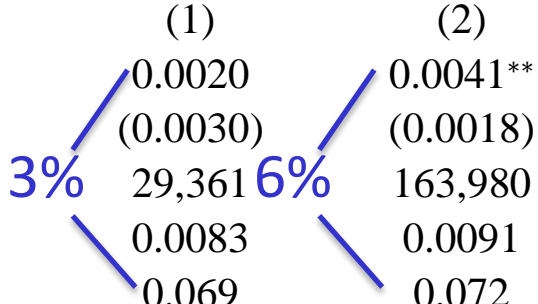
	Information Email	Action Steps	Target Rates	Active Choice	Default
	(1)	(2)			
Treatment	0.0020 (0.0030)	0.0041** (0.0018)			
N	29,361	163,980			
R ²	0.0083	0.0091			
Control Group Mean	0.069	0.072			
RCT	Y	Y			
Difference in Difference	N	N			
P-values for equality of treatment effects					
Information Email	–	0.419			
Action Steps		–			
Target Rates					
Active Choice					

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Treatment	0.0020 (0.0030)	0.0041** (0.0018)	0.0069*** (0.0023)		
N	3% 29,361	6% 163,980	135,905		
R ²	0.0083	0.0091	0.0134		
Control Group Mean	0.069	0.072	0.076		
RCT	Y	Y	Y		
Difference in Difference	N	N	N		
P-values for equality of treatment effects					
Information Email	–	0.419	0.185		
Action Steps		–	0.33		
Target Rates			–		
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N	3% 29,361	6% 163,980	9% 135,905	31,906	
R ²	0.0083	0.0091	0.0134	0.0134	
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Treatment	0.0020 (0.0030)	0.0041** (0.0018)	0.0069*** (0.0023)	0.1068*** (0.0191)	0.3728*** (0.0070)
N	3% 29,361	6% 163,980	9% 135,905	104% 31,906	51,542
R ²	0.0083	0.0091	0.0134	0.0134	0.2112
Control Group Mean	0.069	0.072	0.076	0.103	0.179
RCT	Y	Y	Y	N	N
Difference in Difference	N	N	N	Y	Y
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Active Choice				–	0.000

- Effect sizes are increasing with the intensity of the intervention
- Similar pattern of results holds for contribution rates and cumulative contributions

Cost Effectiveness Methodology

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Policy	Fixed Cost	Variable Cost
Information	\$5000	\$0
Action Steps	\$5000	\$0
Target Rates	\$5000	\$0
<i>Active Choice</i>	<i>\$0</i>	<i>\$1.2</i>
Auto Enrollment	\$5000	\$0

Cost Effectiveness Methodology

- We collect (or *estimate*) cost data for each of the interventions (j)

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Auto Enrollment	\$5000	\$0

- Then we compute cost-effectiveness for our outcomes

- Cost per new enrollee: $CE_j = \frac{TotalCost_j}{\# Enrolled_j}$

- Cost per new dollar of contributions: $CE_j = \frac{TotalCost_j}{\$Contributed_j}$

- Then rank order the policies for firms of varying sizes
 - Small (n=25), Medium (n=750), Large (n=1000), DoD (n=800,000)
 - If most-preferred policy changes by firm size, determine critical value

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Cost Effectiveness Analysis Results

Table 7: Cost-Effectiveness Estimates

Firm	N	Info Email (1)	Action Steps (2)	Target Rates (3)	Active Choice (4)	Auto Enrollment (5)
Panel A. Thrift Savings Plan Participation (\$ Per New Enrollment)						
Small	25	\$100,000	\$48,780	\$28,986	\$11	\$536
Medium	750	\$3,333	\$1,626	\$966	\$11	\$18
Large	1,000	\$2,500	\$1,220	\$725	\$11	\$13
Dept of Defense	800,000	\$3	\$2	\$0.91	\$11	\$0.02

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- Method: $CE_{AE} = \frac{TotalCost_{AE}}{\# Enrolled} = \frac{\$5,000}{0.3728pp \times 25ppl} = \frac{\$5,000}{9.32} = \$536/Enr$
- For both outcomes:
 - Active Choice most cost-effective for small, med, and large firms
 - Automatic Enrollment most cost-effective for very large firms

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Panel B. Thrift Savings Plan Cumulative Contributions (\$ Per New \$ of Contributions)						
Small	25	\$87	\$23	\$18	\$0.01	\$1
Medium	750	\$3	\$1	\$1	\$0.01	\$0.05
Large	1,000	\$2	\$1	\$0.46	\$0.01	\$0.04
Dept of Defense	800,000	\$0.003	\$0.001	\$0.001	\$0.01	\$0.00005

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Effect Magnitudes

Outcome	Info	Action	Targets	Active Choice	Auto Enroll
Participation	3%	6%	9%	104%	208%
% Contribution	1%	10%	12%	281%	
\$ Contributions	5%	18%	21%	81%	197%

Summary

- Leveraging several large scale behavioral experimental interventions in the Army and administrative data, we find:

1. Important program effects that increase with program intensity

Effect Magnitudes

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\$ Contributions	5%	18%	21%	81%	197%

2. That confirm existing estimates (esp. the rank ordering) while minimizing concerns about different study settings
3. And new evidence that Active Choice is typically the most cost effective policy (around \$11/enrollment or 1¢ /\$ contribution, though very large firms may prefer Automatic Enrollment).

Summary

- Leveraging several large scale behavioral experimental interventions in the Army and administrative data, we find:

1. Important program effects that increase with program intensity

Effect Magnitudes

Outcome	Info	Action	Targets	Active Choice	Auto Enroll
Participation	3%	6%	9%	104%	208%
% Contribution	1%	10%	12%	281%	
\$ Contributions	5%	18%	21%	81%	197%

2. That confirm existing estimates (esp. the rank ordering) while minimizing concerns about different study settings
3. And new evidence that Active Choice is typically the most cost effective policy (around \$11/enrollment or 1¢ /\$ contribution, though very large firms may prefer Automatic Enrollment).

Additional Materials

Main Results: TSP Contribution Rates

Table 4: Main Effects of Interventions on Percentage of Salary Contributed

	Information Email	Action Steps	Target Rates	Active Choice
	(1)	(2)	(3)	(4)
Treatment	0.0036 (0.0169)	0.0318*** (0.0111)	0.0396*** (0.0149)	0.6136*** (0.1245)
N	29,361	163,980	135,905	31,532
R ²	0.0060	0.0085	0.0153	0.0127
Control Group Mean	0.488	0.312	0.334	0.218
Control Variables	Y	Y	Y	Y
RCT	Y	Y	Y	N
Difference in Difference	N	N	N	Y
P-values for equality of treatment effects				
Information Email	–	0.060	0.107	0.000
Action Steps		–	0.673	0.000
Target Rates			–	0.000
Active Choice				–
* p < 0.10, ** p < 0.05, *** p < 0.01. Estimates from Col 1 are pooled from two separate RCTs with identical emails. Std errors in Col 1 are clustered at the individual level.				

Main Results: Cumulative TSP Contributions

Table 5: Main Effects of Interventions on Thrift Savings Plan Balance

	Information Email (1)	Action Steps (2)	Target Rates (3)	Active Choice (4)	Automatic Enrollment (5)
Treatment	2.3068 (3.4694)	8.8811*** (2.3946)	10.9054*** (2.8098)	82.6126*** (31.0430)	138.2654*** (11.7645)
N	29,357	163,946	135,848	31,884	51,542
R ²	0.0141	0.0183	0.0279	0.0478	0.0598
Control Group Mean	45.21	48.88	52.47	102.01	70.05
Control Variables	Y	Y	Y	Y	Y
RCT	Y	Y	Y	N	N
Difference in Difference	N	N	N	Y	Y
P-values for equality of treatment effects					
Information Email	–	0.044	0.053	0.010	0.000
Action Steps	–	–	0.583	0.018	0.000
Target Rates	–	–	–	0.021	0.000
Active Choice	–	–	–	–	0.094
* p < 0.10, ** p < 0.05, *** p < 0.01. Estimates from column 1 are pooled from two separate RCTs with identical informational emails. Standard errors in Column 1 are clustered at the individual level					