LOSS AVERSION OR LACK OF TRUST:
WHY DOES LOSS FRAMING WORK TO
ENCOURAGE PREVENTATIVE HEALTH BEHAVIORS?

Emily A. Beam
Yusufcan Masatlioglu
Tara Watson
Dean Yang

Loss Aversion or Lack of Trust: Why Does Loss Framing Work to Encourage Preventative
Health Behaviors?
Emily A. Beam, Yusufcan Masatlioglu, Tara Watson, and Dean Yang
NBER Working Paper No. 29828
March 2022
JEL No. C93,D03,I12

ABSTRACT

We implemented a field experiment designed to increase participants' willingness to visit a health clinic. We find differential responses to a $50 incentive framed as a loss versus framed as a gain. We find little support for the notion that loss aversion is responsible for the effectiveness of loss framing. Instead, it appears that loss framing promotes take-up by raising the perceived probability that the incentive will be provided as promised. The results suggest trust is an alternative pathway through which loss framing may affect behavior, and trust may be an important way to promote desirable health behaviors.

Emily A. Beam
University of Vermont
Department of Economics
233 Old Mill
94 University Place
Burlington, VT 05403
emily.beam@uvm.edu

Yusufcan Masatlioglu
University of Maryland
7998 Regents Drive Symons Hall, Rm. 2200
College Park,, MD 20742
yusufcan@umd.edu

Tara Watson
Department of Economics
Williams College
24 Hopkins Hall Drive
Williamstown, MA 01267
and NBER
tara.watson@williams.edu

Dean Yang
University of Michigan
Department of Economics and
Gerald R. Ford School of Public Policy
735 S. State Street, Room 3316
Ann Arbor, MI 48109
and NBER
deanyang@umich.edu

I.   Introduction

According to standard economic theory, policy-makers can use financial incentives to encourage desirable behavior, including preventative health behaviors. Behavioral economics suggests that seemingly minor differences in the framing or design of these incentives can have meaningful impacts on decision-making. As noted in a review by Madrian (2014), factors such as the uncertainty of incentives, the timing of incentive payments, and whether payments are viewed as a gain or a loss can impact take-up. Policy-makers are increasingly considering ways to leverage behavioral insights to maximize the effectiveness of the incentives they provide.

This study compares the effectiveness of loss and gain frames in the preventive health context, and seeks to understand why the impacts of loss frames differ from those of gain frames. The loss framing approach involves imbuing individuals with a sense of ownership over an incentive up front, with the threat of taking the incentive away if the desired goals are not met. Compared to a gain framing approach that offers a reward for a desired goal, framing the incentive structure around losses has been shown to be effective in educational, employment, and health contexts (Volpp et al., 2008; Fryer et al., 2012; Hossain and List, 2012; and Levitt et al., 2016).

Why is loss framing successful? The most common explanation stems from prospect theory, a behavioral economics model positing that individuals are more sensitive to losses than equivalent gains relative to a reference point (Kahneman and Tversky, 1984). Loss-averse preferences yield an observed asymmetry in decisions over losses versus gains because loss-averse individuals value something they own (or, more precisely, something incorporated into their reference point) more than the equivalent object they do not yet own. Because loss framing is designed to induce a sense of ownership over an incentive, individuals are more responsive to incentives that are framed as a loss.

A second possible explanation for the effectiveness of loss framing is that giving an incentive up front induces an individual to have more confidence that the incentive will be provided as promised. The perceived probability of receiving a reward is likely higher for someone who has a tangible reward in hand relative to someone hearing about a promised reward. This trust-related response is likely more relevant in field contexts outside the lab, and it is expected to be most relevant when individuals do not initially trust the person or institution offering the incentive. A lack of trust can lead to loss framing being more effective than gain framing under standard economic preferences – that is, loss framing might be effective even in the absence of loss aversion. This explanation would highlight the importance of trust in using incentives to promote health behaviors.

In this study, we implement a randomized field experiment that compares loss versus gain framing to promote preventive health care utilization. We offer individuals in and near Dearborn, Michigan, an incentive to visit a health clinic run by our partner organization, the Arab Community Center for Economic and Social Services (ACCESS). In the "Visa gift card" (loss framing) treatment, participants are given a Visa gift card of either $50 or $10 that can be activated by visiting the clinic; they will effectively lose the value of the card if they choose not to visit a clinic. In the "reminder card" (gain framing) treatment, participants are given a physically similar generic reminder card with the promise that it will be exchanged for a gift card if they visit the health clinic, but they are not given the gift card up front. In both cases, any individual who went to the health clinic would receive an active Visa gift card, and any funds remaining after the visit could be spent elsewhere. Because of random assignment to the treatments, differences in responsiveness to the incentives are attributable to the differences in the frames.

We find that providing an incentive with loss framing encourages visits to a health clinic. Our paper builds upon previous studies by exploring the role of two potential explanations for the effectiveness of loss framing: loss aversion and trust. Loss framing may induce a sense of ownership, changing the reference point in a way that has special significance for loss averse individuals. It also may raise the perceived probability that the incentive will be provided as promised. It is theoretically and practically important, though empirically challenging, to

distinguish between a framing effect stemming from *loss aversion* and that driven by the participant's *trust* that the incentive will be delivered.

We build a theoretical framework that links loss aversion and trust to incentive take-up. Loss framing may give participants a sense of ownership of the incentive payment prior to making their decision about whether to visit the clinic. Thus, if loss framing is effective because of loss aversion, we expect participants will be more responsive to the Visa gift card (loss framing) than the reminder card (gain framing), and we expect the gap to be most evident among those with higher measured loss aversion.

Our model also predicts a relationship between trust and take-up. Those who trust the organization are more likely to believe that the incentive will be delivered as promised if the individual visits the health clinic. But among those who do not trust the organization, a Visa gift card given *ex ante* through the loss frame is likely to be viewed as more trustworthy than the generic reminder card offered in the gain frame with the promise of a gift card. If trust is an important determinant of the responsiveness to loss framing, we expect participants will be more responsive to the Visa gift card than the reminder card, and we expect the gap to be most evident among those with lower baseline levels of trust in the organization. Because loss framing increases individuals' expected probability that they will actually receive the incentive, the observed response to loss framing could arise even in the absence of loss averse preferences.

Our empirical results suggest that individuals are more likely to visit a health clinic when incentivized with loss framing than with gain framing, consistent with prior lab and field experiments. We do not find support for the notion that the differential response stems from loss aversion. Recipients are not significantly more responsive to the loss frame incentive when they are more loss averse, likely because the sense of ownership induced by the loss framing is insufficiently strong.

By contrast, baseline trust of our partner organization is predictive of responsiveness to the gift card treatment. Take-up is higher for the gift card (loss frame) than the reminder card (gain frame) incentive, but only among those who do not trust our partner organization at baseline. For those who distrust or are unfamiliar with ACCESS, the Visa-branded gift card appears to be a

more trustworthy incentive. We conclude that loss framing is effective because it raises the perceived probability that the incentive will be delivered as promised. In this context, trust is an important determinant of the effectiveness of incentives to promote desirable health behavior.

II.   Previous literature

It is well established that loss framing makes a difference in the lab setting (e.g. Hannan et al.*,* 2005), but the literature investigating the application of loss framing to field or real-world contexts is less well developed. A handful of field experimental studies investigate whether it is possible use loss framing to induce a desired behavior. For example, Volpp et al. (2008) allows treatment group participants in a weight loss study to put their own funds (with a financial match from the researchers) in a deposit contract; these funds were returned to the individual if they met weight loss goals. The treatment group lost statistically more weight than a control group without the deposit contract, which the authors interpret as an indication that behavioral biases can be exploited to improve health behavior. (There was no equivalent gain frame included in the study.)

Fryer et al. (2012) conduct a more direct comparison of loss versus gain framing and find that teachers respond more to "pay-for-performance" incentives when the incentives are framed as a loss. Teachers in the "loss" treatment were given $4,000 (the expected value of the bonus) at the beginning of the school year and signed a contract that they would return some or all of the funds if their students did not make sufficient improvement in math achievement. In the "gain" treatment, teachers were given the bonus at the end of the year. The incentive was associated with markedly higher math performance when framed as a loss, which the authors interpret as stemming from loss aversion.

Similarly, Levitt et al. (2016) incentivize exam performance among students in the Chicago area using a variety of treatment arms motivated by the behavioral literature. In one set of experiments, one group of students received an incentive ($20 or a trophy) before taking the exam and were told they would need to return the incentive if they did not improve. Another

group of students were not given the incentive up front, but they were told they would receive it (it was held up at the front of the room by the administrator) if their test scores did improve. The authors find somewhat higher effect sizes for incentives framed as a loss, though the differences in responsiveness are not statistically significant. They interpret the finding as suggestive, but not definitive, evidence that loss aversion may be exploited to improve responsiveness to incentives. In a footnote, they also point out that incentive framing may also affect salience and "trust and subjective beliefs with respect to the actual payout."

Another related field experiment (Hossain and List, 2012) involves productivity incentives for workers in a Chinese electronics factory. In that study, some workers were provisionally given a bonus at the beginning of the work week and were told it would be retracted at the end of the week if they failed to meet certain performance targets (loss frame). Other workers were promised an *ex post* bonus (gain frame) if they achieved the targets. As is the case in our own experiment, the actual incentive payment was received at the same time by both groups of workers, but the framing differed. The results suggest that teams are more responsive to the incentive when it is framed as a loss.

Most studies focus on loss aversion as the likely explanation for the effectiveness of loss framing. To our knowledge, there are no field experiments investigating trust as a potential alternative explanation. Lab evidence does suggest that the perceived probability of receiving an incentive could affect decision making. Ericson and Fuster (2011) demonstrate that individuals report a higher valuation of an object when they are told they have a higher probability of receiving it. More broadly, the social context can matter for experimental findings. For example, Brandon (2020) finds differential effects of an LED light bulb intervention depending on whether households could opt out of the experimental sample without social pressure.

Existing work focused on mistrust of the medical system indicates that the role of trust may be particularly important in the health care domain. For example, Blendon et al. (2014) document that fewer than half of low-income Americans believe that doctors can be trusted. Exploiting geographic differences in the fall-out from the infamous Tuskegee syphilis experiment, Alsan and Wannamaker (2018) document that mistrust of medical professionals is associated with worse

health outcomes for African-American men. La Veist et al. *(2009)* document an association between mistrust of health care organizations and underutilization of health services. Similarly, researchers have documented an association between willingness to get the Covid-19 vaccine and trust in government (Chaudhuri et al., 2021).

III.   Preventive health care

Though most prior work on loss framing has not been in the health care context, financial incentives are widely used to promote the use of preventive health care. A 2019 survey of large corporations found that four-fifths offer financial wellness incentives, which average $762 per employee (Business Group on Health, 2020). Incentives have been found to be effective in promoting usage of preventive health services, particularly for one-time actions (see Kane et al., 2004; Jochelson, 2007; and Sutherland et al.*,* 2008 for comprehensive reviews). Effectively framing incentives for health behaviors may reduce the cost of achieving organizations' or employers' desired goals.

Our focus here is basic preventive health care. Preventive health screenings can detect problems early enough to maximize treatment effectiveness, improving health quality and reducing mortality (Maciosek et al., 2010). Given that preventive health care requires upfront outlays of money and time with future and uncertain benefit, myopic or liquidity-constrained individuals may tend to under-invest in it. A 2007 Robert Wood Johnson Foundation report examined twelve types of preventive health services and found that for seven services, fewer than half of recommended populations were receiving them (Partnership for Prevention, 2007). A 2013 Kaiser study suggests that 18 percent of individuals and about one-third of low-income individuals postponed preventive care in the past year due to cost (Kaiser, 2015). Preventive care has the potential to reduce societal health care costs, particularly when early treatment is available and affordable (Cohen et al., 2008). Policy-makers recognize this concern; a key feature of the 2010 Affordable Care Act is the reduction of patient cost-sharing for certain preventive services.

Our community partner, Arab Community Center for Economic and Social Services (ACCESS) is a social service non-profit organization in Dearborn, Michigan. ACCESS also offers basic health services. ACCESS was initially founded to serve the needs of the growing Arab immigrant community in metro Detroit 50 years ago, and it since has grown to become the largest Arab American community non-profit in the country. Today, it has a strong record of serving low-income families of all races and ethnicities in the metro Detroit area. Roughly half of its clients are Arab American (56%), and the remainder are primarily African American (19%) or White (16%). More than half of its clients have a household income of $20,000 or less (ACCESS 2018). About 80 percent of the individuals we surveyed were familiar with ACCESS at baseline, and 43 percent of the sample had previously used ACCESS's services.

Prior research has documented low levels of preventive health service use among Arab/Chaldean-identifying residents of Michigan, a key demographic group in our sample. Perlstadt et al. (2015) document that 17.5 percent of Michigan Arab/Chaldean adults lack a regular health care provider and 33.2 percent had not received a check-up in the past year. These figures are higher than those for non-Hispanic White-identifying Michigan residents, a difference that is fully explained in a statistical sense by socioeconomic characteristics. A separate study of Arab-American ACCESS clients found that 51% of women over 40 with no history of breast cancer had not had a mammogram screening in the past two years (Ayyash et al., 2019). In our baseline sample, 17 percent indicated that no adult in their household had received preventive medical care in the past year.

Though we aimed to incentivize health care utilization, the incentive was tied to a visit to the ACCESS health clinic rather than utilization *per se*. The clinic offered basic preventive screening (such as a blood pressure check) for as little as $5 out-of-pocket for an uninsured person, and roughly four-fifths of our sample had insurance and would have faced little or no out-of-pocket expense for preventive care. In practice, most individuals chose to make an appointment without receiving any immediate service or obtained a minimal preventive service at little or no cost. Thus, most participants who visited the clinic used the incentive payment elsewhere, presumably for non-health-related consumption. We do not observe overall health service utilization and

therefore do not evaluate whether the incentive may have crowded out other health care, or crowded in health care by connecting participants to a provider. The outcome studied here is the whether or not respondents visited the ACCESS health clinic.

IV. Stylized model

In this section, we provide a stylized theoretical model to describe the behavior of study participants. Let m denote the amount of the monetary incentive provided to subjects to visit a health clinic. This monetary incentive could take two different forms: (i) loss frame: an inactive Visa-branded gift card (g), or (ii) gain frame: a reminder card (r) similar in size and color. The two cards are pictured in Appendix Figure 1. To redeem either the Visa gift card or the reminder card, each subject must travel to the health clinic. For simplicity, we assume c represents the total net cost of visiting the clinic, including time and transportation costs. Because treatment is randomly assigned, we assume the distribution of costs is similar across different treatments. The treatment (loss versus gain frame) might have two distinct effects. The first one is to change the sense of ownership of the incentive and the second is to affect the subjective belief that the participant will receive the incentive payment if they visit the clinic (trust).

Even though the subject does not receive the monetary incentive before going to the clinic, participants' feelings of ownership might be affected by the Visa gift cards (loss frame) and reminder cards (gain frame). It has been shown that subjective feelings of ownership play important role in explaining behavior (Strahilevitz and Loewenstein (1998); Reb and Connolly (2007); and Nash and Rosenthal (2014)). The feeling of ownership shifts participants' reference points, resulting in an increased take-up rate among loss-averse individuals.

To model the sense of ownership, we introduce the parameter p, which measures the probability that participants incorporate the incentive payment into their reference point. The parameter p might depend on whether the subject receives a Visa gift card (loss frame) or reminder card (gain frame). Once subjects incorporate the incentive amount into their reference point, the failure to obtain it will be perceived as a loss. If the participant does not have a sense of ownership over

the incentive (i.e., no change in their reference point), the incentive will be perceived as a gain. For simplicity, we treat perceived ownership of the incentive as binary at the individual level, with p representing the fraction of individuals with a sense of ownership over the incentive.

We model the reference-dependent preferences following Tversky and Kahneman (1991). Individuals have the following utility associated with some change a to their current perceived reference point:

$$u(a) = \begin{cases} a & if \ a \ \geq \ 0 \\ \lambda a & if \ a < \ 0 \end{cases}$$

Following Kahneman and Tversky (1984), we assume that some participants (the loss-averse) have utility functions that are steeper for losses than for gains. In other words, the psychological impact of a loss is greater than an equivalent gain and individuals are more sensitive to losses. Loss aversion is captured by a coefficient of $\lambda \geq 1$. Thus, the model predicts that a loss averse individual will get more disutility from forfeiting a if she has a sense of ownership over a (i.e. she has incorporated a into her reference point) than she will get utility from gaining a if she does not perceive a to be part of her reference point.

We also introduce a new parameter τ that captures the subjective probability the participant assigns to receiving the promised payment. It is a measure of how much participants trust the organization to provide the incentive as promised. The value of this parameter lies between 0 and 1; if the participant trusts the organization at baseline, τ tends to be higher. The parameter τ might depend on whether the subject receives a Visa gift card or reminder. Our expectation is that the loss frame, in which participants physically have a Visa-branded gift card, would be associated with a higher subjective probability of payout.

For a stylized model, let τ_{Hg} denote the parameter for people who highly trust our partner organization at baseline and receive the Visa gift card, τ_{Hr} denote the parameter for those who highly trust the organization and receive the reminder card, τ_{Lg} denote the parameter for people who do not trust our partner organization and receive the Visa gift card, and τ_{Lr} denote the parameter for those who do not trust the organization and receive the reminder card. Intuitively,

we assume that the Visa gift card induces a higher subjective probability of receiving payment for each participant type, i.e., $\tau_{Hr} \leq \tau_{Hg}$ and $\tau_{Lr} \leq \tau_{Lg}$. Similarly, those with higher baseline trust will perceive a higher probability of payment from both types of incentives: $\tau_{Lg} \leq \tau_{Hg}$ and $\tau_{Lr} \leq \tau_{Hr}$. We also posit that the Visa gift card treatment is at least as impactful in inducing trust in the incentive for those who do not have a pre-existing trusting relationship with the organization. That is, $(\tau_{Hg} - \tau_{Hr}) \leq (\tau_{Lg} - \tau_{Lr})$. This is would be the case if participants who trust the organization are quite confident that any incentive will be provided as promised and therefore have a value of τ_{Hr} that is near one.

We now describe the take-up behavior for a subject with five parameters (m, c, p, λ, and τ). Each participant has two options: "do nothing" or "go to the clinic" to obtain the incentive payment. The treatment of Visa gift card (loss frame) or reminder card (gain frame) potentially impacts both p, the probability of perceived ownership, and τ, the subjective probability that the incentive will be forthcoming. Both of our key treatment groups have an equivalent dollar value of the incentive, m, of $50. We measure loss aversion, λ, as well as baseline trust in the organization (a partial determinant of τ), both of which will mediate the take-up decision. The cost of visiting the clinic, c, is not measured, but is assumed to be equally distributed across treatment groups.

With probability p, the participant believes she has a sense of ownership over the incentive and her reference point adjusts to incorporate it. Based on the reference point, the participant makes a choice based on her expected gain, expected loss, and cost. With the "do nothing" option, she expects to lose $m\tau$ (loss domain), where m is the dollar amount of the incentive and τ is the subjective probability that the payment would have been received. The utility loss associated with this is $-\lambda m\tau$, where λ is the degree of loss aversion. With "go to clinic" option, she expects to pay cost c and face no other change in utility relative to the reference point.

On the other hand, if the participant does not have a feeling of ownership over the incentive payment, then there is no change in her reference point. In this case, "do nothing" corresponds no change in utility. However, "go to clinic" will provide a total utility of $m\tau - c$ (gain domain). These parameters are summarized below in Figure 1.

Figure 1: Theoretical decision parameters

		"Do nothing"	"Go to clinic"
Reference point	Does not shift reference point $(1-p)$	$(0-0)-0$ =0	$(m\tau - 0) - c$ $= m\tau - c$
	Shifts reference point (p)	$\lambda(0 - m\tau) - 0 =$ $-\lambda(m\tau)$	$(m\tau - m\tau) - c =$ $-c$

Notes: The decision rule depends on whether the individual incorporates the incentive into the reference point, which occurs with probability p. If not, the individual compares the expected gain of the incentive $m\tau$ (the value of the incentive m times the perceived probability that it will be provided τ) with the cost of going to the clinic c. If the reference point is shifted, the expected loss $m\tau$ is multiplied by a loss aversion term $\lambda \geq 1$ if the individual does not go to the clinic, making the choice to go to the clinic (weakly) more attractive relative to the case without a reference point shift.

Assume for the moment that $\lambda \geq 1$, implying that participants are loss averse or loss neutral. If the net cost is sufficiently low ($c < m\tau$), the participants will go to the clinic. Similarly, if the cost is sufficiently high ($c > \lambda m\tau$), participants will not go to the clinic regardless of the reference point. When the cost lies in the middle range ($m\tau < c < \lambda m\tau$), the sense of ownership affects whether the participant will go to the clinic. Figure 2 illustrates that, conditional on a given $\lambda > 1$, there are three groups: very low-cost participants who go to the clinic, very high-cost participants who do not go to the clinic, and middle-cost participants who go to the clinic if they feel ownership over the incentive. The size of the middle cost group depends on the degree of loss aversion λ, the size of the incentive m, and the perceived probability the incentive will be provided τ. For loss-neutral participants ($\lambda = 1$) the "middle cost" group does not exist.

Figure 2: Relationship between parameters and take-up
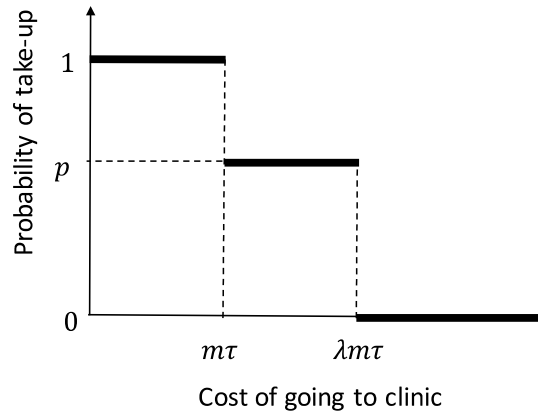
Notes: The probability of going to the clinic for a low cost individual is one. People with very high cost do not go to clinic. And only a fraction of the middle group goes to the clinic. Conditional on the cost distribution, the size of the middle group depends on the size of the incentive m, the loss aversion parameter λ, and the degree to which individuals believe the incentive will be provided, τ. The probability of take-up in the middle group is determined by the fraction of individuals p who have a sense of ownership over the incentive.

We assume that subject are heterogenous with respect to the cost they face. Let $f(c)$ represent the probability density function (pdf) of cost parameter c. To find out the total take-up rate, we calculate the area under the curve shown in Figure 3. While all subjects in the low group go to the clinic, only a fraction of subjects in the middle group visit the clinic. That is,

$$\text{Take-up Rate (TR)} = \int_0^{m\tau} f(c)dc + \int_{m\tau}^{\lambda m\tau} pf(c)dc = (1-p)F(m\tau) + pF(\lambda m\tau).$$

Figure 3: Schematic representation of decision to visit clinic
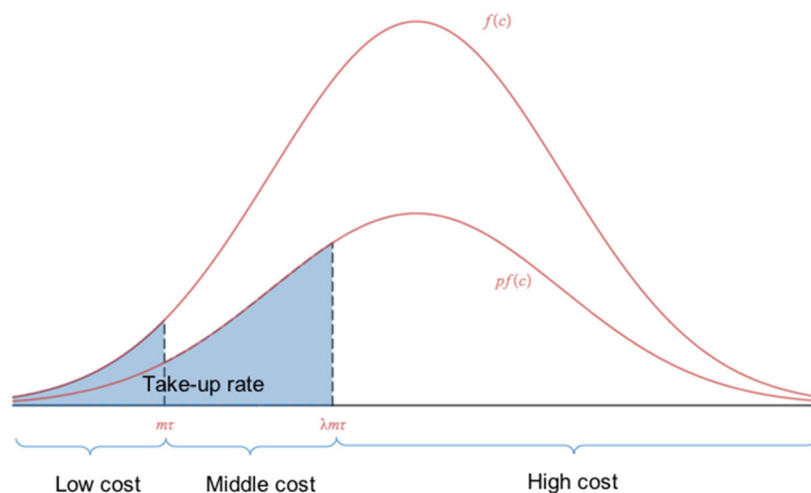
Notes: The shaded area under the curve represents the take-up rate in each range of the cost distribution *f(c)*. People with very low cost always go to the clinic. Similarly, people with very high cost never go to clinic. The size of the low, middle, and high cost groups depends on the incentive m, the subjective probability that the incentive will be received, τ, and the loss aversion parameter λ. In the middle cost group, individuals participate only if they have a sense of ownership over the incentive, which occurs with probability p.

Armed with this basic stylized model, we now investigate the effects of trust, ownership, and loss aversion on the take-up rate, respectively.

A higher subjective probability τ that the incentive payment will be delivered is associated with higher take-up. As can be seen in Figure 4(a), increasing τ moves both cut-offs to the right, meaning more participants will visit the clinic. If participants believe the incentive payment will materialize, some who were not willing to bear the travel cost will now do so. Hence, the take-up rate increases as the level of trust increases. Mathematically,

$$\frac{\partial \mathrm{TR}}{\partial \tau} = (1-p)mf(m\tau) + p\lambda mf(\lambda m\tau) > 0.$$

When the probability of perceived ownership p increases, loss averse participants will be more likely to respond to the incentive, as shown in Figure 4(b). Formally, we have :

$$\frac{\partial \text{TR}}{\partial p} = \int_{m\tau}^{\lambda m\tau} f(c)dc > 0 \text{ if } \lambda > 1 \text{ and } \tau > 0 .$$

Finally, a higher loss aversion also yields a higher take-up rate. The group with a shifted reference point will be more responsive if they are more loss averse. Formally, we have

$$\frac{\partial \text{TR}}{\partial \lambda} = pm\tau f(\lambda m\tau) > 0 \text{ if } p, \tau > 0 .$$

Notice that when p is zero, so is the effect of loss aversion. In other words, if one cannot induce a sense of ownership, loss aversion has no effect on behavior. This is shown in Figure 4(c).

Figure 4: Comparative statics on take-up rates
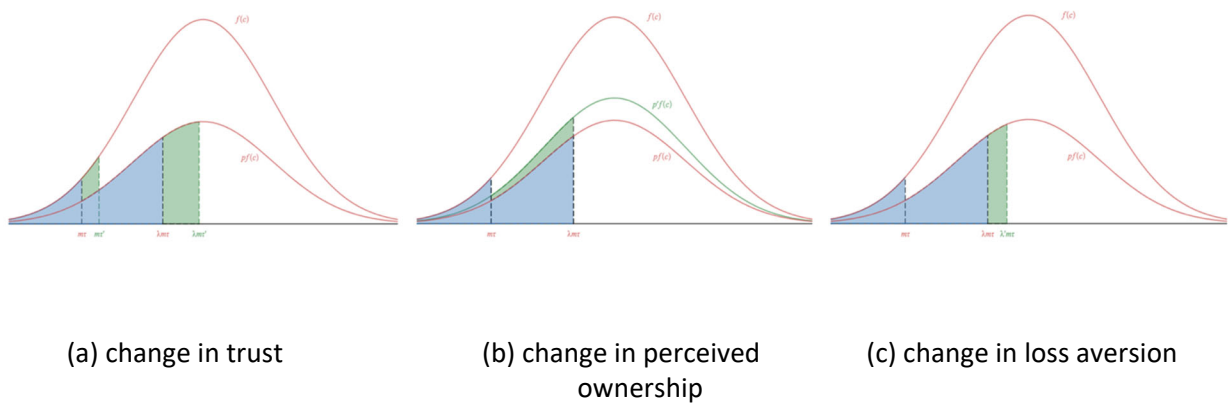
| (a) change in trust | (b) change in perceived ownership | (c) change in loss aversion |

Notes: The shaded area under the curve represents the take-up rate in each range of the cost distribution *f(c)*. In each panel, the green area indicates the amount of increase in the take-up rate after the corresponding change. In panel (a), both cutoffs move to the right when trust is increased, indicating that more people are willing to go to the clinic since the perceived gain is higher. In panel (b), an increase in the sense of ownership increases the take-up rate among the middle-cost group. Finally, in panel (c), the effect of loss aversion is strictly positive if the sense of ownership is not zero.

The stylized model yields the following predictions that can be tested empirically:

1. The take-up rate increases as the loss aversion coefficient increases, if there is a positive sense of ownership. Similarly, the take-up rate increases as the probability of the sense of

ownership increases, but only if the participant is loss averse. We assume the Visa gift card (loss frame) is more likely to induce as "ownership" than the reminder card ($p_r \leq p_g$).

> **Hypothesis 1a** (evaluated *within* each treatment): Participants who exhibit higher loss aversion will have higher take-up rates in each treatment.

> **Hypothesis 1b** (comparison *between* treatments): If Hypothesis 1a holds, loss averse individuals will be more responsive to the Visa gift card (loss frame) incentive than the reminder card (gain frame).

If these hypotheses are validated empirically, the findings lend support to the notion that the Visa gift card induced higher responsiveness to the loss frame due to loss aversion.

2. The model suggests that the take-up rate increases as the level of subjective probability of payment increases. We suspect those who have a high degree of trust of our partner organization at baseline are likely to perceive a high likelihood of payment from the reminder card or the gift card. We also believe that the Visa gift card (loss frame) is associated with a higher perceived probability of payment relative to the reminder card, and that this effect is larger among those who do not have an existing trusting relationship with the organization at baseline.

> **Hypothesis 2a** (evaluated *within* each treatment): Participants who trust the partner organization at baseline will have higher take-up rates.

> **Hypothesis 2b** (comparison *between* treatments): "Non-trusters" will be more responsive to the Visa gift card (loss frame) incentive than the reminder card (gain frame), and the gap will be greater for those without trust at baseline than for those who do trust the organization at baseline.

V.   Experimental design and data

To investigate these hypotheses, we partnered with ACCESS, a social service non-profit described above. We worked with ACCESS to implement a randomized field experiment using door-to-door surveys. We surveyed 2,004 individuals in three waves from 2013 through 2015, with the exact methodology varying slightly between each wave as we responded to challenges in the field. The first wave was implemented from July through September 2013 and included 652 respondents. The second wave was implemented from October 2013 through August 2014, with a break during the winter months, and included 557 respondents. The final wave was implemented from May through October 2015 and included 795 respondents.

   a.   *Survey area selection*

To ensure that participants would be likely to use and benefit from ACCESS's preventive services, we targeted neighborhoods for our door-to-door survey that were (1) near ACCESS and (2) fairly low-income. Specifically, we used 2017-2011 American Community Survey 5-Year estimates to identify Census tracts (geographic areas designed to approximate neighborhoods) within a 7 km (4.3 mile) radius originating at the ACCESS Dearborn clinic (90 tracts).[1] This included neighborhoods in Dearborn and Detroit. We then excluded tracts in which fewer than 20% of individuals had an annual income that fell below the federal poverty line (13 tracts), and we randomized the order of surveying tracts. We sampled tracts in order by approaching every home in the tract once and then moving onto the next tract until we reached our goal of 2,000 households.

During our first survey wave, we encountered several safety issues: some interviewers were harassed by residents; on another day, interviewers witnessed gunfire a few blocks away. After these experiences, we excluded tracts that reported relatively high recent crime levels, and we contacted the Dearborn police department to exclude any additional tracts that they considered

---

[1] The 2013 and 2014 waves were restricted to 30 tracts within 4km (2.5mi) of ACCESS, of which 29 had at least 20% of individuals earning less than the federal poverty line. In 2015, we surveyed among tracts that were between 4 and 7km from ACCESS.

to be unsafe. We surveyed across a total of 21 tracts over the course of three years and randomized interventions at the household level, controlling for tract fixed effects in the analysis.

The sample areas had large immigrant populations, primarily from the Middle East. All interviewers were fluent in English and Arabic, and we surveyed respondents in whichever of the two languages they were most comfortable. English speakers received intervention materials only in English, while Arabic speakers received materials in English and in Arabic.[2] To convey legitimacy but reduce bias on questions about trust of ACCESS and preventive health care usage, interviewers identified themselves as representatives of the University of Michigan and did not mention a partnership with ACCESS until sharing the intervention materials after the survey.

b.   Recruitment and baseline survey

We surveyed the randomly ordered Census tracts sequentially, and pairs of interviewers approached all households that were located within each tract. We skipped only houses that were obviously vacant or that had posted "no solicitation" signs. To maximize the likelihood of reaching respondents, interviewers surveyed in evenings and on weekends. When respondents came to the door, interviewers invited them to participate in a brief survey about preventive health care usage. Interviewers offered a small bottle of hand sanitizer as a thank-you gift, but they did not mention the likelihood of receiving incentives to visit ACCESS.

Thirteen percent of addresses were deemed unapproachable because of no solicitation signs, obvious vacancies, or other factors. Of the remaining 87 percent of addresses, 36 percent of residents answered their doors, 88 percent of those met the eligibility criteria (being between ages 18 and 64 and an English or Arabic speaker), and 46 percent of those eligible agreed to participate. Participating households represented 12 percent of all addresses in the chosen tracts.

Respondents who agreed to participate completed a brief baseline survey about their demographic characteristics, health care utilization, and trust and knowledge of ACCESS. The final

---

[2] Among households we visited, fewer than one percent could not participate in the survey because the potential respondent spoke neither English nor Arabic.

questions measured their loss aversion (non-incentivized) and cognitive ability through Raven's matrices and number recall.

At the end of the survey, the interviewer would open and talk through the contents of the information packet with the respondent and give the respondent the envelope contents to keep. Respondents who completed the surveys in English received an English-only packet, and respondents who conducted the survey in Arabic received a packet with English and Arabic versions of the contents. The letters and informational flyers detailing the Visa gift card or reminder card offer used the ACCESS clinic letterhead. (See the on-line appendix for English-language versions of all treatment materials used in 2015; these were only marginally changed from early waves.) The envelope contents were unknown to the interviewer before the end of the baseline survey, and the treatment assignment was determined randomly within each interviewer and tract.

The Visa gift card (loss frame) and reminder (gain frame) treatments were designed to look and feel as similar as possible, with the exception that the gift card included the Visa logo and a 16-digit card number. A sticker was placed on both cards to remind the recipient about the deadline for redemption. In the second and third waves of the experiments, all recipients also received a reminder call roughly two weeks after the baseline survey. Examples of the Visa gift card and reminder card are shown in Appendix Figure 1.

c.   *Sample characteristics*

There were initially four treatment arms in the study - a $10 reminder card, a $50 reminder card, a $10 Visa gift card, and a $50 Visa gift card. The $10 treatments had low take-up and were eliminated after the first wave. For most of the analysis below, we focus on the sample that received the $50 incentives, and therefore focus on this sub-sample in the Table 1 summary statistics. The sample is 57 percent female and 57 percent married, with just under half born in the United States. About 81 percent of respondents have some form of health insurance. Eighty percent were familiar with our partner community organization, ACCESS, and 43 percent had

visited the organization. Additional control variables include measures of health status, use of medical care, and cognitive ability.[3]

Table 1 also shows how the sample characteristics differ by wave. Respondents from each wave had different characteristics because different neighborhoods were surveyed. All regression analyses control for survey wave, and preferred specifications also include survey language, enumerator, survey day-of-week, survey month, and Census tract fixed effects.

d. Measuring loss aversion

Our simple lottery choice task is adapted from Fehr and Goette (2007) and is similar to approaches commonly used in the literature. We ask series of eight hypothetical (i.e. non-incentivized) questions about their willingness to accept a risky opportunity, of the form: "Suppose that you can choose to pursue an opportunity where half of the time you could instantly earn a profit of $10 and the other half of the time you could instantly lose $X."[4] The values of X ranged from a loss $12 to a gain of $2, and we measure the minimum acceptable opportunity when respondents switched between rejecting and accepting the opportunity. Because the order in which respondents answer these questions may influence their switch point, we randomized whether questions started with the most favorable or least favorable opportunity and control for order in our empirical specifications.

---

[3] We measure respondents' cognitive ability in two ways. First, we used digit-span sequencing to measure working memory, asking respondents to recite back strings of numbers of increasing length. On average, respondents could recall six numbers sequentially without errors. Second, we use Raven's matrices to measure fluid intelligence. We show respondents a series of three pieces that form a pattern, with a fourth piece missing. We ask them to select from four choices the best fit for that missing piece. On average, respondents scored 1.2 correct out of 3 questions of increasing difficulty. We normalize and then control for cognitive ability in our specifications that use individual-level covariates.

[4] Although these questions are typically worded as a gamble, we adjusted the wording to be an "opportunity" after pilot testing revealed many subjects would reject all gambles because of religious objections to gambling.

Table 1: Demographic characteristics by sample wave

		Wave		
	Overall	2013	2014	2015
	(1)	(2)	(3)	(4)
Female	0.57	0.59	0.59	0.55
Age	37.46	36.70	37.14	37.98
Married	0.57	0.52	0.58	0.59
Arabic speaking	0.30	0.30	0.34	0.26
Middle Eastern[a]	0.69	N/A	0.79	0.62
Black	0.14	0.25	0.12	0.10
Hispanic	0.03	0.03	0.01	0.04
Number of children	4.36	4.10	4.63	4.29
Household size	1.66	1.50	1.81	1.61
Born in US	0.48	0.49	0.43	0.50
US citizen	0.87	0.85	0.86	0.89
HS graduate or less[b]	0.46	N/A	N/A	0.46
Quality of health (1 = excellent, 6 = very poor)	2.65	2.64	2.62	2.67
Preventive health visits per capita past 12 mo, adults	1.57	0.99	1.64	1.76
Preventive health visits per capita past 12 mo, children[c]	1.85	1.14	1.83	2.16
Know about ACCESS	0.80	0.82	0.90	0.71
Ever used ACCESS	0.43	0.48	0.46	0.38
Trust ACCESS (agree/strongly agree)	0.36	0.41	0.38	0.33
Loss aversion (Kőszegi-Rabin)	1.78	1.45	1.76	1.94
Digit span	6.05	6.23	5.97	6.03
Raven's matrices (out of 3)	1.23	0.93	1.43	1.25
Have any health insurance	0.81	0.71	0.78	0.88
Have health insurance through employer or spouse	0.32	0.28	0.26	0.37
Have public health insurance	0.44	0.34	0.47	0.45
Emergency health visits per capita past 12 mo, adults	0.59	0.73	0.56	0.55
Emergency health visits per capita past 12 mo, children[c]	0.48	0.59	0.49	0.43
Non-emergency health visits per capita past 12 mo, adults	1.53	1.10	1.96	1.42
Non-emergency health visits per capita past 12 mo, children[c]	1.73	1.33	1.91	1.76
Observations	1678	326	557	795

Notes: [a]Only asked in 2014 and 2015 wave. [b]Only asked in 2015 wave. [c]restricted to households with children.

As argued in Segal and Spivak (1990), Rabin (2000), Wakker (2005), Köbberling and Wakker (2005), Fehr and Goette (2007), and Gächter, Johnson, and Herrmann (2007), our lottery task measures loss aversion rather than risk aversion. Segal and Spivak (1990) show that risk aversion over sufficiently small stakes lotteries is more appropriately considered "loss aversion" (see Masatlioglu and Raymond, 2016). We therefore interpret unwillingness to risk a loss in a low-stakes lottery with positive expected value as evidence of loss aversion – i.e. preferences which treat losses versus gains asymmetrically relative to a reference point.

An individual will accept a risky opportunity if her expected utility from the lottery is greater than zero, taking into account any asymmetric preferences with respect to losses and gains. Based on switch points in answers to the series of lottery questions, we calculate individual-specific loss aversion coefficients following Kőszegi and Rabin's (hereafter KR, 2006) model of reference-dependent utility. We assume a linear utility function with loss-aversion coefficient λ described earlier, in which a person has utility $u(a) = a$ if $a > 0$ and $u(a) = \lambda a$ if $a \leq 0$. As in KR, we assume that each lottery is the reference point.[5] We obtain loss aversion measures for 1,774 respondents (89%), or 1,497 (89%) of those who received reminders or gift cards worth $50.

Individuals who accept all opportunities have a KR loss-aversion coefficient less than 1 (29 percent of respondents), suggesting they are loss loving. This share is comparable to other lab studies that find a range of 12 to 29 percent but lower than the 53 percent Chapman et al. (2018) found in a representative sample of the U.S. population.[6] Individuals who reject all eight opportunities have a coefficient greater than 3 (19 percent of respondents). The mean loss aversion is 1.78 and the median loss-aversion coefficient is 1.86, which is in the range of someone

---

[5] For example, we can bound the loss aversion coefficient for a person who accepts "win $10, lose $6" but rejects "win $10, lose $8." Her expected utility of $g = \$10$ and $l = -\$8$ is $0.5g + 0.5l + 0.25u(g - l) + 0.25u(l - g) = 0.5 * 10 - 0.5 * 8 + 0.25u(10 - (-8)) + 0.25u(-8 - 10)$. As she rejects it, we know her utility is less than zero. That is, $\lambda > 1.22$. Because the person accepts $g = \$10$ and $l = -\$6$, we can determine that $\lambda < 1.5$. In our calculations, we use the *minimum* loss aversion coefficient based on respondent rejections.

[6] These studies, compiled and highlighted by Chapman et al. (2018), are Schmidt and Traub (2002); Brooks and Zank (2005); Abdellaoui et al. (2007, 2008); Sokol-Hessner et al. (2009); Abdellaoui et al. (2011); Sprenger (2015); and Goette et al. (2018).

who would reject the opportunity of a 50% chance to win $10 if the loss is $4 but accept it if the loss is $2. The figures are well in the range of loss aversion estimates across other lab studies, ranging from 1.5-2.5 (Chapman et al., 2018). A recent meta-analysis of loss aversion studies reported a median of reported loss aversion across studies of 1.69 and a mean of 1.97 (Brown et al., 2021.) We incorporate loss aversion into our main empirical specifications with a continuous measure of the KR loss-aversion coefficient.

e. Measuring trust

About 80 percent of sample respondents said they had heard of our community partner, ACCESS. For those who indicated they had heard of ACCESS, we asked respondents to use a five-point Likert scale to report how much they agree with the following statement: "Individuals working at ACCESS can be trusted."

It is possible that trust in ACCESS might be correlated with other indicators of trust. For example, if respondents are mistrustful more generally, they might not visit the doctor for fear that doctors cannot be trusted. To distinguish between trust of the organization versus a general lack of trust, we asked two additional questions about trust: (1) "Generally speaking, do you believe that most people can be trusted, or can you never be too careful in dealing with people?" and (2) "Generally speaking, do you believe that medical professionals can be trusted, or can you never be too careful in dealing with medical professionals?" Overall, 67% say they trust people generally, and 45% say they trust medical professionals.

Figure 5 shows the distribution of responses across the sample of respondents. Of the total sample, 36 percent said they agreed or strongly agreed with the statement. 21 percent of the sample was neutral, and 5 percent disagreed or strongly disagreed. The remainder said they did not know (17 percent), did not answer (<1 percent), or were not asked the question because they had not heard of ACCESS (20 percent). In other words, the bulk of those who did not agree or strongly agree with the trust statement were individuals who had not heard of or had no firm opinion about trusting ACCESS.

It is possible that trust in ACCESS might be correlated with other indicators of trust. For example, if respondents are mistrustful more generally, they might not visit the doctor for fear that doctors cannot be trusted. To distinguish between trust of the organization versus a general lack of trust, we asked two additional questions about trust: (1) "Generally speaking, do you believe that most people can be trusted, or can you never be too careful in dealing with people?" and (2) "Generally speaking, do you believe that medical professionals can be trusted, or can you never be too careful in dealing with medical professionals?"[7] Overall, 67% say they trust people generally, and 45% say they trust medical professionals.

Figure 5: Distribution of trust of ACCESS
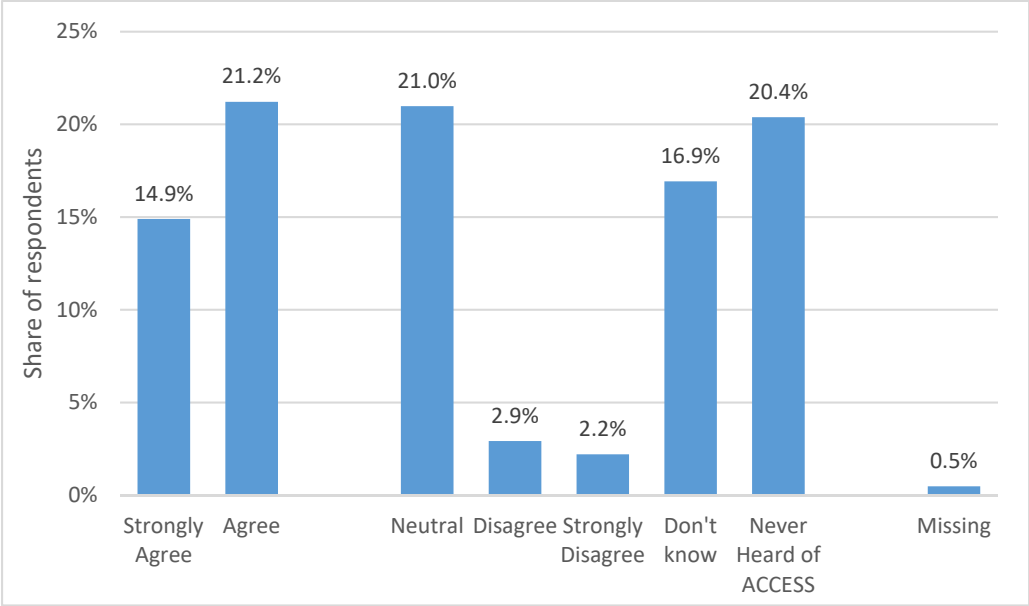
Notes: Distribution of trust in the sample (N=1678). We refer to "trusters" as those who strongly agree or agree with the statement that individuals working at ACCESS can be trusted. "Non-trusters" were neutral, disagree, strongly disagree, answered "don't know", or were not asked the question because they had never heard of ACCESS. Most "non-trusters" have a neutral opinion about ACCESS rather than actively distrusting the organization.

---

[7] We have high response rates for both questions, with 21 missing values for trusting people (1.1%) and 11 for trusting medical professionals (0.6%) in the full sample.

f. Interventions and protocol

The exact interventions varied across survey wave. These are detailed below.

Wave 1 – 2013:

(a) $10 reminder: A reminder card that respondents could redeem for a $10 Visa gift card if they visited ACCESS to receive a preventive health service within 30 days

(b) $50 reminder card: Same as (a), but the Visa gift card was worth $50

(c) $10 gift card: A Visa gift card worth $10 that respondents could activate by visiting ACCESS to receive a preventive health service within 30 days

(d) $50 gift card: Same as (c), but the Visa gift card was worth $50.

The results described below emphasize treatments (b) and (d) because treatments (a) and (c) were eliminated after the first wave. Results including the $10 treatment arms are shown in Figure 6 with more details available in Appendix Table 1.

Wave 2 – 2014: Due to low take-up of the $10 treatments (a) and (c), we restricted our treatments to (b) and (d). We also added a reminder phone call for all participants.

Wave 3 – 2015: We include treatments (b) and (d), but members of both groups also received general health information about the importance of preventive health care.[8] We issued a reminder phone call for all participants.

Each incentive offer came with three additional pieces of information: a flyer about ACCESS and its location, a price list for common preventive health services available at the ACCESS clinic, and a flyer advertising a comprehensive recommended preventive health screening for adults, which was packaged at $50 for those without insurance.

---

[8] We added two new intervention groups in our 2015 wave: a control group and an information-only group. Because this paper focuses on effects of monetary incentives, we exclude both groups from the analysis presented here.

Recipients had 30 days from the time of the survey to bring their reminder or gift card to ACCESS and obtain a preventive health service, and this date was noted with a sticker on the reminder or gift card. To mitigate potential salience differences between those with the reminder and the gift card, we also called respondents to remind them of the upcoming deadline in the second and third waves. We also ensured the cards had the same color, shape, and general appearance with the exception of the Visa logo. We randomized at the individual level, and the treatment was blind to the enumerator until after respondent completed the baseline survey, when he or she opened the sealed intervention envelope. We stratified our randomization by enumerator and by language of the respondent. We test for balance across treatment arms, as shown in Table 2. We do see some evidence of imbalance for a few covariates, as Visa gift card recipients are less likely to be female and more likely to have private health insurance. The direction of the loss aversion questions (from the least risky gamble to most risky, or vice versa) is also marginally statistically significant. As a result, we can reject the null hypothesis that the set of covariates are equal between treatment and control groups at the ten percent level. We note, however, that it is unlikely that interviewers would have been able to manipulate treatment assignment, and we believe these differences are the result of chance. Our main regression specifications control for all Table 2 covariates, with the exception of measures of ACCESS knowledge, usage and trust, and measures of loss aversion.

g. Outcomes

In this paper, we focus on one outcome: whether the participant went to the ACCESS clinic in response to the incentive. We conducted follow-up surveys, but there was substantial attrition and the data are not exploited in this paper. We know from speaking with our community partner that not all who visited the clinic receive a health service, and we cannot rule out the possibility that the incentives may have crowded out preventive health care that would have taken place elsewhere. Instead, we report results for the effectiveness in loss versus gain framing for a particular measurable behavior – visiting the health clinic – which is an imperfect proxy for the amount of preventive health care received.

Table 2: Demographic characteristics and balance tests

	$50 Reminder card	$50 Gift card	Joint equality of means, p-value
	(1)	(2)	(3)
Female	0.60	0.55	0.028**
Age	37.36	37.55	0.692
Married	0.58	0.57	0.685
Middle Eastern	0.68	0.69	0.312
Black	0.13	0.14	0.907
Hispanic	0.03	0.03	0.696
Number of children	4.43	4.30	0.192
Household size	1.71	1.60	0.166
Born in US	0.47	0.49	0.446
US citizen	0.86	0.89	0.194
HS graduate or less	0.46	0.45	0.776
Quality of health (1 = excellent, 6 = very poor)	2.60	2.69	0.104
Preventive health visits per capita past 12 mo, adults	1.57	1.58	0.881
Preventive health visits per capita past 12 mo, children	1.82	1.88	0.603
Know about ACCESS	0.80	0.79	0.942
Ever used ACCESS	0.45	0.40	0.152
Trust ACCESS (agree/strongly agree)	0.38	0.35	0.316
Loss aversion (Kőszegi-Rabin)	1.78	1.79	0.980
Digit span	6.03	6.06	0.830
Raven's matricies (out of 3)	1.24	1.23	0.622
Have health insurance through employer or spouse	0.29	0.34	0.067*
Have public health insurance	0.46	0.41	0.055*
Have self-purchased health insurance	0.05	0.06	0.386
Have some other health insurance	0.00	0.01	0.566
Emergency health visits per capita past 12 mo, adults	0.62	0.56	0.332
Emergency health visits per capita past 12 mo, children	0.47	0.50	0.570
Non-emerg. health visits per capita past 12 mo, adults	1.61	1.46	0.285
Non-emerg. health visits per capita past 12 mo, children	1.80	1.64	0.321
Direction of risk aversion questions	0.46	0.51	0.078*
Observations	843	835	
Jointly predict treatment, SUR p-value		0.061*	

Notes: *** p<0.01, ** p<0.05, * p<0.1. All tests include survey language, wave, enumerator, month-year, and day-of-week fixed effects and report robust standard errors. Middle Eastern ethnicity question asked only in 2014 and 2015, and education asked only in 2015. Digit span and raven's matrices normalized in regressions. Joint balance p-value is based on chi-squared statistic from seemingly unrelated regressions for each covariate and its associated missing variable flag, with controls for fixed effects.

h. Loss Aversion and Trust

As described above, we are particularly interested in the effect of loss aversion and baseline trust in ACCESS as potential mediators. Unlike the assignment to the loss frame or gain frame, these individual characteristics are not randomly assigned. To illustrate determinants of these key variables, Table 3 shows which factors predict baseline levels of loss aversion (columns (1) and (2), measured continuously) and trust (columns (3) and (4), measured as a binary variable).

The second column of Table 3 is the preferred specification predicting loss aversion, using KR loss aversion coefficients continuously. As described above, loss aversion is estimated from a series of questions about willingness to enter a risky venture with uncertain outcomes. After controlling for Census tract and other factors, women and married individuals are somewhat more loss-averse in the sample. Those with higher Raven's scores were also slightly more loss-averse on average. This is consistent with Chapman et al. (2018) who find a positive association between cognitive ability and loss aversion in a sample representative of the U.S. population.[9]

In the last columns of Table 3, we investigate the predictors of baseline trust in our partner organization. Here we define "Trusters" as those who strongly agreed or agreed with the trust statement, and other "Non-trusters" as those who were neutral, disagreed, strongly disagreed, did not know, or had never heard of ACCESS. Note that most respondents in the "Non-truster" group were neutral, did not know how to answer, or were not asked the question because they had never heard of ACCESS, as opposed to actively distrusting the organization. The final column with fixed effects indicates that Arabic speakers are much more likely to trust ACCESS. Additionally, women, married individuals, and those who are not self-insured are more likely to trust ACCESS. In Appendix Table 5, we provide evidence that these other factors correlated with

---

[9] Chapman et al. (2018) investigate other correlates of loss aversion as well. We find, as they do, that age and being non-white is negatively associated with loss aversion. Some of our correlations are different than theirs: they find that education is positively correlated with loss aversion, while we find no strong relationship with being a HS graduate, and they do not find a significant association with marital status. We find that women are more loss averse in our sample, while they find that men are. The literature on gender differences in loss aversion is mixed (Bouchouicha et al., 2019.)

trust are not responsible for the differential effect of Visa gift cards versus reminder cards among the more and less trusting.

VI.   Results

a.   Descriptive results

We first illustrate the unadjusted take-up rates in response to our randomly assigned treatments – Visa gift card (loss frame) and reminder card (gain frame). Though our primary focus is on the $50 treatments, we show both $10 and $50 treatments for completeness in Figure 6. Take-up rates for the two $10 treatments are quite small – 3.6 percent for the reminder card and 5.6 percent for the Visa gift card – and not statistically distinguishable from zero or from each other.

Figure 6 also shows that the $50 treatments do promote take-up. The $50 reminder treatment has a 28 percent take-up rate, and the $50 Visa gift card has a 30 percent take-up rate. These are statistically distinguishable from each other when controls are included ($p=0.33$ without controls and $p=0.05$ with controls, as shown in Appendix Table 1.) Both $50 treatments are clearly distinguishable from the effect of the $10 treatments and from zero.

Regression results including the $10 treatments are presented in Appendix Table 1. Our preferred analyses control for language, enumerator, day-of-week, month-year, and tract fixed effects, as well as demographic characteristics. With these controls, a $50 incentive increases take-up by 21.0 percentage points relative to the $10 incentive. We exclude $10 treatment recipients in the remainder of the paper due to apparent small effects and lack of statistical power, though we note that our results are robust to their inclusion.

Table 3: Determinants of trust and loss aversion

	Loss aversion, KR		Trust Access	
	(1)	(2)	(3)	(4)
Female	0.102*	0.099*	0.056**	0.058**
	[0.059]	[0.060]	[0.023]	[0.023]
Age	-0.046	-0.080	0.096***	0.081***
	[0.072]	[0.074]	[0.028]	[0.028]
Married	0.484***	0.454***	0.093***	0.086**
	[0.085]	[0.087]	[0.035]	[0.035]
Arabic speaking	0.005	0.173	0.127***	0.188***
	[0.093]	[0.108]	[0.034]	[0.039]
Middle eastern	0.040	0.135	-0.096***	-0.024
	[0.096]	[0.124]	[0.034]	[0.043]
Black	-0.103	-0.036	-0.093*	-0.016
	[0.166]	[0.174]	[0.053]	[0.057]
Hispanic	0.045	0.050	-0.003	0.003
	[0.036]	[0.036]	[0.014]	[0.014]
Number of children	0.006	0.001	0.017*	0.011
	[0.023]	[0.023]	[0.009]	[0.009]
Household size	-0.017	-0.004	-0.034	-0.025
	[0.077]	[0.080]	[0.032]	[0.032]
Born in US	0.055	0.055	0.013	0.007
	[0.099]	[0.099]	[0.041]	[0.041]
US citizen	0.025	0.042	0.010	-0.002
	[0.098]	[0.104]	[0.034]	[0.035]
High school graduate or less	-0.018	-0.006	0.005	0.010
	[0.028]	[0.028]	[0.010]	[0.010]
Quality of health (1 = excellent, 6 = very poor)	0.018	0.014	0.008*	0.007
	[0.011]	[0.012]	[0.005]	[0.005]
# Preventive health visits past 12 mo, adults	0.002	0.006	-0.004	-0.005
	[0.022]	[0.022]	[0.004]	[0.004]
# Preventive health visits past 12 mo, children	0.002	0.002	0.001	0.002*
	[0.003]	[0.003]	[0.001]	[0.001]
Insured, employer/spouse	-0.055	-0.082	-0.045	-0.048
	[0.089]	[0.091]	[0.036]	[0.036]
Insured, public	-0.095	-0.073	-0.002	-0.004
	[0.082]	[0.082]	[0.034]	[0.034]
Insured, self-purchased	-0.215	-0.218	-0.110*	-0.131**
	[0.140]	[0.148]	[0.056]	[0.056]
Raven's index score, normalized	0.075**	0.070**	-0.020	-0.016
	[0.032]	[0.033]	[0.013]	[0.013]
Number recall score, normalized	-0.043	-0.061*	0.015	0.009
	[0.033]	[0.035]	[0.013]	[0.013]
Observations	1,497	1,497	1,670	1,670
R-squared	0.441	0.465	0.137	0.191
Enumerator, survey month, day-of-week, tract FE		X		X

Notes: *** p<0.01, ** p<0.05, * p<0.1. Missing values coded as zero, with missing flags included but not reported. Wave fixed effects included in all specifications. Controls for any other insurance, per capita emergency health visits (adults and children), per capita non-emergency health visits (adults and children), and order of loss-aversion questions included but not reported. Middle Eastern ethnicity question asked only in 2014 and 2015, and education asked only in 2015. Robust standard errors reported in brackets.

Figure 6: Unadjusted take-up rates by treatment arm
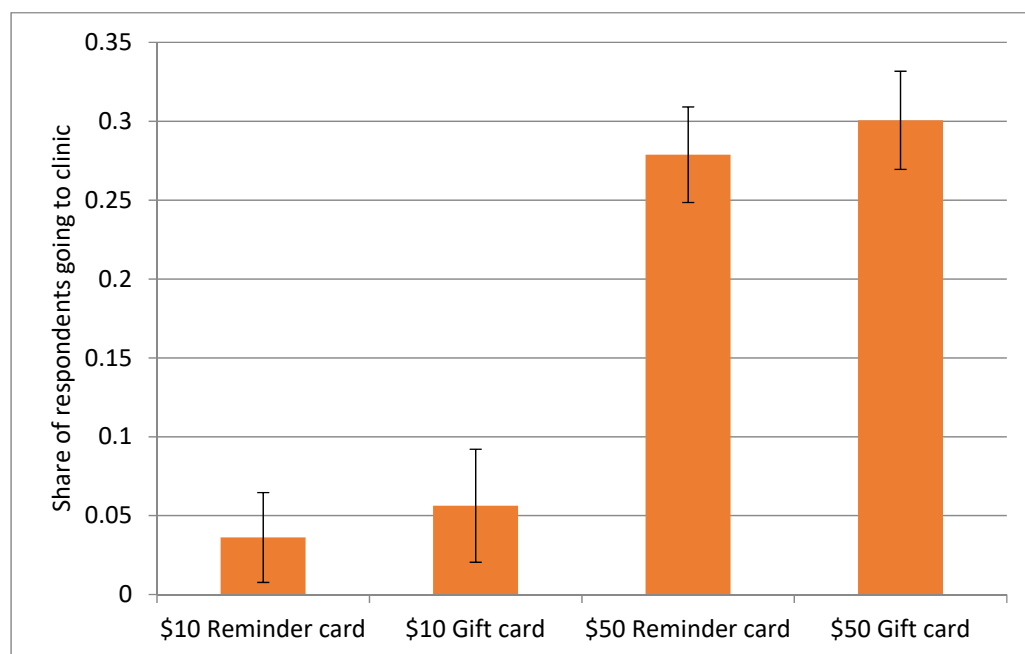
Notes: Unadjusted take-up rates for the four treatment arms. There was very low take-up in the treatment arms that offered a $10 incentive to go to the health clinic, regardless of the framing. 25-30 percent of respondents receiving $50 incentives went the clinic. The difference between the $50 gift card (loss frame) treatment and the $50 reminder card treatment is not statistically significant in raw data shown here, but is significant when controls are included.

In Appendix Table 2, we show additional determinants of take-up. For both $50 treatments, women, Arabic speakers, those with higher cognitive scores, and those with public health insurance are more likely to visit the health clinic.

  b. *Loss Aversion*

Now we turn to the relationship between loss aversion and the decision to visit the health clinic and redeem the incentive. Hypothesis 1a suggests that participants who exhibit higher loss aversion will have higher take-up rates. This is to be investigated *within* each treatment arm. Hypothesis 1b implies that loss averse individuals will respond more to the Visa gift card incentive (loss frame) than the reminder card, and the gap will increase with the degree of loss aversion. This hypothesis will be evaluated by comparing *between* treatment arms.

We start with a descriptive graph, Figure 7, in which we replicate the main results for all respondents in the $50 treatments as well sub-samples based on loss-aversion measures. The overall average difference in take-up between those who receive the $50 Visa gift card (loss frame) and $50 reminder card (gain frame) is about 2.2 percent. We then break participants into four groups according to their estimated loss aversion: loss loving ($\lambda < 1$), low loss aversion ($1 \leq \lambda < 1.5$), high loss aversion ($1.5 \leq \lambda < 3$), and irrationally loss averse ($\lambda \geq 3$) including those who reject gambles without losses. The differences between Visa gift card and reminder card redemption rates are 4 to 5 percentage points for more loss-loving participants and 1 to 2 percentage points for more loss-averse participants. These results are not statistically significant, and the point estimates present a pattern contrary to what one would expect if the loss framing induced a sense of ownership and disproportionately affected the loss averse. There is no clear pattern linking loss aversion to take-up rates, nor to the gap in take-up rates between gift card and reminder treatments.

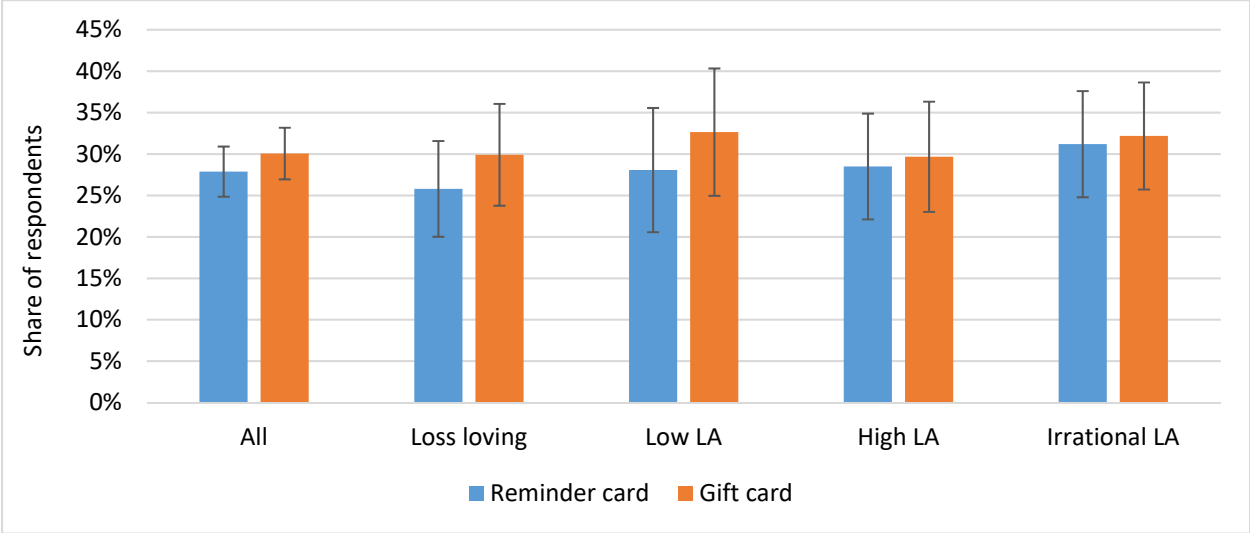**Figure 7: Relationship between loss aversion and take-up**

Table 4: Impact of loss aversion and incentive type on redemption

| | Redeemed incentive | | | |
	(1)	(2)	(3)	(4)
Loss aversion	0.003	-0.007	0.007	0.001
	[0.010]	[0.015]	[0.015]	[0.013]
Gift card				0.035
				[0.036]
Gift card X Loss aversion				0.006
				[0.015]
Observations	1,678	843	835	1,678
R-squared	0.201	0.228	0.236	0.204
Individual covariates	YES	YES	YES	YES
Enumerator, DOW, MY, and tract FE	YES	YES	YES	YES
Sample	All	Coupon	Gift Card	All

Notes: *** p<0.01, ** p<0.05, * p<0.1. See Table 3 and footnotes for list of individual covariates. Missing values coded as zero, with missing flags included but not reported. Interaction of gift card and missing loss aversion flag included but not reported. Robust standard errors reported in brackets.

In the regression analysis presented in Table 4, we use a continuous measure of estimated loss aversion.[10] In column (1), we see no relationship between measured loss aversion and take-up in the full sample. This finding does not support Hypothesis 1a that those with higher loss aversion would be more likely to take-up. In columns (2) and (3), we divide the sample into those who randomly received a reminder card or Visa gift card. Column (2) again suggests no relationship for the reminder card group, which we expect if the reminder card (gain frame) induced no sense of ownership over the incentive. In column (3), we also see no statistically significant relationship between loss aversion and take-up among those who received the Visa gift card (loss frame). All three columns are inconsistent with Hypothesis 1a. The results cast doubt on the notion that the Visa gift card created a sense of ownership.

---

[10] A flag for a loss aversion measure and its interaction with the gift card are included but not reported.

In the final column of Table 4, we explore Hypothesis 1b. The hypothesis suggests that the any gap in responsiveness to the Visa gift card versus the reminder card should be larger for the more loss averse. The interaction term is close to zero and statistically insignificant, providing no support for this conjecture. It does not appear that the more loss averse are more responsive to the Visa gift card than the less loss averse. In sum, Table 4 suggests that the Visa gift card loss frame did not create a sense of ownership over the incentive among participants, and we do not find evidence to support Hypotheses 1a or 1b.

The lack of significant findings in Table 4 could occur if we are not effectively measuring loss aversion. It is indeed the case that measured loss aversion coefficients were affected by the order in which questions were asked. In addition, some participants refused to answer the questions for religious reasons, and a substantial fraction had answers that were outside normal ranges. Nevertheless, the measures we use are standard in the literature, and our estimates are within conventional ranges (Chapman et al., 2018; Brown et al., 2021).

We try alternative ways of coding the reported lottery information, but no reasonable coding methods yields a compelling case that loss aversion predicts take-up. Appendix Table 3 shows that using a categorical measure of loss aversion measure does not change the basic result. We also asked an alternative set of loss aversion questions about whether the individual reports always using coupons or whether they ever forget to use rebates. Using these questions to create an alternative index of loss aversion does not substantively change the null results (not shown). Our interpretation is that the loss frame did not sufficiently induce a sense of ownership in this context such that the loss-averse were more responsive. Overall, our findings suggest loss aversion is not strongly linked to take-up, and we conclude that the Visa gift card does not produce a loss aversion-related effect of loss framing.

c. *Trust*

Next, we turn to the question of trust. Hypothesis 2a is that participants who trust our partner organization at baseline will have higher take-up rates. This is evident in the first column of

Table 5 (Panel A). Those who "agree" or "strongly agree" with the notion that people at ACCESS could be trusted were 5.9 percentage points more likely to visit the health clinic to redeem the incentive.[11] Columns (2) and (3) of Table 5 break the sample into those who receive a reminder and those receive a Visa gift card. The estimated effect of trust is 10.6 percentage points for those who receive the reminder (gain frame) and statistically significant at the 1-percent level. The effect is negligible (1.3 percentage points, with a p-value of 0.72) for those who receive the Visa gift card (loss frame).

As suggested by Hypothesis 2b, we expect that participants who receive the Visa gift card will have higher take-up rates than those who receive the reminder card, and this gap will be larger among those who do not trust our partner organization at baseline. Columns (4) and (5) of Table 5 investigate this possibility. Participants without trust of the organization at baseline are much more responsive to the gift card treatment (loss frame); the impact of the gift card is 7.2 percentage points for this group, as shown in column (4). The statistically significant interaction term in column (4) suggests that there is no comparable effect for those who do trust ACCESS at baseline. In fact, "trusters" are no more responsive to the gift card (loss frame) than to the reminder card (gain frame). In column (5), we separate out those who responded that they did not know whether they trusted ACCESS, which arguably is different from a neutral stance, making the omitted category those who distrusted, were neutral, or never heard of ACCESS. Though those who reported "don't know" have no statistically significant differential response, the differential response to loss framing between "trusters" and others remains evident in this specification. We surmise that, because non-trusting loss frame subjects have the Visa gift card in hand at the point of decision-making, they have a higher subjective probability that they will receive the incentive payment. For those that already trust the organization, the loss versus gain frame distinction is unimportant.

---

[11] As in Table 3, we compare these "trusters" to those who were neutral, disagreed, strongly disagreed, did not know, or had never heard of ACCESS.

Table 5: Impact of trust and incentive type on redemption

| | Redeemed incentive | | | | |
	(1)	(2)	(3)	(4)	(5)
Trust ACCESS	0.059**	0.106***	0.013	0.098***	0.107***
	[0.025]	[0.036]	[0.036]	[0.033]	[0.035]
Gift card				0.072***	0.093***
				[0.025]	[0.029]
Gift card X Trust ACCESS				-0.078*	-0.099**
				[0.045]	[0.048]
Don't know if Trust ACCESS					0.031
					[0.043]
Gift card X Don't know					-0.081
					[0.058]
Observations	1,678	843	835	1,678	1,678
Individual covariates	YES	YES	YES	YES	YES
Enumerator, DOW, MY, and tract FE	YES	YES	YES	YES	YES
Sample	All	Reminder card	Gift card	All	All

Notes: *** p<0.01, ** p<0.05, * p<0.1. See Table 3 and footnotes for list of individual covariates. Missing values coded as zero, with missing flags included but not reported. Interaction of gift card and missing trust flag included but not reported. Robust standard errors reported in brackets.

To demonstrate the robustness of our trust measure, Figure 8 disaggregates those who disagreed or strongly disagreed separately from those who felt neutral or had not heard of ACCESS. For those with less trust, the point estimate of the gift card redemption rate is 5 to 11 points higher than the reminder card redemption rate. The most pronounced effect of the Visa gift card is for those who are not familiar with ACCESS or had a neutral opinion. By contrast, those who trust the organization at baseline do not disproportionately respond to the gift card. Appendix Table 4 presents regression-adjusted disaggregated results, examining different values of the trust variable, and the conclusions are the same.

Figure 8: Relationship between trust and take-up
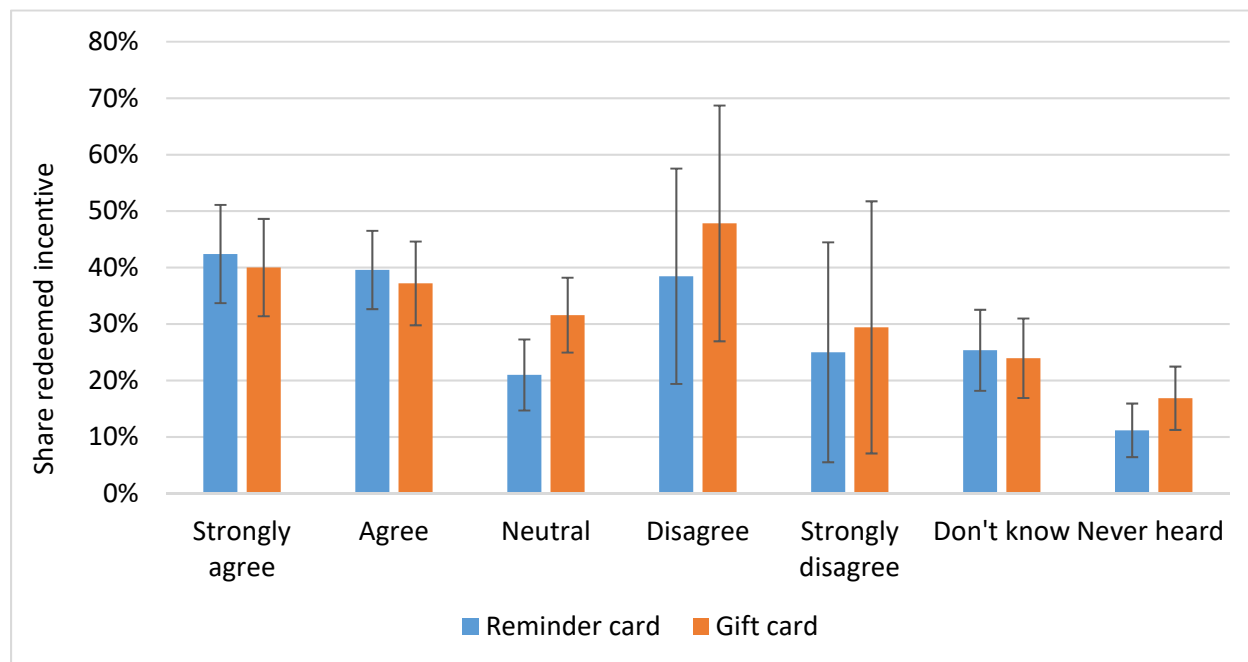
Notes: The figure shows the fraction redeeming the incentive for those receiving the reminder card and those receiving the Visa gift card by baseline responses to questions about whether they have heard of the organization and if so agree that the organization can be trusted. The largest differential response to the two treatments are among those who had not heard of ACCESS or had a neutral feeling about trusting it.

d. Is it trust or something correlated with trust?

One possible concern is that trust is not randomly assigned and could be correlated with other factors that predict take-up (see Table 3). Though our main models control directly for these factors, they do not permit differential responses to the Visa gift card loss frame treatment. In Appendix Table 5, we test for differential treatment responses across several baseline characteristics, including the statistically significant correlates of trust we identified in Table 3. The apparent effect of trust is not dissipated by allowing the effect of the Visa gift card (loss frame) to vary by these observable factors. We cannot rule out the possibility that trust is correlated with an unobserved factor that also affects differential responsiveness to the loss

frame compared to the gain frame. However, the most likely explanation is that baseline trust of the organization matters.

We also examine differential responsiveness using measures of trust that are not related to the organization *per se*. We ask respondents whether they trust people in general and whether they trust medical providers. We find that the effect is particular to trust of the organization, as there is no evidence that individuals' general trusting nature drives these results. Respondents who trust people in general or doctors are not differentially responsive to the gift versus reminder cards (results not shown). This finding suggests that the effect of the Visa gift card for "Non-trusters" is likely driven by the perceived probability that the incentive will be received.

VII. Conclusions

We conduct a field experiment investigating the use of loss versus gain frames in promoting preventive health care, and seek to understand the mechanism underlying the relevance of these frames. Previous literature has emphasized the role of loss aversion in the effectiveness of loss framing, but that does not appear to be the driving factor in this setting. We find no evidence that loss-averse recipients are more responsive to the incentives, nor are they particularly more responsive to the loss frame treatment, a Visa gift card offered *ex ante*, relative to the gain frame treatment, a visually similar reminder card. In this setting, it appears that the Visa gift card (loss frame) did not induce a sufficient sense of ownership among study participants to generate a differential response to loss framing among the loss averse.

We do, however, see a group of participants that *are* particularly responsive to the loss framing: those that do not trust the organization at baseline. For those that already trust our partner organization, there is no difference in responsiveness between the reminder card and the Visa gift card treatments. But for those unfamiliar with or less trusting of the organization, the Visa gift card in hand in the loss frame helps participants to feel confident their incentive payment will be given as promised. This finding suggests that, rather than exploiting loss aversion, loss framing instead raises the subjective probability that the incentive will be delivered.

A range of loss frame incentive designs intended to induce a feeling of ownership may simultaneously increase the perceived trustworthiness of the incentive. Study participants may have doubts about future promises in some settings and may respond differently to loss versus gain frames simply because of the trust issue. Thus, researchers should take care in both study design and interpretation to distinguish trust effects from loss aversion-related effects. The framing of an incentive as a loss rather than a gain may be effective even in the absence of behavioral biases because of rational responses to expected pay-offs when the participant is unsure about the institution offering the incentive.

The distinction between loss aversion and trust is important from a practical perspective as well. If loss framing is inexpensive, this could be a useful approach for policy-makers to maximize the effectiveness of health incentives, regardless of the underlying reason for its effectiveness. However, it may be costly to frame incentives as losses. Hannan et al. (2005) document in a lab setting that "punishment" contracts are perceived as unfair, and the reduced effort associated with unfairness partially offsets the gains that otherwise exist from the loss framing. In some contexts, alternative approaches to raising the perceived trustworthiness of an incentive may be the most cost-effective way to motivate desirable health behavior.

VIII.   References cited

Abdellaoui, Mohammed, Han Bleichrodt, and Corina Paraschiv. 2007. "Loss Aversion under Prospect Theory: A Parameter-Free Measurement," *Management Science* 53(10): 1659–1674.

Abdellaoui, Mohammed, Han Bleichrodt, and Olivier l'Haridon. 2008. "A Tractable Method to Measure Utility and Loss Aversion under Prospect Theory," *Journal of Risk and Uncertainty* 36(3): 245-266.

Abdellaoui, Mohammed, Olivier L'Haridon, and Corina Paraschiv. 2011. "Experienced vs. Described Uncertainty: Do We Need Two Prospect Theory Specifications?" *Management Science* 57(10): 1879–1895.

ACCESS. 2018. "2018 Annual Report."
https://www.accesscommunity.org/download/file/fid/1258.

Alsan, Marcella, and Marianne Wanamaker. 2018. "Tuskegee and the health of black men," *The Quarterly Journal of Economics* 133(1): 407-455.

Ayyash, Mariam, Marwa Ayyash, Sheena Bahroloomi, Hiam Hamade, and Mona Makki. 2019. "Knowledge Assessment and Screening Barriers for Breast Cancer in an Arab American Community in Dearborn, Michigan," *Journal of Community Health* 44: 988–997.

Blendon, Robert J., John M. Benson, and Joachim O. Hero. 2014. "Public trust in physicians – U.S. medicine in international perspective," *New England Journal of Medicine* 371(17): 1570-1572.

Bouchouicha, Ranoua, Lachlan Deer, Ashraf Galal Eid, Peter McGee, Daniel Schoch, Hrvoje Stojic, Jolanda Ygosse-Battisti, and Ferdinand M. Vieider. 2019. "Gender effects for loss aversion: Yes, no, maybe?," *Journal of Risk and Uncertainty* 59: 171–184.

Brandon, Alec. 2020. "Social Pressure and Self-Selection in Experimental Policy Evaluation." The University of Chicago dissertation: Proquest Web.

Brooks, Peter and Horst Zank. 2005. "Loss Averse Behavior," *Journal of Risk and Uncertainty* 31(3): 301–325.

Brown, Alexander L., Taisuke Imai, Ferdinand M. Vieider, and Colin F. Camerer. 2021. "Meta-Analysis of Empirical Estimates of Loss-Aversion," unpublished manuscript retrieved from https://www.taisukeimai.com/files/loss_aversion_meta.pdf.

Business Health Group, "Press Release June 18, 2020." retrieved December 17, 2020, from https://www.businessgrouphealth.org/en/who-we-are/newsroom/press-releases/95-percent-of-employers-now-include-emotional-and-mental-health-programs-in-well-being-platforms.

Chadhuri, Kausik, Anindita Chakrabarti, Joht Singh Chandan, and Siddhartha Bandyopadhyay. 2022. "COVID-19 vaccine hesitancy in the UK: a longitudinal household cross-sectional study," BMC Public Health 22:104

Chapman, Jonathan, Erik Snowberg, Stephanie Wang, and Colin Camerer. 2018. "Loss Attitudes in the U.S. Population: Evidence from Dynamically Optimized Sequential Experimentation (DOSE)," *National Bureau of Economic Research Working Paper* 25072.

Cohen, Joshua T., Peter J. Neumann, and Milton C. Weinstein. 2008. "Does preventive care save money? Health economics and the presidential candidates." *The New England Journal of Medicine* 358(7): 661-663.

Ericson, Keith M. Marzilli and Andreas Fuster. 2011. "Expectations as Endowments: Evidence on Reference-Dependent Preferences from Exchange and Valuation Experiments." *The Quarterly Journal of Economics* 126(4): 1879-1907.

Fehr, Ernst. and Goette, Lorenz., 2007. Do workers work more if wages are high? Evidence from a randomized field experiment. *American Economic Review*, 97(1): 298-317.

Fryer, Roland G., Steven D. Levitt, John List, and Sally Sadoff. 2012. "Enhancing the efficacy of teacher incentives through loss aversion: A field experiment." National Bureau of Economic Research Working Paper 18237.

Gächter, Simon, Eric J. Johnson, and Andreas Herrmann. 2007. "Individual-level loss aversion in riskless and risky choices." IZA Discussion Paper No. 2961.

Goette, Lorenz, Thomas Graeber, Alexandre Kellogg, and Charles Sprenger, 2018. "Heterogeneity of Loss Aversion and Expectations-Based Reference Points," Working Paper, https://authors.library.caltech.edu/104499/.

Hannan, R. Lynn, Vicky B. Hoffman, and Donald V, Moser. 2005. "Bonus versus penalty: Does contract frame affect employee effort?" *Experimental Business Research* 2: 151-169.

Holt, Charles A., and Susan K. Laury. 2002. "Risk aversion and incentive effects." *American Economic Review* 92.5:1644-1655.

Hossain, Tanjim, and John A. List. 2012. "The behavioralist visits the factory: Increasing productivity using simple framing manipulations," *Management Science* 58: 2151-2167.

Jochelson, Karen. 2007. "Paying the patient: Improving health using financial incentives." *London: Kings Fund.*

Kane, Robert L., Paul E. Johnson, Robert J. Town, and Mary Butler. 2004. "A structured review of the effect of economic incentives on consumers' preventive behavior." *American Journal of Preventive Medicine* 27(4): 327-352.

Kahneman, Daniel, and Amos Tversky. 1984. "Choices, values, and frames." *American Psychologist*. 39 (4): 341–350.

Kaiser Family Foundation. 2015. "Preventive services covered by private health plans under the Affordable Care Act," http://kff.org/health-reform/fact-sheet/preventive-services-covered-by-private-health-plans.

Köbberling, Veronika, and Peter Wakker. 2005. "An index of loss aversion." *Journal of Economic Theory*.

Kőszegi, Botond, and Matthew Rabin. 2006. "A model of reference-dependent preferences." *The Quarterly Journal of Economics*: 1133-1165.

LaVeist TA, Isaac LA, Williams KP. 2009. "Mistrust of health care organizations is associated with underutilization of health services." *Health Services Research* 44(6): 2093-2105.

Levitt, Steven D., John A. List, Susanne Neckermann, and Sally Sadoff. 2016. "The behavioralist goes to school: Leveraging behavioral economics to improve educational Performance," *American Economic Journal: Economic Policy* 8(4): 183-219.

Maciosek, Michael V. et al. 2010. "Greater use of preventive services in the U.S. could save lives at little or no cost." *Health Affairs* 29.9: 1656-1660.

Madrian, Brigitte C. 2014. "Applying insights from behavioral economics to policy design." *Annual Review of Economics* 6(1): 663-668.

Masatlioglu, Y. and Raymond, C. 2016. "A behavioral analysis of stochastic reference dependence." *American Economic Review*, 106(9): 2760-82.

Nash, Jane Gradwohl, and Robert A. Rosenthal. 2014. "An investigation of the endowment effect in the context of a college housing lottery," *Journal of Economic Psychology* 42: 74-82.

Partnership for Prevention. 2007. "Preventive care: A national profile on use, disparities, and health benefits," Washington, D.C. Downloaded March 22, 2017 from http://www.rwjf.org/en/library/research/2007/08/preventive-care-national-profile-on-use.html

Perlstadt, Harry, Miles McNall, Larry Hembroff, and KyungSook Lee, 2015. "Healthcare Access and Insurance among Arab/Chaldean Americans in Michigan," manuscript for 7th International Conference on Health Issue in Arab Communities.

Rabin, Matthew., 2000. "Risk aversion and expected-utility theory: A calibration theorem." *Econometrica*, 68(5): 1281-1292.

Rabin, Matthew. and Thaler, Richard .H., 2001. "Anomalies: Risk aversion." *Journal of Economic Perspectives*, 15(1): 219-232.

Reb, Jochen, and Terry Connolly, 2007. "Possession, feelings of ownership and the endowment effect," *Judgment and Decision Making* 2: 107-114.

Schmidt, Ulrich, and Horst Zank. 2005. "What is loss aversion?" *Journal of Risk and Uncertainty*, 30(2): 157-167.

Schmidt, Ulrich, and Stefan Traub. 2002. "An Experimental Test of Loss Aversion," *Journal of Risk and Uncertainty* 25(3): 233–249.

Segal, Uzi, and Avia Spivak. 1990. "First order versus second order risk aversion." *Journal of Economic Theory*, 51(1): 111-125.

Sokol-Hessner, Peter, Ming Hsu, Nina G. Curley, Mauricio R. Delgado, Colin FCamerer, and Elizabeth A. Phelps, "Thinking Like a Trader Selectively ReducesIndividuals' Loss Aversion,"Proceedings of the National Academy of Sciences, 2009,106(13), 5035–5040.

Sprenger, Charles. 2015. "An Endowment Effect for Risk: Experimental Tests of Stochastic Reference Points," *Journal of Political Economy* 123(6): 1456–1499.

Strahilevitz, Michal A., and George Loewenstein, G. 1998. "The effect of ownership history on the valuation of objects," *Journal of Consumer Research* 25 (3): 276-289.

Sutherland, Kim, Jon B. Christianson, and Sheila Leatherman. 2008. "Impact of targeted financial incentives on personal health behavior: A review of the literature." *Medical Care Research and Review* 65(6): 36S-78S.

Volpp, Kevin G., Leslie K. John, Andrea B. Troxel, Laurie Norton, Jennifer Fassbender, and George Lowenstein. 2008. "A randomized controlled trial of financial incentives for weight loss," *Journal of the American Medical Association* 300(22): 2631-2637.

Wakker, Peter P. 2005. "Decision-foundations for properties of nonadditive measures: general state spaces or general outcome spaces." *Games and Economic Behavior* 50(1): 107-125.

Appendix Figure 1: Reminder Card and Visa Gift Card Examples

Appendix Table 1: Impact of treatment on redemption rate

| | Redeemed incentive | | | |
	(1)	(2)	(3)	(4)
$50 Gift card or reminder card	0.199***	0.212***		
	[0.027]	[0.026]		
$10 Gift card			0.020	0.016
			[0.023]	[0.026]
$50 Reminder card			0.199***	0.200***
			[0.030]	[0.030]
$50 Gift card			0.220***	0.241***
			[0.030]	[0.030]
Observations	2,004	2,004	2,004	2,004
R-squared	0.065	0.218	0.065	0.219
P-value, $50 coupon = $50 gift card			0.326	0.050**
Individual covariates	NO	YES	NO	YES
Enumerator, DOW, MY, and tract FE	NO	YES	NO	YES

Notes: *** p<0.01, ** p<0.05, * p<0.1. See Table 3 and footnotes for list of individual covariates. Wave fixed effects included in all specifications. Missing values coded as zero, with missing flags included but not reported. Robust standard errors reported in brackets. Controlling for covariates, particularly those on which we are not balanced, affects the estimated effect size and statistical significance of the results between columns 3 and 4.

Appendix Table 2: Determinants of incentive redemption

	Redeemed incentive		
	(1)	(2)	(3)
Female	0.068**	0.105***	0.086***
	[0.031]	[0.032]	[0.021]
Age	-0.001	0.001	-0.000
	[0.001]	[0.001]	[0.001]
Married	0.032	0.063	0.050*
	[0.036]	[0.039]	[0.026]
Arabic language	0.141***	0.125**	0.131***
	[0.050]	[0.049]	[0.034]
Middle eastern	0.011	0.070	0.045
	[0.057]	[0.056]	[0.038]
Black	0.006	0.129**	0.069
	[0.064]	[0.063]	[0.042]
Hispanic	0.025	0.028	0.016
	[0.097]	[0.072]	[0.055]
Number of children	0.001	-0.015	-0.008
	[0.019]	[0.020]	[0.013]
Household size	0.006	0.008	0.008
	[0.013]	[0.012]	[0.009]
Born in US	-0.056	-0.034	-0.051*
	[0.044]	[0.044]	[0.030]
US citizen	-0.022	0.036	0.012
	[0.058]	[0.058]	[0.040]
High school graduate or less	0.050	0.010	0.035
	[0.046]	[0.049]	[0.032]
Quality of health (1 = excellent, 6 = very poor)	0.018	0.010	0.015
	[0.015]	[0.015]	[0.010]
# Preventive health visits past 12 mo, adults	0.007	0.002	0.005
	[0.009]	[0.007]	[0.005]
# Preventive health visits past 12 mo, children	0.012	0.007	0.009
	[0.010]	[0.007]	[0.006]
Know about ACCESS	0.019	0.007	0.000
	[0.046]	[0.049]	[0.033]
Ever used ACCESS	0.069	-0.032	0.022
	[0.044]	[0.044]	[0.030]
Trust ACCESS	0.066	0.023	0.047*
	[0.042]	[0.042]	[0.029]
Loss aversion (Kőszegi-Rabin)	-0.005	0.005	0.004
	[0.015]	[0.015]	[0.010]
Raven's index score, normalized	0.009	0.015	0.014
	[0.017]	[0.018]	[0.012]
Number recall score, normalized	0.043**	0.005	0.026**
	[0.018]	[0.018]	[0.012]
Insured, employer/spouse	-0.011	-0.076	-0.041
	[0.045]	[0.047]	[0.032]

Insured, public	0.089**	0.103**	0.087***
	[0.045]	[0.049]	[0.032]
Observations	843	835	1,678
R-squared	0.242	0.237	0.205
Sample	Reminder card	Gift Card	All

Notes: *** p<0.01, ** p<0.05, * p<0.1. Missing values coded as zero, with missing flags included but not reported. Wave fixed effects included in all specifications. Controls for any other insurance, self-purchased insurance, per-capita emergency health visits (adults and children), per-capita non-emergency health visits (adults and children), and order of loss-aversion questions included but not reported. Middle Eastern ethnicity question asked only in 2014 and 2015, and education asked only in 2015. Sample includes recipients of $50 cards. Robust standard errors reported in brackets.

Appendix Table 3: Impact of loss aversion and incentive type on redemption, disaggregated

	Redeemed incentive			
	(1)	(2)	(3)	(4)
Low loss aversion	-0.018	-0.012	-0.043	0.006
	[0.035]	[0.048]	[0.056]	[0.046]
High loss aversion	-0.003	-0.007	0.003	0.001
	[0.037]	[0.052]	[0.058]	[0.047]
Irrational loss aversion	0.016	-0.018	0.024	0.010
	[0.038]	[0.056]	[0.056]	[0.049]
Gift card				0.053
				[0.043]
Gift card X Low LA				-0.049
				[0.068]
Gift card X High LA				-0.006
				[0.062]
Gift card X Irrational LA				0.014
				[0.060]
Observations	1,678	843	835	1,678
R-squared	0.202	0.228	0.237	0.204
P-value, loss aversion = 0	0.830	0.987	0.706	0.996
P-value, Gift card X LA = 0				0.823
Sample	All	Reminder card	Gift Card	All

Notes: *** p<0.01, ** p<0.05, * p<0.1. See Table 3 and footnotes for list of individual covariates. Missing values coded as zero, with missing flags included but not reported. Interaction of gift card and missing loss aversion flag included but not reported. Robust standard errors reported in brackets.

Appendix Table 4: Impact of trust and incentive type on redemption, disaggregated

	Redeemed incentive			
	(1)	(2)	(3)	(4)
Trust ACCESS: Strongly agree	0.050	0.139**	-0.028	0.107*
	[0.043]	[0.063]	[0.063]	[0.056]
Trust ACCESS: Agree	0.074**	0.138***	0.040	0.124***
	[0.037]	[0.051]	[0.058]	[0.046]
Trust ACCESS: Neutral	0.007	0.007	0.026	0.006
	[0.037]	[0.051]	[0.057]	[0.045]
Trust ACCESS: Disagree	0.103	0.146	0.090	0.126
	[0.075]	[0.110]	[0.108]	[0.107]
Trust ACCESS: Strongly disagree	-0.052	0.004	-0.069	-0.026
	[0.082]	[0.114]	[0.129]	[0.102]
Trust ACCESS: Don't know	-0.006	0.067	-0.051	0.039
	[0.038]	[0.054]	[0.056]	[0.049]
Gift card X Strongly agree				-0.012
				[0.059]
Gift card X Agree				0.000
				[0.050]
Gift card X Neutral				0.096**
				[0.045]
Gift card X Disagree				0.059
				[0.137]
Gift card X Strongly disagree				0.054
				[0.158]
Gift card X Don't know				0.012
				[0.050]
Gift card X Never heard of ACCESS				0.101**
				[0.039]
Observations	1,678	843	835	1,678
R-squared	0.206	0.242	0.238	0.211
Sample	All	Reminder card	Gift Card	All

Notes: *** p<0.01, ** p<0.05, * p<0.1. See Table 3 and footnotes for list of individual covariates. Never heard of ACCESS is omitted trust category. Missing values coded as zero, with missing flags included but not reported. Interaction of gift card and missing trust flag included but not reported. Robust standard errors reported in brackets.

Appendix Table 5: Impact of incentive type and trust on redemption, checking for alternative mechanisms

	Interacted covariate								
	Female	Age	Married	Born in US	Arabic speaker	Insured	Self-purchased insurance	Very good health	High aptitude
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Trust ACCESS	0.108***	0.107***	0.108***	0.106***	0.105***	0.107***	0.106***	0.107***	0.107***
	[0.035]	[0.035]	[0.035]	[0.036]	[0.036]	[0.035]	[0.035]	[0.035]	[0.035]
Gift card	0.078**	0.090**	0.088**	0.092**	0.095***	0.098*	0.091***	0.079**	0.100***
	[0.037]	[0.036]	[0.035]	[0.041]	[0.030]	[0.053]	[0.030]	[0.034]	[0.038]
Gift card X trust ACCESS	-0.101**	-0.099**	-0.102**	-0.098**	-0.096**	-0.098**	-0.098**	-0.097**	-0.100**
	[0.048]	[0.048]	[0.049]	[0.049]	[0.049]	[0.048]	[0.048]	[0.048]	[0.048]
Covariate	0.072**	-0.061	0.044	-0.055	0.141***	-0.288	-0.050	0.023	0.008
	[0.029]	[0.047]	[0.033]	[0.037]	[0.042]	[0.190]	[0.068]	[0.044]	[0.042]
Gift card X covariate	0.027	0.006	0.011	0.002	-0.010	-0.005	0.035	0.033	-0.011
	[0.042]	[0.042]	[0.042]	[0.043]	[0.051]	[0.053]	[0.084]	[0.042]	[0.043]
Observations	1,678	1,678	1,678	1,678	1,678	1,678	1,678	1,678	1,678
R-squared	0.209	0.210	0.209	0.209	0.209	0.210	0.209	0.210	0.209

Notes: *** p<0.01, ** p<0.05, * p<0.1. See Table 3 and footnotes for list of individual covariates. Interacted covariates in columns 1 and 3-7 defined as binary variables equal to 1 for respondents with that characteristic. Age equals 1 if the respondent is older than the sample median age of 35. Very good health equals 1 if the respondent reports having "excellent" or "very good" health in the past month, and high aptitude equals one if the respondent's averaged raven's test and and digit span results are in the top half of the distribution. Missing values coded as zero, with missing flags included but not reported. Interactions of gift card and missing trust flag, don't know whether trust flag, and missing covariate flags included but not reported. Robust standard errors reported in brackets.