

**Responses to Losses in High Deductible Health Insurance:  
Persistence, Emotions, and Rationality**

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# **Responses to Losses in High Deductible Health Insurance: Persistence, Emotions, and Rationality**

## **Abstract**

To what extent do people with high deductible health insurance change behavior and switch to lower deductible insurance following a large loss, and what role do emotions play in their behavior? Data from an Internet survey of insurance purchasers who were explicitly told that loss probabilities remained unchanged was collected. About 14% of buyers switched from high deductible insurance after a large loss.. In contrast, there were minimal effects on emotions and switching from experiencing no losses with higher premium, low deductible insurance. Changes in the choice of insurance plans are not always based on systematic expected utility maximizing tradeoffs. Many individuals decide to switch insurance plans next period if they experience disappointment with their insurance purchase decision in the current period.

**KEYWORDS:** High deductibles; health insurance; rationality; emotions

## **Introduction**

Multiple studies on variations or changes in the demand for health insurance when individuals can decide between options find that choices are influenced by economic variables in expected ways—buyers switch if premiums change and benefits remain the same, if benefits change and the premiums do not, and if the buyer’s risk changes (Phelps, 1973). But there are also errors, only partially corrected (Neipp and Zeckhauser, 1985; Samuelson and Zeckhauser, 1988; Abaluck and Gruber, 2011; Ketcham, et al, 2012; Ketcham, et al, 2015) . However, a gap in this literature is the absence of a general understanding of how often some people

erroneously revise their health insurance purchasing decisions over time when there is no change in premiums and benefits—and when and why such behavior occurs. This question is especially important as buyers have greater ability today to choose between coverage with high and low deductibles given the greater prevalence of both high and low deductible options in group insurance and individual insurance exchanges.

This paper provides new experimental evidence from a controlled setting with high and low deductible options where the external circumstances that should influence choice are explicitly specified to be identical over time, so people should *not change* plans unless their utility functions and hence their preferences change. We then see how many people nevertheless revise their insurance policies in response to their loss experience and infer some of the reasons for their behavior. In our experiment, we control for external changes that make observational studies suspect, therefore allowing us to gain a more precise look at the decision making processes.

The specific insurance decision we examine is highly relevant today: the choice between a high deductible health plan with significantly lower initial out-of-pocket healthcare payments than if one opted for a low deductible health plan. High deductible plans are now chosen by almost one-third of consumers in group insurance plans. In government-run health insurance exchanges as of April, 2014, 20 percent of buyers chose Bronze plans and 65 percent chose Silver plans. The average deductible in 2016 will be \$5,765 per person for a Bronze plan, and \$3,064 for a Silver plan if there is no additional cost sharing subsidies for low income people (Rae, et al, 2015). There is little analysis of consumer characteristics related to switches into or out of such plans when individual choice is possible. Our primary interest in this paper is *not* why these plans were chosen initially, but rather, how often and why individuals switch away from their first choice over time as their insurance-related experience accumulates.

## The Experimental Setting

We designed an experiment relevant to choices in the current health insurance market environment in the United States where everyone is required to have at least some insurance. As long as certain minimum standards about covered services and limits on maximum out-of-pocket payments are met, consumers can select from a variety of plans with different levels of coverage and different premiums. In our experiment, participants could choose at the beginning of each of ten periods between a “high deductible” and a “low deductible” insurance plan in the face of a fixed and unchanging risk distribution. In other words, the probabilities and potential costs of treating moderate or severe illnesses is explicitly stated to be the same in each period regardless of the insurance plan chosen-and the person’s loss experience. Hence, only the person’s previous period loss experience may be changing over time but there is no change in the expected insurance benefits or costs next period whether or not the person suffered any type of illness in the previous period.

We chose this structure to isolate consumer behavior in a situation where there would be no reason for individuals to change their insurance decision from their choice in the previous period. The experiment was designed to determine whether there is a role that emotions experienced after learning the outcome in period  $t$  impacted on the insurance plan purchased in period  $t+1$ .

Based on prior research, we tested the hypothesis that feelings of regret at having chosen a high deductible plan, and then experiencing the larger out of pocket payment if illness struck, may prompt the person to switch to a low deductible plan in the next period. Conversely, someone who paid the higher premium associated with a low deductible plan and did not suffer an illness may decide that the extra premium was wasted, and switch to a high deductible plan in

the next period. Although there has been theoretical research that regret may influence insurance purchase decisions (Bell, 1982; Loomes and Sugden, 1982; Braun and Muermann, 2004), there have been no empirical studies of the role that regret and the emotions it generates plays in the decision to switch insurance policies over time.

### *Health Insurance Experimental Design*

The experiment consisted of a 10-period game where participants were asked to imagine that they are 35 years old with a middle class income. They were told at the outset of the experiment that the game would consist of 10 periods and that in each period they would either suffer no illness, a moderate illness, or a severe illness with respective probabilities of .60, .35 and .05. That is, they were explicitly told to assume that an illness of any severity in one period had no effect on the illness probability in later periods. . If the participant suffers no illness, he/she incurs no cost for treatment. The participants were told that the cost of treating a moderate illness was \$500 and the cost of treating a severe illness was \$20,000.

Participants were required to purchase one of two health insurance policies at the start of each period—Policy A is a high deductible plan (\$2,000) and Policy B is a low deductible plan (\$100). The expected value of benefits each period under the high and low deductible plans were \$900 and \$1,135 respectively. Participants were not told the expected benefits of the two plans but could determine them with the information they had in hand. The high deductible policy in each scenario always had a lower premium than the low deductible policy, but the relative premiums for pairs of policies were varied across subjects. Table 1 summarizes the low, medium, and high premiums relative to claims and the associated premium differentials. Approximately one-third of participants were offered subsidized policies relative to an actuarially fair price so the premiums for both the high and low deductible policies were less than the expected benefits (loading of -0.25 of average benefits). One-third were offered an

option where the premiums were slightly higher than the actuarially fair price (loading of 0.16), and one-third were offered high premiums relative to expected benefits (loading of 0.29) (.Loading is defined as (Premium-Expected benefits)/Premium.)

**TABLE 1**  
**Low, Medium and High Premiums for Policy A and B**

	<b>Policy A</b>	<b>Policy B</b>	<b>Differential</b>	<b>Premium/ Expected Claims</b>	<b>Overall Loading</b>
	<b>High Deductible (\$2,000)</b>	<b>Low Deductible (\$100)</b>			
Expected Benefits	\$900	\$1,135	235	—	—
Low Premium	\$720	\$910	190	0.89	-0.25
Medium Premium	\$1,080	\$1,360	280	1.19	0.16
High Premium	\$1,260	\$1,590	330	1.40	0.29

After selecting a health insurance policy, the participant is notified of his/her illness in that period. If the participant purchases the high deductible plan in a given period and suffers a moderate illness, he/she is responsible for the premium and the full cost of treatment (\$500) since the loss is less than the deductible. If the participant purchases the low deductible plan in a given period and suffers a moderate illness, he/she is responsible for the premium and the first \$100 of the cost of treatment. If the participant purchases the high deductible plan in a given

period and suffers a severe illness, he/she is responsible for the premium and the first \$2,000 of the cost of treatment in contrast to those who bought a low deductible plan where they would only have to pay the first \$100 of the treatment cost in addition to the premium. If the participant suffers no illness in a given period, he/she is responsible for the premium of the high or low deductible plan chosen. Note that in all cases, the person has lower expenses with a moderate illness if the low deductible policy is chosen, but the difference between expense levels shrinks as premiums and loadings rise. However, if there is no loss the high deductible-low premium plan is the better deal.

After making their health insurance purchases for the given period, participants were told whether they experienced no illness, a moderate illness, or a severe illness. Participants then answered the following question: “How do you feel about having bought Policy A [Policy B] now that you know that you had no illness/moderate illness/severe illness?”

The following 5-point response scale was used to define the variable FEEL:

<u><i>A great deal of regret</i></u>	<u><i>Some regret</i></u>	<u><i>Unaffected</i></u>	<u><i>Glad</i></u>	<u><i>Very Glad</i></u>
1	2	3	4	5

Each participant in the sample completed 10 periods of the game with the same conditions. The experiment was designed such that one-third of participants suffered a severe illness in period 2, one-third of participants suffered a severe illness in period 8, and one-third of participants never suffered a severe illness. Any participant who suffered a severe illness in period 2 was precluded from suffering a severe illness in period 8 so that 2/3 of the sample suffered one severe illness. Other participants had a one-in-three chance of suffering a moderate illness in either period 2 or 8 so that chance of a moderate illness was  $1/3 \times 2/3$  or about 22 percent in one of these two periods. In the other eight periods there was a one-in-three chance

that any participant could suffer a moderate illness whether or not they had suffered a severe illness.

The experiment was conducted on a web-based platform (Qualtrics) with 1,567 adults in the final sample. There was no explicit monetary reward for a successful choice, but participants in the experiment were volunteers presumably eager to play the game well.

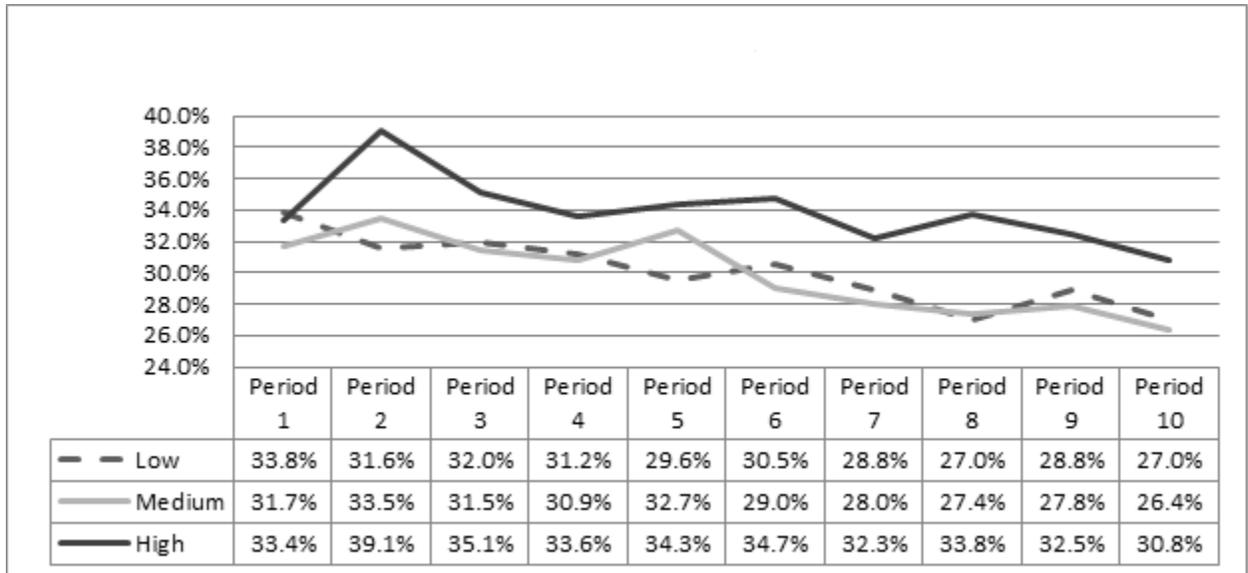
Before a participant began the 10-period game, he/she was asked two hypothetical questions to make sure that he/she understood the nature of the experiment and the impact of specific health insurance decisions on his/her out-of-pocket payments in any given period. Individuals who did not correctly answer at least one hypothetical question were excluded from participating in the experiment. Individuals who correctly answered only one hypothetical question were instructed to reread the instruction but were allowed to participate in the experiment.

### **Choice Consistency**

Approximately half of all subjects switched from one plan to the other at some point in the experiment even though there were no changes in the risks of experiencing an illness or the costs of health insurance over time. Subjects facing the subsidized lowest premiums should be more likely to choose the low deductible plan than those facing the higher premiums with positive loadings.

Figure 1 shows the actual pattern of choices of the high deductible plan (Plan A) over time. Except for period 1, the proportion of subjects choosing the high deductible plan (Policy A) is consistently higher if they were in the High Premium group than if subjects were offered the other two premiums. However, about one-third of subjects who were offered the low premium chose the high deductible plan, as shown by the dashed line in Figure 1, behavior inconsistent

with expected utility maximization. There is a statistically significant difference between the percentage of individuals purchasing the high deductible plan (Policy A) when faced with the high premium compared with the other two premiums; however, there is no statistical difference between the percentage purchasing Policy A for those offered medium and low premiums.



**Figure 1 Percentage of Individuals Purchasing High Deductible Plan for Low, Medium or High Premiums**

**Figure 1 Legend** = Percent Insured with Policy A for Each Time Period

### Reactions to Loss Experience

Turning to respondents' answers on how their loss experience influenced their ex post feelings about the insurance choice they previously made, we define a binary variable equal to one to represent the portion with FEEL scores 3-5 (HIGH FEEL). Looking across rows in Table 2, compared to no illness, a larger proportion of participants who purchased high deductible

insurance and suffered an illness (moderate or severe) report low FEEL scores (i.e. 1 or 2) indicating at least some regret, presumably because they knew that they could have received higher claim payments if they had purchased low deductible insurance. In contrast, among those who bought low deductible insurance, at least 95 percent of the respondents had high FEEL scores when they suffered an illness in any period because they received higher claim payments than if they had purchased a high deductible policy.

Turning to the columns in Table 2, when individuals did not suffer an illness the proportion with high FEEL scores is higher for those purchasing the high deductible policy than the low deductible one, as expected, given the lower premiums for the high deductible policy. On the other hand, when individuals experienced either a minor or severe illness the proportion with high FEEL scores was higher for those with a low deductible policy because of their smaller out-of-pocket expenses. The difference in FEEL scores was statistically significant for both the row and column comparisons in all periods based on a Chi-square test ( $p < .001$ ).

**TABLE 2**

**Proportion of high deductible and low deductible buyers who have HIGH FEEL scores after no illness and any illness, by period**

<b>Period 1 Proportion HIGH FEEL</b>			
	No Illness	Any Illness	Chi-Square Test
Policy A (High Deductible) in Period 1	0.88	0.45	( $p < 0.001$ )
Policy B (Low Deductible) in Period 1	0.70	0.95	( $p < 0.001$ )
	(N = 1,058)	(N = 509)	
<b>Period 2 Proportion HIGH FEEL</b>			
	No Illness	Any Illness	Chi-Square Test
Policy A (High Deductible) in Period 2	0.92	0.46	( $p < 0.001$ )

Policy B (Low Deductible) in Period 2	0.69 (N = 711)	0.97 (N = 856)	(p < 0.001)
<b>Period 3 Proportion HIGH FEEL</b>			
Policy A (High Deductible) in Period 3	No Illness 0.94	Any Illness 0.43	Chi-Square Test (p < 0.001)
Policy B (Low Deductible) in Period 3	0.74 (N = 1,056)	0.98 (N = 511)	(p < 0.001)
<b>Period 4 Proportion HIGH FEEL</b>			
Policy A (High Deductible) in Period 4	No Illness 0.93	Any Illness 0.49	Chi-Square Test (p < 0.001)
Policy B (Low Deductible) in Period 4	0.72 (N = 1,028)	0.97 (N = 539)	(p < 0.001)
<b>Period 5 Proportion HIGH FEEL</b>			
Policy A (High Deductible) in Period 5	No Illness 0.91	Any Illness 0.36	Chi-Square Test (p < 0.001)
Policy B (Low Deductible) in Period 5	0.70 (N = 1,046)	0.96 (N = 521)	(p < 0.001)
<b>Period 6 Proportion HIGH FEEL</b>			
Policy A (High Deductible) in Period 6	No Illness 0.95	Any Illness 0.48	Chi-Square Test (p < 0.001)
Policy B (Low Deductible) in Period 6	0.67 (N = 1,069)	0.97 (N = 498)	(p < 0.001)

<b>Period 7 Proportion HIGH FEEL</b>			
	No Illness	Any Illness	Chi-Square Test
Policy A (High Deductible) in Period 7	0.92	0.43	(p < 0.001)
Policy B (Low Deductible) in Period 7	0.69	0.96	(p < 0.001)
	(N = 1,057)	(N = 510)	
<b>Period 8 Proportion HIGH FEEL</b>			
	No Illness	Any Illness	Chi-Square Test
Policy A (High Deductible) in Period 8	0.93	0.57	(p < 0.001)
Policy B (Low Deductible) in Period 8	0.71	0.97	(p < 0.001)
	(N = 695)	(N = 872)	
<b>Period 9 Proportion HIGH FEEL</b>			
	No Illness	Any Illness	Chi-Square Test
Policy A (High Deductible) in Period 9	0.92	0.45	(p < 0.001)
Policy B (Low Deductible) in Period 9	0.74	0.98	(p < 0.001)
	(N = 1,069)	(N = 498)	
<b>Period 10 Proportion HIGH FEEL</b>			
	No Illness	Any Illness	Chi-Square Test
Policy A (High Deductible) in Period 10	0.90	0.50	(p < 0.001)
Policy B (Low Deductible) in Period 10	0.75	0.97	(p < 0.001)
	(N = 1,058)	(N = 509)	

Do people then switch insurance coverage as a reaction to their loss experience and their feelings about it? The left panel of Table 3 examines the behavior of those who bought a high deductible insurance (Policy A) in any given period and shows that they are more likely to switch to low deductible insurance (Policy B) in the next period if they experienced an illness than if they did not. The differences between the two percentages are statistically significant or close to being so in each period except periods 4 and 9 (Surprisingly, those who suffered a moderate illness were much more likely to switch to a low deductible in period 2 than those with a severe illness. Possibly they thought that a severe illness was unlikely to reoccur, knowing that if they instead had a low deductible they would have had a claim of \$400 which was greater than the extra premium for this coverage. This behavior would be consistent with these individuals viewing insurance as a protective measure. In period 8 there was almost no difference in switching behavior between a moderate and severe illness, possibly because individuals recognized that they had saved considerable money over time by purchasing a high rather than low deductible). When examined across all periods taken together, the differences in percentages were statistically significant using a Chi-Square test ( $p < 0.001$ ). The difference in proportion switching to a low deductible plan was higher for those experiencing an illness in any period except the last one, with the excess switching ranging from 6 to 14%, with a mean (over all periods) of 8.5%.

**TABLE 3****Proportion of buyers who SWITCH policies after no illness and any illness**

Number and % switching after illness

Period	Switch from high deductible (Policy A) to low deductible (Policy B)			Switch from low deductible (Policy B) to high deductible (Policy A)		
	Total	No Illness	Any Illness	Total	No Illness	Any Illness
1	517	347	170	1,050	711	339
	26.1	23.6	31.2*	15.4	17.4	11.2**
2	544	253	291	1,023	458	565
	26.3	21.7	30.2**	11.1	12.5	10.1
3	515	340	175	1,052	716	336
	26.0	22.7	32.6**	11.3	11.7	10.4
4	500	324	176	1,067	704	363
	24.4	22.2	28.4	11.8	12.1	11.3
5	504	341	163	1,063	705	358
	26.4	22.9	33.7**	11.5	11.5	11.5
6	493	319	174	1,074	750	324
	27.8	22.9	36.8***	10.2	11.9	6.5**
7	466	314	152	1,101	743	358
	26.0	21.7	34.9**	10.5	10.8	10.1
8	461	205	256	1,106	490	616
	27.6	23.4	30.9*	11.9	11.2	12.5
9	466	303	163	1,101	766	335
	25.1	25.4	24.5	8.3	8.9	6.9

\*Chi-square test significant at  $p < 0.1$ \*\*Chi-square test significant at  $p < .05$ \*\*\*Chi-square test significant at  $p < 0.001$ 

The right panel of Table 3 shows that among those who purchased low deductible insurance (Policy B) in any given period and experienced no illness, the proportion switching to Policy A in the next period is the same or higher across all periods when compared to those with any illness, except for period 8 (The difference between Policy B initial buyers who switched to a high deductible in period 8 after experiencing no illness or any illness is statistically non-

significant ( $p=.516$ ). When the data from all periods are combined, the difference between the percentage switching to Policy A between No Illness and Any Illness is statistically significant ( $p<0.001$ ) (When each period is considered separately, only periods 1 and 6 are statistically significant). The effect of paying higher premiums but not having an illness and thus not making a claim led to a modest switch to a lower-priced Policy A. Table 4 shows the results of logistic regression analyses to explain the relative risk of next period switching as a function of FEEL and the experience of a loss. If a variable does not affect the odds of switching, its regression coefficient should be unity. The regressions in the left and right panels show that having a high FEEL score compared to a low FEEL score significantly indicates a lower likelihood of switching (i.e., a coefficient less than 1) (R1 in the table) in all periods. Once the FEEL score is in the regression, adding a binary variable for the actual loss experience does not add to the explanatory power of the regression (R2) as shown by the non-significant p-values, except in period 9 for high deductible buyers (left panel). For low deductible buyers (right panel) LOSS as well as FEEL is statistically significant in periods 5, 7 and 8. A person who suffers an illness in period 9 is less likely to maintain their high deductible in period 10, possibly because s/he feels that the illness is less likely to reoccur in the next and last period. Low deductible buyers in periods 5, 7 and 8 who suffered an illness were more likely to switch to a high deductible, perhaps for the same reason). The conclusion from the logit analysis is that emotions alone can often explain which subjects switch insurance policies.

**TABLE 4****Relationship of HIGH FEEL and HIGH FEEL & any illness to SWITCH**

Odds Ratios

<b>Period 1</b>						
High deductible (Policy A) buyers			Low deductible (Policy B) buyers			
	N	HIGH FEEL	ANY ILLNESS	N	HIGH FEEL	ANY ILLNESS
R1	517	0.42***	--	1,050	0.20***	--
R2	517	0.41***	0.97	1,050	0.20***	1.01
<b>Period 2</b>						
	N	HIGH FEEL	ANY ILLNESS	N	HIGH FEEL	ANY ILLNESS
R1	544	0.48***	--	1,023	0.33***	--
R2	544	0.52**	1.14	1,023	0.29***	1.24
<b>Period 3</b>						
	N	HIGH FEEL	ANY ILLNESS	N	HIGH FEEL	ANY ILLNESS
R1	515	0.35***	--	1,052	0.35***	--
R2	515	0.34***	0.91	1,052	0.32***	1.27
<b>Period 4</b>						
	N	HIGH FEEL	ANY ILLNESS	N	HIGH FEEL	ANY ILLNESS
R1	500	0.42***	--	1,067	0.38***	--
R2	500	0.40***	0.90	1,067	0.35***	1.30
<b>Period 5</b>						
	N	HIGH FEEL	ANY ILLNESS	N	HIGH FEEL	ANY ILLNESS
R1	504	0.40***	--	1,063	0.31***	--
R2	504	0.41***	1.04	1,063	0.25***	1.63**
<b>Period 6</b>						
	N	HIGH FEEL	ANY ILLNESS	N	HIGH FEEL	ANY ILLNESS
R1	493	0.42***	--	1,074	0.30***	--
R2	493	0.53**	1.44	1,074	0.32***	0.79
<b>Period 7</b>						
	N	HIGH FEEL	ANY ILLNESS	N	HIGH FEEL	ANY ILLNESS
R1	466	0.26***	--	1,101	0.26***	--
R2	466	0.25***	0.95	1,101	0.21***	1.68**
<b>Period 8</b>						

	N	HIGH FEEL	ANY ILLNESS	N	HIGH FEEL	ANY ILLNESS
R1	461	0.33***	--	1,106	0.35***	--
R2	461	0.32***	0.94	1,106	0.24***	1.90**

### Period 9

	N	HIGH FEEL	ANY ILLNESS	N	HIGH FEEL	ANY ILLNESS
R1	466	0.52**	--	1,101	0.29***	--
R2	466	0.38***	0.58**	1,101	0.28***	1.16

\*Chi-square test significant at  $p < 0.1$

\*\*Chi-square test significant at  $p < .05$

\*\*\*Chi-square test significant at  $p < 0.001$

## Conclusion

Our results suggest that for many (though by no means all) individuals, changes in the choice of insurance deductible plans are not based on rational tradeoffs between premium costs and risk-reduction benefits. Many individuals appear to switch from one deductible plan to another if they have regrets about their insurance purchase decision in that period. Those who had previous experience with an illness are more likely to maintain the same insurance policy over time. The experiment indicates that some people do change their insurance coverage in response to previous-period loss experience even though they are told that a past loss experience does not affect the probability of future losses so that this behavior cannot pay off.

The most popular plans on the Affordable Care Act (“Obamacare”) exchanges are the two high deductible (Bronze and Silver) plans. About half of our respondents made consistent choices over all periods. But the evidence that many people did respond irrationally by changing plans after loss experience may reduce our confidence in consumer decision making for the entire population.

One limitation of the experiment is that the absence of real monetary payoffs may bias estimates toward zero. Our findings of significant results in many cases are thus robust but we would like if possible to incorporate monetary rewards in a future experiment.

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