# Mediating Conflict in the Lab.

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Preliminary

# Introduction

- An experimental study on the effectiveness of mediation.

- Increasing interest in mediation: families, labor relations, legal disputes, civil and international conflicts.

- Reported increase in mediation services.

- *Mediator*: a third party who wants to minimize conflict but has neither superior information nor enforcement power.

- Controlled lab experiment. Not focussed on psychological mechanisms.

Main question:

*Theory predicts that a benevolent mediator who has neither superior information nor enforcement power can nevertheless strictly increase the probability of a peaceful resolution of conflict.*

- A large literature, theoretical and empirical, debating when the result holds. Here:

- Is this true in the lab?

# The Model

- Hörner, Morelli, Squintani, 2015. As implemented in the lab.

- Two risk-neutral players, 1 and 2, compete for a resource of size 1.

- If they do not agree, the resource shrinks to $1/2 < \theta < 1$, and is divided according to the two players' types, $H$ or $L$:

  $\theta/2$ to each if types are equal;

  $\theta$ to $H$ and 0 to $L$ otherwise.

- Ex ante efficiency corresponds to maximizing the probability of peaceful resolution.

- Players' types are private information and assigned independently.

- Each is $H$ with known probability $q$, $L$ with probability $1 - q$.

- Players attempt to reach agreement via a two-stage game:

  1. A communication stage. Cheap talk
  2. A demand or allocation stage.

- Two procedures:

  1. Unmediated communication.
  2. Mediation.

**Unmediated communication (UC)**

- Knowing one's own type $t$, each player sends to the other player a message $m \in \{s, h, l\}$.

- After messages are sent and received, each player expresses a demand $d \in \{1-\theta, 1/2, \theta, w\}$.

- If neither player chooses $w$ and $d_1 + d_2 \leq 1$, each receives $d_i$.

- If either player chooses $w$, or if $d_1 + d_2 > 1$, war follows: the resource shrinks to $\theta$ and is divided according to the players' types.

## Mediation

- The mediator $M$ wants to maximize the probability of peace.

- $M$ knows $q$ but not the types' realizations.

- Each player sends $M$ a confidential message $m \in \{s, h, l\}$.

- $M$ recommends $r \in \{\{1-\theta, \theta\}, \{1/2, 1/2\}, \{\theta, 1-\theta\}, w\}$.

- If $r = w$ or if either player rejects $r$, war follows: the resource shrinks to $\theta$ and is divided according to the players' types.

- Otherwise, $r$ is implemented.

## The Myerson mediator

If $M$ can commit to $r = w$ with positive probability, then:

**Proposition HMS.** *If $(2\theta - 1) < q < (2\theta - 1)/\theta$, mediation can achieve a strictly higher probability of peace than any equilibrium of the unmediated communication game.*

Note:

- The mediator has no superior information.
- The mediator has no enforcement power.

- The confidentiality of the messages allows the mediator to "obfuscate" the opponent's type, induce $H$ to accept $r = 1/2$, and keep $L$ sincere while holding $w$ lower.

But is the result likely to hold?

$\Longrightarrow$ An experiment

# Note:

- HMS's UC analysis allows for a correlated equilibrium: posits a public correlation device that issues recommendations probabilistically in response to the messages. (Or 2-round direct communication).

- The optimal solution is identical to optimal mediation subject to no-obfuscation.

- Correlated randomization is impossible in the lab.

- The UC performance in the lab should be worse, confirming Prop HMS.

- We also expect more lying:

**Proposition 1.** *Consider any uncorrelated equilibrium of the UG game in which* $d = w$ *is never played. If* $\theta/2 > 1 - \theta$*, then at least one type of player must be lying with strictly positive probability.*

- $d = w$ is weakly dominated by $d = \theta$.

## The Experiment

- $\theta = 0.7$.

- Par1: $q = 1/2$; Par0: $q = 1/3$ (Kept fixed in each session)

  $q = 1/2 \Longrightarrow q > (2\theta - 1)$: Prop HMS applies.

  But if $q = 1/3$, then $q < (2\theta - 1)$.

- Three treatments: UC, HM, CM. (Plus NC - practice rounds).

- CM: HMS's optimal mediation program, posted on a screen:

The Computer Mediator’s plan:

| | | |
|---|---|---|
| $(l, l)$ | → | (50, 50). |
| $(h, l)$ | → | (70, 30) with prob 5/8<br>(50, 50) with prob 3/8. |
| $(h, h)$ | → | (50,50) with prob 1/2<br>Walks Out with prob 1/2. |

If the computer receives a Silent message from a player, it interprets it as either *h* or *l* with equal probability.

$$q = 1/2$$

The Computer Mediator's plan:

$(l, l)$ $\Rightarrow$ (50, 50).

$(h, l)$ $\Rightarrow$ (70, 30) with prob 3/4
Walks Out with prob 1/4.

$(h,h)$ $\Rightarrow$ Walks Out.

If the computer receives a Silent message from a player, it interprets it as either *h* with probability 1/3 or *l* with probability 2/3.

$$q = 1/3$$

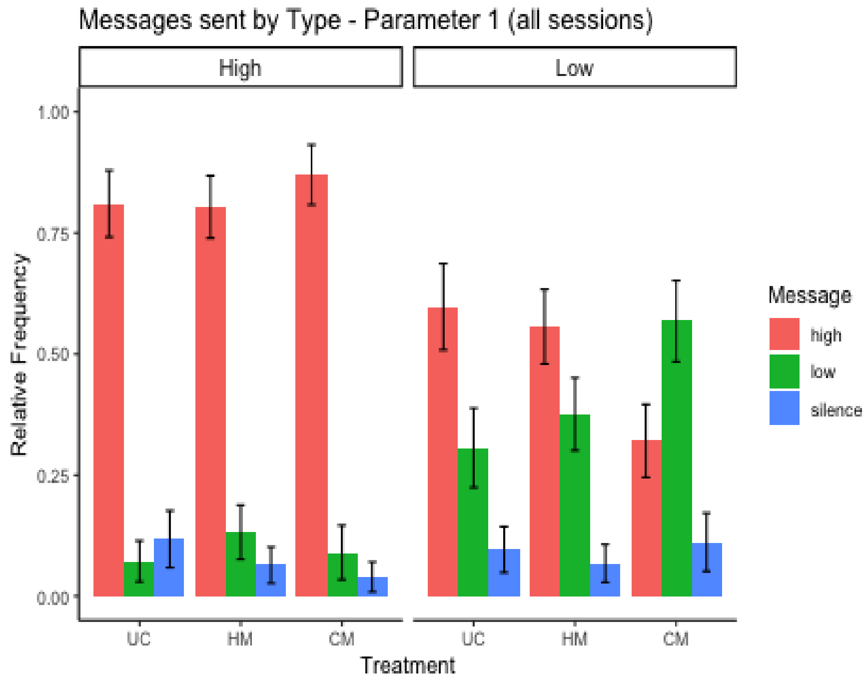
- Two orders: (NC), UC, HM, CM; or (NC), CM, HM, UC.
- ((10)), (20), (30), (20) rounds per treatment; random matching.
- 3 sessions per parametrization per order: 12 sessions.
- 12 subjects per session; 144 subjects in total.
- Hypotheses:

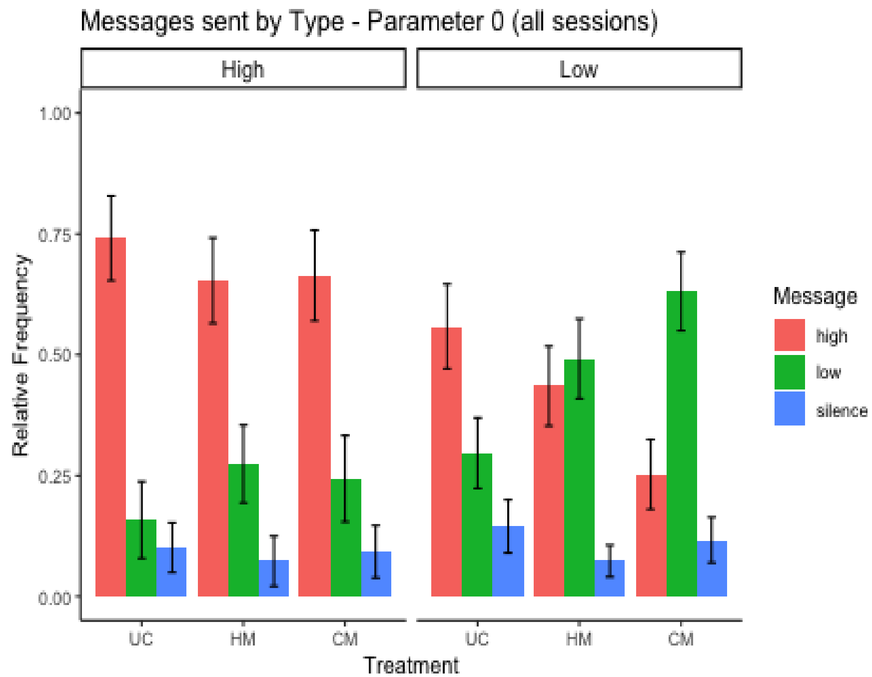
  **1.** CM leads to more truthful reporting than UC.

  **2.** CM leads to more peace than UC.

  **3.** HM?

# L's are more sincere in CM

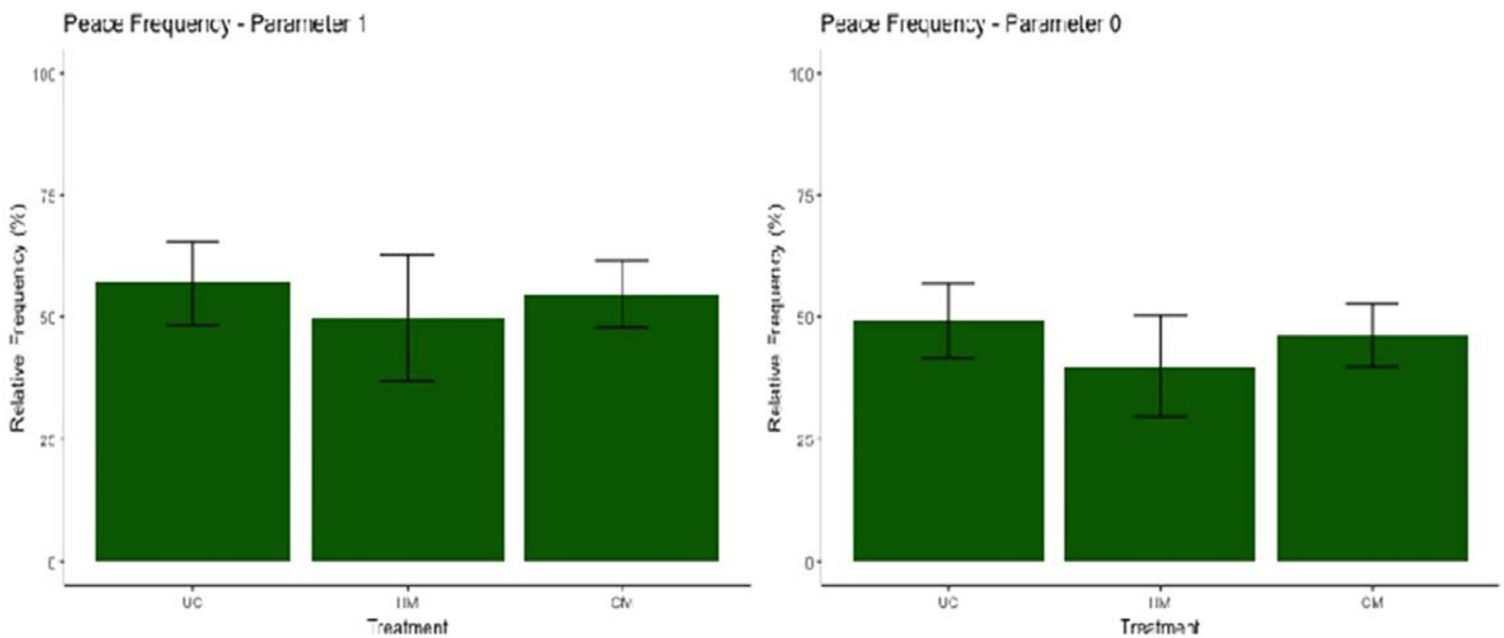



Standard errors are clustered at the individual level.

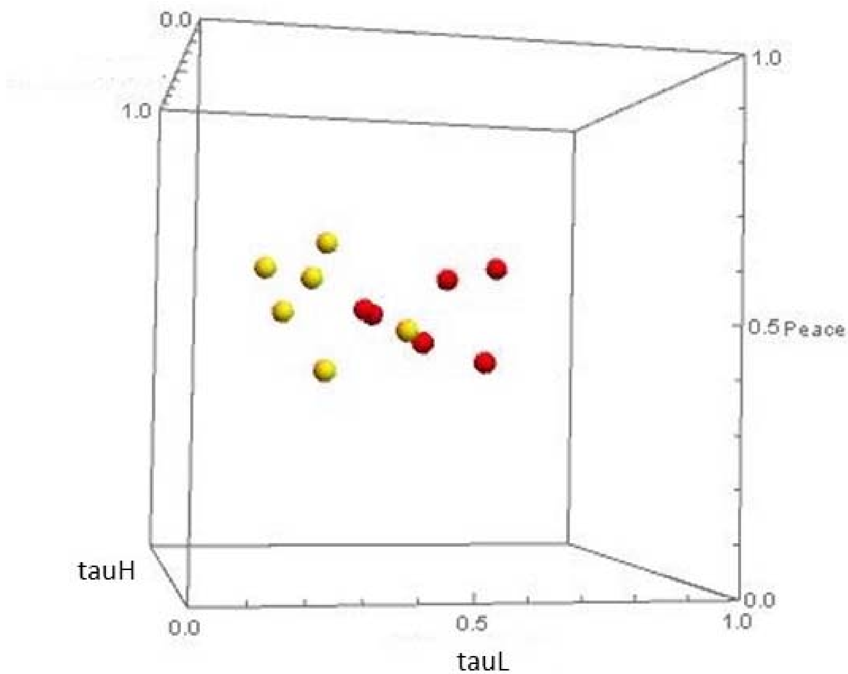
Regressions

## But peace is not higher

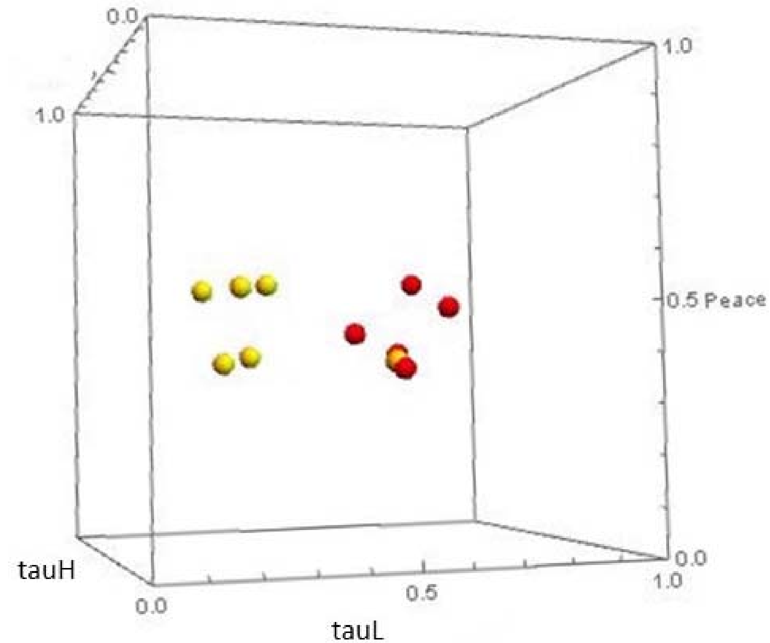



Standard errors are clustered at the session level.

Regressions

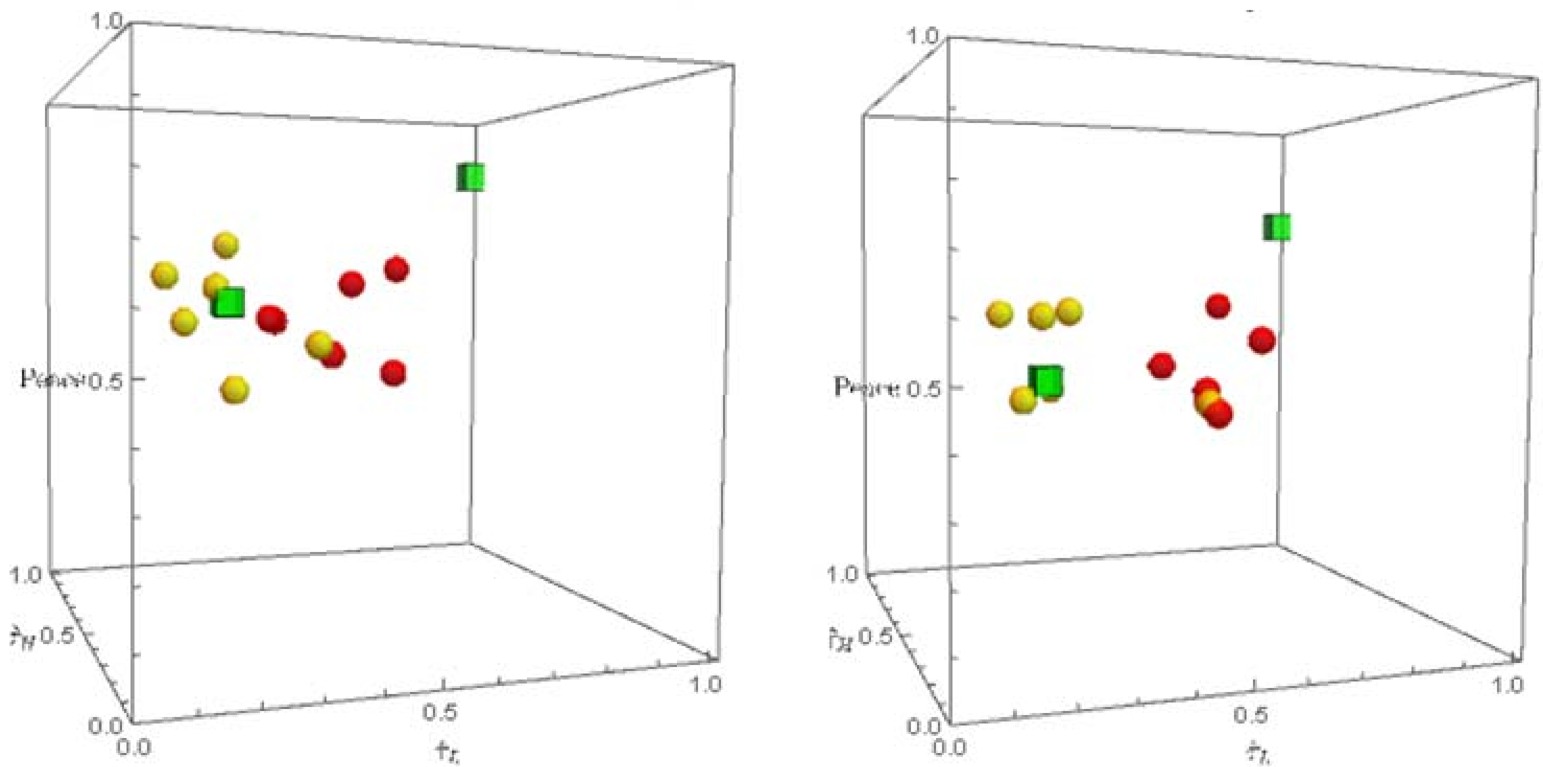



$q = 1/2$




$q = 1/3$

What does the theory say?




Panel A: q=1/2

Panel B: q=1/3

The frequency of peace under CM falls short of the predictions. Why?

## 1. Multiple equilibria

- HMS characterize the "best" equilibrium.

- But keeping fixed the mediator's program, CM has many equilibria.

- We concentrate on equilibria in undominanted strategies where, regardless of message:

  **(i)** all players accept 70;

  **(ii)** $L$ players always accept 50;

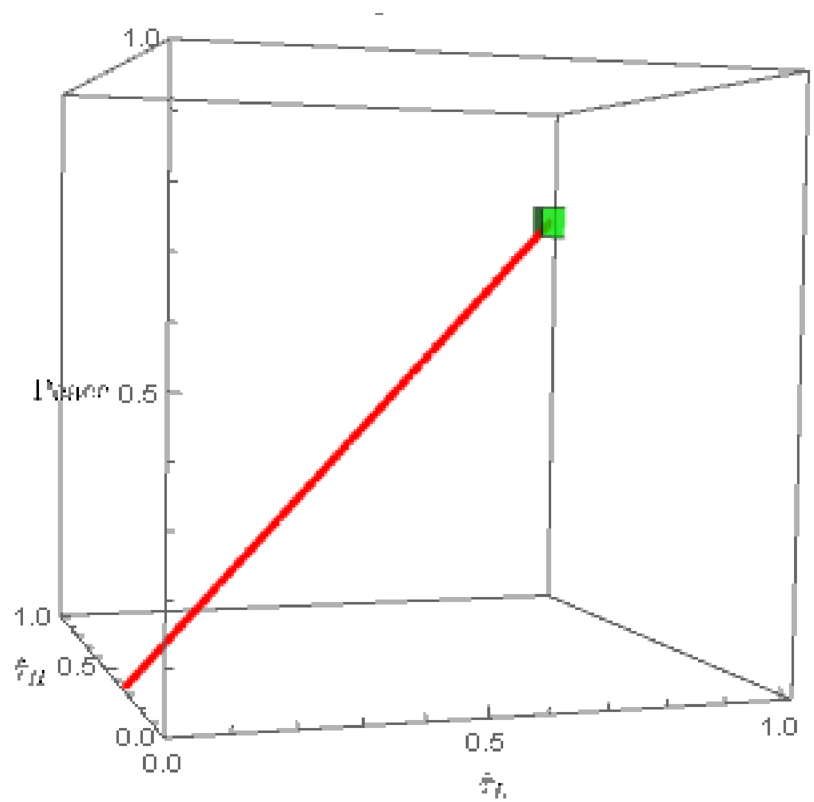
  **(iii)** $H$ players always reject 30.

- The equilibrium strategies to be determined are:

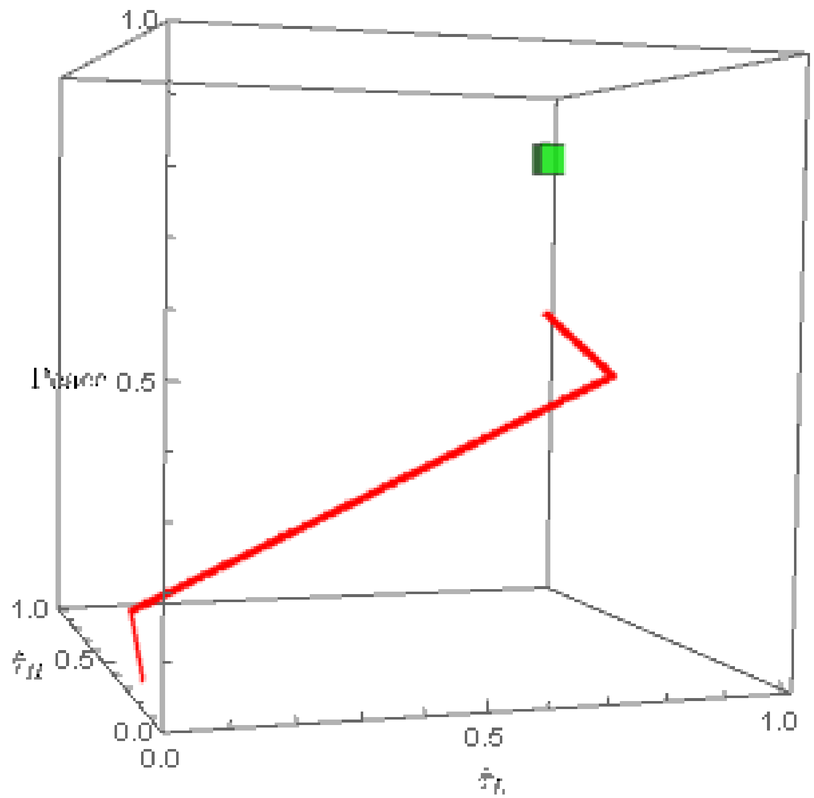
  **(i)** The acceptance strategies of $Hh$ and $Hl$ players offered 50, and of $Ll$ players offered 30;

  **(ii)** The first stage message strategies for both types.

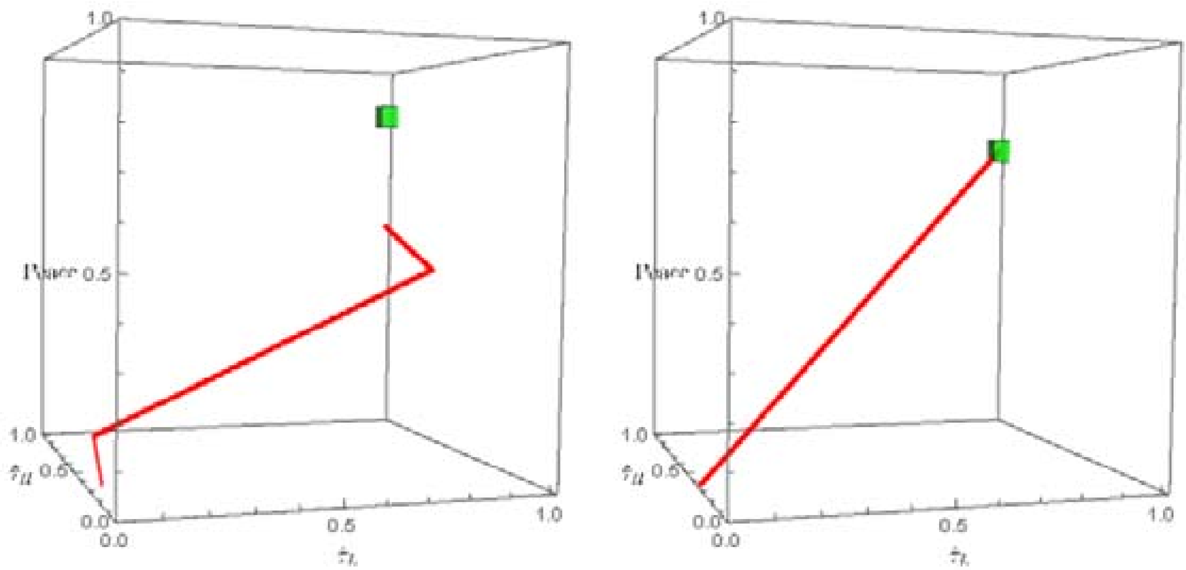
Selecting equilibria not grossly contradicted by the data: $Ll$ accepts 30; $\tau_H \geq \tau_L$.




$q = 1/3$: The cube is the HMS equilibrium.




$q = 1/2$: The cube is the HMS equilibrium.




Panel A: q=1/2        Panel B: q=1/3

- Given the mediation program, equilibrium can support a large range of truthfulness and any peace between 0 and the HMS max.

- With $q = 1/2$, the locus of equilibria is discontinuous around the HMS equilibrium.

Call $\alpha_h$ the prob that an $Hh$ player accepts 50.

**Proposition 2**. *Suppose* $(2\theta - 1)/\theta > q > (2\theta - 1) > 0$. *Then*:

**(i)** $\alpha_h = 1 \Longrightarrow \{\tau_H = 1, \tau_L = 1\}$.

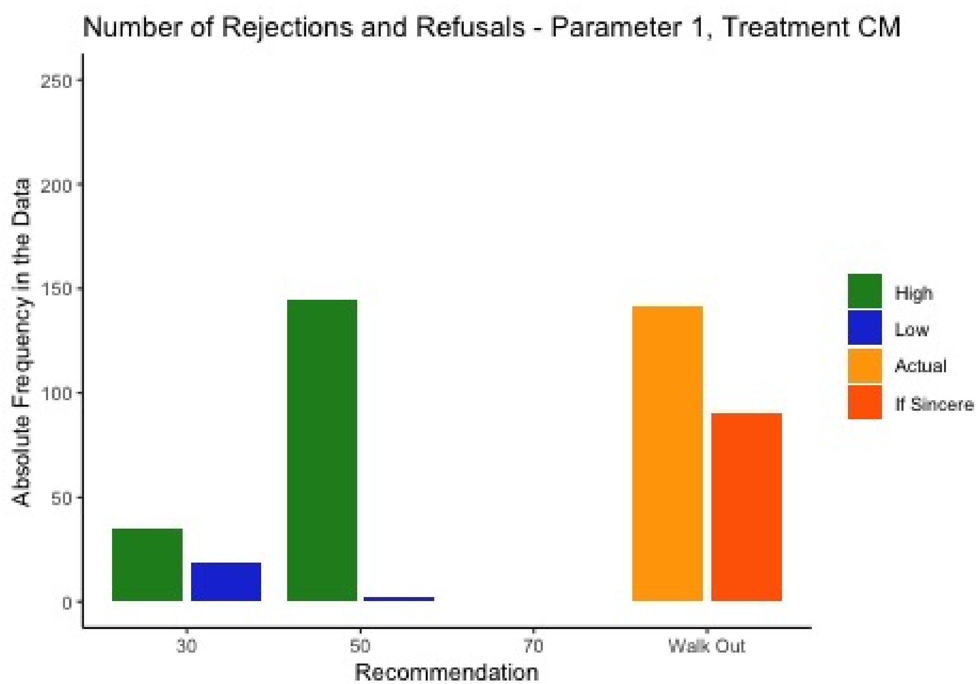
**(ii)** *If either* $\tau_H < 1$ or $\tau_L < 1$, *then* $\alpha_h = 0$.

**(iii)** $\{\tau_H = 1, \tau_L = 1\} \not\Rightarrow \alpha_h = 1$.

$$\Delta_{Hh}(1/2) = (1/2 - \theta/2)[\Pr(j \text{ is } H \text{ and } h_j \,|1/2, h_i)\alpha_h +$$

$$+ \Pr(j \text{ is } H \text{ and } l_j \,|1/2, h_i)\alpha_l] + (1/2 - \theta)\Pr(j \text{ is } L \,|1/2, h_i)$$

$\Longrightarrow$ *Full sincerity is necessary but not sufficient for* $Hh$ *accepting* 50.



- The discontinuity does not exist in the absence of obfuscation (the IR constraints are slack or bind trivially).

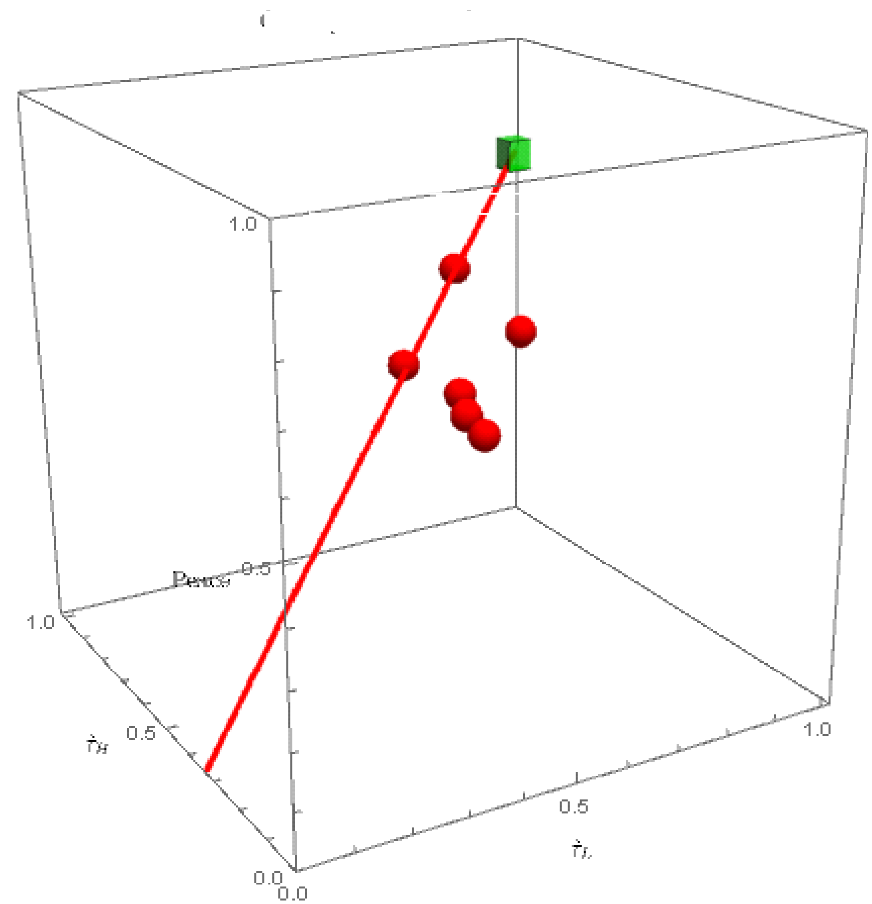
- Obfuscation is at the heart of mediation's superior effectiveness.

- But the equilibrium with obfuscation is fragile: it can only hold if both $H$ and $L$ types are fully sincere.

- With $q = 1/3$, optimal mediation has no obfuscation, and the locus of equilibria has no discontinuity at $\{\tau_L = 1, \tau_H = 1\}$.

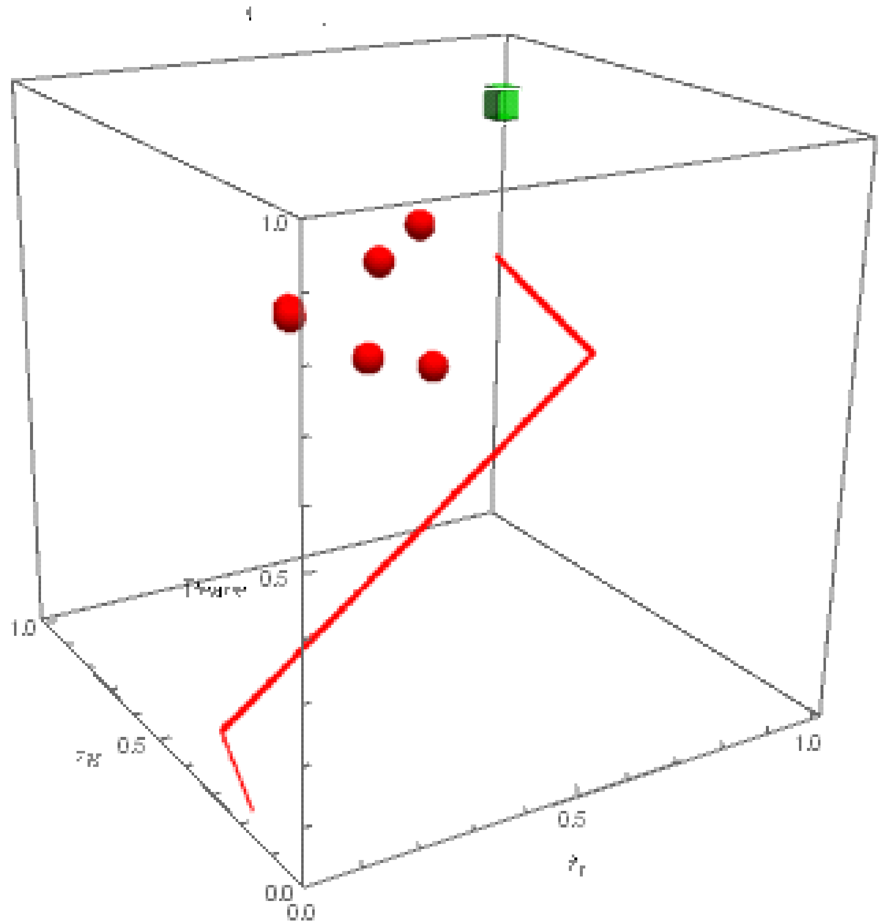
- But it is steep and peace falls rapidly as sincerity decreases.

## 2. Deviations from equilibrium



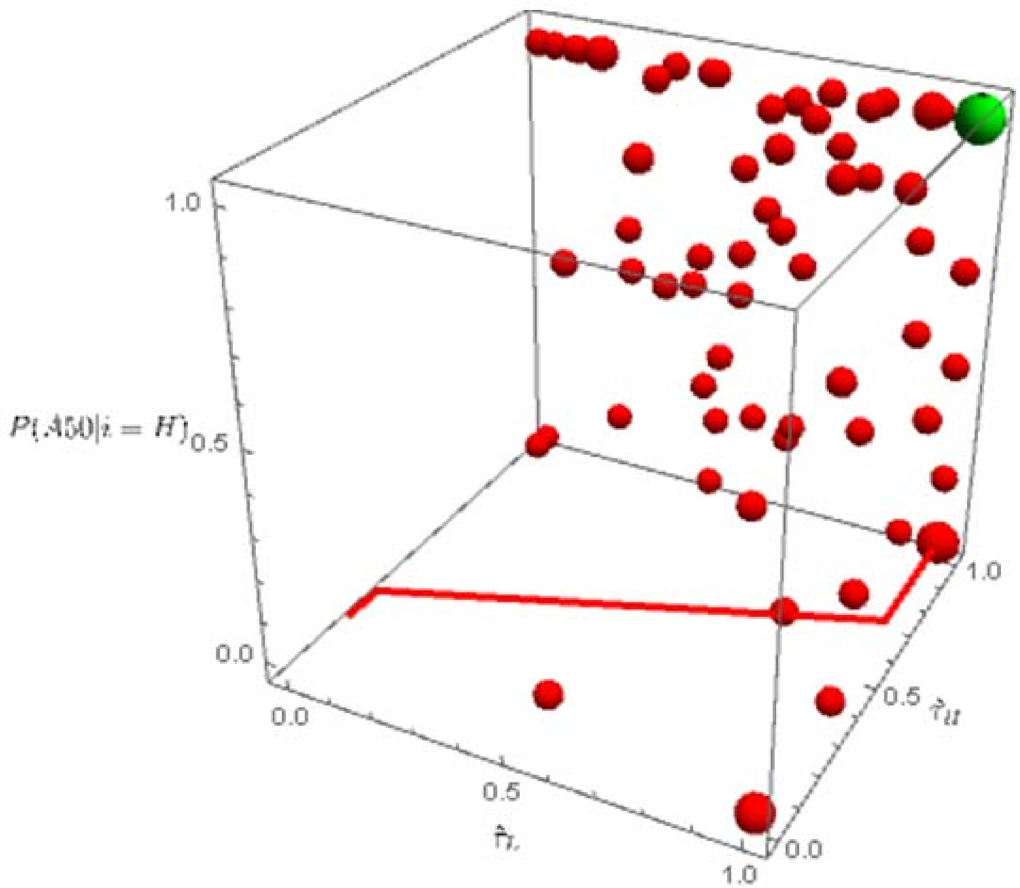

Animation

- Under $q = 1/3$, deviations are due mostly to the imperfect sincerity (especially for $H$'s who then reject the offer).



Animation

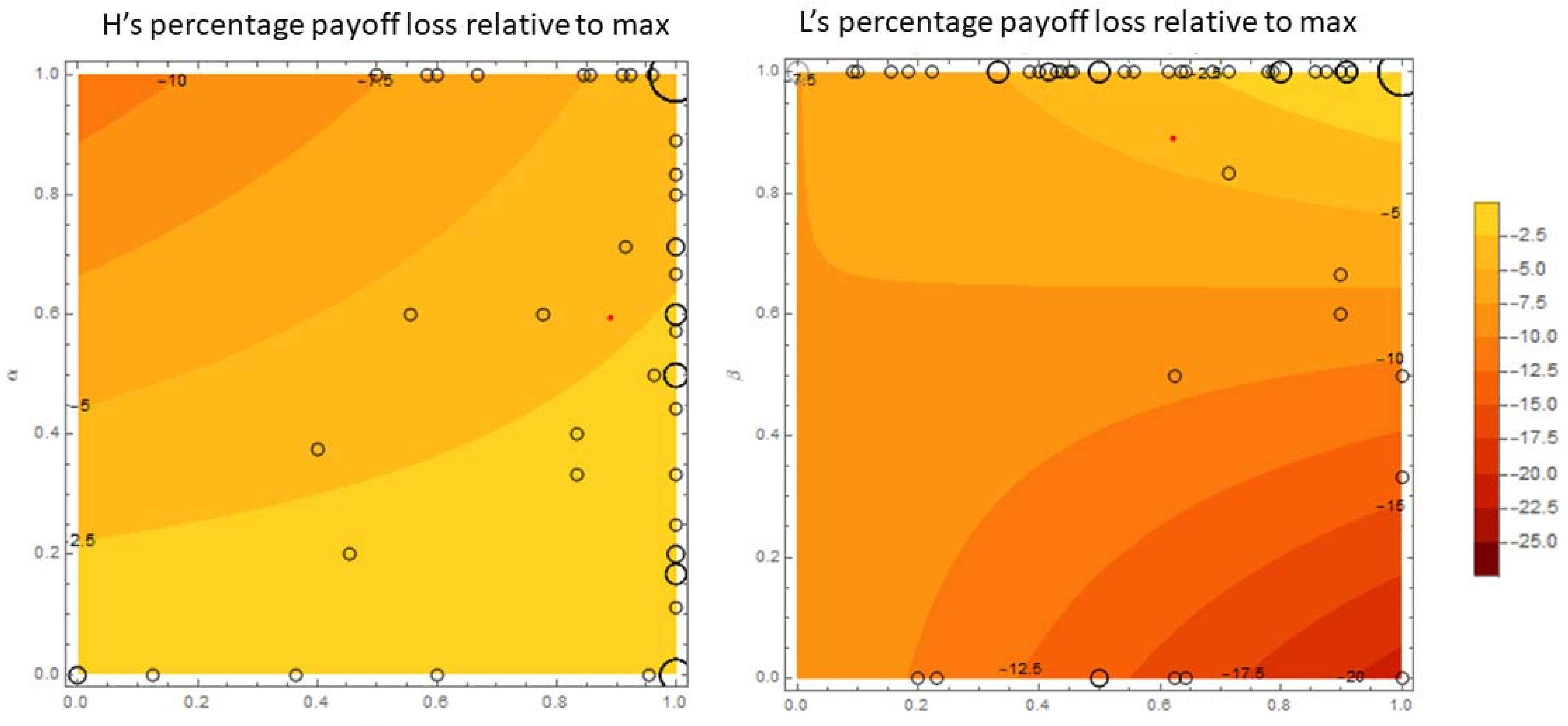
- Under $q = 1/2$, deviations are due mostly to *higher* sincerity and compliance by $H$'s.




Animation

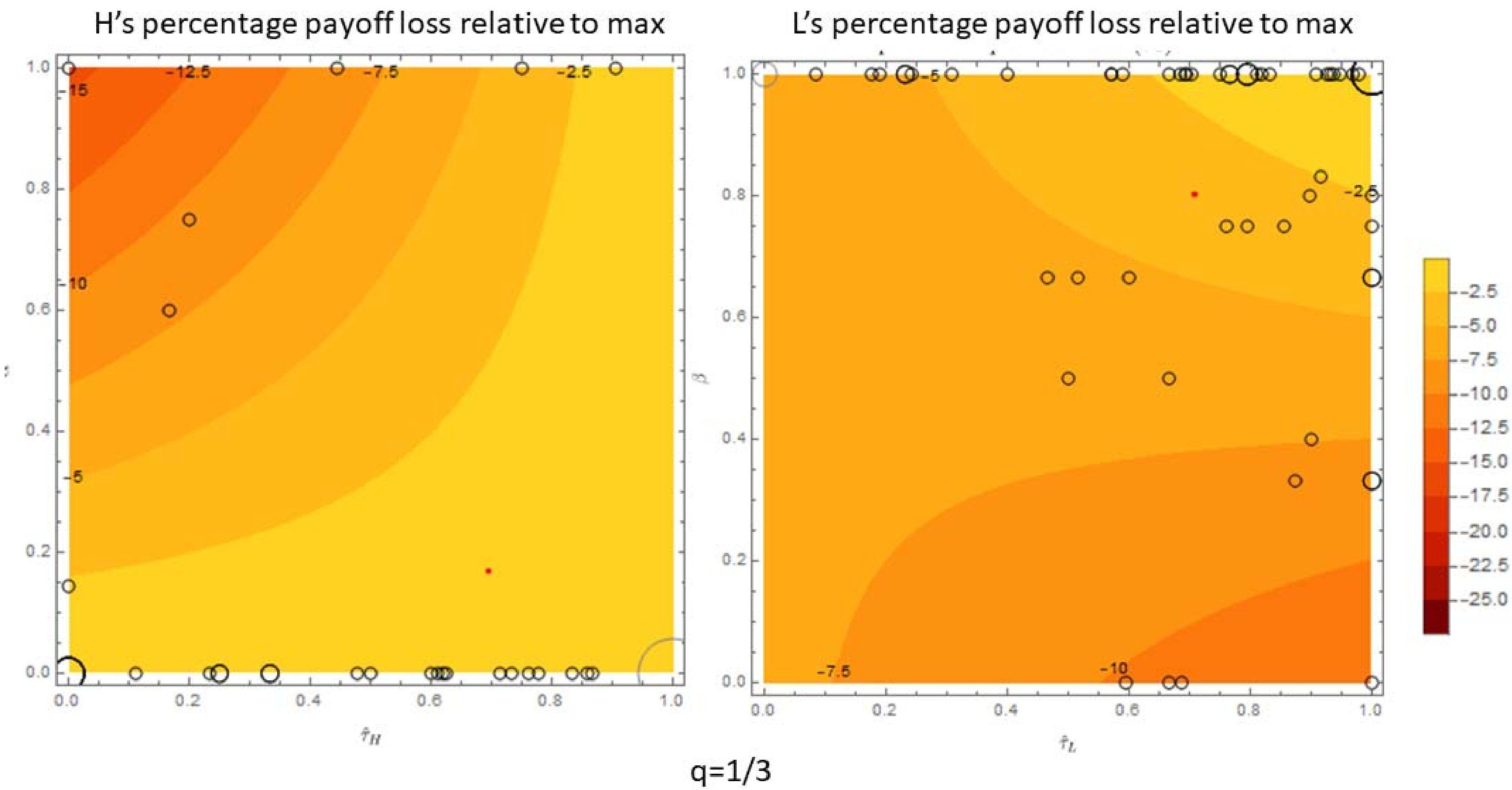
- How costly are these deviations?

# 3. Deviations are not very costly




q=1/2

- $q = 1/2$. 93% of $H$'s and 74% of $L$'s lose less than 5%.
- Note: For $H$, the incentive constraints are not satisfied.




- $q = 1/3$. 92% of $H$'s and 64% of $L$'s lose less than 5%; 85% of $L$'s lose less than 7.5%.

- Note: The incentive constraints are satisfied for both types.

## Conclusions

- In our experiment, mediation falls short of its promise.

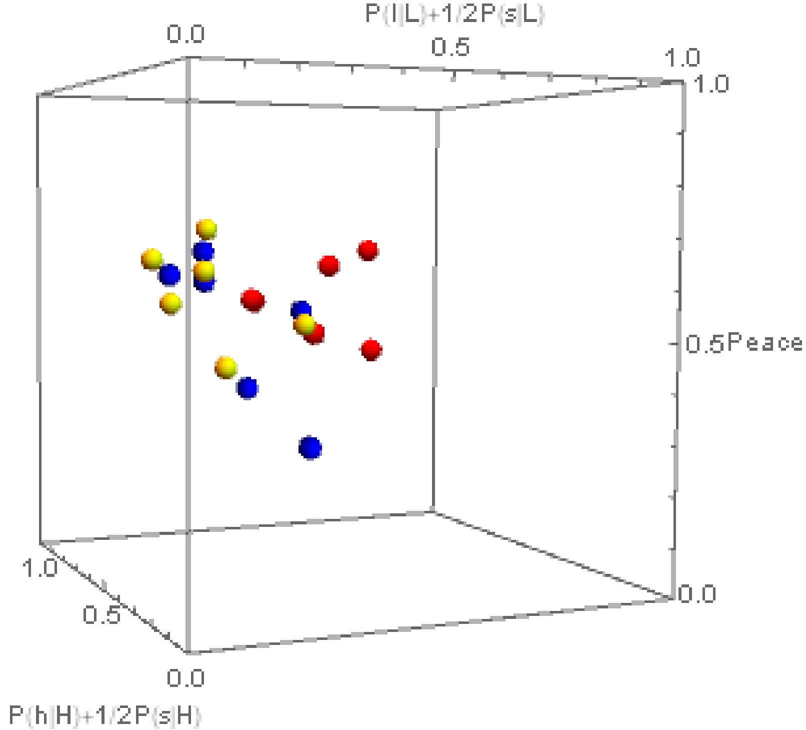
- We see in the theory and in the lab the fragility of the obfuscation equilibrium:

  **(i)** Discontinuity around the HMS equilibrium if the mediation program includes obfuscation. Not otherwise.

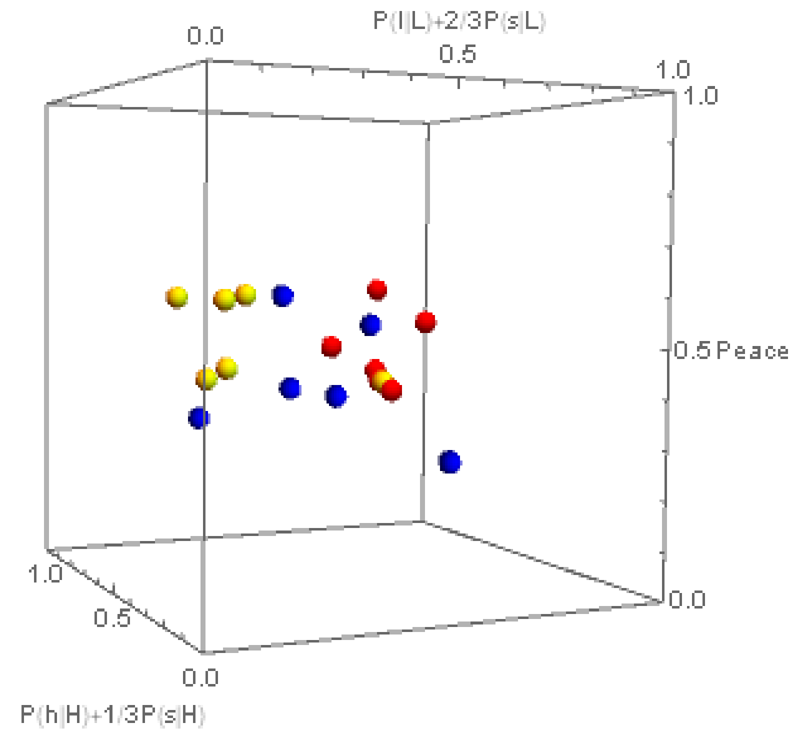
  **(ii)** In the data, compliance and sincerity are best responses for $H$ if the mediation program does *not* include obfuscation. Not otherwise.

- Both mediation programs, with and without obfuscation, fall short of their best theoretical promise. Incentives not steep enough?

- HM?




All data. $q = 1/2$




All data. $q= 1/3$

Table 1: Sincerity

| | *Dependent variable:* | |
|---|---|---|
| | IsHonest | |
| | *Linear Model* | *Probit Model* |
| | (1) | (2) |
| TreatmentHM | $-0.039$ | $-0.139^{**}$ |
| | (0.028) | (0.058) |
| TreatmentCM | 0.005 | 0.019 |
| | (0.034) | (0.058) |
| Order2 | 0.009 | 0.038 |
| | (0.040) | (0.047) |
| Parameter1 | $0.142^{***}$ | $0.466^{***}$ |
| | (0.042) | (0.047) |
| TypeLow | $-0.354^{***}$ | $-0.877^{***}$ |
| | (0.082) | (0.091) |
| Period | $0.002^{***}$ | $0.006^{***}$ |
| | (0.001) | (0.001) |
| TreatmentHM:TypeLow | $0.181^{***}$ | $0.519^{***}$ |
| | (0.042) | (0.073) |
| TreatmentCM:TypeLow | $0.298^{***}$ | $0.772^{***}$ |
| | (0.055) | (0.074) |
| Order2:TypeLow | $-0.025$ | $-0.072$ |
| | (0.062) | (0.060) |
| Parameter1:TypeLow | $-0.198^{***}$ | $-0.616^{***}$ |
| | (0.063) | (0.060) |
| TypeLow:Period | $-0.0002$ | $-0.002$ |
| | (0.001) | (0.001) |
| Constant | $0.611^{***}$ | $0.227^{***}$ |
| | (0.057) | (0.071) |
| Observations | 8,640 | 8,640 |
| $R^2$ | 0.158 | |
| Adjusted $R^2$ | 0.157 | |
| Log Likelihood | | $-5{,}150.925$ |
| Akaike Inf. Crit. | | 10,325.850 |
| Residual Std. Error | 0.453 (df = 8628) | *Note:* |
| *Note:* | $^{*}$p<0.1; $^{**}$p<0.05; $^{***}$p<0.01 | |

Table 3: Peace

| | *Dependent variable:* | |
|---|---|---|
| | IsPeace | |
| | (1) | (2) |
| TreatmentHM | $-0.082^{***}$ | $-0.085^{***}$ |
| | (0.020) | (0.018) |
| TreatmentCM | $-0.025$ | $-0.019$ |
| | (0.020) | (0.018) |
| Order2 | 0.005 | 0.012 |
| | (0.018) | (0.016) |
| Parameter1 | $0.087^{***}$ | $0.186^{***}$ |
| | (0.018) | (0.016) |
| PairTypeHigh-Low | | $0.293^{***}$ |
| | | (0.018) |
| PairTypeLow-Low | | $0.606^{***}$ |
| | | (0.018) |
| Round | $0.001^{***}$ | $0.001^{***}$ |
| | (0.0004) | (0.0003) |
| Constant | $0.435^{***}$ | 0.042 |
| | (0.026) | (0.026) |
| Observations | 4,320 | 4,320 |
| $R^2$ | 0.015 | 0.191 |
| Adjusted $R^2$ | 0.013 | 0.190 |
| Residual Std. Error | 0.497 (df = 4314) | 0.450 (df = 4312) |
| *Note:* | | $^{*}$p<0.1; $^{**}$p<0.05; $^{***}$p<0.01 |

Table 2: Silence

| | *Dependent variable:* | |
|---|---|---|
| | IsSilent | |
| | *Linear model* | *probit* |
| | (1) | (2) |
| TreatmentHM | −0.042** | −0.197** |
| | (0.020) | (0.078) |
| TreatmentCM | −0.049** | −0.216*** |
| | (0.021) | (0.079) |
| Order2 | −0.069*** | −0.455*** |
| | (0.025) | (0.066) |
| Parameter1 | −0.015 | −0.125** |
| | (0.026) | (0.063) |
| TypeLow | −0.029 | −0.181* |
| | (0.039) | (0.106) |
| Period | −0.001*** | −0.008*** |
| | (0.0004) | (0.002) |
| TreatmentHM:TypeLow | −0.012 | −0.116 |
| | (0.021) | (0.099) |
| TreatmentCM:TypeLow | 0.038 | 0.187* |
| | (0.028) | (0.098) |
| Order2:TypeLow | 0.018 | 0.162** |
| | (0.021) | (0.082) |
| Parameter1:TypeLow | −0.005 | 0.007 |
| | (0.022) | (0.080) |
| TypeLow:Period | 0.001 | 0.005*** |
| | (0.001) | (0.002) |
| Constant | 0.212*** | −0.681*** |
| | (0.041) | (0.083) |
| | | Observations |
| Observations | 8,640 | 8,640 |
| $R^2$ | 0.024 | |
| Adjusted $R^2$ | 0.022 | |
| Log Likelihood | | −2,577.875 |
| Akaike Inf. Crit. | | 5,179.750 |
| Residual Std. Error | 0.288 (df = 8628) | *Note:* |
| *Note:* | | *p<0.1; **p<0.05; ***p<0.01 |