Deception: The Role of Guilt*

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October 19, 2012

Abstract

Gneezy (2005) reports evidence indicating that in some settings people do not like to lie. In many other situations people do not suffer when they lie. We show that the theory of simple guilt can accommodate these observations.

1 Introduction

Gneezy (2005) reports intriguing experimental evidence indicating that people do not like to lie. His subjects deceive only if they thereby gain a lot, or impose little loss.

At first glance one might think a simple cost of lying is involved. However, as a general proposition about human motivation that cannot be, since there are situations where people habitually lie without remorse. We propose that examples can be drawn from used car sales, promises made by politicians, tax returns sent to the IRS, testimony in traffic courts (under oath!), and game shows like *Survivor*. A particularly clear specific illustration can be taken from the world of poker, where millions of dollars are at stake in televised tournaments:

*We thank Ernst Fehr for encouraging us to explore if guilt aversion could explain Gneezy's data, and Olof Johansson-Stenman, Peter Martinsson and Simone Cerreia-Vioglio for helpful comments.

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In his book *Bad Beats and Lucky Draws*, Phil Hellmuth, Jr. (2005, p. 34) describes a Texas Hold'Em game in which he held 10♡-6♡. He ended up not having to show his cards. Another player (Johnny Chan) said: "I thought you had a pair of sevens and a flush draw." Hellmuth's responded: "Nope, actually I had the 10♢-J♢." This is a lie of commission! One might take Hellmuth to be a type with an unusually low cost of lying. But this is not the case. He writes: "Although I never lie outside of poker, to me, lying about what you just had in a poker hand is part of bluffing. Why give someone a 'free read' on your play?"[1]

We show that Battigalli & Dufwenberg's (2007) (B&D; cf. B&D 2009, Geanakoplos, Pearce & Stacchetti 1989) theory of simple guilt can explain the central tendencies of Gneezy's data, while accommodating other situations where people do not suffer when they lie. Sections 2 recalls Gneezy's results, section 3 introduces simple guilt, section 4 describes the fit with data, section 5 comments on how guilt-from-blame (another form of remorse) would apply, and section 6 concludes and explains how guilt aversion does not imply cost of lying.

2 Gneezy's experiment

Gneezy studies a two-player "cheap talk sender-receiver" (CTSR) game. There are two options, A and B. Only player 1 is informed of the involved monetary consequences, and then sends one of two messages to player 2:

Message A: "Option A will earn you more money than option B."
Message B: "Option B will earn you more money than option A."

Player 2 must choose between options A and B after getting 1's message. The monetary consequences, known to 1 but not to 2, vary across three treatments as described in Table 1:

[1] Hellmuth is not a unique case. Leading poker texts actively encourage lies, or at least very deceptive use of language and demeanor. For some colorful testimony, we refer to several examples in Doyle Brunson (1978/2002); see *e.g.* pp. 80-1, 88-9, 105-6, 427-8 (the first three of these examples are crafted by "Crazy Mike" Caro).

Treatment	Option	Payoff to Pl. 1	Payoff to Pl. 2
1	A B	5 6	6 5
2	A B	5 6	15 5
3	A B	5 15	15 5

TABLE 1 – Payoffs ($) used in the CTSR game

Message A tells the truth; message B is a lie. Message B was chosen in, respectively, 36%, 17%, and 52% of the cases in treatments 1, 2, and 3.

In order to determine if these results reflect aversion to lying (as opposed to preferences over distributions of payoffs) Gneezy employs three dictator treatments, where player 1 chooses between options A and B and player 2 has no choice. For the CTSR games, Gneezy reports evidence (p. 386) that player 2 followed 1's message in about 80% of the cases, and player 1 expected the message to be followed in about 80% of the cases. To allow comparability, in the dictator games the probability of executing 1's choice was 80% with the dollar consequences as seen in Table 1. If lying were painless, one would expect the frequency of option B choices in the dictator game to match the frequency of message B choices in the CTSR games.

That did not happen. Option B was chosen in, respectively, 66%, 42%, and 91% of the cases, each of which is significantly higher than the corresponding percentage in the CTSR treatments. Gneezy concludes that "it is not only care for others that motivate behavior, but also aversion to lying" (p. 388).

3 Simple Guilt

B&D introduce a theory of guilt aversion, which applies to extensive games with monetary payoffs. The basic idea is that player i suffers from guilt to the extent that he believes that player $j \neq i$ gets a lower (monetary) payoff than i believes j believes she will get.[2] For a two-player game, a psychological utility function of player 1, u_1, can be defined thus:

$$u_1(z, \alpha_2) = \pi_1(z) + \theta_1 \max\{0, \mathbb{E}_{\alpha_2}[\pi_2] - \pi_2(z)\}, \tag{1}$$

where z is the outcome of the game (terminal node reached), $\pi_i(z)$ is the dollar payoff of player i at z, α_2 is player 2's pre-play belief on how the game will be played, $\mathbb{E}_{\alpha_2}[\pi_2]$ is 2's subjective expected payoff calculated using α_2, and θ_1 is an exogenously given positive constant.

We refer to B&D for more discussions about mathematical details, and here concentrate on the interpretation of (1) and its application to Gneezy's games. Eq. (1) says that in a situation of conflict of material interests, like Gneezy's games, the increase in player 1's payoff $[\pi_1(B) - \pi_1(A)] > 0$ may be offset by the guilt cost due to the increase in the disappointment of player 2 caused by his lower payoff

$$\max\{0, \mathbb{E}_{\alpha_2}[\pi_2] - \pi_2(B)\} - \max\{0, \mathbb{E}_{\alpha_2}[\pi_2] - \pi_2(A)\} \geq 0, \tag{2}$$

where inequality (2) is strict if 2 initially expects to get more than $\pi_2(B)$ ($\mathbb{E}_{\alpha_2}[\pi_2] - \pi_2(B) > 0$). The extent of this psychological cost is given by θ_1, which measures 1's sensitivity to guilt. Note that player 1's utility depends on a variable he does not know, the first-order belief α_2 of the co-player. To compute the expected utility of his different courses of action he has to use his second-order beliefs about the first-order beliefs of player 2, $\beta_{1,2}$.

Guilt aversion induces in players a tendency to live up to what they perceive others to expect. Moreover, communication may then move beliefs, motivation, and behavior. For example, if player 1 makes a promise to player 2 this may be credible because if 1 believes 2 believes him he will (being guilt-averse) wish to deliver.

4 Taking simple guilt to data

B&D's guilt aversion theory can be applied to Gneezy's cheap talk game by introducing incomplete information in their framework, because player 2 has no knowledge of the monetary payoffs, he does not even know whether material interests are common or in conflict; he only knows that player 1

[2] This conforms well with findings in social psychology, *e.g.* by Baumeister, Stillwell & Heatherton (1994, 1995).

knows them (cf. B&D 2009, Section 6.2). But the CTSR game situation is sufficiently simple that it can be formally described by introducing a few compelling assumptions and belief-dependent variables.

From the point of view of player 2 (henceforth *receiver*) the pair of dollar payoff functions is an unknown $\pi^t = (\pi_1^t, \pi_2^t) \in \mathbb{R}_+^{\{A,B\}} \times \mathbb{R}_+^{\{A,B\}}$ determined by a treatment parameter $t \in T$ observed only by player 1 (*sender*),[3] who chooses the message $m \in \{m^A, m^B\}$ as a function of the observed value of t. The size of set $\{(\pi_1^t, \pi_2^t) : t \in T\} \subset \mathbb{R}_+^{\{A,B\}} \times \mathbb{R}_+^{\{A,B\}}$ reflects the ignorance of player 2 and we assume it is large, see Assumptions 1, 2. According to B&D's theory, the receiver has a first-order belief $\alpha_{2,1} \in \Delta(T \times S_1)$, where $S_1 = \{m^A, m^B\}^T$ is the set of cheap talk strategies of the sender.[4] The plan of the receiver on how to play the game can be represented as a belief about his own strategy $\alpha_{2,2} \in \Delta(S_2)$, where $S_2 = \{A, B\}^{\{m^A, m^B\}}$. Without loss of generality we assume that $\alpha_{2,2}$ assigns probability one to a pure strategy. In particular, we focus on two pure strategies of the receiver: the "Yes-man" or trusting strategy $Y = (A \text{ if } m^A, B \text{ if } m^B)$, and the "contrarian" strategy $N = (B \text{ if } m^A, A \text{ if } m^B)$. The first-order belief $\alpha_2 = \alpha_{2.1} \times \alpha_{2.2} \in \Delta(T \times S_1 \times S_2)$ determines a probability distribution on $T \times \{A, B\}$ and hence a subjective expected payoff $\mathbb{E}_{\alpha_2}[\pi_2]$. We let $\Pi_2^Y = \mathbb{E}_{\alpha_{2,1} \times Y}[\pi_2]$ denote the receiver's expected payoff if he plans to trust the sender; similarly, $\Pi_2^N = \mathbb{E}_{\alpha_{2,1} \times N}[\pi_2]$ denotes his expected payoff if he plans to do the opposite of what the sender suggests. Symmetry considerations and a principle of insufficient reason suggest the following assumptions about first and second-order beliefs:

Assumption 1 *The first-order beliefs of the receiver about payoffs and the sender, $\alpha_{2,1}$, are independent of t and such that the expected payoff from strategy Y (resp. strategy N) conditional on the received message $m \in \{m^A, m^B\}$ is well defined and independent of m, hence equal to Π_2^Y (resp. Π_2^N). Therefore strategy Y (resp. N) is the unique best response if and only if $\Pi_2^Y > \Pi_2^N$ (resp. $\Pi_2^N > \Pi_2^Y$).*

Assumption 2 *The second-order beliefs of the sender about the receiver,*

[3] The set of functions with domain X and range Y is denoted by X^Y. It is common knowledge that payoffs (gross of show up fee) in experiments cannot be negative. Hence it is common knowledge that in the CTSR game $\pi_i^t \in \mathbb{R}_+^{\{A,B\}}$, $i = 1, 2$.

[4] We can think of $\alpha_{2,1}$ as the marginal of an extended belief $\bar{\alpha}_{2,1} \in \Delta(T \times \Theta_1 \times S_1)$ that also encompasses the guilt type of player 1. But this is not necessary here.

$\beta_{1,2}$,[5] *are independent of* t *and such that the sender believes that (i) Assumption 1 holds, (ii) the receiver is subjectively rational, i.e. he best responds to his beliefs* $\alpha_{2,1}$*, (iii)* (Π_2^Y, Π_2^N) *(a feature of the receiver's belief* $\alpha_{2,1}$*) is continuously distributed with support* $[0, \bar{\Pi}]^2$ *where* $\bar{\Pi} > 15$*, (iv) the probability that* $\Pi_2^Y \geq \Pi_2^N$ *is more than 50%:* $\mathbb{P}_{\beta_{1,2}}[\Pi_2^Y \geq \Pi_2^N] > 0.5$.

With this, we can express the expected utility of type θ_1 from sending message m^z ($z \in \{A, B\}$) given treatment t in a relatively simple form:

$$U_z^t(\theta_1) = [\pi_1^t(z) - \theta_1 D^Y(\pi_2^t(z))]P^Y + [\pi_1^t(z') - \theta_1 D^N(\pi_2^t(z'))](1 - P^Y). \quad (3)$$

where $z, z' \in \{A, B\}$, $z \neq z'$, $P^Y = \mathbb{P}_{\beta_{1,2}}[\Pi_2^Y \geq \Pi_2^N] > 0.5$ is the probability of the trusting strategy Y,[6] $D^Y(x) = \mathbb{E}_{\beta_{1,2}}[\max\{0, \Pi_2^Y - x\} | \Pi_2^Y \geq \Pi_2^N]$ is the expected disappointment of a trusting receiver if he gets x dollars, and $D^N(x) = \mathbb{E}_{\beta_{1,2}}[\max\{0, \Pi_2^N - x\} | \Pi_2^Y < \Pi_2^N]$ is the expected disappointment of a contrarian receiver if he gets x dollars. Of course, all these probabilities and expectations depend on the second-order beliefs of the sender, $\beta_{1,2}$, but we do not make it explicit in eq. (3) to simplify the notation. The following assumption simplifies the analysis (and is in line with the evidence reported in section 2):[7]

Assumption 3. *The sender expects that, on average, trusting and contrarian receivers are equally disappointed by any payoff in the relevant range, that is,* $D^Y(x) = D^N(x)$ *for each* $x \in [0, \bar{\Pi}]$.

Letting $D(x)$ denote the common expectation of the sender of the disappointment of trusters and contrarian receivers, the expected utility gain from lying can be expressed as follows:

$$U_B^t(\theta_1) - U_A^t(\theta_1) = [\pi_1^t(B) - \pi_1^t(A) - \theta_1(D(\pi_2^t(B)) - D(\pi_2^t(A)))](2P^Y - 1). \quad (4)$$

The disappointment of the receiver when he gets x dollars, $\max\{0, \Pi_2 - x\}$, is decreasing and convex in x. The sender's expectation of this disappointment, $D(x)$, is the integral of $\max\{0, \Pi_2 - x\}$ with respect to the unknown

[5] By Assumption 1, the initial beliefs of player 2 determine his beliefs conditional on each message. Therefore here we can model α_2 as a point in $\Delta(T \times S_1 \times S_2)$ and $\beta_{2,1}$ as a point in $\Delta(S_2 \times \Delta(T \times S_1 \times S_2))$.

[6] By Assumption 2, the probability that the receiver is indifferent is zero, therefore $\mathbb{P}_{\beta_{1,2}}[\Pi_2^Y \geq \Pi_2^N] = \mathbb{P}_{\beta_{1,2}}[\Pi_2^Y > \Pi_2^N]$.

[7] Our qualitative results hold under more general assumptions about second-order beliefs.

expectation Π_2, given second-order beliefs $\beta_{1,2}$. Therefore, also $D(x)$ must be decreasing and convex. Our assumptions about the second-order beliefs of the sender imply that these properties hold strictly (see the Appendix):

Lemma 1 *The expected disappointment $D(x)$ is strictly decreasing and strictly convex on $[0, \bar{\Pi}]$.*

Corollary 2 *For each $x \in [0, \bar{\Pi})$, the incremental ratio $(D(x) - D(x+h))/h$ is strictly decreasing in h on $(0, \bar{\Pi} - x)$.*

Proof Let $\Delta(h) = D(x) - D(x+h)$. By definition $\Delta(0) = 0$. Lemma 1 implies that $\Delta(h)$ is strictly concave. Therefore the incremental ratio $\Delta(h)/h$ is strictly decreasing. $\square$

Now recall that, by Assumption 2, $2P^Y > 1$. Furthermore, $\pi_1^t(A) < \pi_1^t(B)$ and $\pi_2^t(A) > \pi_2^t(B)$ in each treatment $t = 1,2,3$. By Lemma 1, $D(\pi_2^t(B)) - D(\pi_2^t(A)) > 0$ for each $t = 1,2,3$. Therefore the difference in eq. (4) is decreasing in θ_1 and the indifference equation $U_B^t(\theta_1) - U_A^t(\theta_1) = 0$ has a unique and positive solution

$$\hat{\theta}^t = \frac{\pi_1^t(B) - \pi_1^t(A)}{D(\pi_2^t(B)) - D(\pi_2^t(A))}. \tag{5}$$

A sender of type θ_1 lies in treatment t if and only if $\theta_1 < \hat{\theta}^t$.

Proposition 3 *Under Assumptions 2-3, the thresholds $\hat{\theta}^1$, $\hat{\theta}^2$, $\hat{\theta}^3$ are ordered as follows: $0 < \hat{\theta}^2 < \hat{\theta}^1 < \hat{\theta}^3$.*

Proof Plugging in eq. (5) the treatments values we have

$$\hat{\theta}^1 = \frac{1}{D(5) - D(6)}, \; \hat{\theta}^2 = \frac{1}{D(5) - D(15)}, \; \hat{\theta}^3 = \frac{10}{D(5) - D(15)}.$$

Lemma 1 yields

$$0 < \frac{1}{D(5) - D(15)} < \frac{1}{D(5) - D(6)}.$$

Corollary 2 yields

$$\frac{1}{D(5) - D(6)} < \frac{10}{D(5) - D(15)}.$$

□

To obtain predictions about the frequency of lies we have to postulate a distribution of guilt sensitivity and second-order beliefs in the population of (potential) senders.

Assumption 4 *Guilt sensitivity* θ_1 *and second-order beliefs* $\beta_{1,2}$ *are independently distributed, and the cumulative distribution function of* θ_1, $G : \mathbb{R}_+ \to [0,1]$, *is continuous and strictly increasing.*

The independence assumption is not necessary for our results, but it simplifies the analysis. Let F denote distribution of second-order beliefs $\beta_{1,2}$. The observed frequency of lies in treatment t within a large random sample of senders is approximately

$$F^t(\text{lies}) = \int G(\hat{\theta}^t(\beta_{1,2}))F(\mathrm{d}\beta_{1,2}),$$

where we made explicit the dependence of threshold $\hat{\theta}^t$ on second-order beliefs. Given Assumption 4 about the distribution of guilt sensitivity and second-order beliefs, Proposition 3 yields the qualitative result observed in Gneezy's experiment:

Proposition 4 *Under Assumptions 2-4, the frequencies of lies in treatments 1-3 are as follows:*

$$0 < F^2(\text{lies}) < F^1(\text{lies}) < F^3(\text{lies}) < 1.$$

5 Guilt from blame

Simple guilt models a conscience which is "internalized" in the sense that player i consults his own beliefs of the degree to which he hurts another player j relative to j's expectations. B&D also develop a notion called guilt from blame under which i suffers to the extent that he believes j infers (at the end of the game) that i set out (at the beginning of the game) to hurt j relative to j's expectations. See B&D for formal details. Guilt from blame captures data quite well in some settings – see e.g. Charness & Dufwenberg (2011) – but cannot readily organize Gneezy's data. Under the assumptions of section 4, player 2's inferences regarding the extent to which player 1 set out to hurt player 2 relative to 2's expectations are the same across treatments. If player 1 understands this, guilt from blame predicts the same behavior for 1 in all treatments.

6 Conclusion

Simple guilt provides a psycho-foundation for honesty, in some situations. It presumes that motivation is belief-dependent, in a particular way, and therefore words may move beliefs, motivation, and behavior. For example, Charness & Dufwenberg (2006) report experimental evidence that for these reasons promises may foster trust and cooperation in situations characterized by hidden action (moral hazard).[8] Our take on Gneezy's data is that the assertions about payoffs in the CTSR games have an analogous effect.

Simple guilt can also accommodate Gneezy's observed difference between the CTSR games and his dictator games. As Dufwenberg & Gneezy (2000, section III.B) show, living up to the co-player's expectations can explain choice in dictator games. In the CTSR games, if the forced assertions about elevated payoffs for B boosts B's expectations (and A's expectation of B's expectations) relative to the dictator games, then A will face higher expectation to live up to. This too is analogous to what Charness & Dufwenberg (2006) found, when their games treatments that allowed promises saw raised expectations relative to treatments where pre-play communication was ruled out.

Why does this not imply a cost of lying? While the belief-dependence of guilt allows that communication moves beliefs, it does not have to be that way in all settings. Poker regulars do not take between-deals chit-chat at face value. In our earlier example, Johnny probably expects Phil to lie. Even if the long-run effect (say relative to silence) is to increase Phil's payoff by $\$x$ at Johnny's expense, this is just what Johnny expects. Therefore Phil suffers no remorse.

We propose that other examples where people lie routinely can be understood similarly.

[8] This interpretation is not uncontested. See Ellingsen, Johannesson, Tjøtta & Torsvik (2010), Vanberg (2008), and Ismayilov & Potters (2012) for critical related commentary.

7 Appendix

Proof of Lemma 1 By Assumptions 2-3, there is a density function $\beta : [0, \bar{\Pi}] \to \mathbb{R}$ strictly positive on $(0, \bar{\Pi})$ such that

$$D(x) = \int_0^{\bar{\Pi}} \max\{\Pi_2 - x, 0\}\beta(\Pi_2)\mathrm{d}\Pi_2 = \int_x^{\bar{\Pi}} (\Pi_2 - x)\beta(\Pi_2)\mathrm{d}\Pi_2.$$

To ease notation we write $D(x|\Pi_2) = \max\{\Pi_2 - x, 0\}$. Fix two payoffs $x < y$ in $[0, \bar{\Pi}]$. We first show that $D(x) > D(y)$, hence $D(\cdot)$ is strictly decreasing. Observe that

$$D(x|\Pi_2) - D(y|\Pi_2) = \begin{cases} 0, & \text{if } \Pi_2 \leq x \\ \Pi_2 - x > 0, & \text{if } \Pi_2 \in (x, y) \\ y - x > 0, & \text{if } \Pi_2 > y \end{cases}$$

Therefore

$$D(x) - D(y) = \int_x^{\bar{\Pi}} [D(x|\Pi_2) - D(x|\Pi_2)]\beta(\Pi_2)d\Pi_2 > 0$$

because is $\beta(\Pi_2)$ strictly positive on $(x, \bar{\Pi})$.

For each $\lambda \in (0, 1)$, we let $\bar{x}(\lambda)$ denote the corresponding convex combination of x and y: $\bar{x}(\lambda) = \lambda x + (1 - \lambda)y$. We show that $D(\bar{x}(\lambda)) < \lambda D(x) + (1-\lambda)D(y)$; hence $D(\cdot)$ is strictly convex. First note that $D(x'|\Pi_2) = \max\{\Pi_2 - x', 0\}$ is a convex function of x'. Thus, for each $\Pi_2 \in [0, \bar{\Pi}]$,

$$D(\bar{x}(\lambda)|\Pi_2) \leq \lambda D(x|\Pi_2) + (1 - \lambda)D(y|\Pi_2).$$

Next observe that, for each $\Pi_2 \in (x, \bar{x}(\lambda))$, $D(x|\Pi_2) = \Pi_2 - x > 0$ and $D(\bar{x}(\lambda)|\Pi_2) = 0 = D(y|\Pi_2)$, hence

$$D(\bar{x}(\lambda)|\Pi_2) = 0 < \lambda(\Pi_2 - x) = \lambda D(x|\Pi_2) + (1 - \lambda)D(y|\Pi_2).$$

These inequalities and the fact that $\beta(\Pi_2)$ is strictly positive on the (non-empty) open interval $(x, \bar{x}(\lambda))$ imply

$$\begin{aligned} D(\bar{x}(\lambda)) &= \int_{\bar{x}(\lambda)}^{\bar{\Pi}} D(\bar{x}(\lambda)|\Pi_2)\beta(\Pi_2)d\Pi_2 \\ &< \int_x^{\bar{x}(\lambda)} [\lambda D(x|\Pi_2) + (1 - \lambda)D(y|\Pi_2)]\beta(\Pi_2)d\Pi_2 \\ &\quad + \int_{\bar{x}(\lambda)}^{\bar{\Pi}} [\lambda D(x|\Pi_2) + (1 - \lambda)D(y|\Pi_2)]\beta(\Pi_2)d\Pi_2 \\ &\leq \lambda D(x) + (1 - \lambda)D(y). \end{aligned}$$

□

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