

# The Economics of Faking Ecstasy

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## Abstract

In this paper, lovemaking is modeled as a signaling game. In the act of lovemaking, a man and a woman send each other possibly deceptive signals about their true state of ecstasy. Each has a prior belief about the other's state of ecstasy. These priors are associated with the other's sexual drive, which varies in different ways for men and women over the life-cycle. The model predicts that love, formally defined as a mixture of altruism and possessiveness, increases the probability of faking ecstasy. It also yields different predictions about the probability of faking for men and women of different ages. The predictions are tested with data from the 2000 Orgasm Survey. Besides supporting many of the model's predictions, the data also reveal a positive relationship between education and the tendency to fake. (JEL D82 J16)

“This is the very ecstasy of love.” William Shakespeare, *Hamlet*, Act 2, Scene 1.

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## 1. Introduction

In this paper, we apply economics to study aspects of human sexuality, particularly faking ecstasy in lovemaking. We develop a signaling model of lovemaking that yields interesting and testable predictions about faking behavior. In the model, a man and a woman who are making love send each other possibly deceptive signals about their true state of ecstasy. For example, if one of the partners is not in ecstasy, then he or she may decide to fake it.

The man and woman each have a prior belief about the other's state of ecstasy. These prior beliefs are associated with the other's sexual drive or capacity for sexual response, which varies in different ways for men and women over the life-cycle. Male sex drive is highest during the early twenties and declines steadily into old age, while female sex drive is low during the teens, increases during the twenties, reaches a maximum during the late twenties, and then declines into old age (Mahoney, 1983, p. 45-46, and Kinsey *et al.*, 1968, p.759).<sup>2</sup> Therefore, when a woman is middle-aged, her partner's prior belief that she is in ecstasy during lovemaking may be generally higher than when she is younger or older. On the other hand, when a man is young, his partner's prior belief that he is in ecstasy may be higher than when he is either middle-aged or older. In the model, the man or woman's probability of faking depends on his or her partner's prior belief. Thus, the model yields different predictions about faking behavior for men and women of different ages.

Although men may not be able to fake ejaculation, they may nevertheless be able to fake orgasm. Ejaculation is the propulsion of seminal fluid, while orgasm is the peak feeling during sex. In *Love and Orgasm*, psychiatrist Alexander Lowen, based on his clinical observations, concludes that "...in terms of full satisfaction, the male suffers from orgasmic impotence as

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<sup>2</sup> One explanation is hormones. Levels of the 17-ketosteroids rise sharply in females during the late teens, peak somewhere in the mid twenties, drop sharply until the mid thirties, stay constant until the late fifties, then drop further. On the other hand, the male sex hormone testosterone is at its highest during the late teens and early twenties, then gradually falls over the remainder of a man's lifetime.

much as the female does” (1975, p.56). If male ejaculation and orgasm were completely distinct, then men would have the same capacity to fake orgasm as women do. However, to the extent that they are related, the cost of faking and the probability of being caught faking are greater for men than for women. In the model, this difference in signaling costs between the sexes results in different equilibrium strategies for each sex.

One more factor is crucial in determining the amount of deception between a man and woman: love. “It was the men I deceived the most that I loved the most,” wrote the French author Marguerite Duras (1990, p. 203). But what is love? In the model, love is formally defined as a mixture of altruism and possessiveness. Love is shown to alter the man and the woman’s payoff functions in a way that increases the equilibrium probability of faking, but more so for the woman than for the man.

The model’s predictions are tested on data gathered from the 2000 Orgasm Survey. In the survey, people were directly asked whether or not they had ever faked an orgasm in their current relationship. With such data, the predictions of the model that relate the true type (in ecstasy or not in ecstasy) to the signal (moan or remain silent) are testable. People were also asked about their age and asked questions related to how much altruism they feel toward, and how possessive they are of their partner, allowing us to test the predictions of the model concerning the effects of age and love on the probability of faking. We find that the data support many of the predictions of the model. Faking costs decrease while love increases the estimated probability of faking, and age generally has the predicted effects on the probability of faking for both women and men. In addition, the data reveal an interesting positive relationship between education and the tendency to fake.

The remainder of the paper is organized as follows. Section 2 discusses related economic literature. Section 3 lays out the theoretical model of lovemaking. In section 4, the model is

solved for the cases of no love, medium-intensity mutual love, and strong mutual love, and the resulting testable predictions are highlighted. Section 5 contains a description of the data and variables that are used to test the predictions of the theory. Section 6 contains the empirical model. In section 7, the empirical results are compared with the theory. Section 8 summarizes key findings and concludes.

## 2. Related Literature

This paper is an application to the study of human sexuality of the economic approach to human behavior pioneered by Becker (1976). We postulate that even in intimate relations, people make choices that maximize their expected payoff as they conceive it, whether they be selfish or loving. The resulting model yields testable predictions about how lovemaking behavior depends on the characteristics of individuals and their lovemaking environment.

Surprisingly, applications of economics to human sexuality are sparse. Existing papers include Allen and Brinig (1998) on sex drive and bargaining power within the family, Oettinger (1999) on sex education and teen sexual activity, Rasmusen (2000) and Elmslie and Tebaldi (2008) on adultery, Francis (2008) on homosexuality, and Morrow and Sivan (2007) on strategic interaction in the marketplace for sex. None of the existing papers model signaling aspects of lovemaking, the focus of this study.

The theory of signaling is well developed in economics. Spence (1974) developed the classic model of education as a signal of ability in the job market. Recently, signaling theory has been applied to shed light on a number of other interesting behavioral phenomena, including the “too cool for school” phenomenon (Feltovich, Harbaugh, and To, 2002), the “acting white” phenomenon (Fryer, 2005), and the “false modesty” phenomenon (Harbaugh and To, 2009). However, none of the existing papers have explored the “faking it” phenomenon that

we explore here.

Lastly, note that one of the interesting contributions of the present paper is a formal characterization of love. In economics, love has usually been modeled as altruism. Becker (1974) defined parental love as altruism to derive his famous Rotten Kid Theorem. Bergstrom (1989) defined romantic love as altruism to pose a puzzle about the allocation of spaghetti between lovers. The present paper defines romantic love more generally as a mixture of altruism and possessiveness.

### **3. A Theoretical Model of Lovemaking**

Consider a man, “Adam”, and a woman, “Eve”, who are making love. We model aspects of their interaction through two games. In the first game, denoted  $\Gamma_{Eve}$ , Adam is wondering whether or not Eve is enjoying the lovemaking, i.e., is in ecstasy. Nature starts by choosing whether or not Eve is in ecstasy. The probability that Nature chooses Eve to be in ecstasy is  $a_{Eve} \in [0, 1]$ . Eve then learns whether or not she is in ecstasy and chooses whether to moan or to remain silent. Not knowing whether or not Eve is in ecstasy, but observing whether Eve is moaning or silent, Adam then chooses whether to act as though Eve is in ecstasy (this could involve staying close to or embracing her) or to act as though she is not (this could involve leaving or getting angry at her).

In the second game, denoted  $\Gamma_{Adam}$ , the roles are reversed and Eve is wondering whether or not Adam is in ecstasy. Nature begins by choosing whether or not Adam is in ecstasy. The probability that Nature chooses Adam to be in ecstasy is  $a_{Adam} \in [0, 1]$ . Adam then learns whether or not he is in ecstasy and chooses whether to moan or remain silent. Not knowing whether or not Adam is in ecstasy, but observing whether he is moaning or silent, Eve then chooses whether or not to act as though Adam is in ecstasy. In  $\Gamma_{Eve}$ , Adam is

wondering whether Eve’s moaning is genuine or fake. In the rhetoric of signaling games, Eve is the sender and Adam is the receiver. In  $\Gamma_{Adam}$ , Eve is wondering whether or not Adam’s moaning is fake. Here, Adam is the sender and Eve is the receiver.

We assume that Adam and Eve never remain silent (always moan) when they are in ecstasy and always act as though the other is not in ecstasy if the other remains silent (in other words, there are no quiet orgasms).

We now describe the strategy sets for Adam and Even in  $\Gamma_{Eve}$ . Since Eve always moans when she is in ecstasy, she has only two possible strategies. She can choose to moan when she is not in ecstasy, the *Faking* strategy, or she can choose to remain silent when she is not in ecstasy, the *Honest* strategy. Since Adam always acts as though Eve is not in ecstasy if she remains silent, he also has only two possible strategies. He can choose to act as though Eve is in ecstasy when she is moaning, the *Confident* strategy, or he can choose to act as though Eve is not in ecstasy despite her moaning, the *Insecure* strategy.

Strategies in  $\Gamma_{Adam}$  are identical to those in  $\Gamma_{Eve}$ , only the roles are reversed. Adam chooses between *Faking* and *Honest*, while Eve chooses between *Confident* and *Insecure*.

In  $\Gamma_{Eve}$ , the probability that Eve is in ecstasy,  $a_{Eve}(Age_{Eve})$ , is assumed to depend critically on Eve’s biological age, and in  $\Gamma_{Adam}$ , the probability that Adam is in ecstasy,  $\alpha_{Adam}(Age_{Adam})$ , is assumed to depend critically on Adam’s biological age. As argued in the introduction, the sexual drives of men and women vary in different ways over the life-cycle. It is taken as stylized facts that the lifetime evolutions of Adam and Eve’s sexual drives resemble those drawn in Figure 1, where Adam and Eve are assumed to be of the same age.<sup>3</sup>

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<sup>3</sup> Allen and Brinig (1998) analyze the implications of these stylized facts for divorce. They argue that the spouse having the lowest demand for sex at any time in the marriage has a property right over the occurrence of sex. For this reason, the wife may have more bargaining power at the margin in young couples, while the husband may have more bargaining power at the margin in middle-aged couples.

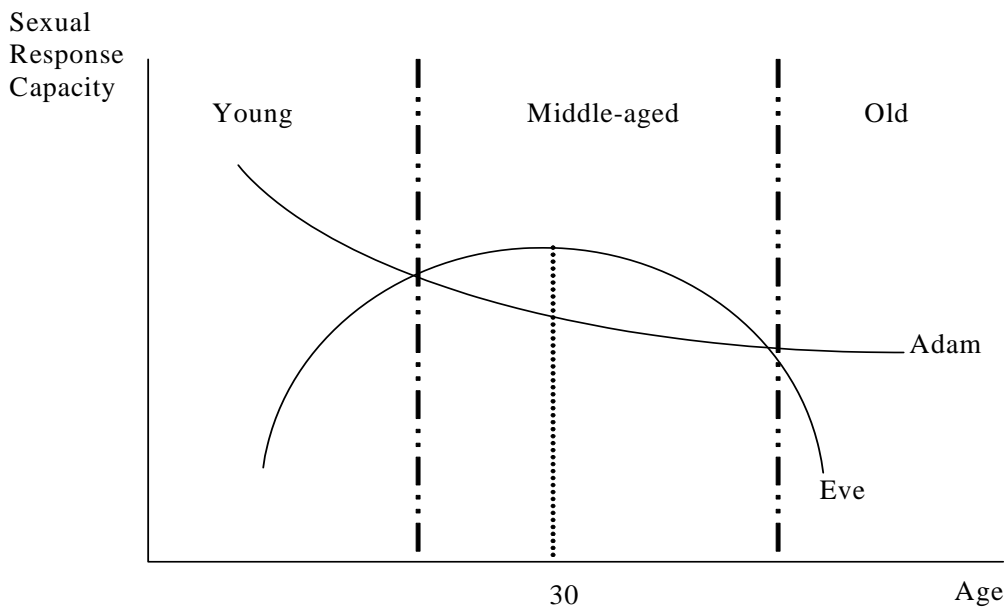


Figure 1: The lifetime evolutions of Adam and Eve's sexual response capacities, assuming that Adam and Eve are the same age.

The probabilities  $a_{Eve}(Age_{Eve})$  in  $\Gamma_{Eve}$  and  $a_{Adam}(Age_{Adam})$  in  $\Gamma_{Adam}$  are assumed to be common knowledge.

### 3.1 Faking without Love

To complete the description of the two signaling games,  $\Gamma_{Adam}$  and  $\Gamma_{Eve}$ , utilities must be assigned to outcomes. In what follows,  $s \neq r$  and  $s, r \in \{Adam, Eve\}$ , where  $s$  refers to senders and  $r$  refers to receivers in the signaling games.

Let  $\bar{e}_r^1$  denote receivers' disutility from acting as though they are not the source of senders' ecstasy when in fact they are the source of senders' ecstasy. Let  $\bar{e}_r^2$  denote receivers' disutility from acting as though they are the source of senders' ecstasy when in fact they are not the source of senders' ecstasy. In other words,  $\bar{e}_r^1$  is the receivers' disutility from their own unfounded insecurity (type 1 error), while  $\bar{e}_r^2$  is the receivers' disutility from their own

unfounded confidence (type 2 error). One can interpret  $\bar{e}_r^1$  and  $\bar{e}_r^2$  as the receivers' disutility associated with the continuation game that follows after they have made a type 1 or type 2 error. Implicit in the continuation game is a probability that the receivers discover their error and then experience the associated disutility.

Let  $\bar{e}_s^1$  denote senders' disutility from the receivers' unfounded insecurity (type 1 error), and  $\bar{e}_s^2$  denote senders' disutility from the receivers' unfounded confidence (type 2 error).

Let  $\bar{v}_r$  denote receivers' utility from senders' vocalization of ecstasy. The variable  $\bar{v}_r$  may be construed as "the effect of language on experience." Ecstasy may produce cries of ecstasy, and the cries of ecstasy may themselves multiply the ecstasy.

Let  $\bar{o}_s$  denote senders' utility from their own ecstasy.

Let  $\bar{c}_s$  denote the sender's cost of faking ecstasy. This faking cost includes the physical and moral costs of faking as well as the expected punishment if the faking is discovered by the receiver.

### 3.2 Faking with Love

What's love got to do with it? Adam and Eve's payoffs depend on whether they are in love. Love reduces conflicts of interest. If Adam loves Eve, her happiness increases if Adam's happiness increases; Adam and Eve then have a common interest in making Eve happy. If Eve also loves Adam, Adam and Eve also have a common interest in making Adam happy.

Love has just been described purely as altruism or caring. In reality, love may describe a mix of emotions, some of them far from altruistic. All of love's mixed emotions other than altruism will be referred to as possessiveness. Possessiveness, in its more benign incarnation, is a demand for togetherness. Yet in its darker incarnation, it is a feeling of jealousy. If Adam is possessive of Eve, Adam does not want to leave Eve. If Eve is possessive of Adam, Eve does not Adam to leave her. If he leaves her for another woman, then she will be jealous

of this other woman. Adam may selfishly enjoy a little jealousy on Eve's part, but certainly not too much of it. Love may make Eve too jealous of Adam, which Adam detests, and at the same time make Eve care for Adam such that Adam's disutility from Eve's own jealousy gives Eve disutility. Eve's heart is then torn between two opposing forces of love.

The notion of possessiveness can be captured in the model. Consider the following outcome: Eve is in ecstasy but Adam acts on a belief that she is not in ecstasy. One way for Adam to act, if he believes that he is not pleasing Eve, is to shy away or storm off. Indeed, one of these actions may well be optimal for him if he fears being made a fool of by Eve. If Eve is not possessive of Adam, then this outcome, though perhaps mildly unpleasant, is certainly not dire. If, however, Eve is possessive of Adam, this outcome is dire indeed; Eve runs the risk of losing the man she loves. Here, possessiveness affects Eve's utility in the same direction as caring would affect her utility. Possessiveness induces Eve to despise this particular outcome, and Adam despises this particular outcome himself since the last thing he wants is to misread Eve's feelings, especially if he too is in love.

Consider the opposite outcome: Eve is not in ecstasy, but Adam acts on a belief that she is in ecstasy. One way for Adam to act, if he believes that he is pleasing Eve, is to stick around. Indeed, this may well be an optimal action for him to take if he is possessive of Eve. If Eve is not possessive of Adam, then this outcome is dreadful; Eve may well despise the excessive attention of a man she does not love. If Eve is possessive of Adam, then this outcome, though still unpleasant, is certainly not dreadful; Eve does not mind so much the (misguided) attention of a man she loves. Here, possessiveness affects Eve's utility in the opposite direction that caring would affect her utility. Possessiveness induces Eve to despise this particular outcome much less, and perhaps even to enjoy it, even though Adam despises this outcome since it involves him being duped.

How much does Adam despise the outcome where he learns that he has been duped? If Adam does not love Eve, then this outcome is quite unpleasant; Eve has made a fool of him. To prevent such a wound to his ego, Adam could instead storm off (or otherwise grow distant from Eve), and this would not displease him much provided he does not love her much. If Adam is possessive of Eve, then this outcome is not altogether unpleasant; Adam does not mind so much being duped, for love makes the ego melt away. The alternative is to storm off (or otherwise distance himself from Eve), and this would displease him more provided he loves her much.

In the model, love is defined as a mix of caring and possessiveness. In the following notation,  $s \neq r$  and  $s, r \in \{Adam, Eve\}$ . Define three love functions that vary with the individual-specific parameters for caring,  $\kappa_s, \kappa_r \in [0, 1]$ . Let  $o_r(\kappa_r)$  denote the indirect utility that receivers derive from the direct utility that senders derive from their own ecstasy. Let  $c_r(\kappa_r)$  denote the indirect cost that receivers incur from the direct cost that senders incur for faking ecstasy. Let  $v_s(\kappa_s)$  denote the indirect utility that senders derive from the direct utility that receivers derive from senders' vocalization of ecstasy.

Define four love functions that also vary with individual-specific parameters for possessiveness,  $\pi_r, \pi_s \in [0, 1]$ . Let  $e_r^1(\kappa_r, \pi_r)$  denote the disutility that receivers derive directly from, and indirectly from the disutility that senders derive from, their own unfounded insecurity. Let  $e_r^2(\kappa_r, \pi_r)$  denote the disutility that receivers derive directly from, and indirectly from the disutility that senders derive from, their own unfounded confidence.

Let  $e_s^1(\kappa_s, \pi_s)$  denote the disutility that senders derive directly from, and indirectly from the disutility that receivers derive from, receivers' unfounded insecurity. Let  $e_s^2(\kappa_s, \pi_s)$  denote the disutility that senders derive directly from, and indirectly from the disutility that receivers derive from, receivers' unfounded confidence.

The following parametric assumptions are made:

$$\begin{aligned}
o_r(\kappa_r) &= \kappa_r \bar{o}_s, \quad c_r(\kappa_r) = \kappa_r \bar{c}_s, \quad v_s(\kappa_s) = \kappa_s \bar{v}_r \\
e_r^1(\kappa_r, \pi_r) &= (1 - \kappa_r) \pi_r \bar{e}_r^1 + \kappa_r e_s^1, \quad e_r^2(\kappa_r, \pi_r) = (1 - \kappa_r)(1 - \pi_r) \bar{e}_r^2 + \kappa_r e_s^2 \\
e_s^1(\kappa_s, \pi_s) &= (1 - \kappa_s) \pi_s \bar{e}_s^1 + \kappa_s e_r^1, \quad e_s^2(\kappa_s, \pi_s) = (1 - \kappa_s)(1 - \pi_s) \bar{e}_s^2 + \kappa_s e_r^2. \quad (1)
\end{aligned}$$

In these functions, our definition of love has a precise expression. For example, if  $\kappa_s = 0$ , then the sender does not care for the receiver, and only cares for the sender; if  $\kappa_s = 1$ , then the sender does not care for the sender, and only cares for the receiver. On the other hand, if  $\pi_s = 0$ , then the sender is not possessive of the receiver, in the sense that the sender experiences no disutility from the receiver mistakenly distrusting the sender, but only disutility from the receiver mistakenly trusting the sender. If  $\pi_s = 1$ , then the sender is so possessive of the receiver that the sender gets no disutility from the receiver mistakenly trusting the sender, and only disutility from the receiver mistakenly distrusting the sender. The interpretation of the parameters  $\kappa_r$  and  $\pi_r$  is analogous. Notice that possessiveness operates on the relative disutilities to senders and receivers from receivers' type 1 versus type 2 errors.

Iterating the above recursive equations until convergence for  $\kappa_s, \kappa_r, \pi_s, \pi_r \in (0, 1)$ , we obtain:

$$\begin{aligned}
e_r^1(\kappa_r, \pi_r) &= \begin{cases} (1 - \kappa_r) \left[ \frac{\pi_r \bar{e}_r^1 + \kappa_r \pi_s \bar{e}_s^1}{1 - \kappa_r \kappa_s} \right] & \text{if } \kappa_r, \pi_r \in (0, 1) \\ \bar{e}_r^1 & \text{if } \kappa_r, \pi_r \notin (0, 1) \end{cases}, \\
e_r^2(\kappa_r, \pi_r) &= \begin{cases} (1 - \kappa_r) \left[ \frac{(1 - \pi_r) \bar{e}_r^2 + \kappa_r (1 - \pi_s) \bar{e}_s^2}{1 - \kappa_r \kappa_s} \right] & \text{if } \kappa_r, \pi_r \in (0, 1) \\ \bar{e}_r^2 & \text{if } \kappa_r, \pi_r \notin (0, 1) \end{cases}, \\
e_s^1(\kappa_s, \pi_s) &= \begin{cases} (1 - \kappa_s) \left[ \frac{\pi_s \bar{e}_s^1 + \kappa_s \pi_r \bar{e}_r^1}{1 - \kappa_s \kappa_r} \right] & \text{if } \kappa_s, \pi_s \in (0, 1) \\ \bar{e}_s^1 & \text{if } \kappa_s, \pi_s \notin (0, 1) \end{cases},
\end{aligned}$$

Table 1: Normal Form of the Faking Game  $\Gamma_s$

	Confident	Insecure
Faking	$\alpha_s[\bar{o}_s + v_s] + (1 - \alpha_s)[v_s - e_s^2 - \bar{c}_s],$ $\alpha_s[\bar{v}_r + o_r] + (1 - \alpha_s)[\bar{v}_r - e_r^2 - c_r]$	$\alpha_s[\bar{o}_s + v_s - e_s^1] + (1 - \alpha_s)[v_s - \bar{c}_s],$ $\alpha_s[\bar{v}_r + o_r - e_r^1] + (1 - \alpha_s)[\bar{v}_r - c_r]$
Honest	$\alpha_s[\bar{o}_s + v_s],$ $\alpha_s[\bar{v}_r + o_r]$	$\alpha_s[\bar{o}_s + v_s - e_s^1],$ $\alpha_s[\bar{v}_r + o_r - e_r^1]$

$$e_s^2(\kappa_s, \pi_s) = \begin{cases} (1 - \kappa_s) \left[ \frac{(1 - \pi_s)\bar{e}_s^2 + \kappa_s(1 - \pi_r)\bar{e}_r^2}{1 - \kappa_s\kappa_r} \right] & \text{if } \kappa_s, \pi_s \in (0, 1) \\ \bar{e}_s^2 & \text{if } \kappa_s, \pi_s \notin (0, 1) \end{cases}. \quad (2)$$

This completes the general specification of the utility functions of Adam and Eve in the event that they love each other. The normal forms of the faking games, denoted  $\Gamma_s$  for all  $s \in \{Adam, Eve\}$ , are given in Table 1. The sender is the row player and the receiver is the column player.

Whether the sender experiences the utility  $\bar{o}_s$  does not depend on the sender's choice of strategy, only on a move of Nature. Adding a term to the sender's payoff that only depends on a move of Nature cannot affect the pattern of best responses or the equilibrium strategy choices by the players in the game. This yields a first testable prediction:

**TP0** The level of satisfaction that men and women derive from their own orgasm does not affect their own probability of faking.

In order to facilitate exposition and to focus the analysis on the effects of age, love, and the gender difference in the cost of faking, we set  $\bar{o}_s$ ,  $\bar{v}_r$ , and  $\bar{e}_j^i$  equal to 1 for  $i = 1, 2$  and  $j = s, r$ . For the gender difference in the faking cost, we set  $\bar{c}_{Eve} = 0$  and  $\bar{c}_{Adam} = 1$ . Lastly, love is assumed to be an equal mixture of caring and possessiveness, i.e.,  $\lambda_{Adam} \equiv \kappa_{Adam} = \pi_{Adam}$  and  $\lambda_{Eve} \equiv \kappa_{Eve} = \pi_{Eve}$ . The cases of no love, medium-intensity mutual love, and strong mutual love are analyzed in turn.

## 4. Lovely Equilibria

In each case, we report the set of Nash equilibria (NE) and the set of NE that survive iterative deletion of dominated strategies (IDDS). In what follows,  $\phi$  denotes the sender's probability of choosing *Faking* and  $\psi$  denotes the receiver's probability of choosing *Confident*.

**Case 1** *No Love* ( $\lambda_{Eve} = 0, \lambda_{Adam} = 0$ ). In this case,  $\Gamma_{Eve}$  reduces to

	<i>Confident</i>	<i>Insecure</i>
<i>Faking</i>	$2\alpha_{Eve} - 1, \alpha_{Eve}$	$0, 1 - \alpha_{Eve}$
<i>Honest</i>	$\alpha_{Eve}, \alpha_{Eve}$	$0, 0$

For all  $\alpha_{Eve} \in (0, \frac{1}{2}]$ , the set of NE is  $\{(\phi, \psi) : (\phi = 0, \psi = 1) \vee (\phi \in [\frac{\alpha_{Eve}}{1 - \alpha_{Eve}}, 1], \psi = 0)\}$ . The unique NE surviving IDDS is  $(\phi = 0, \psi = 1)$ . For all  $\alpha_{Eve} \in (\frac{1}{2}, 1)$ , the unique NE is  $(\phi = 0, \psi = 1)$ .  $\Gamma_{Adam}$  reduces to

	<i>Confident</i>	<i>Insecure</i>
<i>Faking</i>	$3\alpha_{Adam} - 2, \alpha_{Adam}$	$\alpha_{Adam} - 1, 1 - \alpha_{Adam}$
<i>Honest</i>	$\alpha_{Adam}, \alpha_{Adam}$	$0, 0$

For all  $\alpha_{Adam} \in (0, 1)$ , the unique NE is  $(\phi = 0, \psi = 1)$ .

If we assume that, in any given case, any NE in that case's set of NE may be played, then Eve's equilibrium probability of faking may depend on  $\alpha_{Eve}$  in the case of no love. In particular, Eve may fake with positive probability if  $\alpha_{Eve}$  is no greater than  $\frac{1}{2}$ , that is, if Eve is young or old, while Eve always fakes with zero probability if  $\alpha_{Eve}$  is greater than  $\frac{1}{2}$ , that is, if Eve is middle-aged.

However, if we assume that, in any given case, only a NE surviving IDDS can occur, then Eve's equilibrium probability of faking does not depend on  $\alpha_{Eve}$  and is always zero when there no love. On the other hand, Adam's equilibrium probability of faking is zero regardless of  $\alpha_{Eve}$  in the case of no love.

Thus, the above analysis generates two testable predictions:

**TP1** Younger and older women who are not in love are *weakly* more likely to fake than middle-aged women who are not in love.

**TP2** Age has a *weakly* greater effect on the probability of faking for women who are not in love than for men who are not in love.

**Case 2** *Medium-Intensity Mutual Love* ( $\lambda_{Eve} = \frac{1}{2}$ ,  $\lambda_{Adam} = \frac{1}{2}$ ).  $\Gamma_{Eve}$  reduces to

	<i>Confident</i>	<i>Insecure</i>
<i>Faking</i>	$\frac{3}{2}\alpha_{Eve}, \alpha_{Eve} + \frac{1}{2}$	$\frac{1}{2}\alpha_{Eve} + \frac{1}{2}, 1$
<i>Honest</i>	$\frac{3}{2}\alpha_{Eve}, \frac{3}{2}\alpha_{Eve}$	$\alpha_{Eve}, \alpha_{Eve}$

For all  $\alpha_{Eve} \in (0, \frac{1}{2}]$ , the set of NE is  $\{(\phi, \psi) : (\phi \in [0, \frac{\alpha_{Eve}}{1-\alpha_{Eve}}], \psi = 1) \vee (\phi = 1, \psi = 0)\}$ . The unique NE surviving IDDS is  $(\phi = 1, \psi = 0)$ . For all  $\alpha_{Eve} \in (\frac{1}{2}, 1)$ , the set of NE and the set of NE surviving IDDS is  $\{(\phi, \psi) : \phi \in [0, 1], \psi = 1\}$ .  $\Gamma_{Adam}$  reduces to

	<i>Confident</i>	<i>Insecure</i>
<i>Faking</i>	$\frac{5}{2}\alpha_{Adam} - 1, \frac{3}{2}\alpha_{Adam}$	$\frac{3}{2}\alpha_{Adam} - \frac{1}{2}, \frac{1}{2}\alpha_{Adam} + \frac{1}{2}$
<i>Honest</i>	$\frac{3}{2}\alpha_{Adam}, \frac{3}{2}\alpha_{Adam}$	$\alpha_{Adam}, \alpha_{Adam}$

$\Gamma_{Adam}$  has the same equilibrium in the case of weak mutual love as in the case of no love.

Comparing the set of NE and the set of NE surviving IDDS across cases 1 and 2, we obtain a clear, testable prediction:

**TP3** Women are more likely to fake if they are in love than if they are not in love.

Examining case 2 yields another testable prediction:

**TP4** Younger and older women who are in love are weakly more likely to fake than middle-aged women who are in love.

In some cases, a love may blossom between a man and a woman that is so strong that each would readily die to save the other's life, if the occasion presented itself.

**Case 3** *Strong Mutual Love* ( $\lambda_{Eve} = 1, \lambda_{Adam} = 1$ ). In this case,  $\Gamma_{Eve}$  reduces to

	<i>Confident</i>	<i>Insecure</i>
<i>Faking</i>	$2\alpha_{Eve}, 2\alpha_{Eve}$	$1, 1$
<i>Honest</i>	$2\alpha_{Eve}, 2\alpha_{Eve}$	$\alpha_{Eve}, \alpha_{Eve}$

$\Gamma_{Eve}$  has the same equilibrium set for each of the same age categories with strong mutual love as with weak mutual love.  $\Gamma_{Adam}$  reduces to

	<i>Confident</i>	<i>Insecure</i>
<i>Faking</i>	$3\alpha_{Adam} - 1, 3\alpha_{Adam} - 1$	$\alpha_{Adam}, \alpha_{Adam}$
<i>Honest</i>	$2\alpha_{Adam}, 2\alpha_{Adam}$	$\alpha_{Adam}, \alpha_{Adam}$

For all  $\alpha_{Adam} \in (0, \frac{1}{2}]$ , the set of NE is  $\{(\phi, \psi) : (\phi = 0, \psi = 1) \vee (\phi \in [\frac{\alpha_{Eve}}{1-\alpha_{Eve}}, 1], \psi = 0)\}$ . The unique NE surviving IDDS is  $(\phi = 0, \psi = 1)$ . For all  $\alpha_{Eve} \in (\frac{1}{2}, 1)$ , the unique NE is  $(\phi = 0, \psi = 1)$ .

Examining case 3 yields another testable prediction:

**TP5** Middle-aged and older men who are in love are weakly more likely to fake than younger men who are in love.

Looking across cases 1, 2, and 3 also reveals that men's probability of faking only ever becomes positive when the intensity of mutual love is strong, whereas women's probability of faking becomes positive even when the intensity of mutual love is medium. Thus, we have a final testable prediction:

**TP6** Women's faking probability is more sensitive to love than men's faking probability.

## 5. Data

From the 2000 Orgasm Survey, data were gathered that can be used to test several of the predictions of the model. The survey was devised by the professional psychologists and

statisticians of PsychTests, a firm that specializes in online testing for academic and business purposes.<sup>4</sup> The online survey was answered voluntarily and anonymously by 16,000 women and men, aged 14 to 74. People were asked a variety of questions concerning their sexual experiences in their current or most recent relationship. Several of the questions addressed the subject of faking orgasm.

Those people who were drawn to fill out the survey might have also been those who have a greater tendency to fake, or who are more suspicious that their partner is faking. Thus, the following results may contain a selection bias due to the sampling procedure.

Table 2 contains a description of the key variables that were constructed from the Orgasm Survey. The variable *Faking* will be the main dependent variable. Notice that respondents were not asked how many times they had faked an orgasm, but whether or not they had faked an orgasm at any point in their current relationship.

The variable *BelieveConfident* is a proxy for the probability of being caught faking, insofar as women can accurately guess whether their partners can tell if they are faking. Since part of a woman's cost of faking is experienced only if she is caught faking, *BelieveConfident* is also a proxy for a woman's cost of faking.

The variable *Altruism* is a possible measure of altruism. If a woman expresses an extreme preference for her partner's sexual pleasure, then this might suggest that she cares for her partner. However, a woman might express an extreme preference for her partner's sexual pleasure for selfish reasons too. On the other hand, if a man expresses an extreme preference for his partner's sexual pleasure, then this might mean that he cares for his partner's sexual pleasure, or that he wants to demonstrate his own sexual prowess. With these caveats in mind, *Altruism* will serve as the empirical analogue of the parameter  $\kappa$  in our model.

A measure of possessiveness is also available. Recall the two effects of possessiveness

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<sup>4</sup> See website: [www.psychtests.com](http://www.psychtests.com). The data from the survey are available from the author upon request.

Table 2: Description of Key Variables

Notation for Variable	Description of Variable	Value of Variable
Faking	Have you faked an orgasm?	1 = Yes, 0 = No
Confident	Can you tell if your partner is faking?	1 = Yes, 0 = No
BelieveConfident	Can your partner tell if you are faking?	1 = Yes, 0 = No
Age	Age	$14 \leq Age \leq 74$
Altruism	How important is it to you that your partner reach orgasm?	1 = Extremely, 0 = o/w (Altruism 1) 1 = Very, 0 = o/w (Altruism 2) 1 = Somewhat, 0 = o/w (Altruism 3)
Egotism	How important is it to you that you reach orgasm?	1 = Extremely, 0 = o/w (Egotism 1) 1 = Very, 0 = o/w (Egotism 2) 1 = Somewhat, 0 = o/w (Egotism 3)
Possessiveness	How would you feel about your partner faking an orgasm?	1 = Embarrassed, Guilty, Bad for my partner, Indifferent, Flattered, Happy 0 = Angry, Deceived, Ridiculed, Inadequate, Betrayed, Appalled
DisutilityDuped	Would you want your partner to fake it if s/he had not spontaneously reached orgasm?	1 = Yes 0 = No
AgeLostVirginity	How old were you when you lost your virginity?	$14 \leq Age \leq 74$
Education	Formal education	9 = less than sec 3, 11 = sec 3 or 4 12 = high school, 13 = 1-3 post-sec 14 = some undergrad, 16 = bachelor 17 = some grad, 18 = masters 20 = doctorate, 21 = post-doc

Table 3: Summary Statistics

Variable	Women (N=4084)		Men (N=2232)	
	Mean	Std. Dev.	Mean	Std. Dev.
Faking	0.72	0.45	0.26	0.44
Confident	0.74	0.44	0.55	0.49
BelieveConfident	0.24	0.43	0.66	0.47
Age	26.74	8.21	28.67	9.48
DisutilityDuped	0.04	0.19	0.06	0.23
AgeLostVirginity	16.54	2.45	17.23	3.09
Education	13.91	1.91	14.20	2.26

in our model. First, it reduces the woman’s disutility from her partner’s miscalculated confidence. Second, it reduces her disutility from her own miscalculated confidence.

This second effect is captured by the variable *Possessiveness* in Table 2. Respondents were asked how they would feel about their partner faking an orgasm. If they expressed negative feelings toward their partner (Angry, Deceived, Ridiculed, Inadequate, Betrayed, Appalled) at the prospect of their partner faking, then this suggests that they are not possessive of their partner, according to how we have defined possessiveness in our model. If they expressed negative feelings toward themselves (Embarrassed, Guilty, Bad for my partner), neutral feelings (Indifferent), or positive feelings toward their partner (Flattered, Happy), then this suggests that they are more possessive of their partner. Therefore, *Possessiveness* will serve as the empirical analogue of the parameter  $\pi$  in our model.

Table 3 contains summary statistics for each of the variables in Table 2 except for those relating to love. The average age of respondents is significantly lower than the U.S. adult population average, and the average educational attainment is approximately one year above the U.S. population average for both men and women.

Since the survey was administered online, the sample was limited to respondents who have access to computers and who are familiar with the Internet. People with higher educational attainment tend to earn a higher income, and people who earn a higher income tend to

have easier access to computers. Therefore, people who have access to computers may be a selected sample of people with above average educational attainment. Moreover, since the Internet was not fully commercialized until the mid 1990's (see Segaller, 1998), younger people tend to be more familiar with using it than older people. Therefore, people who are familiar with the Internet may be a selected sample of people who are younger than average.

In the sample, the mean age at first intercourse is slightly higher for men than for women. This seems surprising. Michael *et al.* (1994), based on a representative survey of 3,500 American adults, report that the mean age at first intercourse was 17.5 for white women born from 1963 to 1972, and 16.8 for black women in the same age category. The mean age at first intercourse was 17.4 for white men born from 1963 to 1972, and 15.3 for black men in the same age category. However, they also calculate that for the successive ten-year birth cohorts, 1933 to 1942, 1943 to 1952, 1953 to 1962, and 1963 to 1972, the percentage of men who had not lost their virginity by age twenty rose steadily from 1.0 to 1.7 to 6.0 to 8.3 percent, whereas that of women oscillated from 4.6 to 4.7 to 3.6 to 5.8 percent.

Table 3 also reveals that 72 percent of women have faked an orgasm in their current or most recent relationship, and that 55 percent of men believe they could tell if their current or most recent partner had faked an orgasm. At least two stories would be consistent with these facts: (a) women are faking even though their partners can tell that they are faking, in which case women are under the illusion that their faking is more credible than it is in reality, or (b) men believe they can tell that their partners are not faking even though their partners are faking, in which case men are under the illusion that their sexual prowess is greater than it is in reality.

Notice also that 66 percent of men believe that their partners can tell whether or not they are faking, versus only 24 percent of women. These data might suggest that the probability

Table 4: Percent Distributions of Altruism, Egoism and Possessiveness

How important is it to you that your partner reaches orgasm? (Altruism)	Women	Men
Extremely	41.0	47.5
Very	41.6	38.3
Somewhat	14.4	12.1
Not at all	3.0	2.1
How important is it to you that you reach orgasm? (Egotism)	Women	Men
Extremely	10.2	26.8
Very	30.4	38.7
Somewhat	47.4	28.7
Not at all	12.0	5.8
How would you feel about your partner faking? (Possessiveness)	Women	Men
Positive feelings toward partner	4.1	5.1
Neutral feelings	20.3	13.1
Negative feelings toward self	34.1	32.8
Negative feelings toward partner	41.5	50.0

of being caught faking is much greater for men than for women, and hence, (at least part of) the cost of faking is greater for men than for women. This was an important assumption in the theoretical model.

Table 4 contains summary statistics for each of the variables relating to love in Table 2. Note that 48 percent of men, compared to only 41 percent of women, say that it is extremely important that their partner reaches orgasm. However, the chi-square test does not reject the hypothesis that *Gender* and *Altruism* are independent. Nevertheless, only 40 percent of women, compared to an overwhelming 66 percent of men, say that it is either very or extremely important for them to reach orgasm. The chi-square test easily rejects the hypothesis that *Gender* and *Egoism* are independent. In terms of sexual pleasure, men seem to be as altruistic as women, but significantly more egotistical than women.

Moreover, only 42 percent of women, compared to 50 percent of men, expressed negative feelings toward their partner at the prospect of their partner faking. Therefore, the data suggest that women are more possessive than men, in the sense that they would be less

devastated than men if they were to discover that their confidence was misplaced.

## 6. An Empirical Model of Lovemaking

The sample is restricted to heterosexuals 18 years of age and over. The model suggests that a woman's decision to fake is a function of her partner's decision to be confident, and vice versa. Ideally, therefore, the variable *Faking* (for the set of women) would be regressed on the variable *Confident* (for the corresponding set of men), and the variable *Confident* on the variable *Faking*, and the system would be solved simultaneously. However, this would require us to have data on couples (and to solve the identification problem). Only individual data are available. For any given woman, the man with whom she is having intercourse cannot be identified. In all likelihood, this man is not even in the sample.

The data do, however, contain clues about the man with whom a woman is having intercourse. Recall that the variable *BelieveConfident* equals 1 if the woman believes that her partner can tell if she is faking, and 0 otherwise. Thus, the variable *BelieveConfident* is a proxy for the variable *Confident* (and for the probability of being caught faking) insofar as women can accurately guess whether their partners can tell if they are faking. If a woman has been with her partner for a long time, her guess is more likely to be accurate. Therefore, the sample is further restricted to respondents involved in steady sexual relationships.

This subsample is divided into two groups:  $W$ , the set of women, and  $M$ , the set of men. First, several variations of the following basic empirical model, corresponding to the game with uncertainty about the woman's state of ecstasy, are estimated:

$$\begin{aligned} \Pr(Faking_w = 1) = & \Phi(\beta_0^w + \beta_1^w BelieveConfident_w + \beta_2^w Y_w + \beta_3^w Egoism_w) \\ & + \beta_4^w Love_w + \beta_5^w D_1 * (a_w^* - Age_w) + \beta_6^w D_2 * (Age_w - a_w^*) \\ & + \beta_7^w D_1 * (a_w^* - Age_w) * Love_w + \beta_8^w D_2 * (Age_w - a_w^*) * Love_w. \end{aligned} \quad (3)$$

Table 5: Correlation Matrices for the Controls

Women ( $N = 3012$ )	Education	AgeLostVirginitiy	OrgasmRate	FrequencySex
Education	1	.246	-.021	-.024
AgeLostVirginitiy		1	-.055	-.055
OrgasmRate			1	.165
FrequencySex				1
Men ( $N = 1950$ )	Education	AgeLostVirginitiy	OrgasmRate	FrequencySex
Education	1	.239	-.047	-.026
AgeLostVirginitiy		1	-.104	-.146
OrgasmRate			1	.061
FrequencySex				1

$\Phi$  is the cumulative normal distribution, and equation (6) is a probit model. The variables *Possessiveness* and *Altruism* will serve as proxies for love. The variables  $D_1$  and  $D_2$  are dummies, where  $D_1 = 1$  if  $a_w^* \geq Age$ , and  $D_2 = 1$  if  $Age \geq a_w^*$ . The function  $D_1 * (a_w^* - Age_w)$  has higher values for women who are much younger than  $a_w^*$ , smaller values for women who are only slightly younger than  $a_w^*$ , and zero values for women who are older than  $a_w^*$ . The function  $D_2 * (Age_w - a_w^*)$  is analogous.

The parameter  $a_w^*$  is the woman’s lifetime peak of sexual response capacity. The sex literature discussed in the introduction suggests that women reach their lifetime peak of sexual response capacity around the age of thirty. Therefore, we let  $a_w^* = 30$ .

The vector  $Y_w$  is a vector of controls which includes (a) the age when the respondent lost her virginity, (b) the respondent’s level of education, (c) dummy variables for the frequency with which the respondent has sex (several times a day, once a day, once a week, two or three times a month, once a month, six times a year, three to five times a year, two to three times a year; fewer than two times a year is the excluded category), and (d) dummy variables for the percent of the time that the respondent achieves orgasm during sex (100, 85-99, 61-84, 40-60, 20-39, and 10-19 percent; 0-9 percent is the excluded category).

The upper half of Table 5 presents Pearson correlation coefficients for these controls. For

women, education is strongly positively correlated with age of virginity loss, and slightly negatively correlated with orgasm rate and frequency of sex. Age of virginity loss is slightly negatively correlated with orgasm rate and frequency of sex, and orgasm rate is strongly positively correlated with frequency of sex.

Several variations of the following basic empirical model, corresponding to the game with uncertainty about the man’s state of ecstasy, are also estimated:

$$\begin{aligned} \Pr(Faking_m = 1) = & \Phi(\beta_0^m + \beta_1^m BelieveConfident_m + \beta_2^m Y_m + \beta_3^m Egoism_m \quad (4) \\ & + \beta_4^m Love_m + \beta_5^m (AGE_m - a_m^*) + \beta_6^m (AGE_m - a_m^*) * Love_m) \end{aligned}$$

The parameter  $a_m^*$  is the man’s lifetime peak of sexual response capacity. The sex literature discussed in the introduction suggests that men reach their lifetime peak of sexual response capacity in their late teens. Therefore, we let  $a_m^* = 18$ .

The vector  $Y_m$  contains the same controls as in  $Y_w$ . The bottom half of Table 5 contains correlation coefficients for these controls. For men, as for women, education is strongly positively correlated with age of virginity loss, and slightly negatively correlated with orgasm rate and the frequency of sex. For men, unlike for women, age of virginity loss is strongly negatively correlated with orgasm rate and frequency of sex, and orgasm rate is only slightly positively correlated with frequency of sex.

## 7. Estimation Results

Table 6 presents the marginal effects for equations (6) and (7). None of the coefficients on the egotism variables is significantly different from zero. The level of satisfaction that men and women derive from their own orgasm does not affect their observed probability of faking. These findings confirm testable prediction TP0 of our model.

Among women who do not care for their partner’s sexual pleasure and who are younger

Table 6: Marginal Effects of the Determinants of the Probability of Faking

	Women ( $N = 3012$ )		Men ( $N = 1950$ )	
	(1)	(2)	(3)	(4)
BelieveConfident	-.2941 (.0204)	-.2938 (.0204)	-.2270 (.0228)	-.2274 (.0229)
DisutilityDuped	.1657 (.0272)	.1653 (.0272)	.1343 (.0521)	.1323 (.0522)
$D_1*(30 - Age)$	.0081 (.0022)	.0132 (.0028)		
$D_2*(Age - 30)$	.0021 (.0022)	-.0015 (.0027)		
$(Age - 18)$			.0137 (.0033)	.0124 (.0042)
Possessiveness	.1054 (.0167)	.1053 (.0167)	.0607 (.0209)	.0597 (.0209)
Egotism 1	-.0409 (.0388)	-.0334 (.0384)	.0275 (.0556)	.0290 (.0557)
Egotism 2	.0279 (.0269)	.0287 (.0268)	.0507 (.0525)	.0524 (.0526)
Egotism 3	.0469 (.0256)	.0472 (.0256)	.0375 (.0540)	.0403 (.0402)
Altruism 1	.1967 (.0576)	.1090 (.0674)	-.0056 (.0871)	-.0136 (.0936)
Altruism 2	.1476 (.0590)	.1450 (.0592)	-.0399 (.0863)	-.0413 (.0863)
Altruism 3	.1026 (.0513)	.1016 (.0515)	-.0733 (.0783)	-.0751 (.0781)
$D_1*(30 - Age)*Altruism 1$		.0127 (.0043)		
$D_2*(Age - 30)*Altruism 1$		.0098 (.0046)		
$(Age - 18)*Altruism 1$				.0049 (.0066)
AgeLostVirginity	-.0193 (.0033)	-.0189 (.0033)	-.0203 (.0036)	-.0202 (.0036)
Education	.0081 (.0044)	.0076 (.0044)	.0111 (.0046)	.0108 (.0047)
LR chi2(32)	406.58	415.64	272.01	274.23
Pseudo R <sup>2</sup>	0.1181	0.1208	0.1186	0.1196

Standard errors are in parenthesis. All regressions control for sex frequency and orgasm rate.

than 30, those who are much younger than 30 are more likely to fake than those who are closer to 30. However, among women who do not care for their partner's sexual pleasure and who are older than 30, the effect of age relative to 30 on the probability of faking is not statistically significant. These results are generally consistent with TP1.

Among men who do not care for their partner's sexual pleasure, men who are closer to 18 (the peak of their sexual response capacity) are less likely to fake than men who are much older than 18. An F-test shows that the effect of age relative to the peak of sexual response capacity is greater for men than for women. Therefore, the data do not confirm TP2.

Possessiveness and altruism each have a significantly positive effect on women's probability of faking. Women who are possessive of their partners are 10 percent more likely to fake than women who are not possessive of their partners. Women who care extremely for their partner's sexual pleasure are 11 percent more likely to fake than women who care very much for their partner's sexual pleasure. The data support the hypothesis that love and faking are positively correlated for women, and hence confirm TP3.

Men who are possessive of their partners are also significantly more likely to fake than men who are not possessive of their partners. However, men are not significantly more likely to fake if they care for their partners' sexual pleasure than if they do not. This is in stark contrast to women. Therefore, the data support the conclusion that men's faking is less sensitive to love than women's faking, and hence confirm TP6.

The effect of age relative to 30 on the probability of faking is greater for women who care for their partner's sexual pleasure than for women who do not care for their partner's sexual pleasure (see the interactions between age and altruism in column 2), which is consistent with TP4. However, the interaction between altruism and age relative to the peak of sexual response capacity is not significant for men (see column 4). Thus, just as for men who do

not care for their partner's sexual pleasure, altruistic men who are much older than 18 are less likely to fake than altruistic men who are closer to 18, which is consistent with TP5.

Men and women who believe that their partners can tell if they are faking are significantly less likely to fake than men and women who believe that their partners cannot tell if they are faking (see the *BelieveConfident* variable in columns 1 through 4). This finding is consistent with the basic theoretical prediction that an increase in the cost of faking tends to reduce the equilibrium probability of faking.

Men and women who would hate to find out that their partners are faking are significantly less likely to fake orgasm themselves than men and women who would be indifferent to finding out that their partners are faking (see the *DisutilityDuped* variable in columns 1 through 4). Therefore, the data provide gender-neutral support for the behavioral theory of “do unto others as you would have done unto you.”

Men and women who lost their virginity at a younger age are more likely to fake than men and women who lost their virginity at a later age. Lastly, more educated men and women are more likely to fake than less educated men and women. People with more education may be a selected sample of people with above-average intelligence. Intelligence may reduce the costs of faking, since the production, and successful perpetuation, of lies requires a degree of imagination. A basic prediction of the theoretical model is that a decrease in the cost of faking tends to increase the probability of faking, which explains the empirical finding that education and faking are positively correlated for both men and women.

## 8. Conclusion

This paper attempted to apply rational choice theory to the study of certain aspects of human sexuality, particularly faking ecstasy. Lovemaking was modeled as a signaling game, and it

was shown that the equilibrium probability of faking is decreasing in the cost of faking and increasing in the strength of love (formally defined as a mixture of caring and possessiveness). These predictions were tested with available survey data. In accordance with the theory, measures of love were found to be strongly positively correlated, while measures of faking costs were found to be strongly negatively correlated, with faking behavior.

One of the interesting findings was that education and faking ecstasy are positively correlated for both men and women. This finding naturally elicits the question of whether there exists a positive relationship between education and a tendency to lie in general. Such a relationship is plausible given that education might reduce the costs of lying. Surprisingly, there appears to have been no research on this question. Honesty can be measured at least roughly through paper and pencil honesty tests (such as those used by firms for pre-employment testing) and lie detector tests, and it would be interesting to explore the effects of education and other social and demographic characteristics on honesty.

## REFERENCES

- Allen, Douglas W., and Brinig, Margaret (1998): "Sex, Property Rights, and Divorce," *European Journal of Law and Economics* 5, 211-33.
- Becker, Gary S. (1974): "A Theory of Social Interactions," *Journal of Political Economy* 82, 1063-1093.
- Becker, Gary S. (1976): *The Economic Approach to Human Behavior*, University of Chicago Press.
- Bergstrom, Ted (1989): "Love and Spaghetti, The Opportunity Cost of Virtue," *Journal of Economic Perspectives* 3, 165-173.
- Duras, Marguerite (1990): *Practicalities*, London: Penguin Books.
- Elmslie, Bruce and Tebaldi, Edinaldo (2008): "So, What Did You do Last Night? The Economics of Infidelity," *Kyklos* 61, 391-410.
- Feltovich, Nick, Harbaugh, Richmond and To, Ted (2002): "Too Cool for School? Signalling and Countersignalling," *RAND Journal of Economics* 33, 630-649.
- Francis, Andrew M. (2008): "The Economics of Sexuality: The Effect of HIV/AIDS

- on Homosexual Behavior, Desire, and Identity in the United States,” *Journal of Health Economics* 27, 675-689.
- Fryer, Roland (2005): “An Economic Analysis of ‘Acting White,’” *Quarterly Journal of Economics* 120, 551-583..
- Harbaugh, Richmond and To, Theodore (2009): “False Modesty: When Disclosing Good News Looks Bad,” Working Paper.
- Kinsey, Alfred C., Pomeroy, Wardell B., Martin, Clyde E., and Gebhard, Paul H. (1968): *Sexual Behavior in the Human Female*, Philadelphia: W.B. Saunders Company.
- Lowen, A. (1975): *Love and Orgasm: A Revolutionary Guide to Sexual Fulfillment*, Collier Books.
- Mahoney, E.R. (1983): *Human Sexuality*, New York: McGraw-Hill.
- Michael, Robert T., Gagnon, John H., Laumann, Edward O., Kolata, Gina (1994): *Sex in America: A Definitive Survey*, Toronto: Little, Brown and Company.
- Morrow, John and Sivan, Yoav (2006): “Strategic Interaction in the Sex Market,” MPRA Working Paper No. 888.
- Oettinger, Gerald S. (1999): “The Effects of Sex Education on Teen Sexual Activity and Teen Pregnancy,” *Journal of Political Economy* 107, 606-644.
- Rasmusen, Eric (2002): “An Economic Approach to Adultery Law,” Chapter 5 of *Marriage and Divorce: An Economic Perspective*, edited by Antony Dnes and Robert Rowthorn, Cambridge: Cambridge University Press.
- Segaller, Stephen (1998): *Nerds 2.0.1: A Brief History of the Internet*, TV Books Incorporated.
- Spence, Michael A. (1973): “Job Market Signaling,” *Quarterly Journal of Economics* 87, 355-374.