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Xianzheng Sun
Utah State University

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Mediated Cheap Talk with an Uncertain-biased Expert

Xianzheng Sun

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Abstract

When bridging between experts and audiences, media firms often have their own biases which give them the incentive to manipulate information deliveries. This paper studies a cheap talk game in which media firms (moderators) can strategically design the delivery of experts’ messages to decision makers. A moderator is allowed to affect the delivery of messages by selecting experts and informing the decision-maker about the experts’ biases. I show that moderators can in equilibrium send partition-type messages to inform the receiver of experts’ biases, and moderation can improve communication informativeness.

1. Introduction

Communication is an everyday economic activity. Informed senders, such as Advertisers, politicians, and lobbyists, send messages to persuade and sell. Uninformed receivers, such as buyers and voters, take advice from the senders and then make economic decisions. Much literature is invested in studying direct communications between two or more parties. However, in today’s society, communications between senders and receivers often involve third parties, like news media. Direct consolidations between listeners and human experts are still important but becoming less common. Instead, people are often framed, primed, and given backgrounds to assist information learning by various media. With their preferences and biases, the media (which I the moderators) will strategically influence the communication between the senders and receivers in their favor. Given their abundance, understanding their effects on communications carries important implications. Plausibly, there are many methods through which such moderation can happen in reality. In this paper, I consider a communication situation in which moderators strategically alter receivers’ perceptions of senders’ biases under a cheap talk framework.

When it comes to communications, biases are significant to consider because their perceptions influence the outcomes of information transmission. What are biases? Economists and game theorists use “bias” to describe different players’ preferences. They often assume that preferences are quantifiable and one-dimensional for tractability; this paper will follow this convention. For example, people have diverse political preferences, which can be quantified on
a left-right scale. In real society, the sources of biases are diverse. It would be almost impossible to find someone whose preferences exactly match yours. Moreover, people with different preferences have to communicate and work with each other constantly. Thus, Crawford and Sobel (1982) proposed an important model (the CS model) to describe information transmission between two parties with misaligned biases.

To better understand the CS model, think of a situation where a politician (male) consults an expert (female) regarding a forest mining policy decision. The two individuals, or the players, derive utility from economic growth and nature preservation, though the expert prefers economic growth more. The politician wants to know how much profit mining one arc of the forest can bring, and this information is known to the expert rather than the politician. The politician wants to know the true economic value of the forest per arc and then take action to maximize his utility. However, since the expert is biased towards economic growth, she has the incentive to over-report the economic value of the forest in order to convince the politician to mine more acres of the forest. Knowing the expert’s preference misaligns with his, the politician will choose whether to accept this biased information.

This kind of information transmission between a biased but informed expert and an uninformed decision-maker is studied by (Crawford and Sobel, 1982). It is called the cheap talk model (because the messages sent are costless). The economic value of the forest in the above example is called the state of the world, denoted by \( \Theta \), and the bias of player \( i \) is denoted as \( b_i \). The realization of \( \Theta - \theta \) is the true value of the forest that is observed only by the expert. It is assumed to be distributed according to some \( f(\theta) \) in the interval \([0, 1]\), and the distribution is public information. Biases are assumed to be constants to be inputted into players’ utility functions. Therefore, they are standardized so that the decision maker’s bias equals zero (“unbiased”) for simplicity. With the quadratic utility assumption, Crawford and Sobel (1982) show that the sender will partition the information space in equilibrium and send partition-type messages.

Partition-type messages are vague messages. In the forest mining example, the expert may partition the range of the state into several sections, such as “low profit” and “high profit”. This would be the case of a 2-partition equilibrium. In this equilibrium, when the state is observed to be higher than some partition point, she reports the high message (that “the profit is high”) to the politician, and vice versa. Crawford and Sobel (1982) demonstrate that, due to the sender’s bias, even if she signals that the state is located at a precise value, her message will still be seen as a noisy message by the receiver. If the receiver believes that the sender’s message is precise in equilibrium, the biased sender will always lie to achieve her most preferred action. Therefore, fully believing the expert cannot be an equilibrium action for the receiver. Hence, in cheap talk communication with biased senders, informative messages that can be conveyed must be vague.

Upon receiving the vague but informative message, the politician updates his belief about the true state and takes action that equals his expectancy of the state. If the state is observed to be equal to the partition point, the expert is indifferent between sending the two messages. Intuitively, an unbiased expert would be indifferent between reporting
“high” and “low” if the observed state equals the average. Hence, the unbiased partition point is the statistical average of the state (in the 2-partition equilibrium). In the example above, we assumed the expert has a positive bias (prefers economic growth more), pooling more “states” to the high section and making her partition point lower than the state’s distributional average. Therefore, even if the profit is slightly lower than the statistical average, she may still report a high message, making the politician’s expectancy conditioned on receiving her high message lower. Then, the politician will “down-scale” her reports, resulting in lower action points. The Cheap talk model shows the effects of biases in direct communications.

Crawford and Sobel (1982) assume that players’ biases are public information - the expert and the DM knows the exact discrepancy in their preferences. However, this assumption fails in many real-world scenarios. Consider the following motivating example, when voters receive political persuasions from political experts (whether a policy is “good” or “bad”), voters usually have vague perceptions of the experts’ biases. They may know an expert as being “relatively left” or “very left”, but they do not know the exact value of this bias if standardized into the interval [0,1].

As a result, moderators with superior information regarding the sender’s bias can influence the receiver’s actions. When experts give speeches through media, their identity is introduced by the newsagents; newsagents signal over experts’ biases just like experts signal over the state of the world. And as demonstrated above, the outcomes of the expert’s message will be altered if the audience’s perception regarding her bias changes. Some newsagents in the journalism industry have internal policies mandating the disclosure of experts’ biases (like political stands). However, since there are no universal standards quantifying biases of experts, such policies do not limit the informative power of newsagents - they are mandated to send a message but are free to design the message.

Dimitrakas and Sarafidis (2005) drop the assumption that the expert’s bias is public information. As an extension of the Crawford and Sobel model, they study a cheap talk model where the expert’s bias is uncertain to the DM. They assume the expert’s bias is distributed according to some continuous function in [0,1]. In this setup, both the state and the expert’s bias is private information of the expert, while the distribution of the expert’s bias is public information. Hence, the expert’s “type” is a two-dimensional pair (θ, b) distributed in the unit square [0,1]^2, as illustrated by the figures. Dimitrakas and Sarafidis (2005) show that the information space will be partitioned by diagonal lines located in the southwest corner of the unit space, as shown in Figure 1. I will discuss their results in more detail in the next section.

In this paper, I further extend Dimitrakas and Sarafidis (2005) to build the moderated game. My model concerns the moderator’s behavior, which can influence the delivery of the expert’s message by signaling the expert’s bias. The game depicts the interaction among an expert (sender), a moderator, and a receiver (Decision-Maker). Firstly, an expert (female) observes the state of the world. She sends a cheap talk message regarding the state to the moderator and the DM. Second, the moderator (male) observes the expert’s bias, updates his belief regarding the state, and sends a cheap talk message to the DM about the expert’s bias. Lastly, the DM update their belief regarding the state based
on the two messages and takes action equating their expectancy. My main result is illustrated in Figure 2. As in Dimitrakas and Sarafidis (2005), the expert sends partition-type messages with a discontinuous partition line. My result shows that moderation prompts the informativeness of communication. This paper contributes to the cheap talk literature by broadening its theoretical application.

1.1. related literature

Other than Dimitrakas and Sarafidis (2005), Li and Madarász (2008) also examines cheap talk communication with an uncertain-biased expert. They studied a cheap talk between an expert and a DM. Different from (Dimitrakas and Sarafidis, 2005), they assumed that the expert’s bias follows a binary distribution. They found that when the expectancy of the expert’s bias is zero, the expert can convey continuous messages over some spectrum and induce their most desired actions. They concluded that both sender’s and receiver’s welfare are higher without disclosing the expert’s bias under most circumstances compared to the case with mandatory disclosure of the expert’s bias. Because the binary distribution assumption is unlikely to hold under the real-world scenarios I presented previously, I adopt Dimitrakas and Sarafidis (2005) as the preliminary to build the moderated game.

This paper may seem related to the topics of Mediation and intermediating in economics. However, these topics are not relevant to my paper. To avoid confusion between these topics and my paper, I shortly introduce these topics here. Mediation is often discussed in the context of political science and international relationships. It describes the situation of, in the presence of a principal-agent problem, a third party mediating and seeking a solution for the principal and the agent. In Mediation literature, the third party is also called the “moderator”, but it is irrelevant to the information moderation I describe in my model. See Salamanca (2022) for a summary of the topic of Mediation. Secondly, the term “intermediating” is used in Hierarchical cheap talk. It concerns the situation where a cheap talk message is passed down from an informed sender to a series of biased intermediators, eventually to a receiver. The receiver acts upon receiving the message, and her action affects all players’ payoffs (Ambrus et al., 2013). Known-biased intermediators alter the message they receive according to their own biases before passing it down, reducing the informativeness of the message as the game proceeds. Unlike the intermediating cheap talk model, my model studies how a third party moderates the communication between a sender and a receiver by signaling the sender’s bias to the receiver. My model contributes to the cheap talk literature by studying the situation where the unknown-biased expert’s message is truthfully delivered and focuses on the moderator’s strategic communication over the expert’s bias.

The rest of this paper is structured as the following. In Section 2, I describe the model setup and preliminaries. In section 3, I define equilibrium. In section 4, I discuss the model and conclude.
2. Model

The three players in this game are the biased expert(she), the biased moderator(he), and the unbiased decision maker(they). The DM is interested in knowing the value of the state. The state $\theta$ is a random variable uniformly distributed on $[0, 1]$. The DM is assumed to have a bias of zero(or unbiased). The moderator has bias $b_2$. The DM’s and the moderator’s biases are public information. The expert has bias $b_1$, which is only observable to herself and the moderator but not the DM. $b_1$ and $b_2$ are assumed to be independently and uniformly distributed in $[0, 1]$.

The game proceeds as the following. The expert first observes the realization of the state, then sends message $m_1 \in M_1$ regarding the state to the moderator and the DM. Then, the moderator updates his belief regarding the state upon receiving $m_1$, observes $b_1$, and sends message $m_2$ regarding $b_1$ to the DM. After receiving both $m_1$ and $m_2$, the DM updates their belief regarding the state and the expert’s bias, then takes action $a$, which affects all player’s payoffs.

As a convention in the cheap talk literature, players are assumed to have quadratic-loss utility

$$u_i(\theta, a, b) = -(a - \theta - b)^2,$$

where $u_i$ and $b_i$ represent player $i$’s utility and bias respectively. With the quadratic-loss utility assumption, $u_i$ of player $i$ will be maximized when the DM’s action $a$ equals $\theta - b_i$; and the maximum of $u_i$ is zero. We can also see that, if there exists two action points $a_1 > \theta - b_i$ and $a_2 < \theta - b_i$, such that $a_1 - \theta - b_i = \theta - b_i - a_2$, then the corresponding payoffs $u_1^i = u_2^i$. These two observations will be useful when solving for the equilibrium.

In section 3, I formally define the equilibrium of this moderated cheap talk game. But first, understanding the expert’s behavior when the moderator is absent would be helpful for us to solve the moderated model. In subsection 2.1, I present the preliminary model regarding the expert’s behavior in the absence of moderation.

2.1. Preliminary: Cheap Talk with an Uncertain-Biased Expert without Moderation

If we omit the moderator from the game described above, the game is identical to Dimitrakas and Sarafidis (2005). In this game, an expert with uncertain bias sends a cheap talk message to the DM in the absence of moderation regarding the state.

In this setup, there are two unknowns to the receiver; the state $\theta$ and the expert’s bias $b_i$. They are independently and uniformly distributed in $[0,1]$. We write it as $(\theta, b_i) \in [0, 1]^2$. In game theory paradigm, this unknown pair is the sender’s type(for example, if an expert has bias $b_i$ and observes the state to be $\theta_i$, we say that she has sender-type $(\theta_i, b_i)$).

Figure 1 illustrates a 2-partition equilibrium of Dimitrakas and Sarafidis (2005). The unit square in the figure represents the two dimensional information space of sender-type $(\theta, b) \in [0, 1]^2$. In the 2-partition equilibrium,
sender-types with $\theta + b_1 > x$ send message $m^h_1$, whereas those with $\theta + b_1 < x$ send $m^l_1$ ("l, h" for "low, high"). $x$ is a constant that determines the location of the partition line. The partition line locates below the diagonal (the dashed line) of the unit square. After receiving the message, the receiver updates their Bayesian belief about the sender-type and takes the optimal action which equals their belief regarding the state.

Dimitrakas and Sarafidis (2005) makes the observation that if a sender-type $(\theta^1, b_1^1)$ sends a certain message, all sender-types $(\theta, b_1)$ such that $\theta + b_1 = \theta^1 + b_1^1$ will send the same message in equilibrium. This observation is a result of the quadratic utility assumption. It implies that the sets of Sender-types that send different signals are separated by straight lines of slope $-1$. These lines are called partition lines; if the sender-type locates right on a partition line, the sender is indifferent between sending the two messages separated by this partition line. Dimitrakas and Sarafidis (2005) also notes that, DM’s action $a = 1$ is the most desirable action for all sender type with $\theta + b_1 \geq 1$ because there is no higher action. Therefore, all partition lines must lay below the northwest-southeast diagonal of the information space.

We can find the exact value of $x$ to solve for this 2-partition equilibrium using figure 1. First, we find the receiver’s conditional expectancy regarding $\theta$ upon receiving the expert’s messages $m^l_1$ and $m^h_1$.

$$E[\theta|m^h_1] = \frac{x^3 - 3}{3(x^2 - 2)}$$

$$E[\theta|m^l_1] = \frac{1}{3x}$$

Graphically, in figure 1, $E[\theta|m^l_1]$ represents the expectancy of $\theta$ in the bottom-left triangular region of the unit square, and $E[\theta|m^h_1]$ represents the expectancy in the rest of the unit square. Since we know that an unbiased sender who observes $\theta = x$ would be indifferent between sending $m^l_1$ and $m^h_1$, we can calculate $x = 0.312$ by setting

$$x = \frac{1}{2} (E[\theta|m^1_1] + E[\theta|m^2_1]).$$

Dimitrakas and Sarafidis (2005) show that there exists a partition-equilibrium of size $k$ (having $k$ partitions), for any integer $k$; as $k$ goes to infinity, the equilibrium converges to a limit equilibrium. However, the informativeness of the communication increases very little as $k$ increases.

3. Definition of Equilibrium

As the convention in the cheap talk literature, I employ the Perfect Bayesian Equilibrium (PBE) as my solution concept. The equilibrium consists of the biased expert’s signaling rule $m_1(\theta, b_1) \in M_1$, another signaling rule, $m_2(m_1, b_2) \in M_2$, for the biased moderator, and the unbiased DM’s action rule, $a(m_1, m_2) \in A$. Players update their beliefs in a
Bayesian fashion upon receiving signals.

For simplicity, I assume $M_1$ and $M_2$ each contain two messages. Connecting to the motivating example from Section 1, this assumption would mean that the political expert can only signal whether her sender-type is "high" or "low"; similarly, the new agent can only signal whether the political expert’s bias is "high" or "low". This assumption limits the application of the model to a very simple and specific scenario, where both the expert and the sender can only send two messages each. However, because of its simplicity, this model still has large applicability. The most common type of question we face in our daily life if probably the "Yes-or-No" question, and there are only two informative answers to it. On the other hand, we much less often face communication situations where we have to provide a very precise, calculated answer. To communications, simple means common. Hence, the simple model I describe in this paper is applicable to a wide array of real-world situations. Additionally, following the equilibrium concept, we can generalize the model to higher-partition communications.

The signaling rules determine the messages that the expert who has sender-type $(\theta, b_1)$ and the moderator send. In the PBE, we have

$$m_1(\theta, b_1) = \arg \max_{m_1} [u_1[a(m_1, m_2), \theta, b_1]], \quad (5)$$

$$m_2(m_1, b_2) = \arg \max_{m_2} [u_2[a(m_1, m_2), E(\theta|m_1, b_2)], b_2]]. \quad (6)$$

These conditions ensure that the expert’s and the moderator’s signaling rules are optimal given the DM’s action rule. We also have

$$a(m_1, m_2) = \arg \max_{a} [u_{DM}[a(m_1, m_2), E(\theta|m_1, m_2)], \quad (7)$$

which states the DM’s action is optimal given the signaling rules. From the quadratic-loss utility assumption, the DM takes equilibrium action equal to their belief regarding the realization of the state.

3.1. The Babbling equilibrium

Since this is a cheap talk game, the babbling equilibrium necessarily exists. In the babbling equilibrium, both the expert and the moderator send uninformative messages to the DM, and the DM ignores all messages. If the expert sends a meaningless message to the DM, the rational DM will ignore this message. If the DM ignores all messages from the expert, the expert has no incentive to send informative messages. Since the moderator’s message only concerns the expert’s bias, he cannot contribute to a meaningless message from the expert. Hence, no player has the incentive to deviate from babbling.
3.2. The 4-partition Equilibrium

Figure 2 illustrates the 4-partition equilibrium. This equilibrium is characterized by five dividing points \( x_1, x_2, x_3, I_1, I_2 \). In this equilibrium, the biased expert sends \( m^1_i \) if her sender-type \( \theta + b_i \) is above the discontinuous partition line, and \( m^h_i \) if otherwise. The expert’s partition line, denoted as \( X \), can be written as

\[
X = \begin{cases} 
  x_3 - \theta, & \text{if } 0 \leq \theta < x_3 - I_2 \\
  I_2, & \text{if } x_3 - I_2 \leq \theta < x_2 - I_2 \\
  x_2 - \theta, & \text{if } x_2 - I_2 \leq \theta < x_2 - I_1 \\
  I_1, & \text{if } x_2 - I_1 \leq \theta < x_1 - I_1 \\
  x_1 - \theta, & \text{if } x_1 - I_1 \leq \theta < x_1.
\end{cases}
\]  

(8)

Conditional on the expert sending message \( m^h_1 \), the moderator sends \( m^l_2 \) if he observes \( b_1 < I_2 \), and \( m^h_2 \) if otherwise. Similarly, when the expert sends \( m^l_1 \), the moderator sends \( m^l_2 \) if \( b_1 < I_1 \), and \( m^h_2 \) if otherwise.

I compute the following to describe this equilibrium. Signaling according to their PBE rules, the expert and the moderator divide the information space into 4 partitions. For notation simplicity, I use \( A, B, C, D \) to denote the 4 partitions that support the message pairs \((m^h_1, m^l_2), (m^l_1, m^l_2), (m^h_1, m^h_2), (m^l_1, m^l_2)\) respectively. Upon receiving each message pair \( m_1, m_2 \), the Decision Maker form Bayesian posterior probability for the state \( \theta \) and compute conditional expectancy. Using figure 2, we can easily calculate the conditional expectancy of \( \theta \) in each region by integration. They can be given by:

\[
E[\theta|A] = \int_0^{x_3 - I_2} (1 - x_3 + \theta) Pr(A) \, dt + \int_{x_3 - I_2}^{x_2 - I_2} (1 - I_2) \theta / Pr(A) \, dt + \int_{x_2 - I_2}^{1} (1 - I_1) \theta / Pr(A) \, dt,
\]  

(9)

\[
E[\theta|B] = \int_{x_1 - I_1}^{1} (l - x_1 + \theta) Pr(B) \, dt + \int_{x_1 - I_1}^{x_2 - I_2} (1 - I_1) \theta / Pr(A) \, dt,
\]  

(10)

\[
E[\theta|C] = \int_0^{x_3 - I_3} (x_3 - \theta - I_2) \theta / Pr(C) \, dt,
\]  

(11)

\[
E[\theta|D] = \int_0^{x_2 - I_2} (I_2 \theta / Pr(D) \, dt + \int_{x_2 - I_2}^{x_2 - I_1} (x_2 - \theta) Pr(D) \, dt + \int_{x_2 - I_1}^{x_1 - I_1} (1 - I_1) \theta / Pr(A) \, dt + \int_{x_1 - I_1}^{1} x_1 (x_1 - \theta) Pr(D) \, dt.
\]  

(12)

Now, consider the moderator’s indifferent points \( I_1, I_2 \). If the moderator observes \( m^h_1 \) and \( b_1 = I_1 \), by definition,
he must be indifferent between sending \( m_l^1 \) and \( m_h^2 \). Hence, conditional on observing \( m_l^1 \) and \( b_1 = I \),

\[
u_2(E[\theta|I, m_l^1], a(B), b_2) = u_2(E[\theta|I, m_h^1], a(A), b_2),
\]

(13)

where \( u_2 \) represents the moderator’s possible payoffs from either sending \( m_l^1 \), resulting in message pair \( B \), or sending \( m_h^1 \), resulting in message pair \( A \). Upon observing \( m_l^1 \) and \( b_1 = I \), it is easy to see that the moderator forms the posterior that \( \theta \) is distributed in \([x_1 - I_1, 1] \). Hence, his expectancy for the state is

\[
E[\theta|I, m_l^1] = \frac{1 - x_1 + I_1}{2} + b_2.
\]

(14)

Similarly, in the case when the expert sends \( m_l^1 \), the moderator has the indifferent condition

\[
E[\theta|A] + E[\theta|C] = x_3 + b_1.
\]

(16)

\[
E[\theta|A] + E[\theta|D] = x_2 - I_2 + b_1.
\]

(17)

\[
E[\theta|B] + E[\theta|D] = x_1 + b_1.
\]

(18)

So far, we have derived 5 indifferent conditions, and we can solve this system of equations to solve for the unknowns \( x_1, x_2, x_3, I_1, I_2 \) in terms of \( b_2 \) to describe the equilibrium.

We established that sender-types located on the indifferent curve \( b_1 = x_3 - \theta \) above \( b_2 = I_2 \) must be indifferent between \( a(A) \) and \( a(C) \). Form Dimitrakas and Sarafidis (2005), we know that the lower sender-types with \( 1 + \theta < x_3 \) will prefer a lower action than sender-types with \( 1 + \theta = x_3 \), making \( m_l^1 \) their most preferred action. Hence, they
have no incentive to deviate from sending $m_1^l$. The opposite can be said about sender-types $b_1 + \theta > x_3$. Thus, $b_1 = x_3 - \theta$ is indeed the equilibrium partition curve for senders with $b_1 > I_2$. Similarly, $b_1 = x_2 - \theta$ and $b_1 = x_1 - \theta$ are the equilibrium partition curves for senders who have $I_1 < b_1 < I_2$ and senders who have $b_1 < I_1$ respectively.

We also established that, if the moderator observes $m_1^h$ and $b_1 = I_1$, he must be indifferent between $a(A)$ and $a(B)$. If the moderator observes $b_1 > I_1$, we can easily see from figure 2 that his posterior belief about $\theta$ will be lower than observing $b_1 = I_1$. Thus, his most preferred DM’s action will now be the lower action, $a(A)$, therefore, he has no incentive to deviate from sending $m_2^h$. The opposite can be said about a moderator who observes $b_1 < I_1$.

We show that $I_1$ and $I_2$ are the equilibrium partition curves of the moderator’s decision after observing $m_1^h$ and $m_1^l$ respectively.

4. Discussion and Conclusion

Following the equilibrium strategies characterized above, players in our motivating model from section 1 should interact as the follows. The political expert will first convey whether imposing a policy is ”good” or ”bad”. The moderator, news agent, then signals whether the expert’s political stand is ”very right” or ”right to neutral”. With the message from the moderator, the voters then form more precise posteriors about the virtue of the policy relative to their own political stands and vote.

My model has important implication to the literature on mandatory disclosure. I show that moderation, or disclosure of the expert’s bias, improves the informativeness of communication. This is consistent with the motives of mandatory disclosure policies held by some news agents-they mandate the disclosure of their guest speakers’ political stands for the audiences. However, moderators will disclose the expert’s bias to the audience to maximize their own payoffs. This implies that mandatory disclosure policies are not actually binding because news agents will disclose regardless of the policy. Consistently, it is very common for news agents to release the biases of their guest speakers when mandatory disclosure of their biases is not in place. Also, outside of the journalism, we often observe participants of political debates attack their opponents by conveying that their opponents have extreme political preferences instead of directly reputing their arguments. By doing so, if the message is credible, they can reduce the informative value of their opponents’ arguments. Through the lenses of the cheap talk communication model, it is highly unlikely that real-life moderators precisely disclose all information they hold truthfully because people usually don’t have the exact same preferences for things. Moderators have their own biases and seek to strategically influence information delivery to maximize their own utility. Even with mandatory disclosure policies, it would not be rational for audiences to equate ”mandatory disclosure” with ”truthful disclosure”.

My result contradicts Li and Madarász (2008), who analyzed a cheap talk game with an uncertain-biased expert and showed that mandatory disclosure hurts the informativeness of communication. Their results come from the
assumption that the expert’s bias follows a binary distribution in the receiver’s prior, which is unlikely to hold in reality. More often in real-life communications, receivers have a vague idea about the direction of the sender’s bias. As discussed in Section 1, voters may know a politician for being “relatively left” or “very left”, but are unlikely to quantify this politician’s bias to a specific value. Receivers rely on a moderator, such as a news agent, to inform them how biased the sender is. My model has shown that in the latter case, moderation prompts more informative communication.

4.1. Limitations

In this paper, I describe the most simplistic form of the moderated cheap-talk game. I assume that both the expert and the moderator can send two messages only for computational simplicity. However, the same solution concept can be generalized to higher partition equilibria in terms of both the expert’s and the moderator’s strategy. For example, if we want to construct a model in which the moderator conveys more accurate messages, we do so by increasing the partitions in his messaging space and setting up more corresponding indifferent conditions. We then solve for the value of the moderator’s bias that can sustain such equilibrium. Also, as discussed in section 3, the simplicity of the 4-partition equilibrium actually gives it large applicability because the simple questions such as ”Yes-or-No” questions are what we face the most in daily communications. Additionally, as demonstrated by Dimitrakas and Sarafidis (2005), with an uncertain-motives expert, the marginal gain in the informativeness of increasing the accuracy is very low.

In this paper, I also made the assumption that disclosure of the expert’s bias sequentially follows the expert’s message. Certainly, this assumption captures some real-life situations. For example, when news agents invite guests speakers to be on their programs, they often first communicate what content that the speaker will present. In this case, the news agents receive the experts’ messages before sending their own messages. For future study, it will also be of interest to study the game with the assumption of simultaneous move or sequential move with the opposite order.

4.2. Conclusion

This paper proposes a moderated cheap talk model with an uncertain-biased expert. Motivated by commonly seen moderated communications, this paper aims to capture how a third party can strategically moderate communications. Results of this paper are obtained in the context of the baseline model of Crawford and Sobel (1982) and Dimitrakas and Sarafidis (2005). It has been shown that moderation could increase the informativeness of communication between an uncertain-biased expert and a decision maker. It would be of interest to later relax its assumptions and generalize it to a broader theory, and compare it with empirical data to test for validity.
 References


Figure 1: preliminary model
Figure 2: preliminary model