

Motivation

- There are situations in which a sender may benefit by altering the receiver's belief about the state of the world. Unlike the predictions of standard economic models, not everyone will blatantly lie to get the largest benefit from the receiver's action.
- The recent development in the literature of lying in economics investigates how people are averse to lying mainly for two reasons: a preference for being honest and a preference for being seen as honest.
- However, little is known about how vagueness, as opposed to a blatant lie, plays a role in communication in relation to lying cost. We explore how the two aspects of lying/misleading communication affect people's sophisticated use of vague messages.
- Our experiment design generalizes the framework of Fischbacher and Föllmi-Heusi (2013) and provides a bridge between the literature of lying behavior to a broader set of studies that involve vague communication.

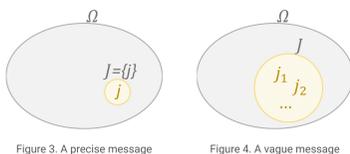
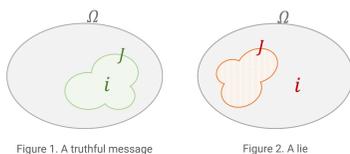
Model: setup

- Our model extends that of Gneezy, Kajackaite, and Sobel (2018) and Khalmetzki and Sliwka (2019) to allow subjects to transmit a set-valued message.
- A population of agents and one audience.
- Each agent learns the state of the world $i \sim \text{Unif}[\Omega]$ (i.i.d.) where $\Omega = \{1, 2, \dots, 10\}$.
- The agent sends a message J after learning i .
 - A message J is a non-empty subset of Ω
 - A message J is truthful if $i \in J$, and a lie otherwise.
 - A message J is called precise if it is a singleton set, and vague otherwise.

- The audience observes the agent's message and updates their belief about how honest the agent is.

Model: utility

- The agent receives the monetary payoff proportional to a number randomly drawn from their message.
- The agent feels guilty when reporting a lie. (internal cost; guilt)
- The agent cares about the audience's posterior belief about how honest the agent is. (external cost; social identity)
- One shot; no repeated interaction.



$$U(i, J) = \text{monetary payoff}(J) - 1(i \notin J) \cdot \text{internal guilt} + \gamma \cdot \text{external social identity}(J)$$

Experiment design

- Zoom meetings for instructions & Qualtrics for the main experiment.
- Subjects first draw a random number between 1-10 on their web browser.
- Subjects are asked to report the number by clicking boxes on the screen.
- The payment depends only on the report, not the drawn number.
- Two stages: within-subject analysis
 - Restricted:** can select only one box at a time (only precise messages available)
 - Unrestricted:** can select multiple boxes at a time (both precise and vague messages available)



Figure 5. A screenshot of the software (restricted message space)



Figure 6. A screenshot of the software (unrestricted message space)

Lying Aversion and Vague Communication: An Experimental Study

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An agent may benefit from misleading the audience's belief about the state of the world. While a blatantly misleading message may be more effective than a vague message, this may cause the individual to feel more guilt or negatively affect the individual's social identity. We explore the extent to which these two types of lying costs affect communication in a novel experiment setting that generalizes the framework of Fischbacher and Föllmi-Heusi (2013). Our result indicates that people can mitigate their psychological costs by employing a vague message instead of a blatant lie. However, the social identity concern affects the form and the degree of the vagueness of the message.

People exploit vagueness so as to be consistent with the truth, while leveraging the imprecision to their own benefit. Their belief about how their message would be interpreted determines the degree of vagueness.

Experiment design: treatments

	Non-anonymous & observable	Anonymous & non-observable
Restricted (only precise messages available)	NA-R	A-R
Unrestricted (both precise and vague messages available)	NA-UR	A-UR

Table 1. 2x2 design: four treatments

- Anonymity of agents: between-subject analysis allows the isolation of internal lying cost from external social identity.
 - Anonymous:** screen name, no student ID, video off
 - Non-anonymous:** real name, student ID, video on
- Observability of the true state
 - In anonymous treatments, the random number is generated within the software, and the experimenter observes the true state.
 - In non-anonymous treatments, the random number is generated outside the software, and the experimenter cannot observe the true state.

Result Overview

	Average report		Subjects using vague messages	Number of liars		Number of subjects
	Restricted	Unrestricted		Restricted	Unrestricted	
Non-anonymous	6.556	8.208	25 (69.4%)	-	-	36
Anonymous	6.788	8.285	18 (54.5%)	12	6	33

- Preferences for vague messages
 - Majority of subjects used vague messages** when the message space was unrestricted.
 - Moreover, subjects reported higher on average when the message space was unrestricted. The difference is statistically significant in both non-anonymous and anonymous sessions. The result is analogous to the 'moral wriggle room' effect.
- The effect of anonymity
 - Subjects reported higher on average in anonymous sessions than in non-anonymous sessions, but the difference is small and statistically insignificant.

Result: internal lying cost and vague messages

- In anonymous sessions (A-R and A-UR),
 - 12 subjects lied (36.4%) when the message space was restricted. 6 of the 12 liars switched to truthful yet vague messages when allowed to use vague messages.
 - Those who did not lie when the message space was restricted remained truthful even when allowed to use vague messages.
 - All vague messages reported included the true state in their messages, but the majority of them used 'obvious' messages that maximize/nearly maximize their expected monetary payoff among vague yet truthful messages.
 - The above results suggest that **people sophisticatedly exploit vagueness so as to be consistent with the truth, while leveraging the imprecision to their own benefit.**

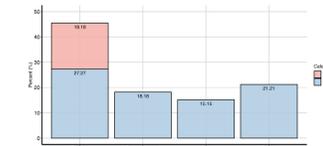


Figure 7. Message types used in A-UR treatments

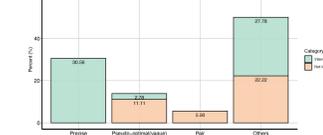


Figure 8. Message types used in NA-UR treatments

Result: external lying cost and vague messages

- Most subjects used vague messages in both anonymous and non-anonymous treatments. However, the pattern differs.
 - In non-anonymous sessions, 25 subjects (69.4%) used vague messages, while in anonymous sessions, 18 subjects (54.5%) used vague messages.
 - The mean of the numbers used in a message in non-anonymous sessions is 3.72, as opposed to that of 3.06 in anonymous sessions. The distribution in non-anonymous sessions also shows a longer tail.
 - Subjects in anonymous sessions used more obvious messages (61.1% of vague messages), while those in non-anonymous sessions avoided obvious messages (only 28% of vague messages).
 - These results indicate that **the sender's belief about the receiver's interpretation of a message matters, and the belief is manifested in the different forms of vague messages.**

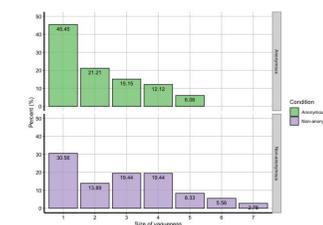


Figure 9. Size of vague messages in A-UR and NA-UR treatments