Engagement, Disengagement & Exit

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Information is an important source of a democracy's value

> "[G]ood public policy for a democratic community ... requires a system for organizing what is known by many disparate people.
>
> [M]aking good use of dispersed knowledge is the original source of democracy's strength."
>
> —Josiah Ober, *Democracy and Knowledge: Innovation and learning in classical Athens*, 2008.

The decision to share information with others is a strategic consideration

1. As preferences diverge, the ability of people to credibly communicate is reduced
2. Exacerbated in settings where communication is costless and non-verifiable (cheap talk)

These settings characterize many democratic societies:

Information decentralized across a diverse population, no barriers to association or communication, and people can talk without fear of punishment

The Question:

What kinds of societies support voluntary association and information sharing across groups?

1. Multiple groups with private information
2. Groups can voluntarily associate with other groups or “go it alone”
3. Within the association:
   - Groups communicate with each other and then make decisions
   - Each group’s decision jointly affects everyone

This paper characterizes the “associations” of groups that can be sustained in equilibrium

These are sets of groups for which:

1. Some information transmission is possible
2. The benefits of this information outweigh the costs stemming from preference diversity within the association
3. Groups outside the association prefer to stay outside

What I care about

- Democratic societies as groups that voluntarily interact and willingly bear negative externalities due to the choices of others
- Larger “associations” may not maximize utilitarian welfare, but do maximize (something akin to) Rawlsian welfare

More specifically

- How to use institutions to grow the size of an association
- How intra-group communication (norms) might affect a group's ability to associate with outgroups
- *What do equilibrium associations look like?*

Groups

- An unknown state of nature, $\theta \in [0, 1]$
- A set of groups: $g \in G$, with n_g the "size" of g (number of signals about θ received by g)
- Group g's policy preference / bias: $\beta_g \in \mathbb{R}$
- "Group" an actor consisting of an amalgamation of n_g signals and a bias

Related Models

Galeotti, Ghiglino, & Squintani (2013), Dewan & Squintani (2012), Dewan et al. (2012), Patty (2013), Gailmard & Patty (2013), Patty & Penn (2012)...

Association and exit

- Prior to any information being revealed, each group chooses whether to associate ($a_g = \texttt{a}$) or exit ($a_g = \texttt{x}$)
- The set of groups that choose association is denoted R, "the association"
- The set of groups that choose exit is denoted X

Preferences

- Every group will undertake an activity, $y_g \in \mathbb{R}$
- For $g \in X$ payoffs are defined by

$$u_g^{\mathtt{x}}(y|\theta) = -(y_g - \theta - \beta_g)^2$$

- For $g \in R$ payoffs are defined by

$$u_g^{\mathtt{a}}(y, R|\theta) = -\sum_{h \in R} \alpha_h^R (y_h - \theta - \beta_g)^2$$

- α_h^R is an exogenous weight attached to group h's actions by each member of R ("influence")

Private information & updating

- State of nature, θ, drawn from Uniform$[0,1]$ distribution
- Each group g privately observes n_g independent $\{0,1\}$ signals with

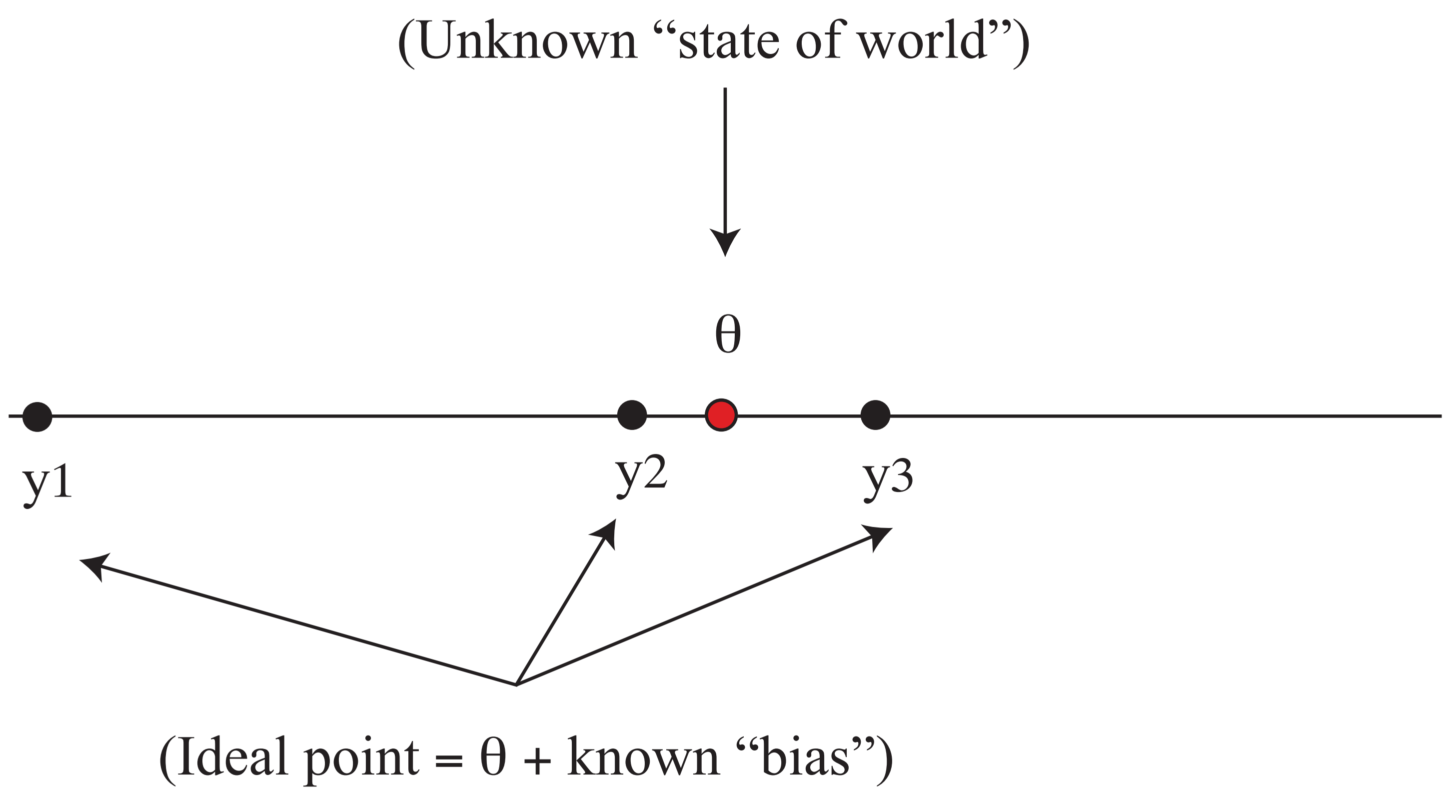
$$\begin{aligned}\text{Pr}[\text{signal} = 1 \mid \theta] &= \theta \\ \text{Pr}[\text{signal} = 0 \mid \theta] &= 1 - \theta\end{aligned}$$

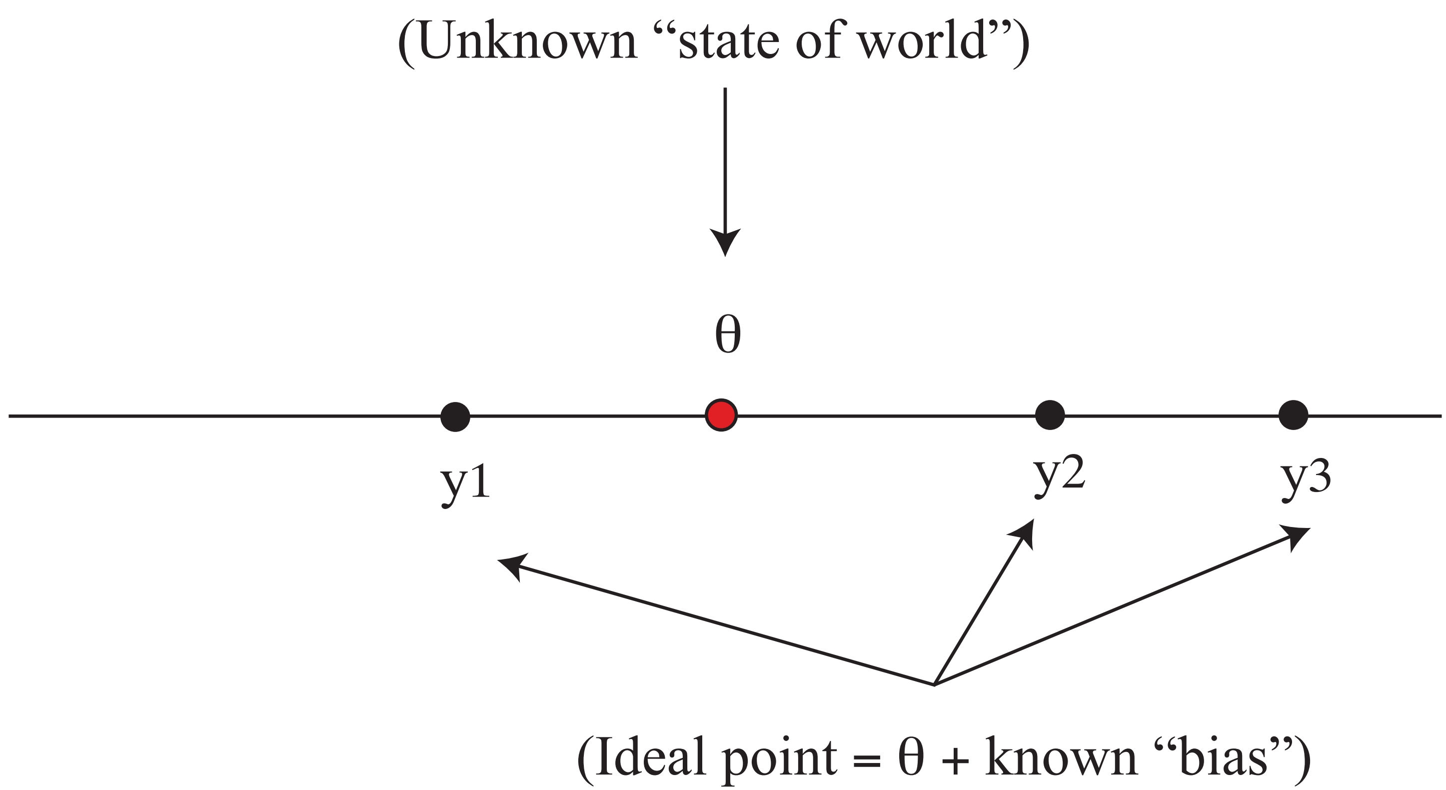
- Group's posterior belief about θ after m signals and k successes is

$$E(\theta|k,m)$$

- If g is privy to k successes and $m-k$ failures, then it optimally selects:

$$y_g^*(k,m) = E(\theta|k,m) + \beta_g$$


(Unknown “state of world”)
θ
y1
y2
y3
(Ideal point = θ + known “bias”)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y1
y2
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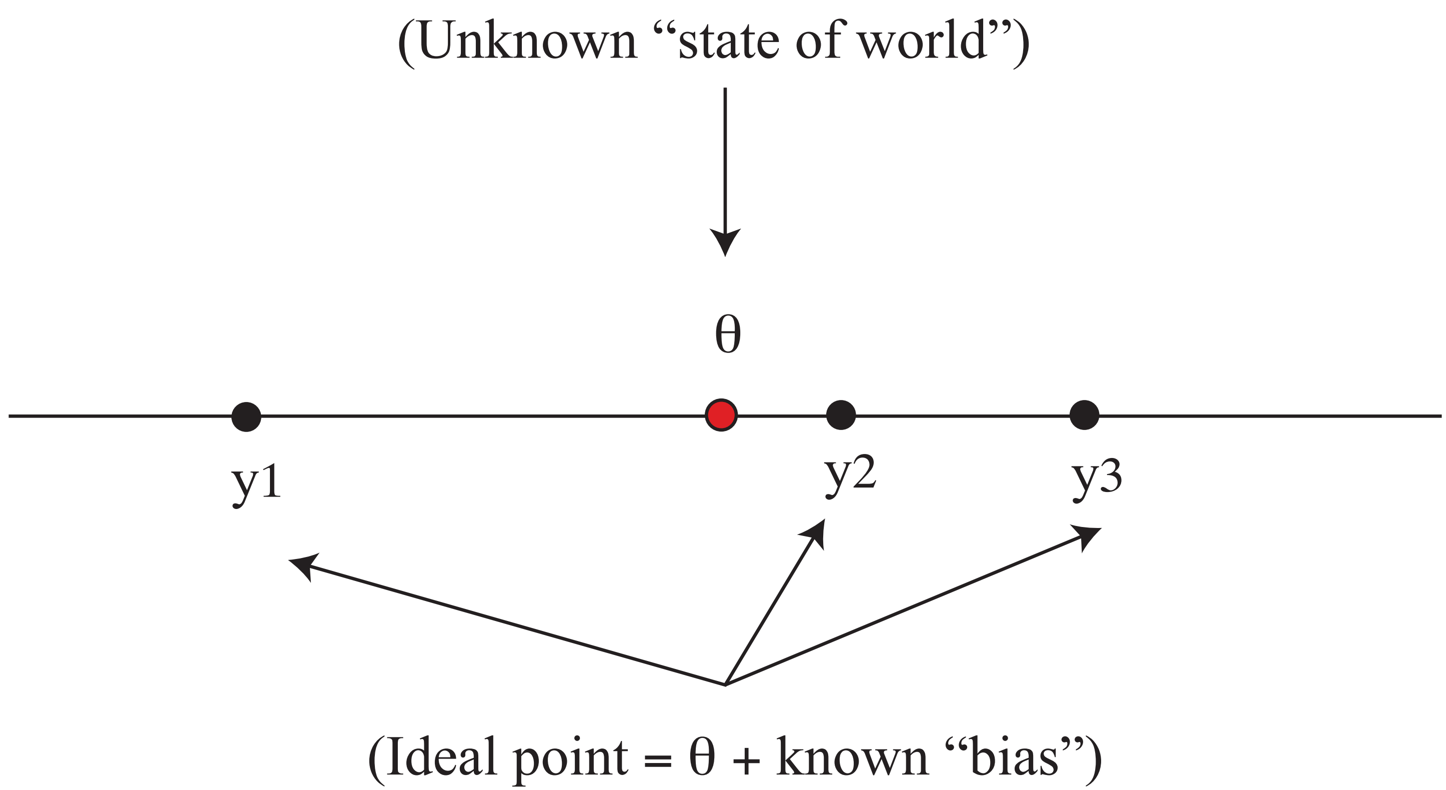

(Unknown “state of world”)
θ
y1
y2
y3
(Ideal point = θ + known “bias”)

Messaging

- Each $g \in R$ sends a public message to the set of associators R
- g's private information is s_g, the $\#$ of successes of n_g signals
- Focus on messaging strategies that are either separating or pooling

- Equilibria characterized as divisions of G into sets $\{E, D, X\}$
  - E: $a_g =$ a and message$= s_g$ for all $s_g \in \{0, ..., n_g\}$
  - D: $a_g =$ a and message$= 0$ for all $s_g \in \{0, ..., n_g\}$
  - X: $a_g = \mathtt{x}$

Messaging equilibrium

For "association" $R \subseteq G$, a division of R into disjoint sets $\{E, D\}$ is a **messaging equilibrium** for R if the following hold:

1. Equilibrium beliefs: messages sent by $g \in E$ are taken as equal to s_g and messages sent by $g \in D$ are disregarded as uninformative
2. Actions y_g^* are sequentially rational given groups' own signals and the messages they receive
3. Groups $g \in E$ have no incentive to lie given the (correct) beliefs, actions and equilibrium messaging strategies of other $h \in R$

$$\mu(R) = \{\{E, D\} : \{E, D\} \text{ is a messaging equilibrium for } R\}$$

Societal equilibrium ("stable societies")

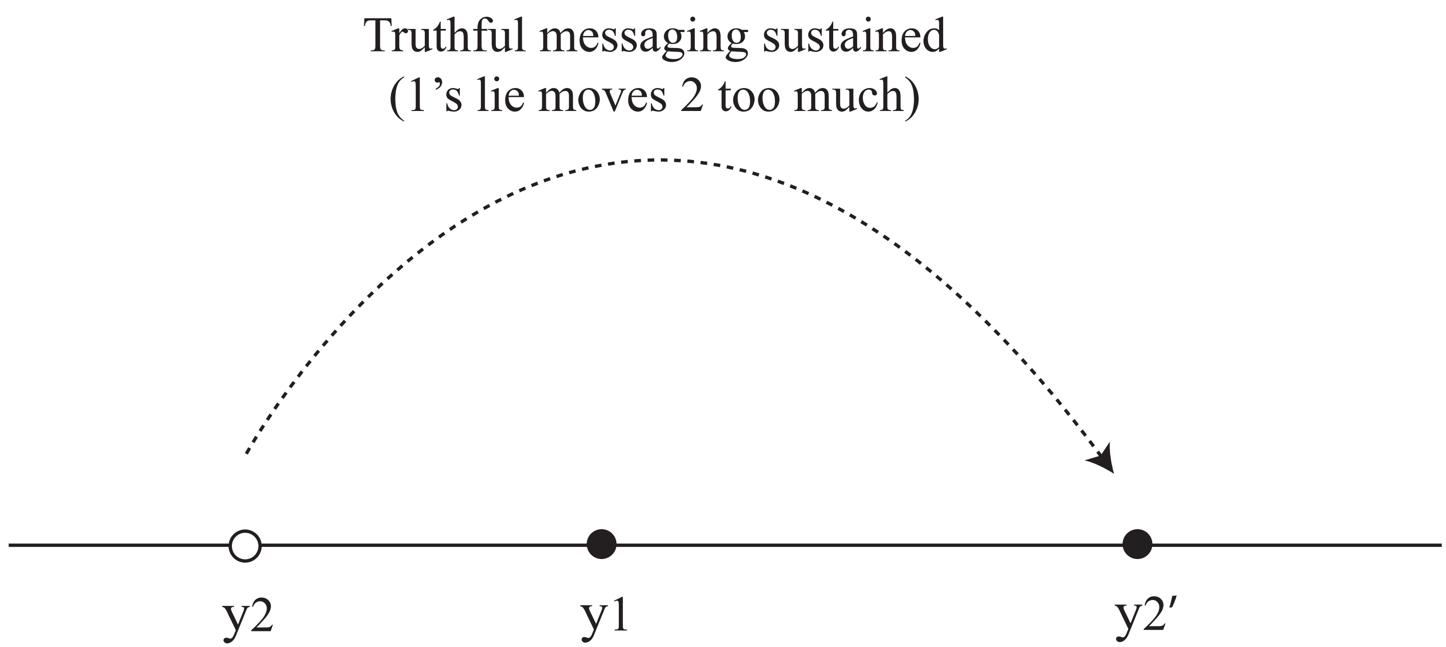
A society $\sigma = \{E, D, X\}$ is **stable** if the following hold:

1. $\{E, D\}$ is a messaging equilibrium for association $R = E \cup D$
2. For $g \in X$ actions y_g^* are sequentially rational given g's signals
3. Groups don't want to change their association decisions:
   - For $g \in R$, EU(association) $\geq EU$(exit)
   - For $g \in X$, EU(exit) $\geq EU$(association at "best" μ)

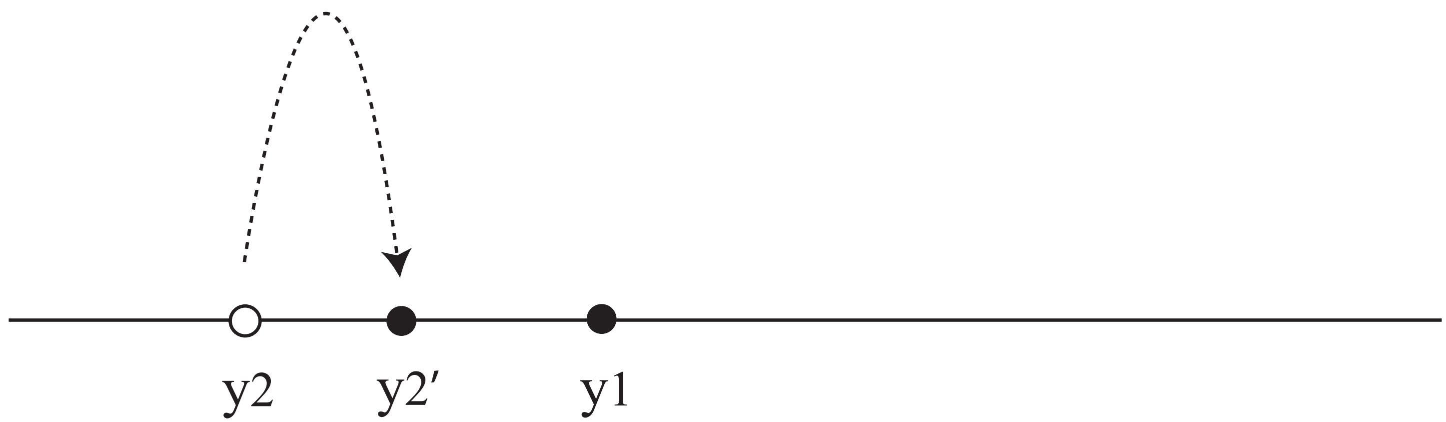
When can truthful messaging be sustained?

- When the impact of a lie shifts the policy choices of others too much
- Intuitively: When the lie overshoots the actual preference divergence of the groups

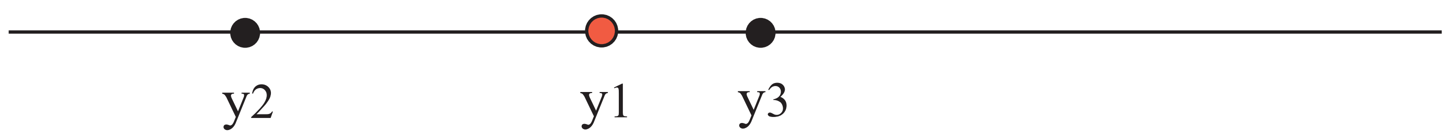
When can 1 message truthfully to 2?


Truthful messaging sustained
(1's lie moves 2 too much)
y2
y1
y2′

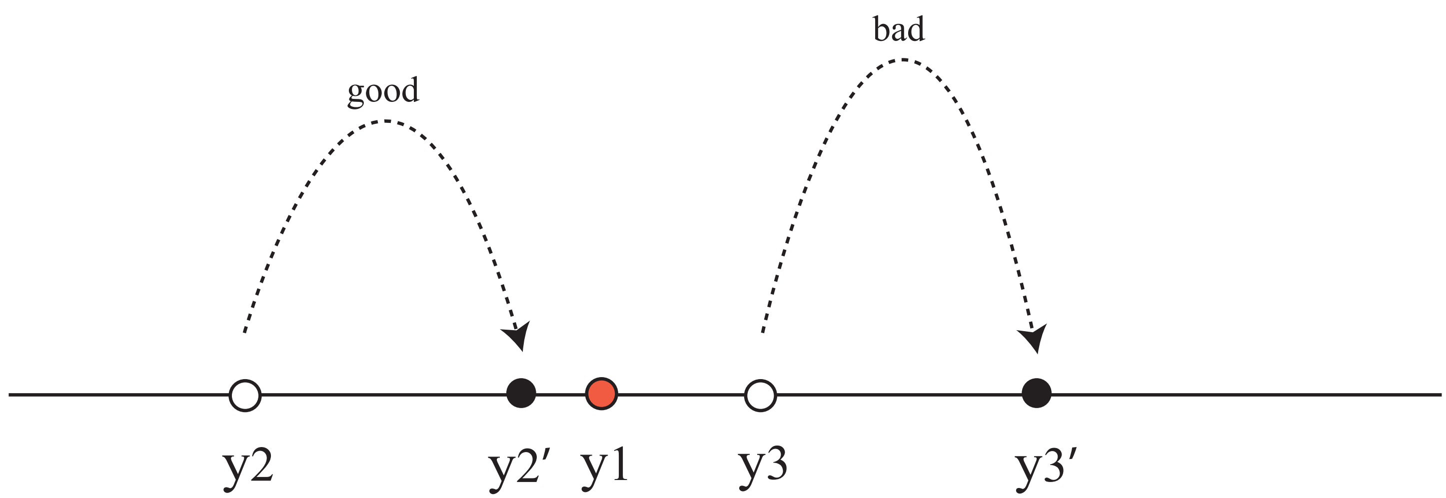
Truthful messaging can't be sustained
(1's lie is beneficial)



It is harder for centrist groups to lie



It is harder for centrist groups to lie



Takeaway points about truthful messaging

- “Congestion effect”: too much information can hinder communication
  - More information (signals) makes it easier to tell a “little lie”
  - Lying less costly as it shifts others less

- Centrist groups more likely to be truthful
  - Lying more costly as it shifts some groups farther
  - Similarly, extreme groups less likely to be truthful

When can voluntary association be sustained?

- When improved precision of decisions outweighs costs of preference divergence relative to "going it alone"

$EU(\text{association})$ $\qquad\qquad\qquad\qquad$ $EU(\text{exit})$

$\downarrow$ $\qquad\qquad\qquad\qquad$ $\downarrow$

$$-\sum_{k\in R}\alpha_k^R(\beta_k-\beta_g)^2-\sum_{h\in E}\alpha_h^R V(\theta|n_E)-\sum_{j\in D}\alpha_j^R V(\theta|n_E+n_j)>-V(\theta|n_g)$$

- Negative externality stemming from divergent preferences in R

$EU(\text{association})$ $\qquad\qquad$ $EU(\text{exit})$

$\downarrow$ $\qquad\qquad$ $\downarrow$

$$-\sum_{k\in R}\alpha_k^R(\beta_k-\beta_g)^2-\sum_{h\in E}\alpha_h^R V(\theta|n_E)-\sum_{j\in D}\alpha_j^R V(\theta|n_E+n_j)>-V(\theta|n_g)$$

- Precision of decisions for groups in E (n_E is # signals in E)

$EU(\text{association})$ $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $EU(\text{exit})$

$\downarrow$ $\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $\downarrow$

$$-\sum_{k\in R}\alpha_k^R(\beta_k-\beta_g)^2-\sum_{h\in E}\alpha_h^R V(\theta|n_E)-\sum_{j\in D}\alpha_j^R V(\theta|n_E+n_j) > -V(\theta|n_g)$$

- Precision of decisions for groups in D

$EU(\text{association})$ $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ $EU(\text{exit})$

$\downarrow$ $\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad\quad$ $\downarrow$

$$-\sum_{k\in R}\alpha_k^R(\beta_k-\beta_g)^2-\sum_{h\in E}\alpha_h^R V(\theta|n_E)-\sum_{j\in D}\alpha_j^R V(\theta|n_E+n_j)>-V(\theta|n_g)$$

- Group g's expected utility from exit (precision of own decision)

Important point about associations

For *a fixed association* R, the set of messaging equilibria $\mu(R)$ can be Pareto ranked

Better messaging equilibria (for everyone in R) minimize this term:

$$-\sum_{k \in R} \alpha_k^R (\beta_k - \beta_g)^2 - \sum_{h \in E} \alpha_h^R V(\theta | n_E) - \sum_{j \in D} \alpha_j^R V(\theta | n_E + n_j)$$

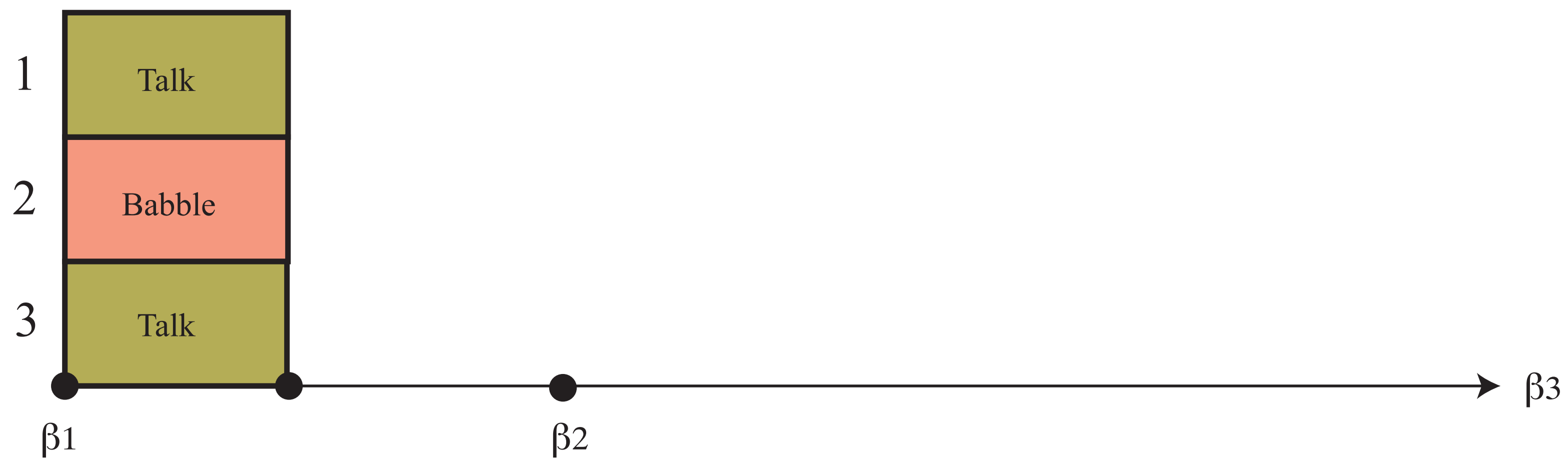
Example: A good group

- Two groups, 1 & 2, don't want to communicate or associate
- How does a (smaller) third group affect association & communication?
- $\beta_1 = 0$ and $\beta_2 = .085$
- $n_1 = n_2 = 2$ while $n_3 = 1$
- α_g is proportional to n_g, so $\alpha = (\frac{2}{5}, \frac{2}{5}, \frac{1}{5})$

Example: A good group

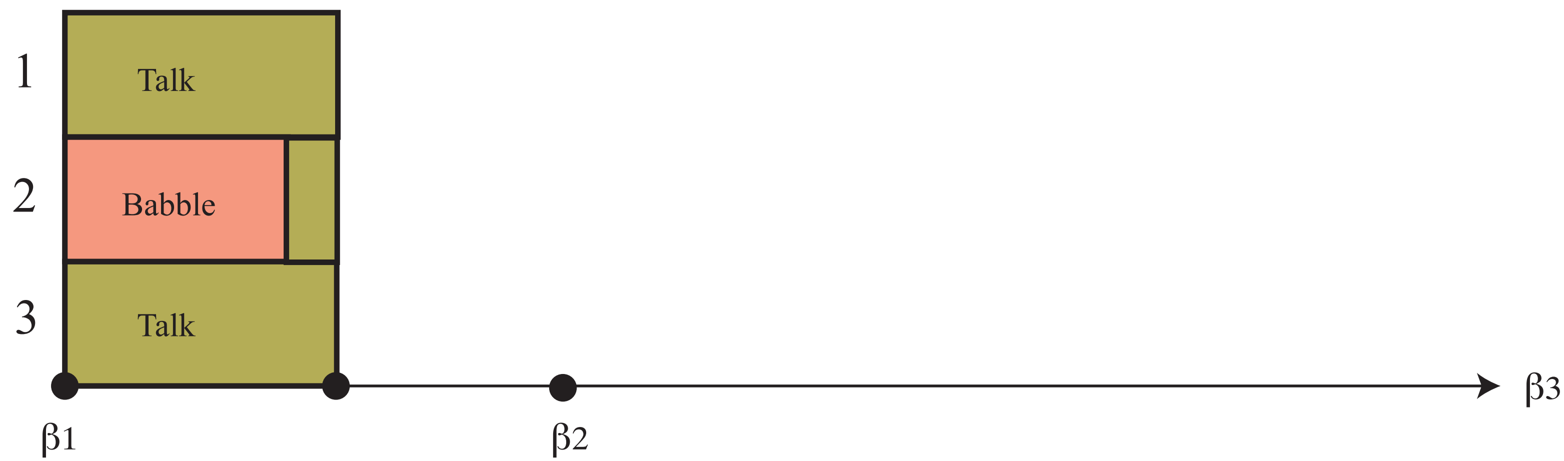
- 1 & 2 too distant to communicate

Example: A good group



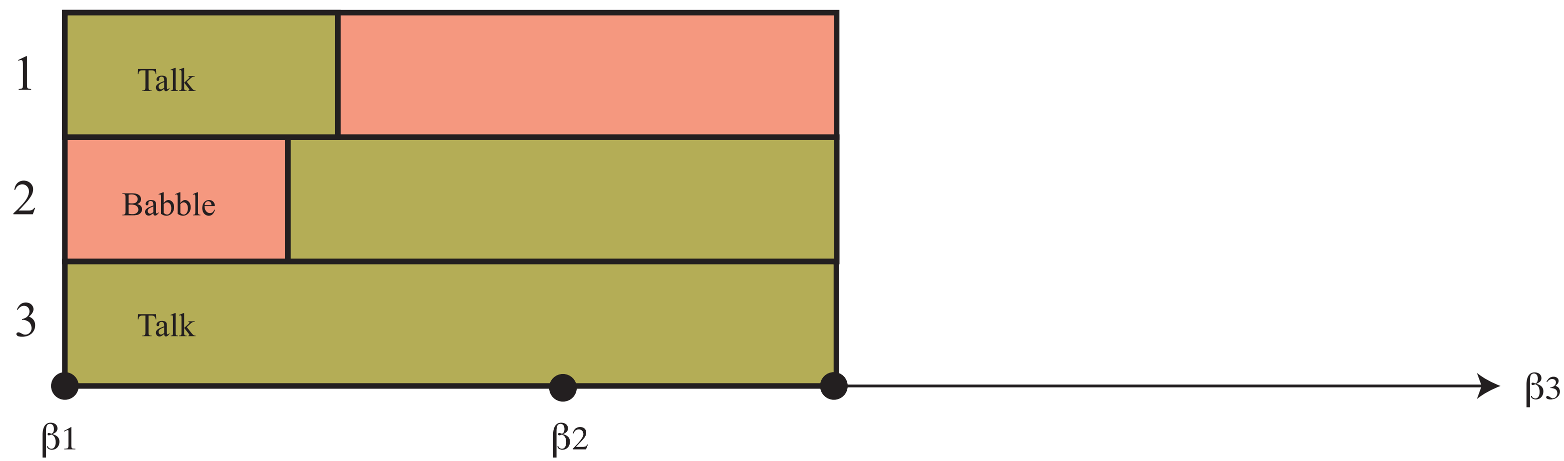
- If 3 enters at β_1 then 3 & 1 message truthfully; 2 listens

Example: A good group



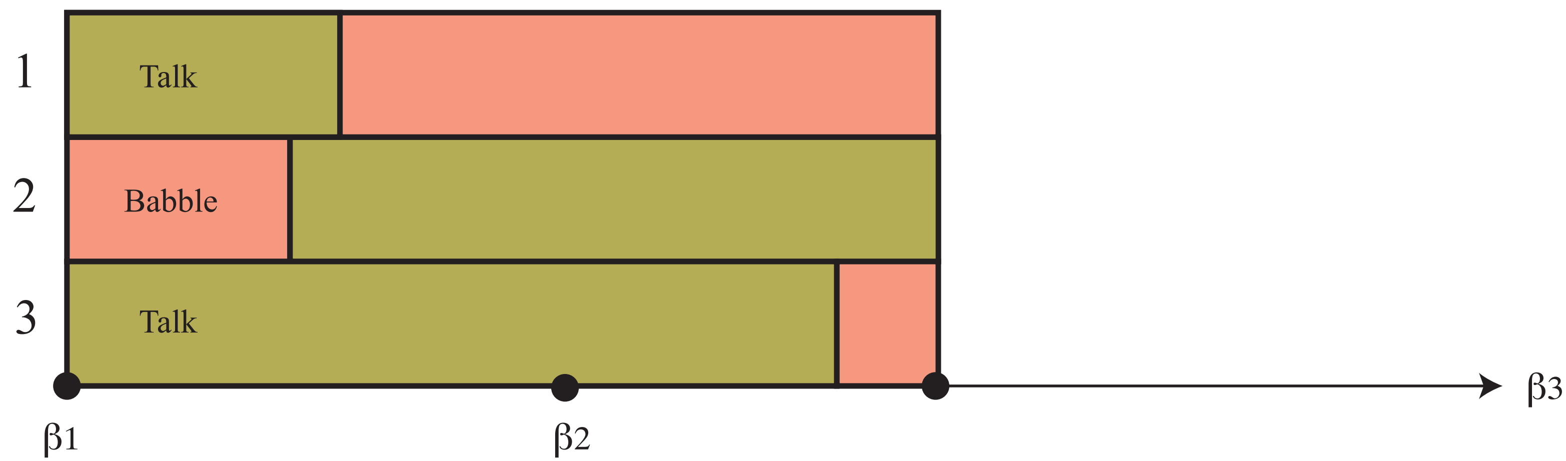
- As β_3 becomes more moderate 2 can be truthful too

Example: A good group



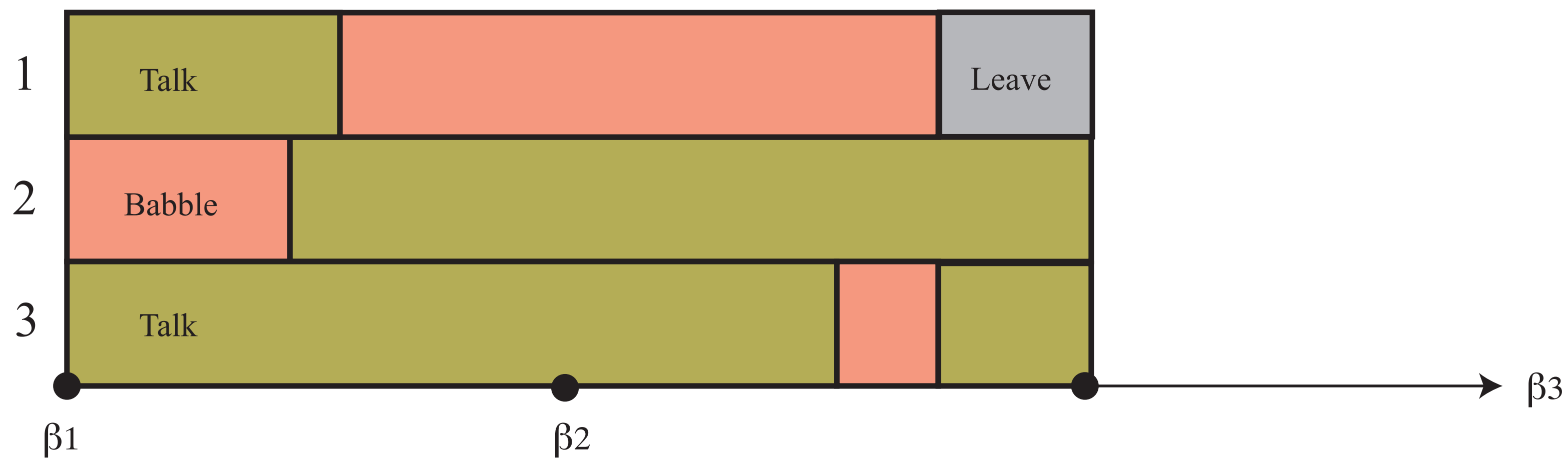
- As β_3 moves toward and past β_2, 1 can no longer be truthful

Example: A good group



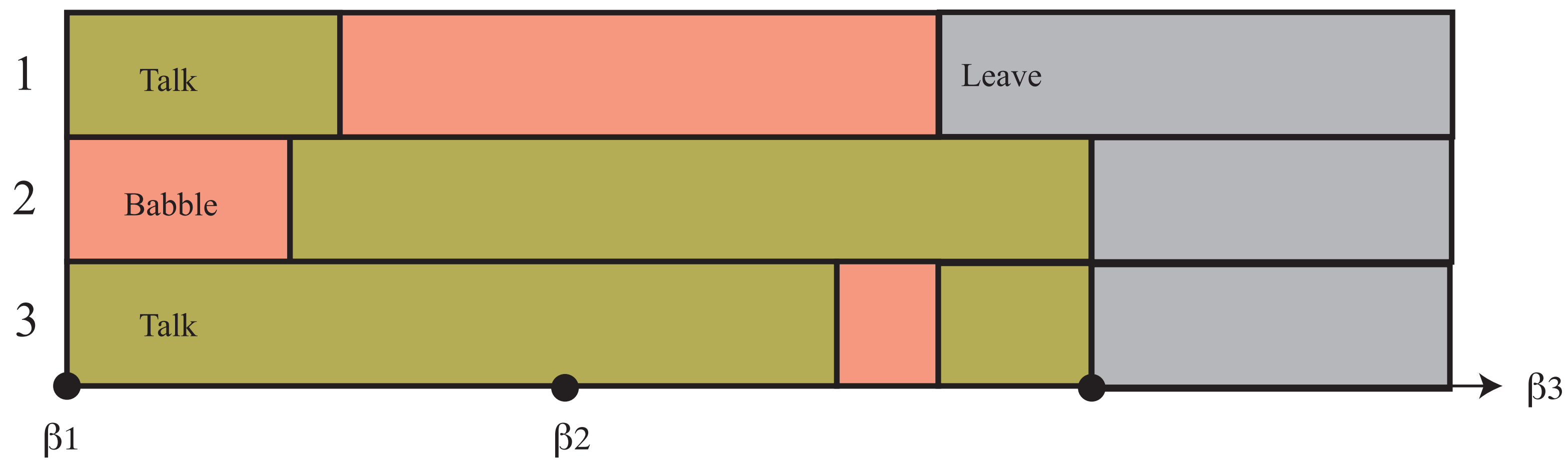
- As β_3 becomes more extreme, 3 can no longer be truthful

Example: A good group



- 1 disassociates; 2 & 3 can now communicate truthfully

Example: A good group



- 3 becomes too distant from 2; they all part ways

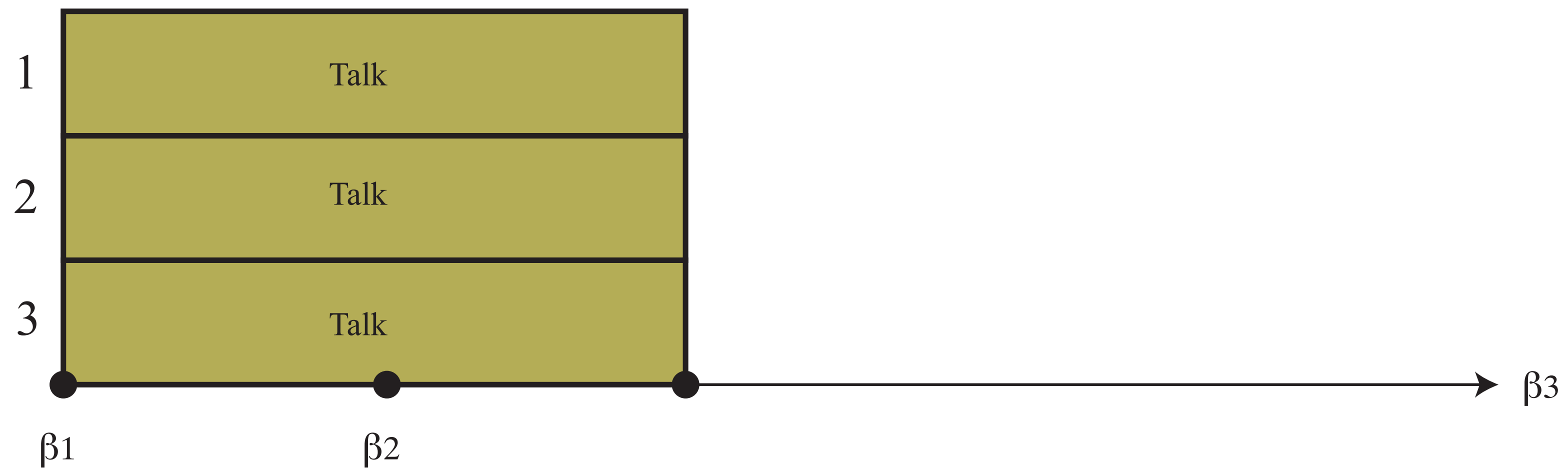
Example: A bad group

- Groups 1 & 2 want to communicate and associate
- For some β_3, 3 prevents *any* association from forming
- $\beta_1 = 0$ and $\beta_2 = .05$
- $n_1 = n_2 = 2$ while $n_3 = 1$
- α_g is proportional to n_g, so $\alpha = (\frac{2}{5}, \frac{2}{5}, \frac{1}{5})$

Example: A bad group

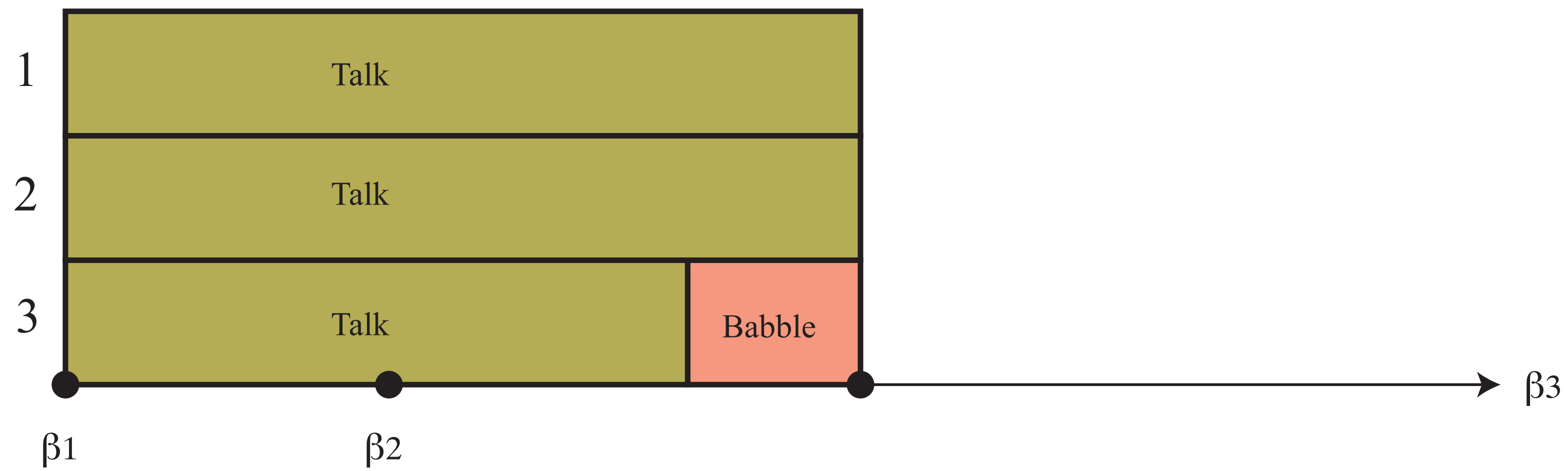
- 1 & 2 associate and communicate

Example: A bad group



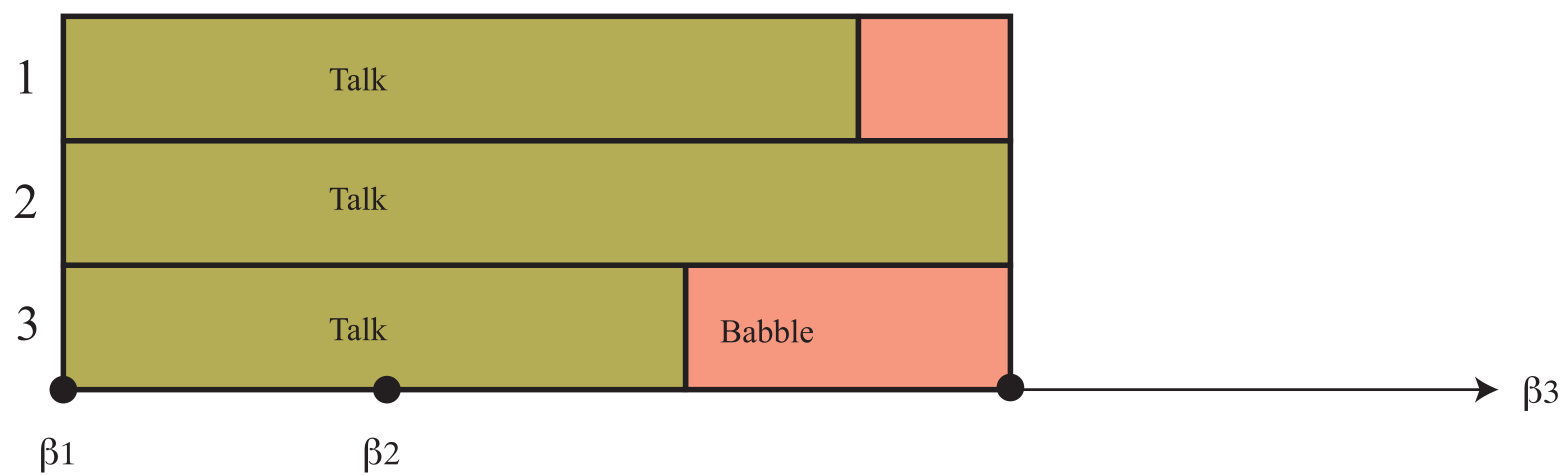
- If 3 enters at β_1 all are truthful ... for a while

Example: A bad group



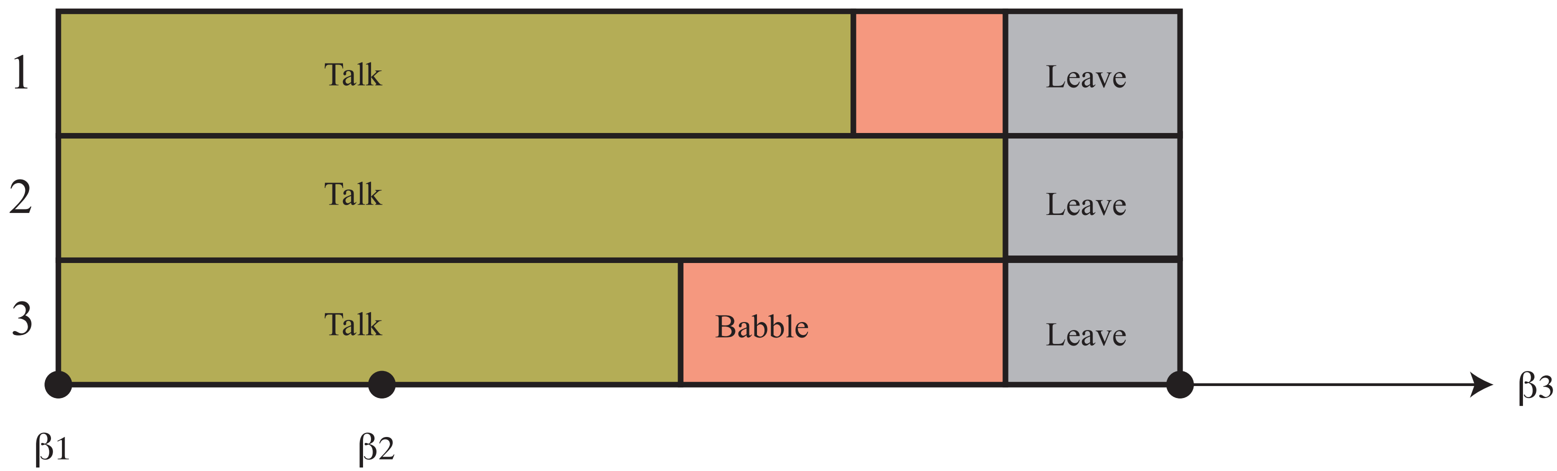
- As β_3 becomes more extreme 3 can no longer be truthful

Example: A bad group



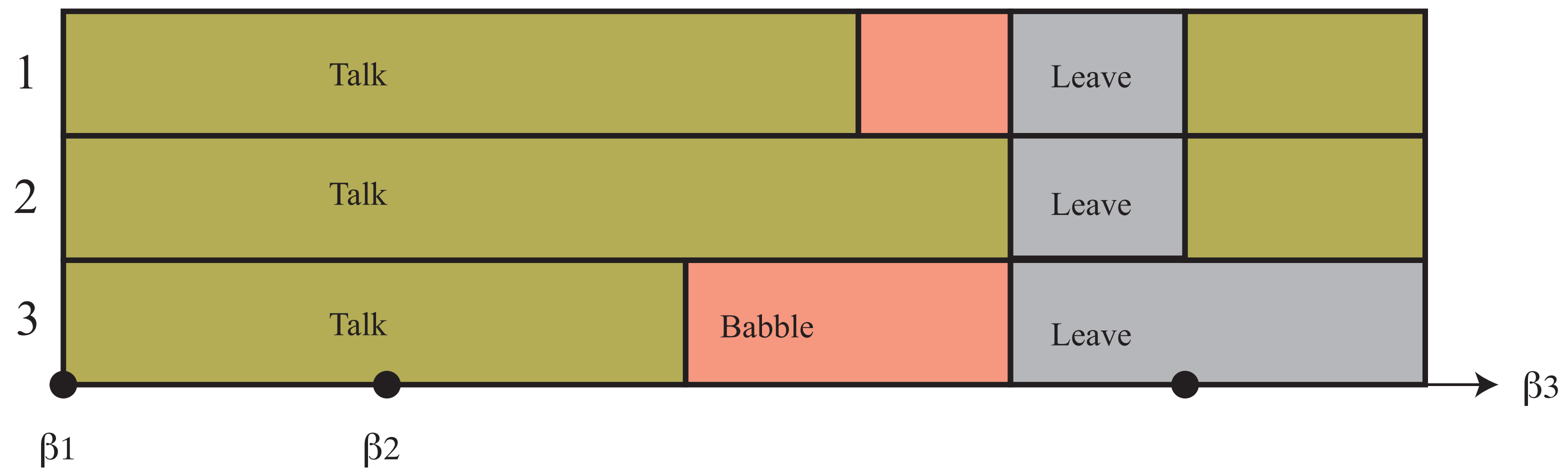
- As β_3 moves even farther, 1 can no longer be truthful

Example: A bad group



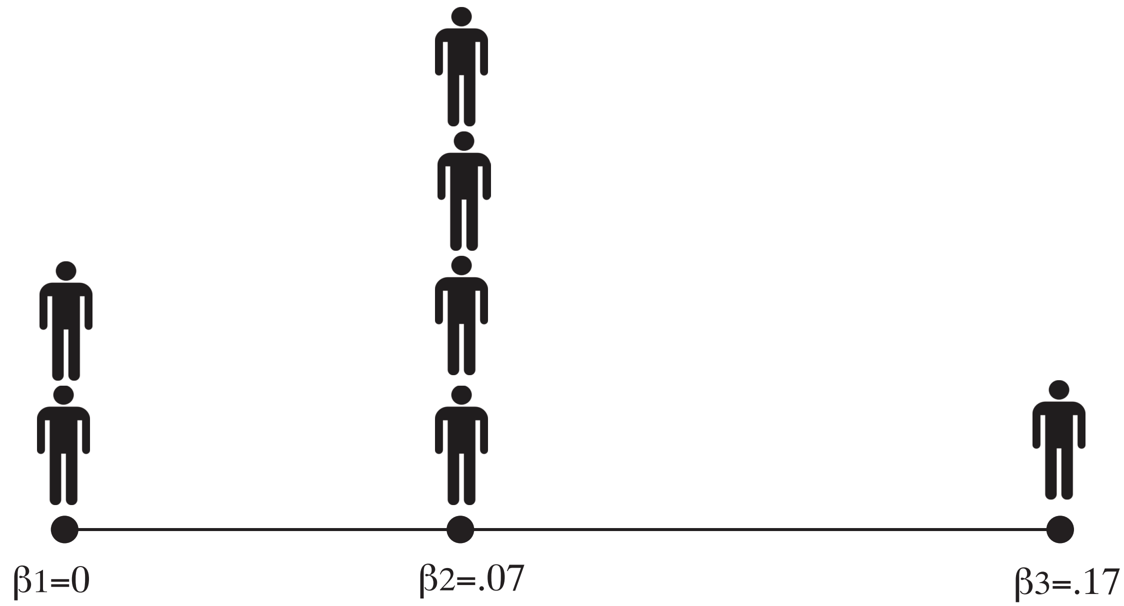
- 1 leaves, and can't associate with 2 because 3 wants to join!

Example: A bad group

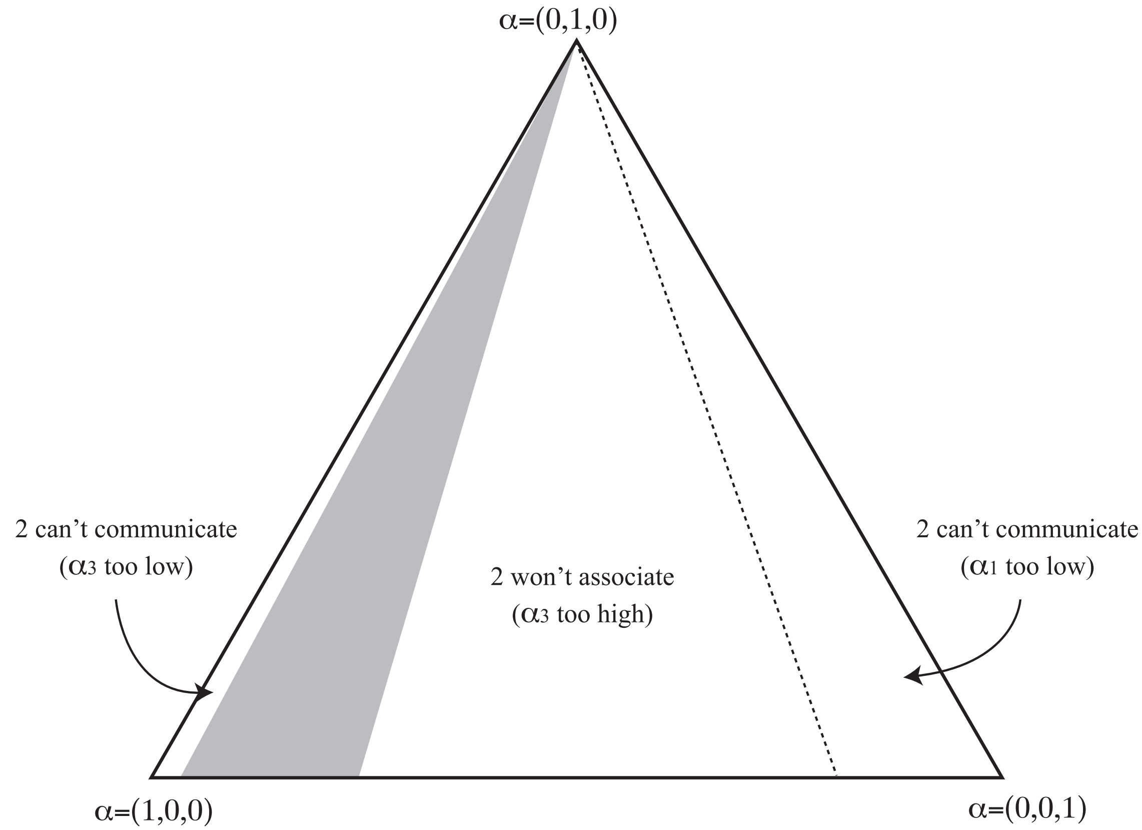


- 3 no longer wants to join; 1 & 2 can now communicate truthfully

Example: Policy discretion to induce association



- No pair of groups would associate / communicate
- 1 & 3 would benefit from associating with 2
  - Both would prefer $\alpha = (0, 1, 0)$ to exit
  - Is there $\alpha > 0$ for which association is possible?



- Association occurs for $\{(\alpha_1, \alpha_2, \alpha_3) : 2.95\alpha_3 \leq \alpha_1 \leq 26.12\alpha_3\}$
- This region makes *everyone* better off than exit

Intra-group communication

- Separating / Pooling focus $\Rightarrow$ foregoing information can be a Pareto improvement
- Can giving up information can benefit a group if we consider semi-separating / mixed strategy equilibria?
  - With two groups, probably not
  - With three groups, I *think* so
- Exclusion vs. obfuscation to reduce congestion effect

Banning intra-group communication

- If group prohibits (intra-group) communication prior to public messaging stage, full information transmission easier to achieve
- Private communication banned $\Rightarrow$ a misstated signal biases both outgroup and ingroup
- Good for information transmission, possibly bad for other reasons!

Conclusions

- Equilibrium "associations": groups where some information sharing is possible, and benefits outweigh costs
- Association / communication decisions interdependent
  - A group's entry can stimulate association or kill preexisting communication
- Institutional mechanisms balancing power between outgroups may induce an informed group to "talk"
- Intra-group mechanisms (norms?) may make messages more or less credible to an association