The Man(ager) Who Knew Too Much

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March 2020

Asymmetric Information and Communication within firms

Firms operate under incomplete and asymmetric information:

- "on the ground" employees produce information about fundamentals
  e.g., product demand, operational constraints, new technologies
- decisions are made "at the top" by executives and owners

Communication of information is key to performance

Economics research has focused on how misaligned incentives, contractual incompleteness and organizational frictions limit effective communication…

… but has ignored a ubiquitous regularity exhibited by individuals, with privileged information:

“**the curse of knowledge**”

The Curse of Knowledge

Informed exhibit the "curse of knowledge" when forecasting others' beliefs

Hard to account for the fact that you **don't** know what I know

Examples:

- Evaluating forecasters after a crisis: "should have seen it coming"
- Ineffective teachers who believe "simple" topics should be "obvious"

Pervasive and robust cognitive bias in forming higher-order beliefs

Experts are poor communicators: assume conclusions are "trivial"

- Teachers, Politicians, Scientists, Economists

What we do

Model of intra-firm communication to study how "curse of knowledge" affects (i) communication, (ii) information production, and (iii) control rights

Firm consists of principal and manager (agent)

- Manager exerts effort to acquire info about project productivity
- Manager wants to **over-invest** in project and exhibits **curse of knowledge**
- Manager communicates with principal
- Principal chooses investment

Communication: costly communication vs cheap talk

Control Rights: Delegation vs. Communication

What we find

(1) The curse of knowledge hampers communication

Less effort for costly communication, less informative cheap talk

(2) The curse of knowledge improves information production

More effort exerted for information acquisition

(3) A cursed manager **can increase** firm value

- Especially, when incentives are well-aligned, and curse is not too large
- The manager can produce relevant information (e.g., R&D, consultants)
- The principal may choose to delegate to a cursed manager, but not to an unbiased one

Background and Motivation

Perspective taking and the Curse of Knowledge

Perspective taking or "putting yourself in someone else's shoes"

Perceiving a situation / understanding a concept from another perspective

- Perceptual: Visual, Auditory
- Conceptual: Thoughts, feelings, attitudes

Critical for social interactions and communication

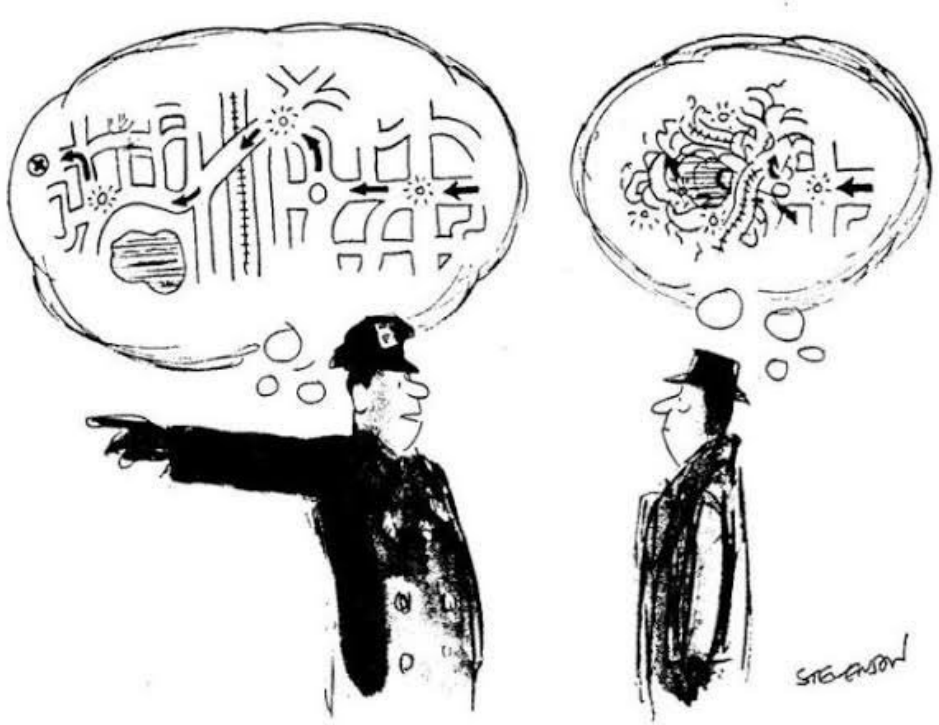
When forming higher-order beliefs, people find it difficult to:

- Imagine others know what we don't know (can lead to "winner's curse")
- Imagine others don't know what we know i.e., "**curse of knowledge**"

Curse of Knowledge ≈ "hindsight bias" and "knew it all along effect"

Examples

For those of us who remember life before Google Maps!



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Curse of knowledge is ubiquitous and difficult to correct

Evaluating forecasts / diagnoses / liability

- Hastie, Schkade, and Payne (1999): Jurors deciding negligence
- Anderson, Jennings, Lowe, and Reckers (1997): Judges evaluating auditors
- Arkes, Wortmann, Saville, & Harkness (1981): Physicians over-estimate likelihood of "known" outcome, even though ex-ante unlikely
- Kennedy (1995): Auditors over-estimate ability to predict bankruptcy ex-post

Experts are poor communications

- Politicians, Scientists, Economists
- Teachers who "move too fast" "skip steps" "too much material" "not clear enough"
- Over-estimate message informativeness / ability of audience
- Particularly bad at forecasting performance of novices (e.g., Hinds, 1999)

Debiasing: Warnings, Feedback, Accountability have limited impact

(Some) Related Literature

Relatively small literature in economics exploring "curse of knowledge"

Camerer, Loewenstein and Weber (1993): explore effects in a market setting

- Argue CoK can alleviate the lemon's problem, and enhance trade

Madarasz (2011): Considers setting where *receiver* has curse of knowledge

- Receiver evaluates experts using ex-post info, underestimates ability
- Communication: Biased expert speaks too rarely and technically, underestimates ability of audience

Broadly related to large literature on strategic communication, disclosure, delegation

The Model

A definition

Suppose Adam is better informed than Beth i.e., info. set I_A is finer than I_B

Adam exhibits the **curse of knowledge** if his prediction of Beth's forecast is

$$E_A\left[E_B[X]\right] = (\mathbf{1} - \boldsymbol{\omega})\, E[X|I_B] + \boldsymbol{\omega}\, E[X|I_A]$$

i.e., Adam cannot ignore the information he knows (but Beth doesn't)

Parameter $\omega \in (0,1)$ characterizes the degree of the curse of knowledge

Note: Law of Iterated Expectations: $\omega = 0 \Leftrightarrow E_A[E_B[X]] = E[X|I_B]$

Setup 1 – Firm Payoffs

Firm value is

$$V(R,k) = Rk - \frac{1}{2}k^2$$

where k represents investment (capital) and R reflects productivity:

Productivity is given by $R = \mu + \theta$:

- μ is prior expected productivity (known) and
- $\theta \sim U\left[-\frac{\sigma}{2}, \frac{\sigma}{2}\right]$ is a learnable shock to productivity

Given information set I, optimal action is **conditional expectation** of R i.e.,

$$k^* = E[R|I] = \mu + E[\theta|I]$$

Setup 2 – Preferences and Beliefs

(1) **Principal** (p) wants to choose investment to maximize firm value i.e.,

$$\max_k \; E\left[V(R,k)\middle|I_p\right] \quad \Rightarrow \quad k^p = \mu + E[\theta|I_p]$$

(2) **Manager** (m) has a bias $\boldsymbol{b \geq 0}$ towards **over-investment** i.e.,

$$\max_k \; E[V(R,k) + bk|I_m] \quad \Rightarrow \quad k^m = \mu + E[\theta|I_m] + b$$

and exhibits **curse of knowledge** i.e., if I_m is finer than I_p, then

$$E_p\left[E_m[\theta]\right] = (\mathbf{1} - \boldsymbol{\omega})\, E\left[\theta\middle|I_p\right] + \boldsymbol{\omega}\, E[\theta|I_m]$$

Setup 3 – Information

Manager can pay a cost $c(p)$ to produce a signal x of precision p:

$$x = \begin{cases} \theta, & \text{with probability } p \\ \xi, & \text{with probability } 1-p \end{cases}$$

where $\xi \sim U\left[-\frac{\sigma}{2}, \frac{\sigma}{2}\right]$ is independent of θ "truth or noise signal"

Note: We are abstracting away from commonly known information

Communication: Manager sends message $d(x)$, principal invests $k^p(d)$

- Costly communication with commitment
- Cheap talk

Delegation: Manager invests $k^m(x)$

Costly Communication

The manager **commits** ex-ante to a noisy message y about x with message precision ρ by paying a cost $\kappa(\rho)$:

$$y = \begin{cases} x, & \text{with probability } \rho \\ \eta, & \text{with probability } 1-\rho \end{cases}$$

where $\eta \sim U\left[-\frac{\sigma}{2}, \frac{\sigma}{2}\right]$ is independent of x

Manager chooses **message precision $\boldsymbol{\rho}$** and **information precision $\boldsymbol{p}$** to maximize:

$$\max_{\rho,p} \; E_m[V(R, k^p(y)) + bk^p(y)] \; - c(p) - \kappa(\rho)$$

Cheap talk

Manager cannot commit to a signal ex-ante

Instead, he sends a **cheap talk message $d(x)$** to maximize:

$$u_m(x) \equiv \max_d \; E_m[V(R, k^p(x)) + bk^p(d)|x]$$

and optimally chooses **information precision p** to maximize:

$$\max_p \; E_p[u_m(x)] - c(p)$$

Model is stylized for tractability (signal structure, linear-quadratic value, …)

Interpretation:

1. Manager and principal start with some common information (**context**)
2. Manager produces costly, *incremental*, private information x with precision p
3. Manager sends a report $d(x)$
   - Costly communication: ρ reflects how well report "makes the case"
     - "showing the steps" / making the case requires effort
   - Cheap talk: credibility of the report

Curse of Knowledge:

Manager over-estimates how "obvious" x is, given context / common info

Communication

Costly Communication

Optimal message precision ρ maximizes $\bar{u}_m(\rho) - \kappa(\rho)$, where

$$\bar{u}_m(\rho, p) \equiv E_m\left[V\left(R, k^{p(y)}\right) + b\, k^p(p)\right]@$$
$$= b\,\mu + \frac{\mu^2}{2} + \frac{\sigma^2}{24}\, p^2 \left(1 - (1-\omega)^2(1-\rho^2)\right)$$

- Utility increases in message precision ρ and information precision p

  More precise communication / information increases firm value

- Marginal utility of communication increases in signal precision

  Communication and information acquisition are complements

Result 1: Under-investment in Communication

Result: Cursed manager **under-invests** in communication precision ρ

$$\frac{\partial^2 \bar{u}_m}{\partial \rho \partial \omega} = \frac{\partial MU(\rho)}{\partial \omega} < 0$$

Intuition:

"the right answer is obvious from context,

so I don't need to explain it better!"

Consistent with narrative about experts being poor communicators

- Reports and presentations are unclear and filled with jargon
- Assume that audience has "read the paper / textbook"

Communication without costs

Curse of knowledge hampers costly communication, but what if **talk is cheap**?

We show there is a Crawford-Sobel, partition equilibrium:

A **partition equilibrium** with N partitions consists of cutoffs $-\sigma/2 = s_0 < s_1 < \ldots s_N = \sigma/2$, such that for all $x \in [s_{n-1}, s_n]$, (i) the manager sends the same message $d(n)$, and (ii) the principal takes the same action $k^p(n) = \mu + E[\theta | x \in [s_{n-1}, s_n]]$

Result: There exists a positive integer

$$N_{max} = ceil\left(-\frac{1}{2} + \frac{1}{2}\sqrt{1 + 2\frac{\boldsymbol{\sigma p(1-\omega)}}{\boldsymbol{b}}}\right)$$

such that for every $1 \leq N \leq N_{max}$, there exists a partition equilibrium with N partitions.

Note: When $\frac{\boldsymbol{b}}{\boldsymbol{\sigma p(1-\omega)}} > \frac{1}{4}$, then the only equilibrium is uninformative.

Credibility and the effective bias

Credibility / Informativeness depends on **effective bias**:

$$\frac{b}{\sigma p(1-\omega)}$$

The effective bias:

- Increases in over-investment bias b — stronger incentives to mislead
- Decreases in prior uncertainty σ — communication is more valuable
- Decreases in information precision p — cheap talk has more content

Result 2: Curse of knowledge ⇒ Less credible cheap talk

Result: The effective bias **increases** with the curse of knowledge ω

Intuition:

"the right answer is obvious from context,
so I have a stronger incentive to distort my report!"

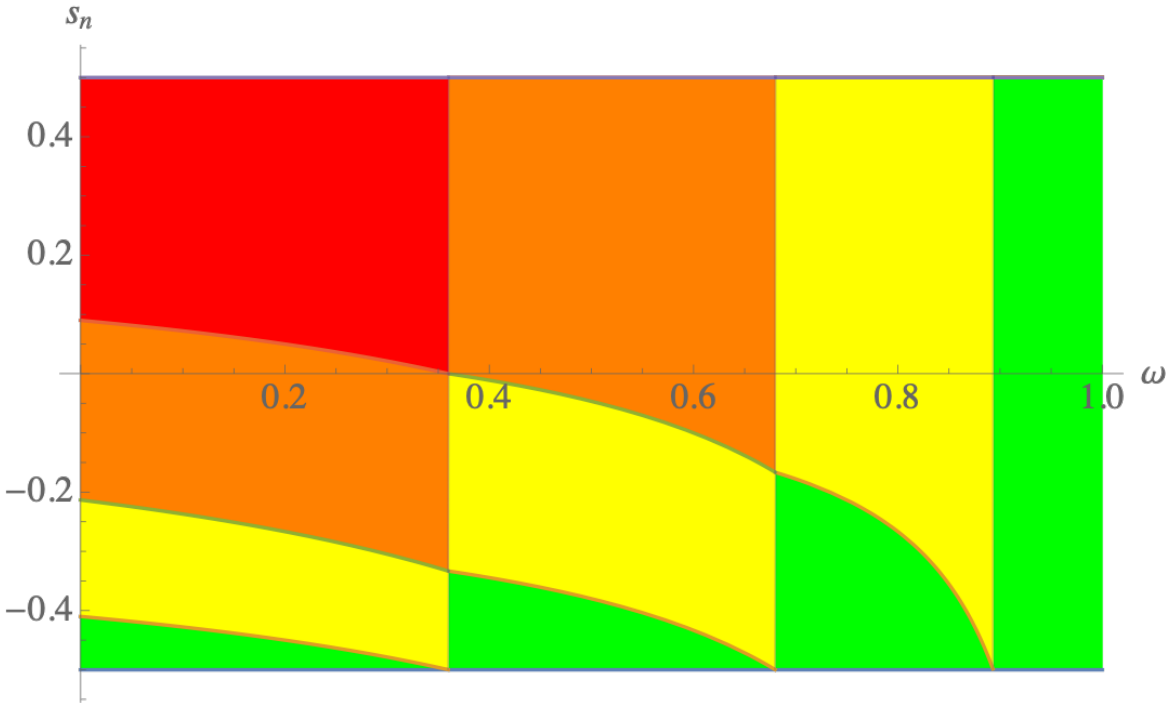
Curse of knowledge harms communication, even when it requires no effort!

Increase in ω reduces informativeness through channels:

(i) Decreases the maximal number of partitions

$$N_{max} = ceil\left(-\frac{1}{2}+\frac{1}{2}\sqrt{1+2\frac{\sigma p(1-\omega)}{b}}\right)$$

(ii) For a fixed number of partitions N, induces more pooling at the top



Information Production

Since curse of knowledge hampers communication, does it make information **less valuable**?

Result 3: Over-investment in information acquisition

With **costly communication**, expected utility is:

$$\bar{u}_m \equiv b\,\mu + \frac{\mu^2}{2} + \frac{\sigma^2}{24}\,p^2\left(1-(1-\omega)^2(1-\rho^2)\right)$$

Result: Cursed managers **over-invest** in information production i.e.,

$$\frac{\partial^2 \bar{u}_m}{\partial p \partial \omega} = \frac{\partial MU(p)}{\partial \omega} > 0$$

Intuition:

"Since I'm good at conveying the right answer,

doing research is more valuable"

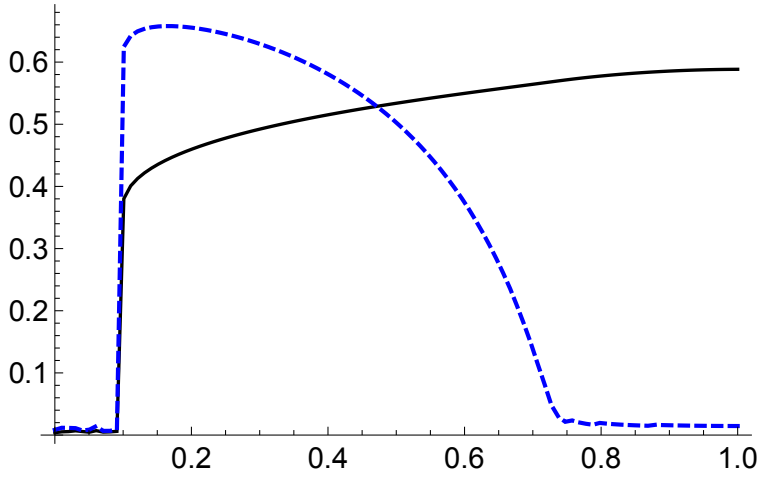
Over-estimate ability to communicate ⇒ stronger incentive to exert effort

Result 4: A cursed manager can increase firm value

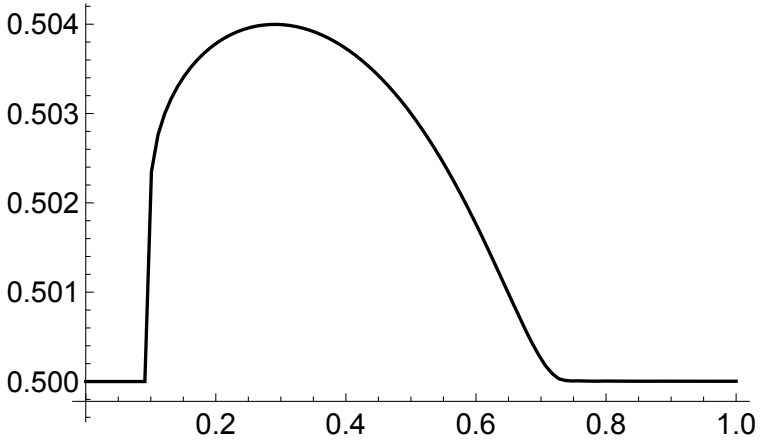
Expected value increases in both information precision and message precision

$$E[V(R,k^p)] = \frac{\mu^2}{2} + \frac{\sigma^2}{24}\, p^2\, \rho^2$$

- Fixed information precision p: cursed managers **decrease** value
- Endogenous info. precision p: cursed managers **can increase** value



(a) ρ (dashed) and p (solid) vs ω



(b) Expected value vs ω

The figure plots the choice of message precision ρ (dashed), acquired information precision p (solid), and expected value of the firm $\mathbb{E}[V(R,k)]$ under costly communication, as a function of the degree of cursedness. The manager optimally chooses message precision ρ subject to a cost $\kappa(\rho) = \kappa_0 \frac{\rho^2}{1-\rho}$ and chooses acquired information precision p subject to a cost $c(p) = c_0 \frac{p^2}{1-p}$. The other parameters of the model are set to: $\mu = 1$, $b = 0.02$, $\sigma = 1$ and $c_0 = 0.01$ and $\kappa_0 = 0.001$.

when ω is not too high

Result 3': Cursed managers acquire more information

With **cheap talk**, expected utility is:

$$\bar{u}_m \equiv \frac{1}{2} E_m \left[E_m[R + b|x]^2 - \left(E_m[R + b|x] - k^p\big(d(x)\big) \right)^2 \right]$$

Result: Holding b fixed, utility increases in perceived informativeness of d

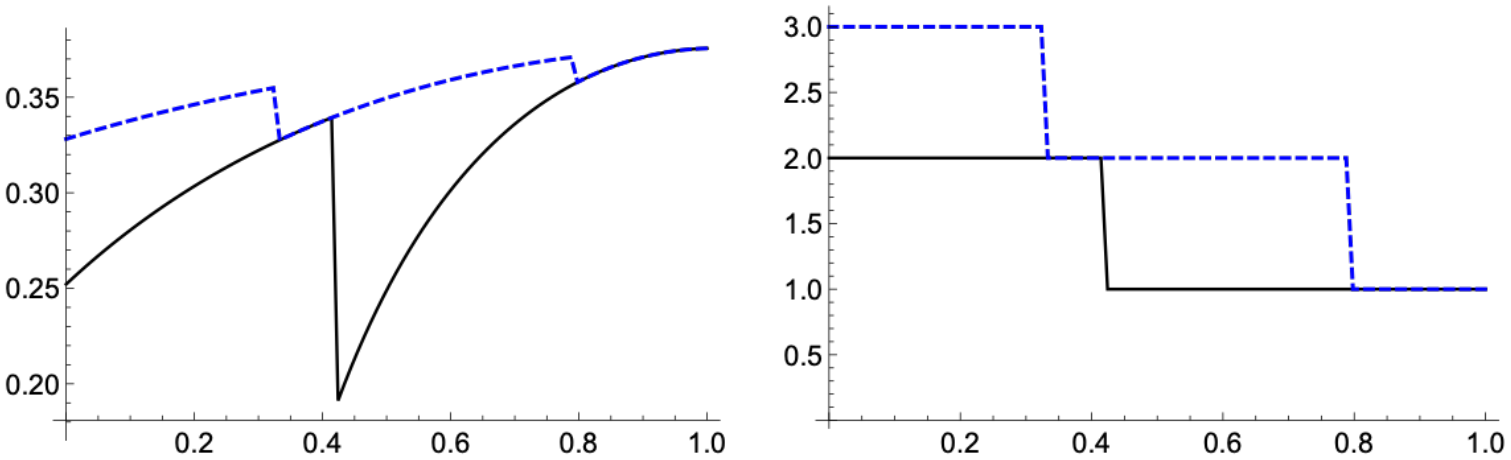
- Utility increases in true informativeness i.e., N and p
- Utility increases with curse of knowledge ω
- For a fixed N, a cursed manager acquires more information i.e.,

$$\frac{\partial^2 \bar{u}_m}{\partial p \partial \omega} = \frac{\partial MU(p)}{\partial \omega} > 0$$

Fixing N, a small increase in $\omega \Rightarrow$ increase information precision

But, sufficiently large increase in $\omega \Rightarrow$ decrease in N_{max} and info. precision

Saw tooth pattern in optimally chosen information precision



(a) Optimal precision p vs ω (b) N_{max} vs ω

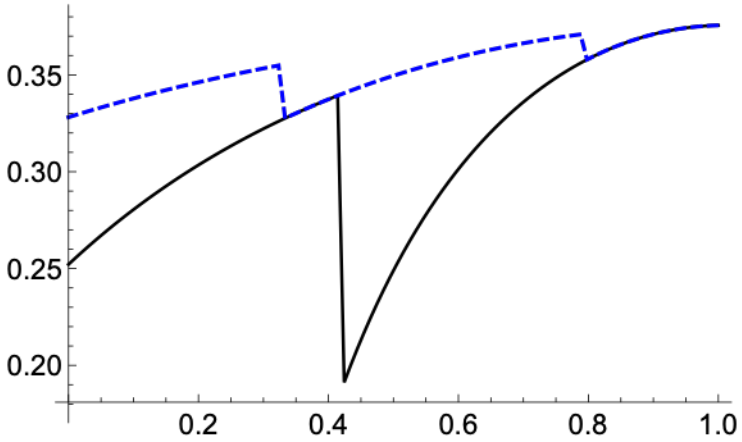
The figure plots the expected value of the firm with cheap talk communication as a function of the degree of cursedness ω, where the manager optimally chooses p subject to a cost $c(p) = c_0 \frac{p^2}{1-p}$. The dashed line corresponds to $b = 0.02$ and the solid line corresponds to $b = 0.05$. The other parameters of the model are set to: $\mu = 1$, $\sigma = 1$, $c_0 = 0.02$.

Result 4': Cursed managers can increase firm value

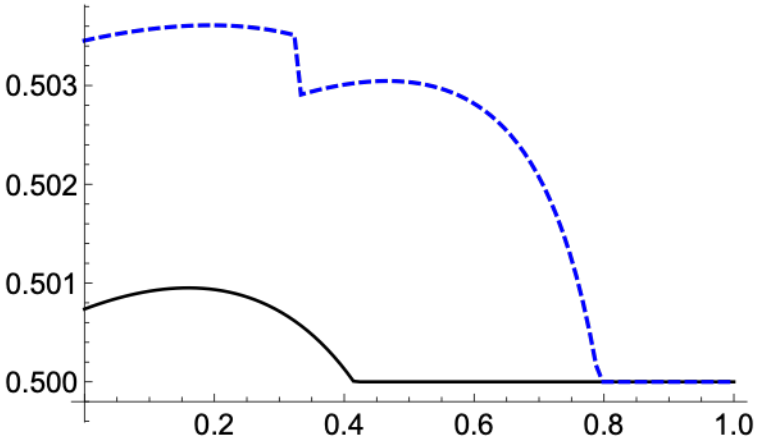
Expected value increases with informativeness and communication:

$$E[V(R, k^p(d)] = \frac{1}{2}(\mu^2 + var(\theta) - E[var(\theta|d)])$$

- **Decreases** with curse of knowledge with **exogenous** information precision
- Can **increase** with curse when info precision is **endogenous**



(a) Optimal precision p vs ω



(c) Expected Value vs ω

When curse ω is not too large, info production dominates communication

Delegation versus Communication

Result 5: Delegate if and only if bias is sufficiently small

Result: With **exogenous** information / message precision, the delegation decision does not depend on the curse of knowledge

- Costly communication: Delegate iff

$$b^2 < \frac{p^2\sigma^2(1-\rho^2)}{12}$$

- Cheap talk: Delegate iff

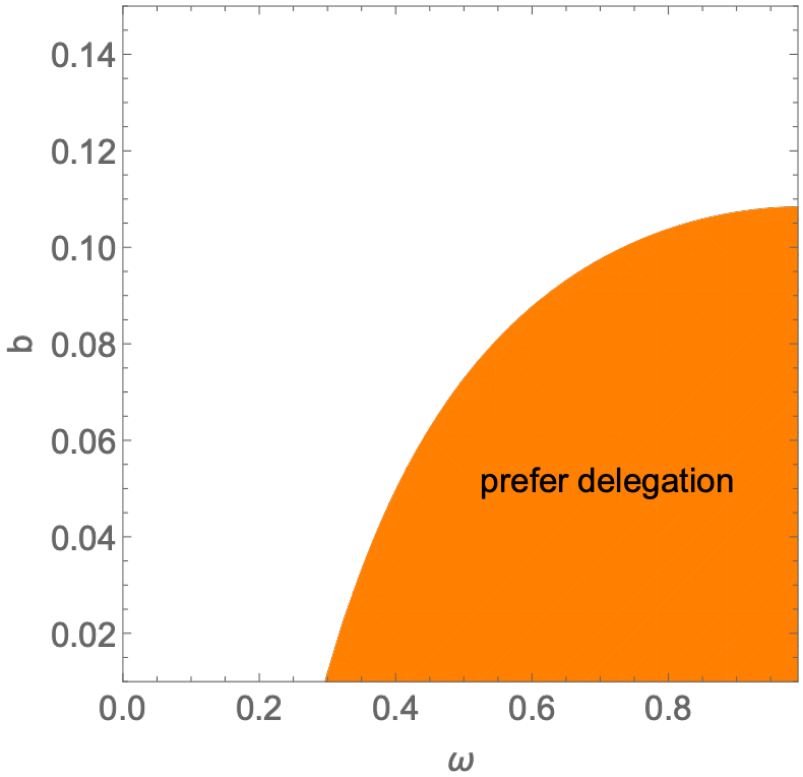
$$b^2 < \frac{p^2\sigma^2}{12}$$

Note: Commitment improves comm ⇒ Delegate more often with cheap talk

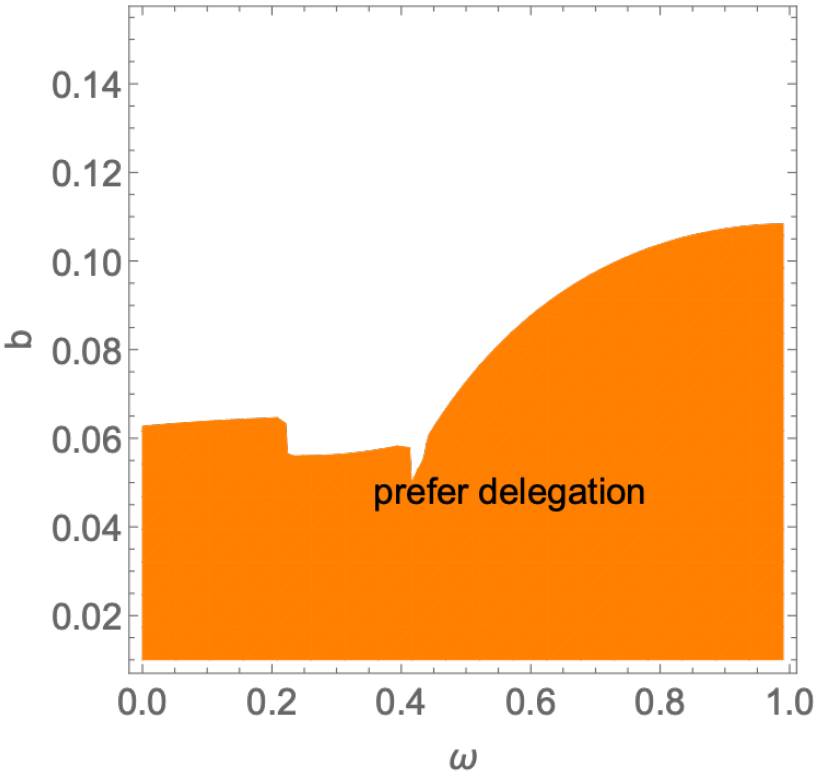
With **endogenous** precision choice, curse of knowledge affects info precision, and so affects delegation decision

The principal may **retain** control with a rational manager ($\omega = 0$), but **delegate** to a cursed one

Costly Communication



Cheap Talk



Other parameters: $\mu = 1, \sigma = 1, c_0 = 0.02, \kappa_0 = 0.001$

Extension: Verifiable Disclosure

"Intermediate case" between cheap talk and commitment

Result: "Disclosure on top" versus "Disclosure at extremes"

(i) When $\frac{b}{\sigma p(1-\omega)} \geq B^*$, manager discloses iff $x \geq \overline{x}$

(ii) When $\frac{b}{\sigma p(1-\omega)} < B^*$, manager discloses iff $x \geq \overline{x}$ **OR** $x \leq \underline{x}$

Result: For fixed precision $\boldsymbol{p}$, curse of knowledge reduces disclosure and value

Result: Fixing equilibrium, higher $\boldsymbol{\omega}$ can lead to higher information acquisition, so value is non-monotonic with $\boldsymbol{\omega}$

Result*: Delegation decision depends on $\boldsymbol{\omega}$, even with fixed $\boldsymbol{p}$, for disclosure at extremes equilibrium

Conclusions

Is the curse of knowledge really a curse or a blessing?

Asymmetric information ⇒ Curse of knowledge

Cursed managers **reduce** firm value when:

- Information precision is exogenous (e.g., reporting, risk management?)
- Incentives are misaligned
- Informal internal communication (lack of commitment)

Cursed managers **can increase** firm value when:

- Information precision is endogenous (e.g., market research, R&D)
- Curse is not too large and incentives are well-aligned
- Formal communication systems (ability to commit)

Enhancing / fostering communication encourages effort in expertise

Cursed Academics?

Curse of knowledge provides one explanation for why many excellent researchers are also bad at teaching

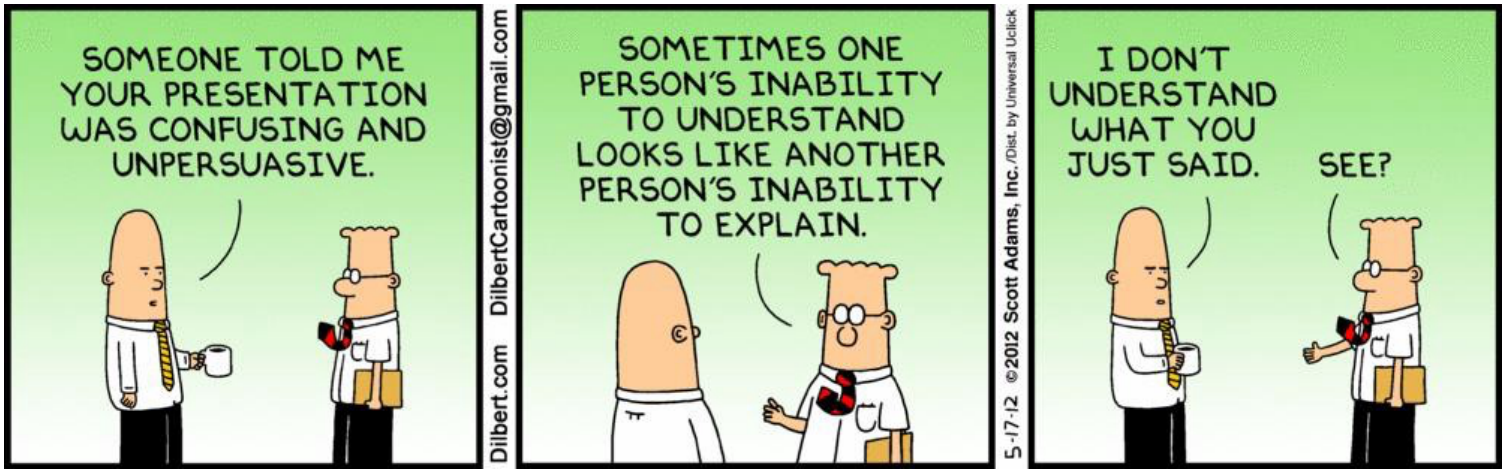
- More cursed academics overinvest in expertise, underinvest in teaching

Analysis highlights complementarity in research and teaching

Just like your dean says!

Encouraging better teaching practices may improve research productivity

- What doesn't work: Warnings, feedback, experience
- What does work: Considering alternative outcomes (counter-explanation)


SOMEONE TOLD ME YOUR PRESENTATION WAS CONFUSING AND UNPERSUASIVE.
SOMETIMES ONE PERSON'S INABILITY TO UNDERSTAND LOOKS LIKE ANOTHER PERSON'S INABILITY TO EXPLAIN.
I DON'T UNDERSTAND WHAT YOU JUST SAID.
SEE?
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Thank you!

Extension: Verifiable Disclosure

Suppose m observes x with probability q, and nothing otherwise

- An informed manager can choose whether to disclose nothing ($d = \emptyset$) or disclose the signal perfectly ($d = x$)
- An uninformed manager cannot verifiably disclose he is uninformed

Denote the equilibrium belief after no-disclosure by $\mu_\emptyset = E[\theta | d = \emptyset]$.

Optimal investment by principal:

$$k^p(d) = \begin{cases} \mu + px, & \text{if } d = x \\ \mu + \mu_\emptyset, & \text{if } d = \emptyset \end{cases}$$

But, manager's curse of knowledge implies:

$$E_m[k^p(d) | x, d = \emptyset] = \mu + (1 - \omega)\, \mu_\emptyset + \omega\, x$$

Result: Let $B^* = \frac{\sqrt{1-q}-(1-q)}{2q}$.

1. If $\frac{b}{\sigma p(1-\omega)} > B^*$, then there exists $\overline{x} \in (-\sigma/2, \sigma/2)$, such that the manager discloses iff $x \geq \overline{x}$ ("**disclosure on top**")

2. If $\frac{b}{\sigma p(1-\omega)} \leq B^*$, then there exists $\underline{x} < \overline{x} \in (-\sigma/2, \sigma/2)$, such that the manager discloses iff $x \geq \overline{x}$ or $x \leq \underline{x}$ ("**disclosure at extremes**")

Intuition:

benefits from higher investment (no disclosure)

vs.

higher value from more informed investment (disclosure)

When bias is sufficiently large, we have standard, **disclosure on top**

When bias is small, we have **disclosure at extremes**

- Smaller bias ⇒ informed investment dominates when x is sufficiently low
- Smaller bias ⇒ Disclosure is more informative (full disclosure when b=0)

Impact of curse of knowledge on expected value

Effective bias $\frac{b}{\sigma p(1-\omega)}$ increases with the curse of knowledge

- When bias sufficiently low, disclosure region **decreases** with ω
- When bias sufficiently high, disclosure region is insensitive to ω

Intuition: Cursed manager believes right answer is "obvious"

$\Rightarrow$ incentive to withhold disclosure is higher

Result: For fixed signal precision $\boldsymbol{p}$, expected value is:

- unaffected by ω for "disclosure on top" equilibrium
- decreasing in ω for "disclosure at extremes" equilibrium

Endogenous Information Acquisition

Result: Holding $\boldsymbol{b}$ fixed, utility increases in **perceived informativeness** of $\boldsymbol{d}$:

- Utility increases with true informativeness (i.e, p)
- Utility increases with the curse of knowledge ω

For fixed equilibrium, utility increases more with p for cursed manager i.e.,

$$\frac{\partial^2 \overline{u}_m}{\partial p \partial \omega} > 0$$

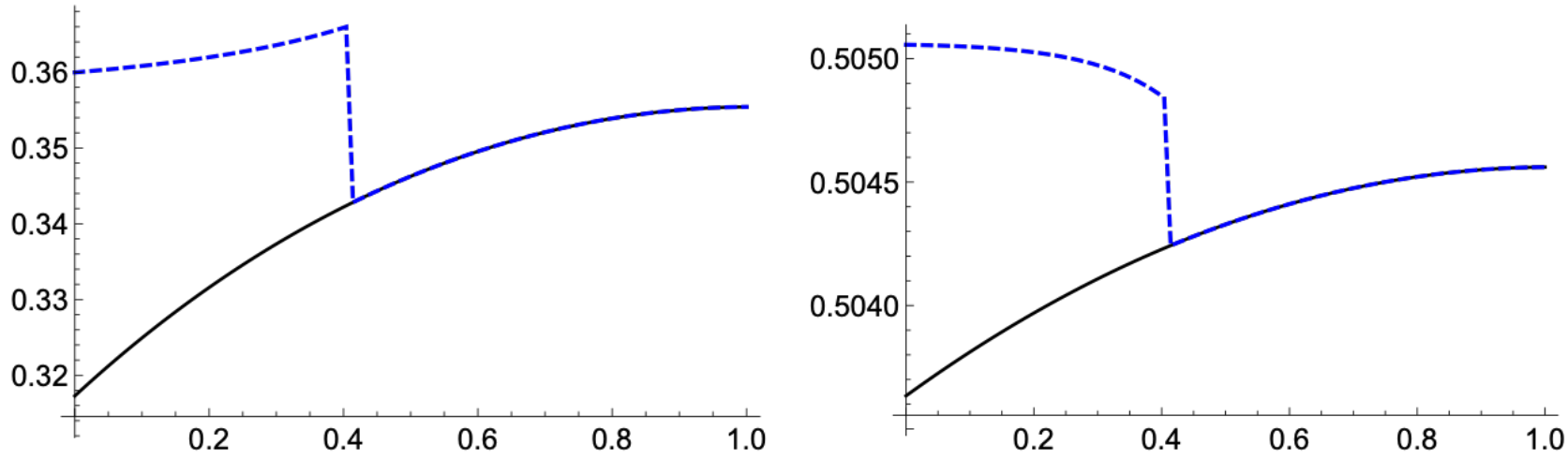
Moreover, utility is higher for the **disclosure at extremes** equilibrium

As with cheap talk, an increase in cursedness can increase firm value by increasing information acquisition!

Cursed managers may increase firm value

For fixed precision, curse (weakly) decreases value via less disclosure

But, it also increases marginal value of information precision, which can increase information production



(a) Optimal precision p vs ω

(b) Expected Value vs ω

The figure plots the expected value of the firm with verifiable disclosure as a function of the degree of cursedness ω, where the manager optimally chooses p subject to a cost $c(p) = c_0 \frac{p^2}{1-p}$. The dashed line corresponds to $b = 0.02$ and the solid line corresponds to $b = 0.05$. The other parameters of the model are set to: $\mu = 1$, $\sigma = 1$, $c_0 = 0.02$ and $q = 0.95$.

Result: Delegation decision depends on informativeness of equilibrium disclosure:

(i) For the "**disclosure on top**" (less informative) equilibrium, delegate iff over-investment bias is sufficiently small

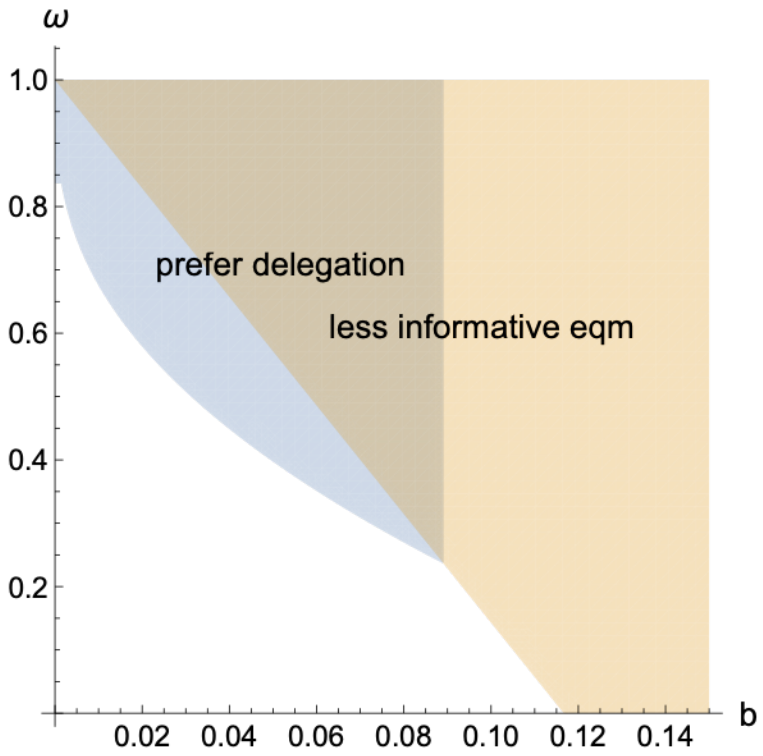
(ii) For the "**disclosure at extremes**" (more informative) equilibrium, delegate iff curse of knowledge is sufficiently large

Disclosure on top equilibrium:

For fixed p, delegation decision independent of curse of knowledge ω (like cheap talk)

Disclosure at extremes equilibrium:

For fixed p, disclosure interval depends on ω, and so does delegation decision



The figure plots the region of the $b - \omega$ parameter space in which delegation is preferred to communication (shaded in blue), and the region in which the less informative equilibrium is sustained (shaded in peach). The other parameter values are set to: $\mu = 1$, $p = 0.7$, $\sigma = 1$ and $q = 0.75$.