

Receiving advisory opinions:

A bumpy road to the goal of making better decisions

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What is the weight of the ox? (best guess wins a prize)



The weight of an ox

West of England Fat Stock and Poultry Exhibition, 1906

- Entertainment game: Prize to the best guesser of the ox's weight

F. Galton (a visitor)

- Computed the mean of 787 guesses
- Mean was highly accurate (within 1 kg from truth)

Surowiecki, 2004 *The wisdom of crowds*

Simple model

When does averaging work?

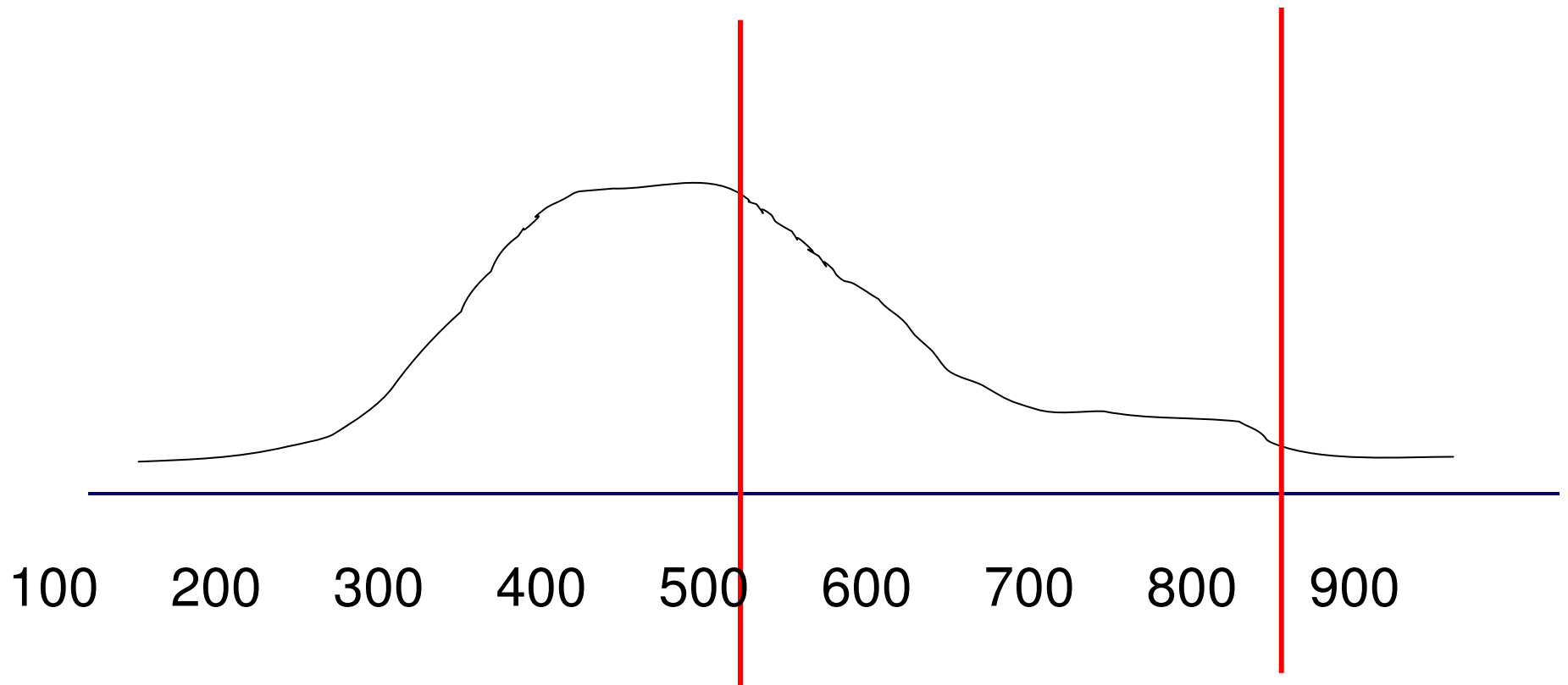
Individual has some vague idea about the true weight:

Subjective estimate = truth + bias + noise

In the ox case,

- There is “large variance of opinion”
- If bias is “not too large”,
- -- > the mean of the sample should be “close to the truth”

Hypothetical distribution of opinions about an ox's weight.



Truth - where ?

One hundred years later:
Another example of the wisdom of crowds:

Prediction markets:

- People bet on their beliefs www.intrade.com
- Bet (x cents) that event X will occur and earn 1\$ if it does.

Will S Jobs depart as CEO of Apple before 31.12.2009 ?

Apple - Will Steve Jobs depart as CEO of Apple?

Steve Jobs to depart as CEO of Apple on/before 31 Dec 2009

Last Price:

54.8

You can buy
this at **54.9**

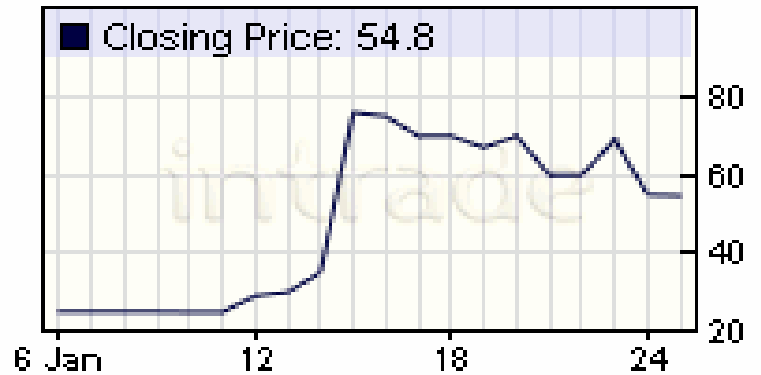
Buy

You can sell
this at **51.0**

Sell

Explain

Trade Now



Shows prices as of February 1 2009

www.intrade.com

German Economy in Recession (*see contract rules for definition*)

The German Economy will go into Recession during 2009

GERMANY.RECESSION.09



[Trade](#)

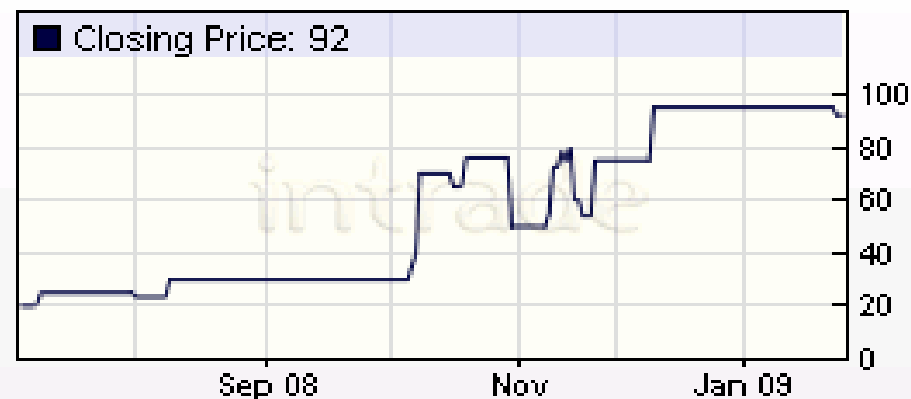
Last Trade : 92.0

[Suggest An Image](#)

Lifetime

Last Week

Last Day



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Links

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Contract Info

Currency USD

Session lo/hi - - -

BID

ASK

Qty

Price

Price

Qty

“Wisdom of crowd effects” on accuracy are found when participants are :

(1) numerous

(2) diverse, independent

(3) cannot manipulate outcome

**My research is on the
“wisdom of small crowds” or “wisdom of others”**

- ❑ Naïve opinions (friends, neighbors, peers) on a movie, course, job candidate, physician.
- ❑ The benefit of advice
- ❑ The process of belief revision
 - 📖 Inconsistent opinions
 - 📖 Integration is an effortful process

Belief updating task: An outline

Phase 1 (series of 24 questions)

In what year were the dead-sea scrolls discovered?

Your best estimate _____

Phase 2 (series of 24 questions repeated)

In what year were the dead-sea scrolls discovered?

Your previous estimate: 1940

Estimate of participant #9: 1928

Your final best estimate: _____

- **Advice sampled ecologically**
- **Bonus for answers that are “close” to the truth**
- **No feedback online**

The benefit of advice:

Findings :

- Students consulting a single opinion reduce their error by about 20%.
- Recall - the advisory opinion is drawn at random from a pool of opinions produced by other students.

Who is a good advisor?

- To be valuable – advisors **need not** be smarter, more knowledgeable, just independent !

Roots of phenomenon: Both stat and psych.

Multiple advisors: Diminishing gains

Harvey et al 1997, 2000; Larrick & Soll 2006; Yaniv & Milyavsky 2007

Self + 4 opinions

Phase 1

In what year were the dead-sea scrolls discovered?

Your best estimate _____

Phase 2

In what year were the dead-sea scrolls discovered?

Your previous estimate: 1940

Estimate of advisor A: 1960

Estimate of advisor B: 1933

Estimate of advisor C: 1940

Estimate of advisor D: 1980

Your final best estimate _____

Self + 8 opinions

Phase 1

In what year were the dead-sea scrolls discovered?

Your best estimate _____

Phase 2

In what year were the dead-sea scrolls discovered?

Your previous estimate: 1940

Estimate of advisor A: 1960

Estimate of advisor B: 1933

Estimate of advisor C: 1940

Estimate of advisor D: 1980

Estimate of advisor E: 1945

Estimate of advisor F: 1923

Estimate of advisor G: 1910

Estimate of advisor H: 1974

Your final best estimate _____

Accuracy of DM

Mean absolute error

Accuracy stat. of policies

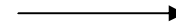
<u># Opinions</u>	<u>Initial</u>	<u>Final</u>	<u>Mean</u>	<u>Median</u>	<u>Consensus</u>
	<u>estimates</u>				<u>Trim</u>
self + 2	70.4	51.7	<u>46.9</u>	<u>46.1</u>	48.9
self + 4	69.6	50.2	42.8	<u>41.1</u>	<u>40.4</u>
self + 8	71.5	47.8	40.7	<u>36.9</u>	<u>38.0</u>

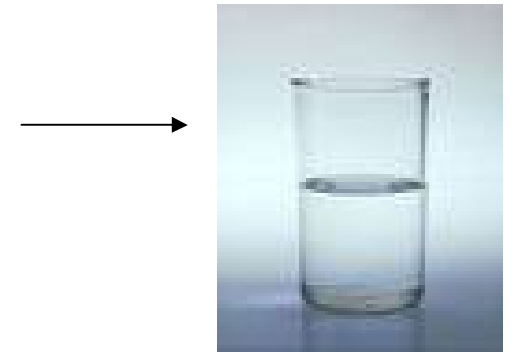


Gain ~ 28%

Getting advice:

- Efficient “shortcut”
- The “oldest decision aid”
- Corrective procedure
 - Creates alternatives to one’s current view





Two psychological fallacies in dealing with conflicting opinions

1. Egocentric discounting
2. Spurious consensus

The weight placed on a single piece of advice

People might:

Ignore advice --- equal consideration --- fully adopt advice

DV: proportional shift from the self



Typical finding: weights on self and other 70:30 (sometime 80:20)

Yaniv, 2000, 2004; Harvey & Fischer 1997, Soll & Larrick 2005;

Egocentric discounting of advice

Outside (objective) view:

Self and advice are data points → both opinions should be weighted equally.

Inside (subjective) view:

Asymmetry (self-other): People consider the reasons underlying the opinions.

They have access to their *own* reasons, not to the advisors' reasons → Less cognitive support for the other's opinion → Bias

“I am always prepared to recognize the fact that there can be two points of view – mine and one that is probably wrong.”

– John Grey Gorton (Australian politician)

An Informal Biography, 1969.

Is egocentrism costly? Are DMs better off not forming prior opinions?

Suppose participants do not (or cannot) form an initial opinion.

Will that improve their performance?

We used a “cognitive blindfolding procedure” – where critical details of the question were concealed from the participant.



Experimental conditions (Ex 1):

DMs Estimate the number of calories in a target food

Full-view :

- DM knows the name of the food (apple, bowl of cooked rice, a cup of 3% yogurt, etc).

Blindfolding :

- The name of the target food is DM is not shown.

Full-view condition

What is the calorie value of an orange?

Your best estimate	<u>100</u>
The best estimate of participant #12	90
The best estimate of participant #19	84
The best estimate of participant #82	320
The best estimate of participant #03	140
The best estimate of participant #25	50
Your final best estimate	_____
Your confidence in estimate (0 - 100%)	_____%

Blindfolding condition

What is the calorie value of E ?

The best estimate of participant #07 120

The best estimate of participant #12 90

The best estimate of participant #19 84

The best estimate of participant #82 320

The best estimate of participant #03 140

The best estimate of participant #25 50

Your best estimate _____

Your confidence in estimate (0 - 100%) _____%

Results: Expt 1

	<u>Condition</u>	
	Full-view	Blindfolding
Accuracy (abs errors)		
Initial error	91.2	--
Final error	76.2	> 66.0
Average of 6 estimates	55.5	~ 54.9
Egocentrism		
% stay with 1 st listed estimate	54%	>> 12%
Distance from 1 st listed	26.6	<< 91.3
Distance from average	53.8	> 37.9
Confidence (%)	56.1	> 46.8

Conclusion

- Expressing a prior opinion puts the person at a disadvantage.
- Egocentric discounting is the culprit
- Where lies the effect?
 - Expressing one's opinion (being specific, commitment, etc)
 - Merely knowing what the question is about, even without entering an estimate.

Experiment 2

Full view condition

- Shown full question, do not enter initial estimate.

Blindfolding condition

- Food name is concealed.

Full-view

What is the calorie value of an orange?

The best estimate of participant #07 120

The best estimate of participant #12 90

The best estimate of participant #19 84

The best estimate of participant #82 320

The best estimate of participant #03 140

The best estimate of participant #25 50

Your final best estimate _____

Your confidence in estimate (0 - 100%) _____%

Blindfolding

What is the calorie value of E ?

The best estimate of participant #07 120

The best estimate of participant #12 90

The best estimate of participant #19 84

The best estimate of participant #82 320

The best estimate of participant #03 140

The best estimate of participant #25 50

Your best estimate _____

Your confidence in estimate (0 - 100%) _____%

Results: Expt 2

	<u>Condition</u>	
	Full-view	Blindfolding
Accuracy (abs errors)		
Error	76.2	> 66.1
Average of 6 estimates	53.6	~ 54.8
Egocentrism		
Distance from average	69.4	> 43.4
Confidence (%)	55.9	> 48.0

Conclusions - Experiment 2

- It is sufficient that participants know what the question is about to create egocentric discounting (Entering an estimate is not necessary)
- Why?
- Full view participants tend to prefer one of the estimates more than the others. They use it, discount others.
- Blindfolded participants use others' opinions efficiently.

Contingent strategies: two modes of processing advice

“Belief-revision process”

- Highly conservative
- Self figure prominently - selective, biased evaluation
 - Examples: attitude perseverance, confirmation bias, anchoring..... Egocentric discounting

“Data-aggregation process”

- More systematic, impartial use of opinions. Seek the “central tendency” in the data.

Should the combiner of the opinions be opinion-less?

Nominal group judgment method (Delphi)

- Expert panels (typically 7 to 15 members) charged with applied tasks
- Prevents undue influence of a single member, other dysfunctional aspects of group meetings.
- (Iterated anonymous feedback process)
- Combining final opinions using a formula (w/ or w/out trimming)

Two psychological fallacies in dealing with conflicting opinions

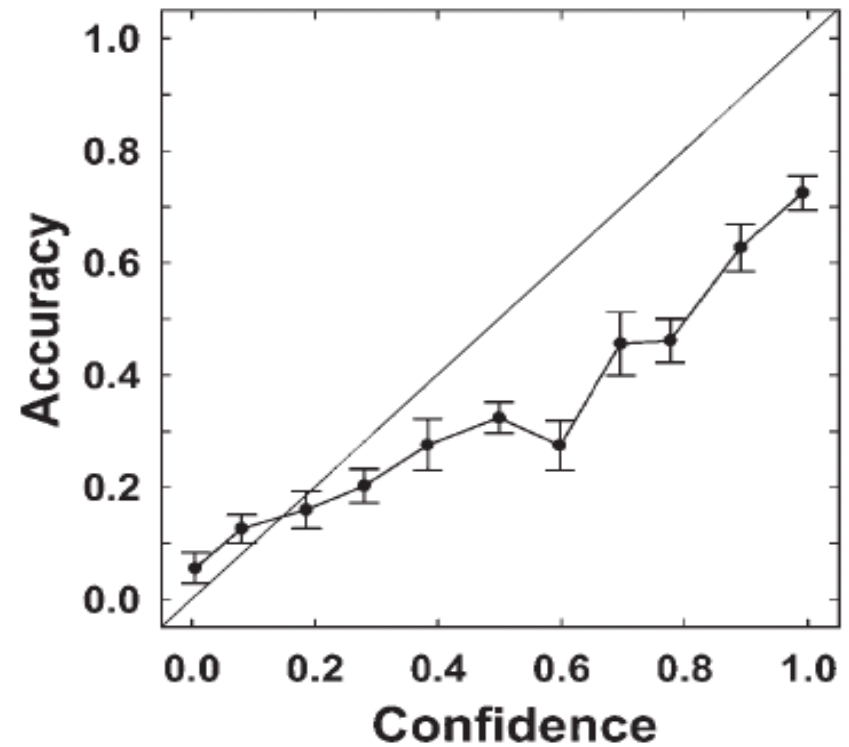
1. Egocentric discounting

- Leads to the phenomenon that “blindfolding” oneself improves performance.

2. Spurious consensus:

- “Seeking consistency” leads to an unintended consequence - dissociation between confidence and accuracy.

Confidence, signal of knowledge, a cue-to-accuracy



McGraw, Mellers, & Ritov, 2004

- Calibration curve - often monotone
- Implication: Internal cues that underlie feelings of confidence also tend to be valid cues of knowledge.

BUT, confidence and accuracy might dissociate in

- Advised decisions (group decisions)
- What makes people confident is not always what makes them most accurate.
- People could be confident in poorer judgments
- Goal: Highlight the antecedents of such a phenomenon.

What makes people feel confident in an advice-based decision?

- Inconsistency is taxing, people are aversive to disagreement of opinion (cognitive & emotional reactions)
- People seek and maintain consistency
- Consistent information profiles
 - are easier to process
 - **induce confidence** (Budescu 2006; Slovic; Weber 2000)
- This seems like an obvious descriptive hypothesis, but...

What leads to greater accuracy ?

- Normatively, accuracy gains are a function of the inter-dependence among the opinions.
- Inter-dependence: The extent to which knowing A's opinion helps one guess B's opinion.
- The higher the inter-dependence among sources (greater redundancy) the lesser the gain from using them (Hogarth, 1978).

Why should we care about inter-dependence?

1. In interactive social settings, advisors influence each other; in an organizational hierarchy, they are subject to the same influences.
2. Advisors who rely on the same data and methods reach similar conclusions, even if they don't interact.
3. Decision-makers might unconsciously solicit the advice of individuals who agree with them, avoid those who disagree.

Q: Do people take into account inter-dependence ?

A: Not as much as needed.... show limited understanding.

- Illusion of validity: “High intercorrelations among inputs increase confidence and decrease validity” (Kahneman & Tversky 1973).
- Participants predicted stock prices based on several sources (Kroll, Levy & Rapoport 1988)
- Other studies (Maines 1996; Soll 1999; Budescu & Yu 2007)

Hypothesis

If people pay attention to consensus, and less so to inter-dependence,

then we should observe cases where

- confidence is boosted
- gains are not obtained.

When exactly?

- Given a “spurious consensus” – a set of highly agreeing opinions generated by inter-dependent sources.

Belief updating task: An outline

Phase 1 (series of 28 questions):

What is the calorie value of one serving of 3% yogurt?

Your best estimate _____

Phase 2 (same 28 questions repeated):

What is the calorie value of one serving of 3% yogurt?

Your initial best estimate was 350

The best estimate of participant #12 415

The best estimate of participant #19 330

The best estimate of participant #82 335

Your final best estimate _____

The main experimental factor:

Method of sampling of the advisory opinions

Independent sampling:

- the computer draws at random opinions from a pool of calorie estimates made by others.

Opinion-dependent sampling:

- the computer draws opinions that agree with the decision-maker's initial inclination.

Participants were told....

“One of two different methods for drawing opinions is being used on each trial.

The specific method used will be announced”

On this trial, the opinions presented to you were drawn **at random** from the pool of 100 opinions.

What is the calorie value of one serving of 3% yogurt?

Your initial best estimate was 350

The best estimate of participant #12 240

The best estimate of participant #82 50

The best estimate of participant #19 150

Your final best estimate _____

On this trial, the opinions presented to you were among those that **agreed most** with your initial opinion in the pool of 100 opinions.

What is the calorie value of one serving of 3% yogurt?

Your initial best estimate was 350

The best estimate of participant #12 420

The best estimate of participant #19 330

The best estimate of participant #82 300

Your final best estimate _____

Dependent variables:

- Accuracy gains
- Change in confidence : pre- vs post-advice
- A **costly** expression of confidence – asked participants to bet online on 14 of 28 of their judgments:
 - **bet** -- **earn 60¢** if judgment is “approx correct”.
 - **not bet** -- **earn 2¢** if judgment is “approx correct”.

On this trial, the opinions presented to you were among those in the pool (of 100 opinions) that **agreed most** with your initial opinion.

What is the calorie value of one serving of 3% yogurt?

Your initial best estimate was 350

The best estimate of participant #12 420

The best estimate of participant #19 330

The best estimate of participant #82 300

Your final best estimate _____

Rate your confidence on a 0-100% scale _____

To bet on this estimate, check the box

Results Yaniv et al., 2009 JEP: LMC

	<u>Method of sampling</u>	
	Independent	Opinion-dependent
Accuracy (mean abs. err.)		
Initial error	100.4	93.9
Final error	73.7	87.2
% gain	27	> 7
Confidence (0 – 100%)		
Initial confidence	58.5	59.4
Final confidence	60.1	< 65.1
Rate of betting (%)	42	< 58

Conclusions

Independent advice yields greater accuracy gains than inter-dependent advice.

Yet, people trust their judgment more when it is based on inter-dependent advice.

---> Dissociation : People might be more confident in their less accurate judgments.

Why? The short theory is...

- DMs are highly sensitive to consensus (gestalt property).
- DMs do not give sufficient attention to inter-dependence.

Why do people fail to learn from experience ?

Consensus is a confounded cue – it may be either valid or spurious

Inter-dependence is not conspicuous, cannot be deduced from a “single shot.” Instead,

- Computation is needed across cases
- or, alternatively, keeping track of relationships in social networks.

It appears that people

- underestimate the detrimental effect of **inter**-dependence
- underestimate the beneficial effect of **independent** opinions, when those are in conflict, and
 - tend to associate “conflict of opinion” with “no information.”
- “Wishing for a one-armed expert.”

“Conflict is the gadfly of thought.”

– John Dewey

“No one wants advice – only corroboration.”

– John Steinbeck

Diet and Fat: A Severe Case of Mistaken Consensus

NYT Oct 9, 2007

It may seem bizarre that a surgeon general could go so wrong. After all, wasn't it his job to express the scientific consensus? But that was the problem. Dr. Koop was ... caught in what social scientists call a cascade.

Cascades are common in medicine as doctors take their cues from others, leading them to overdiagnose some faddish ailments (called bandwagon diseases) and overprescribe certain treatments (like the tonsillectomies once popular for children).

Unable to keep up with the volume of research, doctors look for guidance from an expert — or at least someone who sounds confident. because they didn't work in this field themselves.

<http://www.nytimes.com/2007/10/09/science/09tier.html? r=1>

Acknowledgement:

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Papers:

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Yaniv, I., Choshen-Hillel, S., & Milyavsky, M. (2009). Using the Wisdom of Others Wisely: Blindfolded Judges Make Better Advice-Based Decisions. In review.