

# Actively open-minded thinking (AOT)

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1. Allowing oneself to be convinced by a solid opposing argument is a sign of good character.
2. People should take into consideration evidence that goes against conclusions they favor.
3. Being undecided or unsure is the result of muddled thinking.
4. People should revise their conclusions in response to relevant new information.
5. Changing your mind is a sign of weakness.
6. People should search actively for reasons why they might be wrong.
7. It is OK to ignore evidence against your established beliefs.
8. It is important to be loyal to your beliefs even when evidence is brought to bear against them.
9. When we are faced with a new question, the first answer that occurs to us is usually best.
10. Good thinking leads to uncertainty when there are good arguments on both sides.
11. When faced with a new question, we should consider more than one possible answer before reaching a conclusion.

## AOT in context

A general “theory” of good thinking.

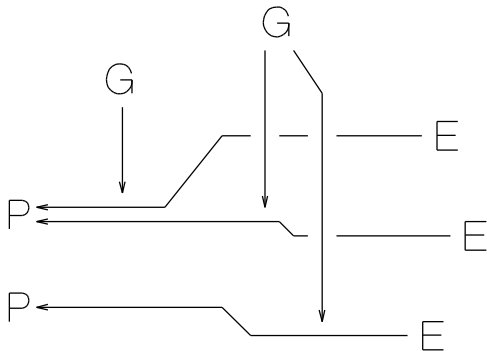
- ▶ philosophical statements: Mill, Dewey
- ▶ early 20th century psychology: Selz, Duncker, Wertheimer
- ▶ developmental theories: Piaget, Kohlberg, Perry
- ▶ integrative complexity: Schroder, Driver, Streufert; Suedfeld; Tetlock
- ▶ Janis
- ▶ Christie Lerch, Stanovich

# A framework for thinking

Thinking = search + inference

Three objects:

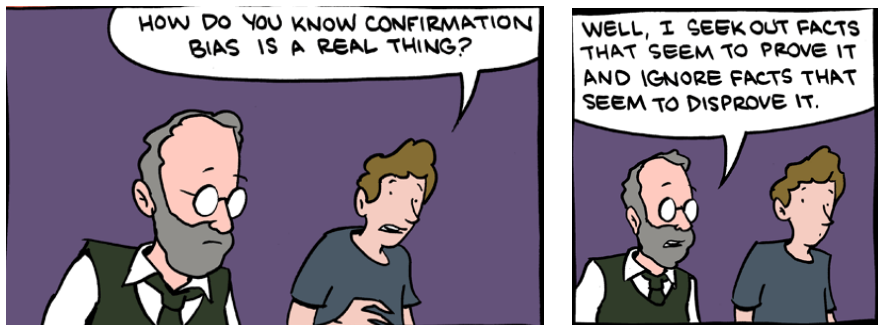
- ▶ possibilities (options, hypotheses)
- ▶ evidence (arguments, reasons)
- ▶ goals (criteria, objectives)



## Myside bias (a.k.a. confirmation bias)

- ▶ Selective recall and production of arguments (Perkins)
- ▶ Biased assimilation, polarization (Lord, Ross, and Lepper), and neglect of counterevidence (Kuhn)
- ▶ Selective exposure (biased search)
- ▶ Belief overkill (Jervis; Ellsworth and Ross), excessive consistency between belief and choice, search for dominance (Montgomery)
- ▶ Pre-decisional distortion (Russo)
- ▶ Overconfidence (or inappropriate extreme confidence)

## Why I have to be right (from Zach Weinersmith)



## AOT as a virtue

- ▶ Fairness to the other side in search and inference
  - ▶ This requires *active* search
- ▶ Appropriate weighing of evidence in inference
  - ▶ Results in appropriate confidence
- ▶ Optimal amount of thinking with confidence lower when little thinking has been done.

## Mill's summary

“The whole strength and value, then, of human judgment, depending on the one property, that it can be set right when it is wrong, reliance can be placed on it only when the means of setting it right are kept constantly at hand. In the case of any person whose judgment is really deserving of confidence, how has it become so? Because he has kept his mind open to criticism of his opinions and conduct. Because it has been his practice to listen to all that could be said against him; to profit by as much of it as was just, and expound to himself, and upon occasion to others, the fallacy of what was fallacious.” J.S. Mill (On liberty)



## Carl Sagan, on withholding judgment

I'm often asked the question, "Do you think there is extraterrestrial intelligence?" I give the standard arguments — there are a lot of places out there, and use the word *billions*, and so on. And then I say it would be astonishing to me if there weren't extraterrestrial intelligence, but of course there is as yet no compelling evidence for it. And then I'm asked, "Yeah, but what do you really think?" I say, "I just told you what I really think." "Yeah, but what's your gut feeling?" But I try not to think with my gut. Really, it's okay to reserve judgment until the evidence is in.

The Burden Of Skepticism, The Skeptical Inquirer, Vol. 12, Fall 87.

# Measures

- ▶ archival measures: integrative complexity (Tetlock & Suedfeld)
- ▶ listing arguments (Perkins, Baron, Gürçay-Morris).  
People list more arguments on their own side, but when asked to think of still more they can usually think of more on the other side, which they just omitted the first time.
- ▶ giving grades to thinking of others (Baron)  
People give higher grades to people who think as they do, in number of arguments and in balance (myside/otherside).
- ▶ beliefs about good thinking (Stanovich/West/Toplak, Baron)  
Measures of belief about the nature of good thinking predict actual thinking. E.g., overconfidence (Gürçay-Morris), but many other tasks as well (Stanovich et al.).
- ▶ task performance (Stanovich et al., Gürçay-Morris)
- ▶ self-report (Metz)

## Integrative complexity (Tetlock, Suedfeld, et al.)

Abortion is a basic right that should be available to all women. To limit a woman's access to an abortion is an intolerable infringement on her civil liberties. Such an infringement must not be tolerated. To do so would be to threaten the separation of Church and State so fundamental to the American way of life.

Many see abortion as a basic civil liberty that should be available to any woman who chooses to exercise this right. Others, however, see abortion as infanticide.

Some view abortion as a civil liberties issue — that of the woman's right to choose; others view abortion as no more justifiable than murder. Which perspective one takes depends on when one views the organism developing within the mother as a human being.

## Perkins, Bushey & Faraday (1986)

Taught high school students to think in an actively open-minded way through a sixteen-session course that emphasized searching thoroughly for arguments on both sides of an issue. Arguments should be:

- ▶ *true* (to the best of the thinker's knowledge)
- ▶ *relevant* to the issue, and
- ▶ *complete* – that is, all important relevant arguments should be considered.

Controversial issues were discussed in class, and students were encouraged to generate and evaluate (for truth and relevance) arguments on both sides, especially the other side.

## Perkins et al. test items

Before and after the course, students were tested by asking them to write down their thoughts on issues that were “genuinely vexed and timely” and that could be discussed on the basis of knowledge that most people have:

- ▶ “Would providing more money for public schools significantly improve the quality of teaching and learning?”
- ▶ “Would a nuclear freeze agreement between the U.S. and the U.S.S.R. significantly reduce the possibility of world war?”
- ▶ “Should all 19-year-olds be required to fulfill a one year social service obligation?”
- ▶ “Would a ban on selling and owning handguns significantly reduce violent crime?”

## Results from Perkins et al. training

The course nearly doubled the number of arguments that students gave on the *other* side from their own. The rated quality (truth and relevance) of these arguments increased as well.

The course did not increase the number or quality of arguments on the student's own side. The effect was truly a matter of increased open-mindedness.

Other courses that involve thinking in some way had no effect: a first-year law-school class, a high school debate class, a first-year college class that taught "critical thinking," and a graduate course on thinking.

## Baron (1995): Positive arguments

The lists of thoughts varied in the student's initial side (yes or no), the number of arguments on the student's side (2 or 4), and the number of arguments on the other side (0 or 2).

- ▶ Killing of human beings is wrong, and abortion is killing a human, even though the human is only a fetus.
- ▶ Aborting a fetus is preventing someone from having a life, and this is wrong. None of us would have wanted to have been aborted ourselves.
- ▶ There is no clear place to draw the line between early abortions, late abortions of fetuses that could survive on their own, and the killing of handicapped or unwanted infants.
- ▶ Condoning abortion is likely to reduce respect for human life in general, leading to decreased effort to preserve human life in other cases.
- ▶ Women who get pregnant by mistake are irresponsible, and they should not be rewarded by being allowed to correct their error.
- ▶ Abortion is never absolutely necessary as a means of birth control. If someone really doesn't want to get pregnant, they can try chastity.

## Negative arguments

- ▶ The fetus is not hurt by early abortion. It has no future plans, no knowledge of life, no pain, and no fear of death.
- ▶ Families must be limited in today's world. If we are going to limit births, it is, on the whole, better to limit the births of unwanted children than the births of children who are wanted. Abortion is one means of preventing unwanted children from being born, when it is too late to prevent them by other means.
- ▶ Contraceptive methods are all subject to failure, so the only way to be sure of not getting pregnant is to abstain from sex. This would be an intolerable burden to impose on married couples who are not ready to have children.
- ▶ Women should be able to decide whether they want to go through something that affects them as much as pregnancy and childbirth do.
- ▶ It's unfair that women should bear the brunt of mistakes for which men are at least as responsible.
- ▶ Many women who get pregnant by mistake are adolescents and others who are not ready to care for children. The possibility of abortion allows many of them to continue their education and have children when they are mature enough to raise them well.



## Meszaros et al., 1995: polarization

Complications per million children

	UNVACCINATED	VACCINATED
Cases of Whooping Cough	101,900	9,700
High-pitched Unusual Crying	-	4,900
Temporary Hospitalization	11,100	1,100
Temporary Unconsciousness/Confusion		
From Whooping Cough	25	2
From Vaccine	-	40
Convulsions	-	2,600
Long-term Brain Damage		
From Whooping Cough	8	1
From Vaccine	-	15
Death		
From Whooping Cough	130	13
From Vaccine	-	5

Source: A. R. Hinman and J. P. Koplan. JAMA, June 15, 1984.

## Belief overkill (Jervis)

“People who favored a nuclear test-ban believed that testing created a serious medical danger, would not lead to major weapons improvements, and was a source of international tension. Those who opposed the treaty usually took the opposite position on all three issues.” (p. 129)

“choices are easier since all considerations are seen as pointing to the same conclusion. Nothing has to be sacrificed. But, since the real world is not as benign as these perceptions, values are indeed sacrificed” (p. 130)

## Ellsworth and Ross (1983) Capital punishment

	Proponents	Opponents
Feel that the death penalty is a more effective deterrent than life imprisonment	93%	8%
Do not feel ...	7%	92%
Society has a right to get revenge ...	45%	7%
It is immoral for society to take a life regardless of the crime...	10%	82%

Yet, 66% of proponents claimed that they “would still favor capital punishment even if it were proven to be no better than life ... as a deterrent.” ... 48% would favor it if it were no deterrent at all.

Only 3% of opponents would favor it if it were shown to be a deterrent.

## Belief overkill (Baron, 2009), correlates with L/R politics

Candidate 1 favors a constitutional amendment defining marriage as between a man and a woman and favors increased income taxes on those with high incomes, to reduce the deficit.

Candidate 2 opposes a constitutional amendment defining marriage as between a man and a woman and opposes increased income taxes on those with high incomes, to reduce the deficit.

What is your position on the two candidates (assuming they both have equally acceptable positions on everything else you care about)?

Strongly favor Candidate 1 – Favor Candidate 1 – Neutral – Favor Candidate 2 – Strongly favor Candidate 2

What is the effect of the candidates' position on a constitutional amendment defining marriage as between a man and a woman on your evaluation of the two candidates?

Strongly favors Candidate 1 . . . [The same question was asked about the other issue.]

## Baron, Scott, Fincher & Metz (2015)

	Relig	AOT	Uscale	ActRule	ActOmit
Relig	<b>0.83</b>	-0.817	-0.808	-0.264	-0.346
AOT	-0.609	<b>0.67</b>	0.683	0.417	0.285
Uscale	-0.570	0.433	<b>0.60</b>	0.318	0.611
ActRule	-0.200	0.284	0.205	<b>0.69</b>	0.436
ActNum	-0.270	0.200	0.404	0.310	<b>0.73</b>

Reliabilities in bold. Raw  $r = .200$  is  $p = .05$  2-tailed.

## Divine command scale items (Piazza & Sousa)

- ▶ The truth about morality is revealed only by God.
- ▶ It is possible to live a righteous life without knowledge of God's laws.
- ▶ Acts that are immoral are immoral because God forbids them.
- ▶ We don't need to try to figure out what is right and wrong, the answers have already been given to us by God.
- ▶ An atheist can still understand what is morally right and wrong.
- ▶ Without God, humans still have a way to distinguish right from wrong.

## Cognitive Reflection Test (CRT, Frederick, 2005)

A bat and a ball cost \$1.10 in total. The bat costs a dollar more than the ball. How much does the ball cost?

If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?

In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?

## Other correlations with beliefs

Kahan: AOT scale correlates .27 with liberalism (.41 corrected for unreliability of the measures).

CRT correlates .00 in the same study.

These results may have more to do with people's "epistemological stance" than how they think about everyday problems.

Opposition to AOT may serve to justify otherwise-unjustifiable beliefs.

Thus, what may be important is understanding of why this is a problem.



## Relation to delusions, Salvi's (non)-confession

This is not an admission of guilt. However it is a statement about the persecution which the catholic people face. The catholic people are being persecuted in the workplace as well as in a whole. There are leaders in Government both Local, state and Federal which are well aware of the abuse taking place.

There is a movement in society which seeks the destruction of the church. One method these individuals use is to buy up companies, corporations and businesses after which putting themselves out of business and or laying off catholic employees. This layoff procedure for Catholics occurs to a great extent in the U.S. school systems, police departments, fire depts. etc. The catholic church is being floored financially.

Why do the free masons persecute the catholic people? Because their good at it. The catholic church is dealing with a group of people who are intelligent, mean, nasty and judicious. These individuals run society and have a good system for themselves but seek to keep the catholic church from printing a currency and having the same system.

John Salvi III, accused of murdering several workers in an abortion clinic. Boston Globe, January 6, 1995.

Misspellings are Salvi's.

# Fake news (Bronstein et al. , 2018)



## Mike Pence: Gay Conversion Therapy Saved My Marriage

Vice President-elect Mike Pence claims that a 1983 conversion therapy saved him.

NCSCOOPER.COM | BY RANDALL FINKELSTEIN



## Donald Trump Protester Speaks Out: "I Was Paid \$3,500 To Protest Trump's Rally"

PHOENIX A.Z. (AP) — For months now, rumors have circulated the Internet that individuals were being paid to protest at rallies held by presidential hopeful Donald Trump. Today a...

ABCNEWS.COM.CO

## Correlations from Bronstein et al. (2018)

	Real	AOT	CRT
Belief in fake news	.08	-.28	-.21
Belief in real news		.12	.10
AOT			.34

## Pseudo-profound bullshit (Pennycook et al., 2015)

Below are a series of statements taken from relevant websites. . . . please rate how “profound” you think [each statement] is. Profound means “of deep meaning; of great and broadly inclusive significance”.

- ▶ Hidden meaning transforms unparalleled abstract beauty.
- ▶ Good health imparts reality to subtle creativity.
- ▶ Wholeness quiets infinite phenomena.
- ▶ The future explains irrational facts.
- ▶ Imagination is inside exponential space time events.
- ▶ We are in the midst of a self-aware blossoming of being that will align us with the nexus itself.
- ▶ Consciousness consists of frequencies of quantum energy. “Quantum” means an unveiling of the unrestricted.
- ▶ Consciousness is the growth of coherence, and of us.
- ▶ We are in the midst of a high-frequency blossoming of interconnectedness that will give us access to the quantum soup itself.
- ▶ Today, science tells us that the essence of nature is joy.

## Other issues

- ▶ Better measures (objective and subjective): simulated decisions, tests of understanding, self vs. ideal, grading
- ▶ Generality: across domains, across components of AOT
- ▶ Relation to epistemic stance — where does knowledge come from?
- ▶ Relation to moral judgment
- ▶ Training (like cognitive therapy) — but how to motivate people to be trained?
- ▶ Effects of culture and different forms of education
- ▶ Changes over time (like Flynn effect?)