

On human judgment and decision making in extended spatial and temporal perspectives

Ola Svenson
Stockholm University

1. Human evolution and decision making.
2. Decisions: how we make them and how we think we make them.
3. Decision making under stress and time pressure
4. Future time and decision making.

- **We have been defined as humans since more than 100 000 years**
-

- We have been gatherers and hunters in small groups using tools for most of that time.
- We have not affected the environment significantly before the farming revolution.
- Human *perception excellent*
- Small *groups cooperation*, social factor
- Cognitive abilities depended on perceptions and concerned concrete problems developed for here and now.

Challenges to those making decisions:

- Decision making: beyond here and now.
- Decision making and feed back: outcomes based on cognition not on perception and perceptual feed back.
- Not small groups: populations affected by outcomes
- The environment is globally affected.

Percieved facts and a wish to conform with own attitudes create one of the goals driving decision making, behavioral intentions and implementation of decisions –behavior-

- As a goal we now may have: “Decrease of CO2 emissions to arrest global warming”.
- However, this goal conflicts with many other goals (e.g., related to different aspects of life style)
- Humans do not like to make decisions with trade offs between goals – goal conflicts

Humans are basically one-dimensional decision makers with *one goal at a time* and prefer such decisions

(but they do not necessarily think so)

There are many ways of avoiding trade-offs between goals:
(AND THIS GIVES HINTS ABOUT HOW THE CO2 ISSUE CAN BECOME INCORPORATED IN DECISION MAKING)

1. people decide/behave/think as they did last time (*decision by recognition*)

2. people in a group decide the *same as others* whom they see in the group they belong to at the moment

3. people decide the same as a “*trusted other*” or follow “*social norms*” e.g, scientific experts, politicians

4. Checking one goal dimension at a time determines the decision - cognitive or emotion. Elimination of alternatives that are not satisfactory on a dimension or selection of an alternative based on one goal dimension.

5. We hate conflicts but if we cannot avoid goal conflicts we *try to create one dimension* for a decision (e.g., rent/m², speed, kg of CO₂/year).

6. If it is not possible to find one goal dimension we are left with a value conflict:

- *Perform trade-offs between goals*

- *Restructure the problem mentally so that conflicts are eliminated or played down so that the single decisive dimension dominates.*

(e.g., play down contradictory information, ignore it, ignore possible side effects, exaggerate other supporting information).

What happens if we have to make a decision with conflicting goals, time pressure and stress and appears?

Can I make this decision in time or is it too late?

Yes, e.g., - speed up process, superficial search of information

- most important goal dominates

(no trade offs)

No, e.g., - buck passing (somebody else takes responsibility for making the decision)

- denial (just do not address the problem)

Making a decision with positive and negative consequences that are delayed into the future.

What happens with the evaluations of the consequences over time?

- *Discounting negative consequences* means that a negative consequence in the future is less negative than if it happened today.

- However, when implementation of a decision made much earlier comes closer in time sometimes:

- Positive aspects tend to become *less positive*

- Negative aspects tend to become

more negative (May lead to regret)

Discounting a large epidemic catastrophical disease

Decision-Making, Time Horizons, and Risk

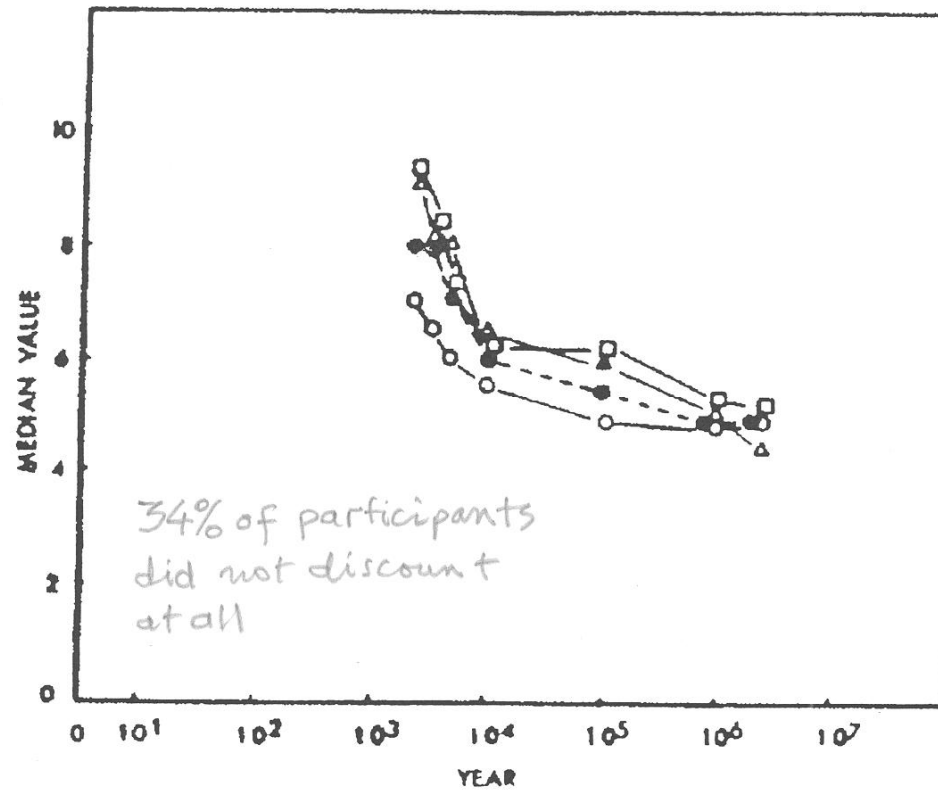


Fig. 7. Median value for subjects who discounted the negative consequences for a large epidemic disease. ○, male engineering students; ●, female engineering students; △, senior high-school students; □, middle-aged group.

When we make decisions today, how far into the future are we supposed to be responsible for the consequences?

Planning horizons (years) responsibility for planning should cover:

<u>Retired</u>	<u>High school</u>	<u>Engin. Stud</u>	<u>Nucl exp</u>
(72 years)	(17)	(21)	(41)

Others their personal economy			
13.4	5.7	5.2	12.1

Environmental pollution (parliament planning)			
82	296	255	104

Table IV. Planning Horizons in Years into the Future Judged as Adequate for Different Activities.*

No.	Question	Group			
		R (72)	G (17)	E (21)	NF (41)
<u>Personal planning</u>					
58	Others, their personal economy	13.4	5.7	5.2	12.1
59	Newly married couple	20.5	4.9	4.9	9.9
60	Parents of child (10 years)	12.9	5.4	5.2	8.8
61	65-year-olds, their future	8.6	4.4	3.6	8.5
<u>Societal planning</u>					
63	Swedish energy policy	27	34	38	30
64	Nuclear waste	100	376	458	110
62	A Swedish administrative district (kommun)	12	11	13	14
<u>Responsibility of Parliament</u>					
65	Swedish energy policy	40	69	50	41
66	Nuclear waste management	121	375	588	49
67	Environmental pollution	82	296	255	104
68	Swedish economy	53	45	43	13
<u>Responsibility in general</u>					
69	For how many generations into the future can we be responsible today when we make decisions?	4.2	5.9	3.4	5.4

*Mean ages in parentheses.

When is the following likely to happen in the future?
(years ahead)

Retired High school Engn.stud Nucl. Experts

Next ice age

1 109 5 623 5 572 10 000

Coal 90% used of the reserves now existing

376 217 262 361

Uranium reserves finished

251 406 1 614 1 656

Table III. Geometric Means of Years of Future Events in Study 2*

No. Question	R	G	E	NF
<u>Long-term conditions</u>				
37 next ice-age	1109(3)	5623(15)	5572(10)	10000(0)
40 Sweden ends as nation	248(19)	248(30)	392(25)	266(11)
<u>Energy supply</u>				
42 Coal 90% used reserves	376(0)	217(8)	262(0)	361(22)
43 Last river for power	24(3)	27(28)	32(33)	33(22)
44 Oil 90% used	135(3)	108(5)	114(3)	126(11)
52 Uranium depleted	251(9)	406(5)	1614(5)	1656(44)
<u>Nuclear energy program</u>				
53 Next Swedish reactor startup	16(38)	15(45)	16(45)	30(55)
54 First core melt in Sweden	12(34)	25(45)	26(58)	65(44)
55 Closing last Swedish reactor	62(9)	53(23)	67(13)	76(0)
<u>Spent fuel management</u>				
56 Safe method for storage of spent nuclear fuel exists already (%)	55(34)	72(40)	31(38)	-
45 Groundwater in storage	0	0	0	78
46 Leakage from storage	434(16)	940(13)	1285(18)	26303(0)
47 Radiation halved	388(16)	403(13)	1303(13)	166724(0)
31 Speeding up decay of spent fuel	275(3)	1135(5)	9550(5)	77(0)
48 Stored fuel no longer dangerous	35(13)	76(15)	121(18)	- (78)
	1675(13)	5781(28)	58076(20)	31623(33)
<u>Dangerousness of cancer risk</u>				
30 Most cancer cured	31(6)	36(5)	15(0)	62(22)
35 Vaccine against cancer	29(6)	41(15)	56(18)	29(11)

*Retired subjects were denoted, R; high-school students, G; university students of engineering, E; and specialists in nuclear fuel management, NF. Percent "never happen" answers in parenthesis following mean. When "never" answers exceeded 60%, no means were computed from the remaining answers.

- Global warming is just one example of human misuse of the earth. CO2 has been attended to because of its feed back (e.g., it affects everybody and has measurable consequences)
-
- Other misuses of resources are masked by dumping waste somewhere else (e.g., electronic waste and ships – Africa and Asia) with no effective feed back to us in the west who earlier used the scrapped utilities.
-
- It is necessary to create concrete perceptual immediate feed backs to promote environmental goals.

- To enable protection of the environment it is necessary to find at least one measurable one-dimensional indicator of an environmental goal
-
- If the environmental goal is in conflict with other goals, it is important to find a “vehicle goal” - a goal that is generally accepted and in harmony with the environmental goal
-
- (Of course) Side effects are the most difficult aspect of environmental protection goals (e.g., using food and wood for fuel).

- Who are the decision makers?
 - 1. Actors in finance
 - 2. Industrial actors
 - 3. Politicians
 - 4. Public
 -
- The higher in the hierarchy, the more power to decide and influence.

Thank you