AACREA

CRED, Columbia University, Elke Weber Proyecto CLIMA

Behavioral Decision Theory:

How Judgments and Decisions are Made Under Uncertainty

Lesson 6

Role of Personality for Objectives, Goals, and Decisions

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Overview

- **D** Subjective perception of risk
- Material and non-material goals
- Experience-based vs. description-based decisions
- Personality traits
- Personality and beliefs
 Personality and decision goals
 Personality and actions

Three lines of social science inquiry

- **D** Subjective risk perception matters
 - different people worry about different things
 - we can't worry about too many things at one time
 - worry drives attention, perception, memory and action
- Material and non-material goals in risky decision making
 - Non-material goals often affective
 - E.g., minimization of postdecisional regret
- Difference in decisions made when information is learned by personal experience over time (*experience-based decision making*) vs. when information is provided as a statistical summary (*description-based decision making*)

Individual Differences

Identify which farmers worry about what, including climate risks, and what they do about it

Participants in Argentinian Study in 2001

□ Farmer Characteristics (n = 31)

- 93% male; aged 25-57 years, with mean of 41.5
- 84% full-time farmers
- avg. level of education "some university, no degree"
- Avg. income level \$100-150 k
- members of AACREA for avg. of 9 years
- **D** Farm Characteristics
 - 670 ha to 6,500 ha, with mean of 2,402 ha
 - 1-10 employees, with mean of 5.4
 - 46% had noncontiguous land
 - main crops: soy, corn, wheat

Climate Change Perceptions and Beliefs

Prop. Endorsing Belief / Mean	n Judgment (and
Bellet / Statement of Fact	<u>Range</u>
Climate in Region Changed Over Last Several Years	.38
Affected by Drought anytime over last 12 years	.33
Number of Years (out of last 12) Affected by Flood	1.45 (0 to 4)
Climate Change Has Affected Farm Management Decis	sions .36
Source of Belief in Climate Change:	
Personal Memory	.29
Other Farmers	.18
Press/TV	.15
Other	.11
More December Rainfall is Desirable/ Undesirable	.45/.55
Lowest Dec. Rainfall Remembered Over Last 10 Years Highest Dec. Rainfall Remembered Over Last 10 Years	28 mm (0 to 50) 5 159 mm (100 to 300)

Decision Exercise

- Hypothetical farm in two locations with multiple plots in each location
 - Choice of crop: Maize, Soy, Wheat, Wheat/Soy
 - If Maize, then
 - Choice of hybrid
 - Date of planting and planting density
 - Amount of fertilizer
- Same decisions made twice by 14 farmers and 3 AACREA technical advisors
 - Scenario 1: Climatology assumptions
 - Scenario 2: La Niña forecast introduced

Finite Pool of Worry (0 to 10 ratings of concern)

Risk Category	Scen1	Scen2
Climate Risk	7.5	8.4
Political Risk	8.6	8.1
Input Price Risk	4.7	6.5
Crop Price Risk	8.1	8.3

Boldfaced values are significantly larger

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Decision Goals (0 to 10 scale)

Goals	Farmers	Advisors
Maximize Farm Profitability	7.92	7.17
Maximize Crop Yields	7.75	5.67
Maximize Crop Prices Minimize Cost of Production Inputs	6.54 6.25	3.17 2.66
Minimize Impact of Political Uncertainty	6.43	3.00
Make Best Possible Decisions Given Circumstances	9.14	9.00
Make Reasonable Decisions Given Circumstances	6.82	3.00
Minimize Possible Regret about Decisions After the Fact	6.89	3.83

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Different "strokes" for "different folks"

- Heterogeneity in decision makers usually defined as differences in
 - Demographic variables (e.g., age, education)
 - Economic variables (e.g., income, farm size)
- Heterogeneity in decision makers in psychology also defined as differences in
 Personality traits

Farmer Personality Traits Measured

Herrmann Brain Dominance Instrument

Preferred Thinking Style

Rational/Planning

Experiential/Experimenting

Risk preferences

- Risk aversion
- Loss aversion
- Temporal discounting
- □ Regulatory Focus (Higgins 1999)
 - Promotion Focus
 - Prevention Focus
- Regulatory State (Kruglanski et al. 2000)
 - Locomotion Orientation
 - Assessment Orientation
- Decision style (reflective vs intuitive)

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HBDI -- Four Quadrant Model of Thinking Preferences

Analytical thinking

- Key word: logical, factual, critical, technical and quantitative.
- Preferred activities: collecting data, analysis, understanding how things work, judging ideas based on facts, criteria and logical reasoning.

Sequential thinking

- □ *Key word:* safekeeping, structured, organized, detailed, planned.
- Preferred activities: following directions, detail oriented work, step-by-step problem solving, organization and implementation.

Interpersonal thinking

- □ Key word: kinesthetic, emotional, spiritual, sensory, feeling.
- Preferred activities: listening to and expressing ideas, looking for personal meaning, sensory input, and group interaction.

Imaginative thinking

- **Key word:** Visual, holistic, intuitive, innovative, and conceptual.
- Preferred activities: Looking at the big picture, taking initiative, challenging assumptions, visuals, metaphoric thinking, creative problem solving, long term thinking.

2001 Argentine farmer survey:

Mean scores, observed range of scores, and theoretical range of score for preferred thinking style

Scales		Mean	Obser ved Min	Obser ved Max	Theore tical Min	Theore tical Max	
HBDI]
Preference							
Code							
	Α	1.1	1	2	1	3	1
	В	1.3	1	2	1	3	
	С	1.8	1	3	1	3	
	D	1.6	1	3	1	3	
HBDI Profile]
Scores							
	Α	88.1	54	120	10	150]
	Β	83.6	51	120	10	150	
	С	56.9	26	95	10	150]
	D	63.5	32	105	10	150]

A=rational thinking style; B=safekeeping thinking style; C=feeling thinking style; D=experimental thinking style

1=primary/dominant preference for point score of 67 and higher

2=secondary/intermediate preference for point score of 34 - 66

3=tertiary preference/avoided thinking style for point score lower than 34

Risk preferences

Risk preferences are measured by presenting decision makers a series of options over gambles and sure things.

Where a decision maker switches from one type of option to the other can tell us about his risk preferences.

Certain	50/50 risk
60	100
55	100
50	100
45	100
40	100
35	100
30	100

Parte II. Decisiones

En esta parte se le presentarán cinco ejercicios en los cuales Ud, deberá elegir entre varias opciones. Le rogamos que tome sus decisiones mirando todas las opciones y seleccionando en forma más o menos rápida (sin hacer cálculos largos o detallados) la opción que a Ud, le parezca más razonable. Recuerde que en este ejercicio no hay respuestas correctas o incorrectas. Nos interesa saber qué opción prefiere Usted.

Ejercicio 1. Imagine que en este ejercicio Ud. tiene enfrente dos urnas o recipientes:

- · En cada urna hay 10 bolillas, pero proporciones distintas de bolillas negras y blancas.
- Ud deberá elegir de cuál de las dos urnas desearía sacar UNA bolilla.

A. La Urna A cont	iene	B. La Urna B cont	tiene
7 bolillas negras y	••••••	9 bolillas negras y	•••••••
3 bolillas blancas	000	1 bolilla blanca	
 Si saca una de las	7 bolillas negras,	 Si saca una de las	9 bolillas negras,
Ud. gana 200 S,	pero	Ud. gana 100 \$,	pero
O Si saca una de las 3 bolillas blancas,		O Si saca la única bolilla blanca,	
Ud. gana 800 S .		Ud. gana X S.	

bolilla es blanca O, y los resultados son distintos en las dos urnas (ver cuadro con valores ♥).

Si en la Urna B la ganancia X al sacar una bolilla blanca fuera de 800 \$, Ud. seguramente elegiría sacar bolillas de la Urna A, ya que tiene una mayor chance (3 de 10 vs. 1 de 10) de ganar \$800, y si sale negra gana \$200 en vez de \$100...

• Decisión: Para usted ¿Cuál debería ser, como mínimo, el		1360 \$
valor de la ganancia X (en 8) para que Ud. empiece a preferir la Urna B en lugar de la Urna A?		1500 \$
		1660 \$
D. C		1860 \$
Por favor, marque en la tabla de la derecha el valor de la ganancia \mathbf{X} a partir de la cual Ud, comenzaría a preferir la		2130 S
Urna B. Elija al menos un valor, pero no más de uno. 🗲		2500 \$
SUGERENCIA: Quizás una maneramás fácil de tomar esta decisión sea reemplazar la X en los resultados de la Urna B con el primer monto en la tabla de la derecha (\$1360).	11	3000 \$
	11	3700 \$
		4400 \$
		6000 \$
Si X = \$1360, Ud. preferiria la Urna B? Si es asi marque el primer casillero en la tabla. En caso contrario, pase a la siguiente suma en la		8000 \$
tabla (\$1500) y repitase la pregunta Cuando encuentre una suma que le haga preferir la Urna B, marque el casillero correspondiente.		12,000 \$
		20,000 \$
		34,000 S

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	Certain	50/50 risk
	60	100
	55	100
	50	100
12 5	45	100
42.5	40	100
	35	100
	30	100

$$42.5^{\sigma} = .5(0^{\sigma}) + .5(100^{\sigma})$$
$$42.5^{\sigma} = .5(100^{\sigma})$$
$$42.5^{\sigma} - .5(100^{\sigma}) = 0$$

Certain	50/50 risk
-65	-100
-60	-100
-55	-100
-50	-100
-45	-100
-40	-100
-35	-100

Certain	50/50 risk
-65	-100
-60	-100
-55	-100
-50	-100
-45	-100
-40	-100
-35	-100

Certain	50/50 risk
65	100
60	100
55	100
50	100
45	100
40	100
35	100

domain of losses

domain of gains

Risk Attitude





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Preferences over time

- Decision makers may have to make tradeoffs between having something now or something else later.
 - Would you rather have \$10,000 now or \$12,000 2 years from now?

Ejercicio 4. Para este ejercicio, asuma que se le ha ofrecido recibir <u>hoy</u> \$ 1500 (Opción A) con total certeza. Sin embargo, de pronto se le presenta otra alternativa (Opción B), en la cual Ud, podría recibir una suma mayor de dinero X si estuviera dispuesto a <u>esperar un mes.</u>

Resumiendo, las dos opciones son:

Opción A	Opción B
Recibir \$1500 HOY	Recibir X \$ dentro de un mes

Si en la Opción B la suma X fuera solamente 1500 \$, Ud. obviamente preferiría la <u>Opción A, ya</u> que recibiría la misma cantidad sin esperar un mes...

• Decisión: Para *cada fila* de la tabla de abajo, por favor indique con una cruz si prefiere la Opción A (recibir \$1500 hoy) o la Opción B (recibir una suma mayor dentro de un mes). Por favor marque una cruz para cada fila. \clubsuit

Opción	Α		Opción	В
	Recibir \$1500 hoy	versus		Recibir \$1600 en un mes
	Recibir \$1500 hoy	versus		Recibir \$1800 en un mes
	Recibir \$1500 hoy	versus		Recibir \$2000 en un mes
	Recibir \$1500 hoy	versus		Recibir \$2200 en un mes
	Recibir \$1500 hoy	versus		Recibir \$2400 en un mes
	Recibir \$1500 hoy	versus		Recibir \$2600 en un mes
	Recibir \$1500 hoy	versus		Recibir \$2800 en un mes
	Recibir \$1500 hoy	versus		Recibir \$3000 en un mes
	Recibir \$1500 hoy	versus		Recibir \$3200 en un mes

A decision maker's discount factor is measured by presenting a series of sure thing options but varying the delay.

Where a decision maker switches from one type of option to the other can tell us about his time-value preferences.

Temporal discount results

- **D** The average discount factor was .78
- □ The median discount factor was .84
- Most people had discount factors between .60 and .88

Regulatory focus (Higgins, 1999)

- Promotion focus, which involves promoting the achievement of ideals
- Prevention focus, which concentrates on preventing deviations from oughts and obligations
 - not mutually exclusive, though distinct survival functions
 - promotion system
 - nurturance and accomplishment and advancement
 - utilizes "approach means" in order to attain its goals
 - a promotion-focused student seeking a high exam score might study extra material or organize a study group with fellow classmates.
 - prevention system
 - security and safety and fulfillment of responsibilities
 - uses "avoidance means" in order to attain its goals
 - a prevention-focused student seeking a high exam score (or rather, trying to avoid a low exam score) might ensure that he or she knows the required material and will avoid distractions prior to the exam
 - chronic promotion or prevention focus derives from a subjective history of past success in promotion and prevention goal
 ²³ attainment

□ Regulatory Focus measures what motivates you.

- If you are high in <u>Prevention</u> focus, you are motivated by security, safety, and responsibility.
- If you are high in <u>Promotion</u> focus, you are motivated by advancement, growth, and accomplishment.
- Note: these two are not mutually exclusive.A person can be high on both or low on both foci.

Regulatory Focus results

Prevention (between 0 and 100)

- Mean: 60
- Most people score between 55 and 70

Promotion (between 0 and 100)

- Mean: 59
- Most people score between 54 and 67

Regulatory States (Kruglanski et al., 2000)

D Locomotion

- movement from a current state toward a valued or desired other state, but moving from place to place, and from decision to decision
- involves initiating movement away from a current state to a new state with no necessary ultimate destination, direction or place in mind
- For example, when you are looking for a parking spot, you would be impatient to park the car just anywhere to be done with the task and to do something else.

Assessment

- orientation to measure, interpret, or evaluate the rate, amount, size, value or importance of something, to appraise critically for the purpose of understanding or interpreting, or as a guide in taking action
- Involved evaluation and making comparisons
- For the parking example, you would be looking for the perfect parking spot for a long time.
- The two aspects could be independent of each other.
 A person high in assessment need not be low in locomotion, or vice versa.

Self-Regulation Regulatory States Results

Locomotion (between 0 and 100)

- Mean: 43
- Most people score between 35 and 55
- **Assessment** (between 0 and 100)
 - Mean: 49
 - Most people score between 40 and 60

Cognitive Impulsivity

More Reflective Style

Inclined to resist reporting the first response that comes to mind and rely more on deliberate thinking

□ More Impulsive Style

inclined to report their intuitive responses and rely less on deliberate thinking.

Cognitive Impulsivity

1	Un mate y una bombilla cuestan 11 pesos en total. El mate cuesta 10 pesos más que la bombilla.
	¿Cuánto cuesta la bombilla? pesos.
2	Si una cosechadora tarda 1 hora en hacer 1 hectárea
	¿Cuánto tardarían 5 cosechadoras para hacer 5 hectáreas? horas.
3	Un lote de soja es invadido por una oruga. Por cada día que pasa, la superficie del lote afectada por la oruga se duplica. Si la oruga tarda 10 días para invadir la superficie completa del lote
	¿Cuántos días llevaría para que la mitad de la superficie del lote días.

Cognitive Impulsivity Results

Scored as the number of correct answers (between 0 and 3)

The mean score was 1.6

<u>Score</u>	n	percent	
0	13	5%	
1	120	44%	
2	92	34%	
3	48	17%	

Personality Traits and Decision Goals

- Assessment-oriented farmers rated subgoals to the overall goal of farm maximization as less important
 - r(assessment, maximizing crop prices) = -.93, p<.001)
 - r(assessment, minimizing political risks) = -.73, p<.05)
- Prevention-focused farmers rated goal of making best possible decision as less important and individual subgoals as more important
 - r(prevention, best possible decision) = -.68, p<.05)
 - r(prevention, maximizing yields) = .72, p<.05)
- Rational/planning farmers rated regret minimization as a decision goal as more important and experiential/experimenting farmers as less important
 - r(planning, regret) = .60, p<.05)</pre>
 - r(experimenting, regret) = -.61, p<.05)</pre>

Personality Traits and Beliefs about Climate Change

- Promotion-focused farmers more likely to belief in
 - changed climate (r = .51)
 - hold belief based on personal experience (r = .50)
- Prevention-focused farmers more likely to
 - hold belief about climate change base on information from other farmers (r = .59)

Personality Traits and Actions Taken

- In both scenarios of decision experiment, promotionfocused farmers did the following
 - used higher-cycle maize hybrid
 - grew it at higher density and using more fertilizer
- More rational and more assessment-oriented farmers allocated farm expenditures to different categories than less assessment-oriented and more experimenting farmers
 - more on farm administration and infrastructure
 - less on labor and debt repayment