

# Econ 211

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# Different Belief Biases

- ▶ Last lecture: belief biases are about things that are external to the decision-maker
  - ▶ Eg, belief in hot hands or the gambler's fallacy
- ▶ This lecture: beliefs biases are about things that are internal to the decision-maker
  - ▶ Overconfidence: biased belief in your ability
  - ▶ Projection bias: biased belief about your utility

# Projection Bias

## Motivation: Breakups

- ▶ Asked of people in romantic relationships: *Imagine that you and the person you're involved with break up within the next week. Using a scale from 1 to 7, where 1 is not happy and 7 is very happy, how do you think you would feel on a typical day two months from now?*
- ▶ Asked of people with recent breakups: *Using a scale from 1 to 7, where 1 is not happy and 7 is very happy, how happy would you say you are these days, on a typical day?*

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- ▶ Average responses:
  - ▶ Anticipating breakup: 3.9
  - ▶ Recent breakup: 5.4

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- ▶ Average responses:
  - ▶ Anticipating breakup: 3.9
  - ▶ Recent breakup: 5.4
- ▶ Any potential problems with this design?
  - ▶ Unincentivized responses; experimenter demand effect; self-image; framing differences; renormalization of happiness scale

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# Interpretation

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  - ▶ Getting bad grade or performance review
  - ▶ Severe medical issue
  - ▶ Winning the lottery

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- ▶ This failure to predict one's adaptability is a specific example of a more general bias:
  - ▶ *Projection bias*: the tendency to overestimate the degree to which future tastes will resemble current tastes

# Shopping Lists

- ▶ Another manifestation of projection bias: current surroundings or state of mind have an undue impact on your planned consumption in the future
- ▶ Field experiment at grocery store
  - ▶ 135 people entering grocery store without a shopping list
  - ▶ Asked to fill out questionnaire with intended purchases
  - ▶ Some subjects chosen at random for “taste test” of a muffin (real purpose was to make some people less hungry)
  - ▶ After shopping, copies of receipts were collected
- ▶ Results: What was the percentage of items in shopping cart that were unplanned purchases?
  - ▶ Hungry shoppers:

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  - ▶ Hungry shoppers: 51%
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- ▶ Explanation?

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- ▶ Explanation? Hungry people buy more because they think they will be more hungry in the future

Source: Gilbert, Gill, and Wilson (1998)

# Planning Ahead

- ▶ In the previous experiment, it is possible that hungry people are buying more because they are going to consume it right away
- ▶ We can get around this with a design that separates the purchasing and the consumption
- ▶ Experiment with 200 office workers:
  - ▶ Workers asked to pick a snack to be delivered one week later
  - ▶ Snacks could be either healthy or unhealthy (not described as such to participants, of course)
  - ▶ Choices made right before or right after lunch
  - ▶ Snacks delivered right before or right after lunch

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  - ▶ Choices made right before or right after lunch
  - ▶ Snacks delivered right before or right after lunch
- ▶ Results: percent choosing unhealthy option:

	Consume after lunch	Consumer before lunch
Choose before lunch	78%	56%
Choose after lunch	42%	26%

Source: Read and Van Leeuwen (1998)

# Winter Clothes

- ▶ OK, so projection bias seems to affect small purchases with tempting items like food, but will it affect purchases of more expensive, practical goods?
- ▶ Data from 2.2 million catalog purchases of cold-weather gear
  - ▶ Note this is *not* an experiment
  - ▶ Also in data set: temperature deviation on day item was ordered, relative to historical average temperature for that day
  - ▶ Standard theory: current temperature deviations should not affect purchasing behavior, since gear would not arrive for several days

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- ▶ Results: orders for winter gear went up on colder-than-normal days
- ▶ Any alternate explanations?
  - ▶ Possible that colder weather increases salience, ie helps you remember to buy that coat you need
  - ▶ Counter-argument: items bought on colder-than-normal days are more likely to be returned

Source: Conlin, O'Donoghue, and Vogelsang (2005)

## Still Not Convinced?

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  - ▶ Car and house purchase
- ▶ Data: 40 million vehicle purchases across the US (again, no experiment)
  - ▶ Again, connected purchase behavior with abnormal weather in the area
  - ▶ Weather acts like a coin flip in a lab experiment
  - ▶ Keep in mind: the enjoyment of the car that day is miniscule compared to total lifetime of car

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  - ▶ Keep in mind: the enjoyment of the car that day is miniscule compared to total lifetime of car
- ▶ Results:
  - ▶ Temperature 20 degrees above average increases fraction of cars sold that are convertibles by 8.5%
  - ▶ 10-inch snowstorm increases fraction of cars sold that have 4-wheel-drive by 6%

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## Still Not Convinced? cont

- ▶ Data: 4 million homes sold at least twice between 1998 and 2008
  - ▶ Connected purchase behavior with weather in the area on that day
  - ▶ Note: takes 30-60 days from purchase dates to actually getting keys

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  - ▶ Connected purchase behavior with weather in the area on that day
  - ▶ Note: takes 30-60 days from purchase dates to actually getting keys
- ▶ Results:
  - ▶ House with swimming pool sells for 0.4% more in summer than in winter
  - ▶ That is a value difference of \$1600 for the average house

Source: Busse, Pope, Pope, and Silva-Risso (2012)

# Utility Functions

- ▶ We are going to formalize the idea of projection bias in a moment
- ▶ But first, we need to establish the idea of a utility function
- ▶ Suppose there are several options to choose from, say  $x$ ,  $y$ ,  $z$ , etc
- ▶ Then a *utility function* is a function which takes in an option and returns a number such that  $u(x) > u(y)$  if and only if I prefer  $x$  to  $y$
- ▶ Standard economic theory says that I will pick the option with the highest utility number
  - ▶ That is, I will *maximize utility*

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- ▶ What is amount of  $x$  that maximizes utility?

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- ▶ Suppose I have utility function  $u(x)$
- ▶ What is amount of  $x$  that maximizes utility?
- ▶ Need to find *first order condition* of  $u(x)$  with respect to  $x$ :

$$u'(x) = 0$$

- ▶ Finally, solve this equation for  $x$

# Theory Behind Projection Bias

- ▶ Individual has consumption  $c$  in state  $s$
- ▶ Utility is  $u(c|s)$ , ie utility of consumption (pool or no pool) depends on state (good or bad weather)
- ▶ Consumer tries to make prediction in state  $s'$  about utility in future state  $s$ :  $\bar{u}_{s'}(c|s)$

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- ▶ Projection bias model:  $\bar{u}_{s'}(c|s) = (1 - \alpha)u(c|s) + \alpha u(c|s')$
- ▶ Variable  $\alpha$  determines your deviation from standard model
- ▶ Note that projection bias *embeds* standard model when  $\alpha = 0$

# Overconfidence

# Motivation: Perceived Driving Ability

- ▶ College students asked to rate both their driving safety and driving skill relative to other people in experiment
- ▶ Even if people's estimate are noisy, the average self-ranking should be 50%

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Self rating:	Below 50%	50% to 80%	80 to 90%	above 90%
Safety	12.5%	27.5%	37.5%	22.5%
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- ▶ What could cause these patterns?
  - ▶ Overconfidence
  - ▶ Don't want to admit weakness
  - ▶ Different conceptions of what skillful or safe driving means

Source: Svenson (1981)

# Motivation: Entrepreneurs

- ▶ Relatively few new businesses are successful
  - ▶ More than 60% of manufacturing businesses close within 5 years
  - ▶ More than 80% of manufacturing businesses close within 10 years
  - ▶ Note: it is possible that this results from completely rational risk-reward decision
- ▶ Survey of 3000 new business owners were asked to assess the probability of their business succeeding:
  - ▶ 81% said their chances were 70% or better
  - ▶ One third said their business was certain to succeed

Source: Cooper, Wu, and Dunkelberg (1988)

# What Might Cause Overconfidence?

- ▶ Consider the process of learning about one's ability from observing your own successes and failures
- ▶ Decision makers may ascribe too much credit to their success and explain failures as bad luck
  - ▶ This is a kind of *attribution bias*: failure to correctly attribute causes to their effects
  - ▶ This is also a *self-serving bias*: a bias that makes the decision-maker feel better about themselves
    - ▶ In turn assumes that ego enters the utility function
    - ▶ Also call this *ego defense*