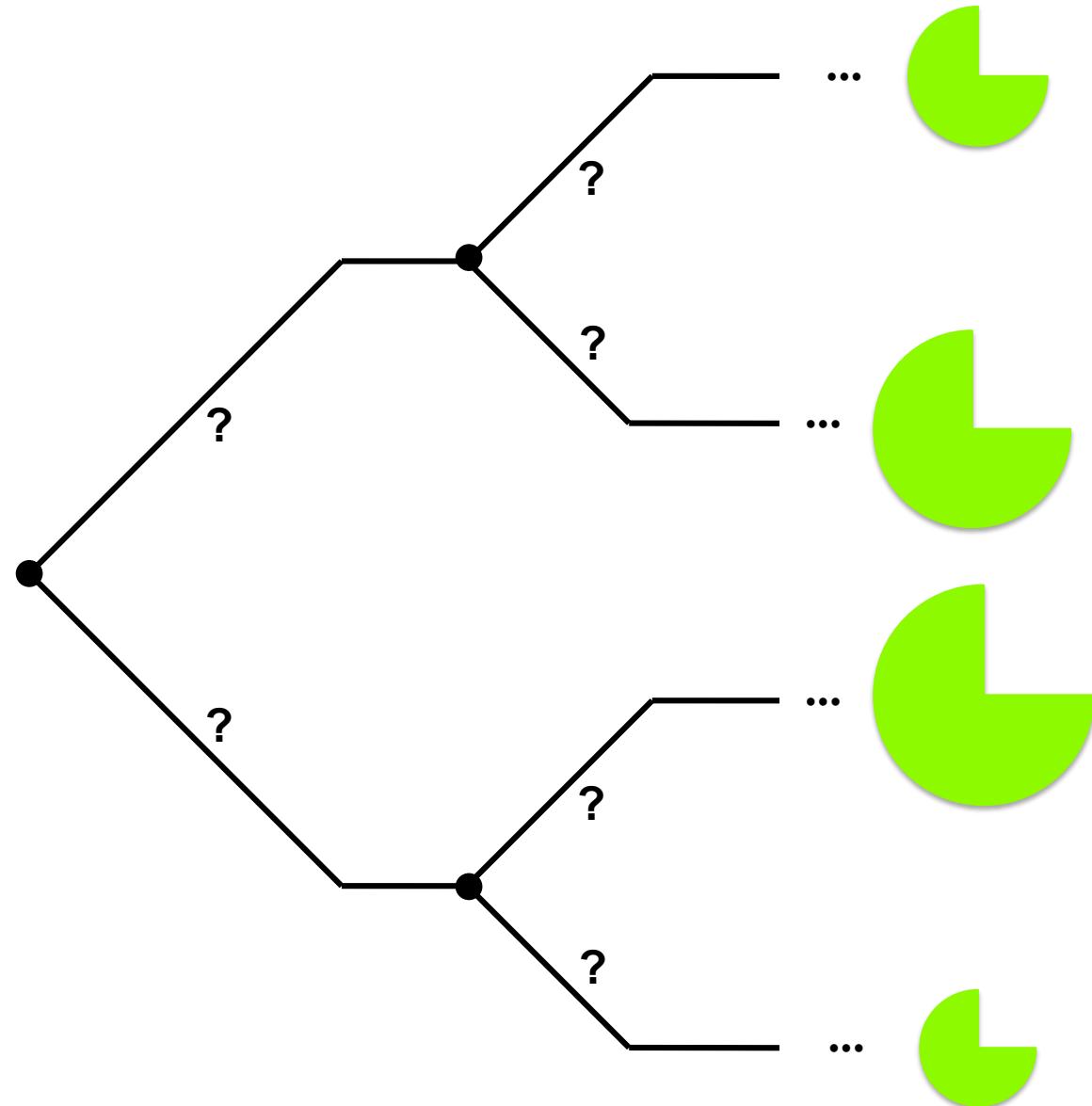


3/6/14 09:45

Thinking About Moves in the Game

Adam Brandenburger

Moves Affect the Size and Division of the Pie (repeated)



From: Brandenburger, A., and H. Stuart, "Biform Games," *Management Science*, 53, 2007, 537-549

Allocentrism



“When I am getting ready to reason with a man I spend one-third of my time thinking about myself and what I am going to say, and two-thirds thinking about him and what he is going to say.”

Image: Shutterstock

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GAME THEORY

THINKING ABOUT PEOPLE THINKING



ADAM BRANDENBURGER

<http://RTBEVENT.COM>

Exercise: The Three Hats (or Pashminas)



Three born and bred New York supermodels are shown a selection of five pashminas at an exclusive Fifth Avenue department store. Three of the pashminas are deep cerulean and two, saffron. The three supermodels are placed in single file, facing forward, and then gently blindfolded. One pashmina is draped on each, with two returned to the shelf. The blindfold is first removed from the supermodel in the back. She is asked if she can guess the color of her pashmina by looking only at the two models in front of her. "No," she says. The blindfold is removed from the supermodel in the middle, and she is asked the same question. (She can only look at the supermodel in front, not in back.) "I can't," she says. Immediately the supermodel in front, still blindfolded, blurts out, "I'm wearing a _____ pashmina. Can I keep it?"

What color pashmina is she wearing?

Permission sought from <http://www.markspaneth.com>

Testing Reasoning About Reasoning

		Player 2	
		<i>a</i>	<i>b</i>
Player 1	<i>a</i>	10	5
	<i>b</i>	15	5
		5	0
		5	10

Which strategies can player 1 choose if he engages in first-order reasoning about the game?

Which strategies can player 1 choose if he engages in second-order reasoning about the game (i.e., reasons about player 2's reasoning)?

What can we conclude if player 1 chooses *a*?

From: Kneeland, T., "Testing Behavioral Game Theory: Higher-Order Rationality and Consistent Beliefs," unpublished, 2013.

Solving the Identification Problem

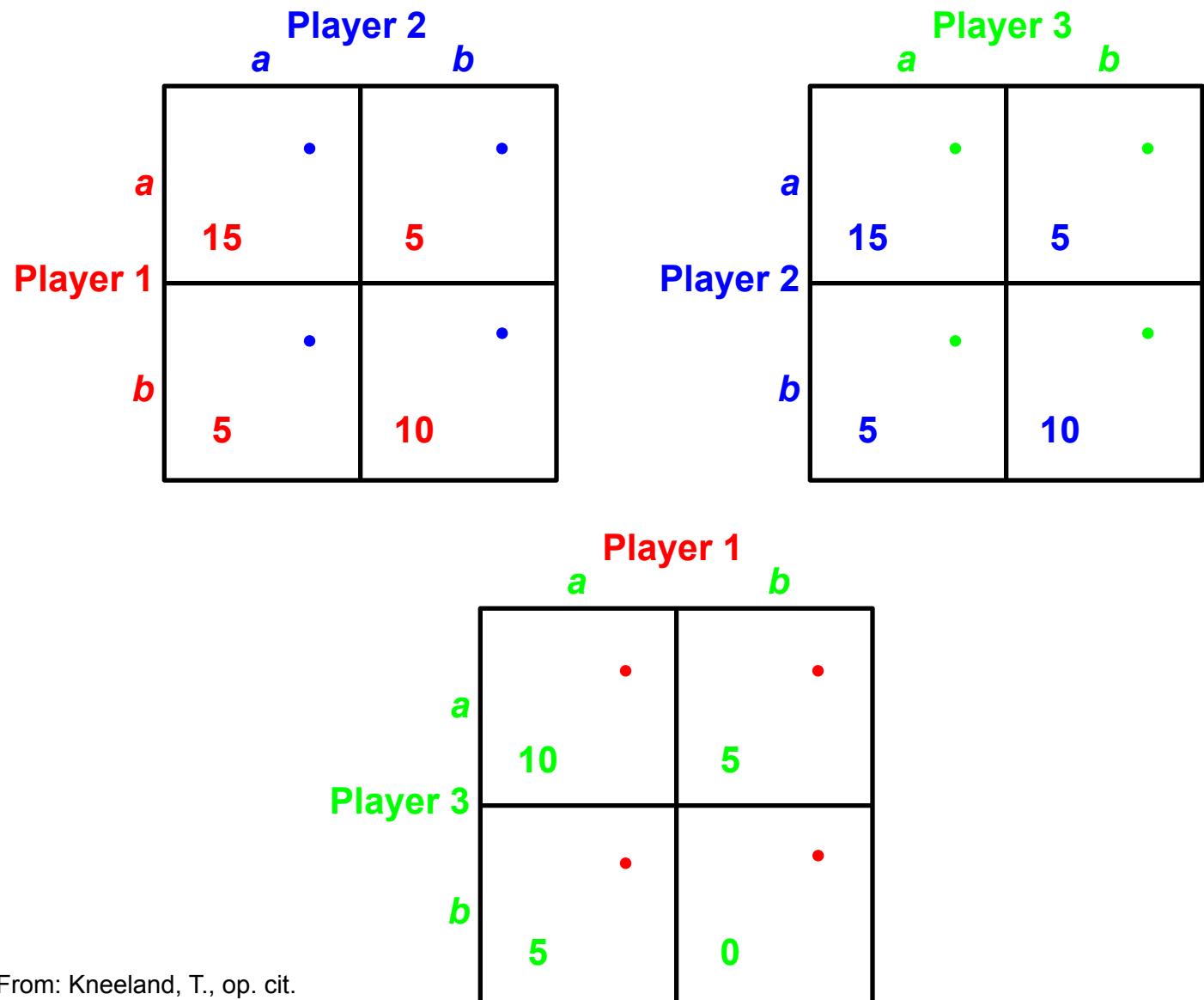
		Player 2	
		<i>a</i>	<i>b</i>
Player 1	<i>a</i>	5	10
	<i>b</i>	15	5
	<i>a</i>	0	5
	<i>b</i>	5	10

What can we conclude if player 1 chose *a* (resp. *b*) in the previous game and again chooses *a* (resp. *b*) in this game?

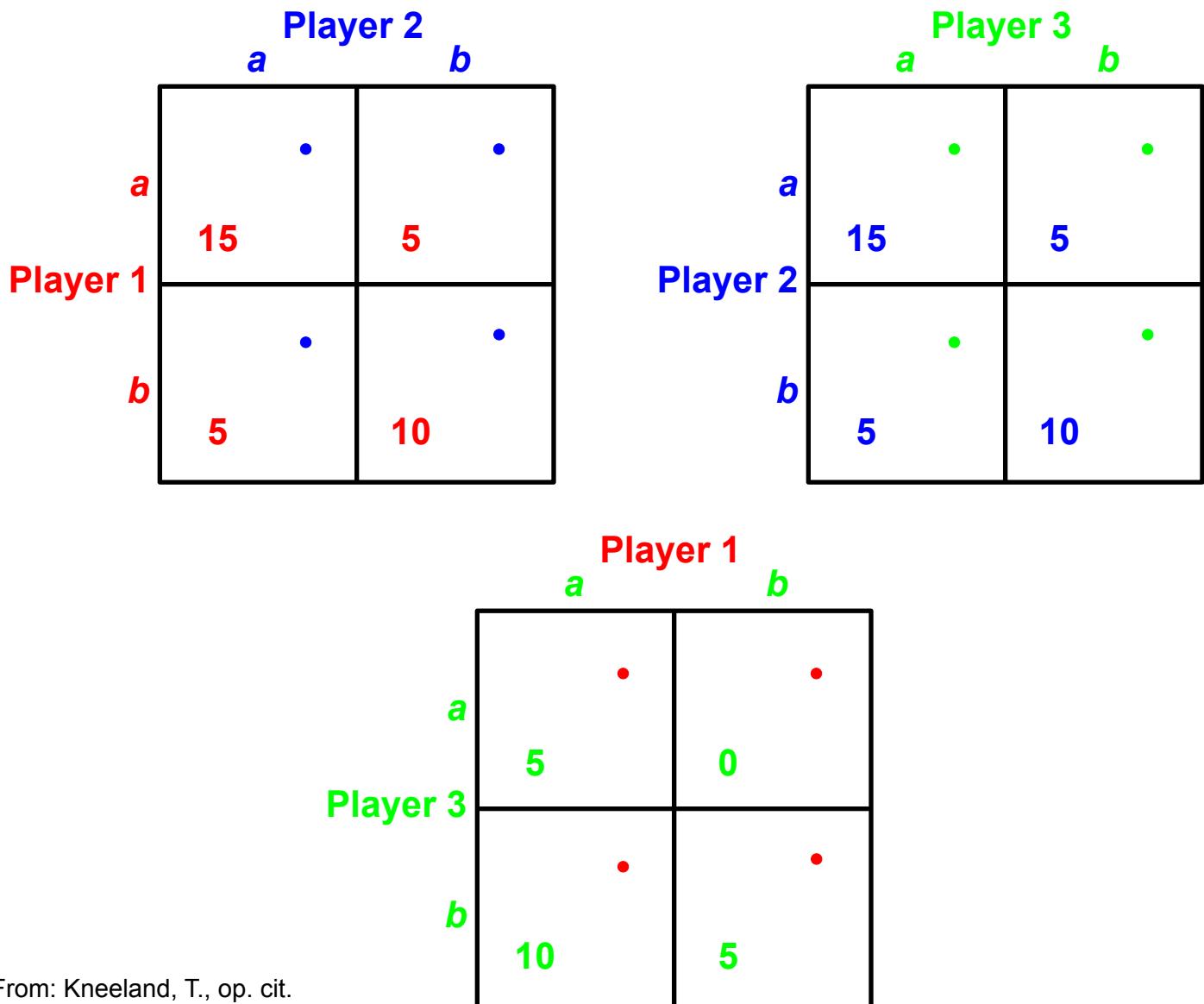
What can we conclude if player 1 chose *a* in the previous game and chooses *b* in this game?

From: Kneeland, T., op. cit.

More Than Two Players

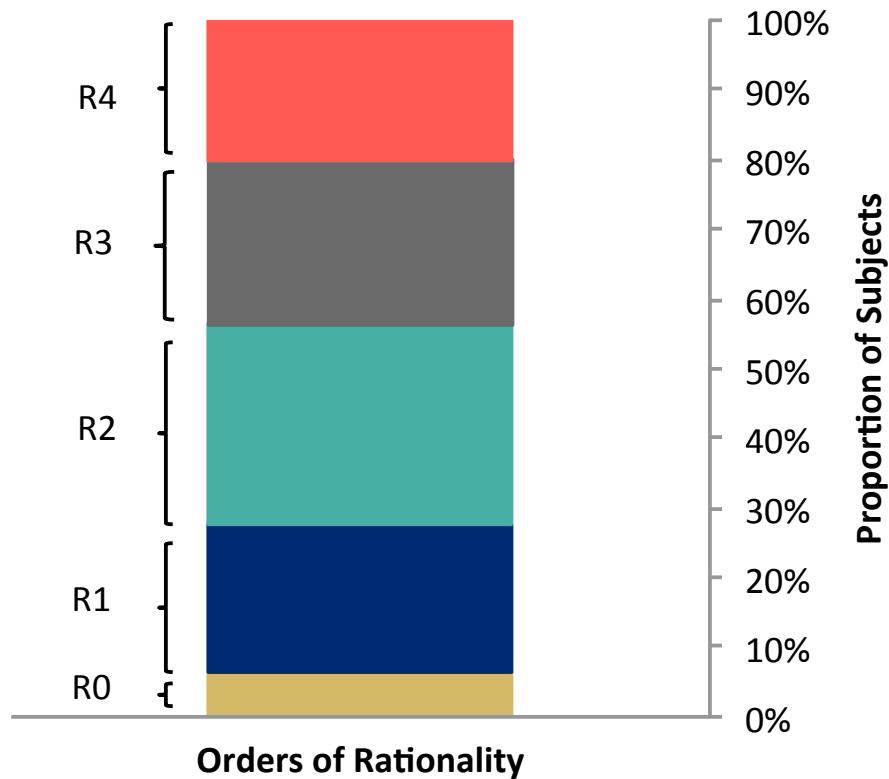


More Than Two Players contd.



From: Kneeland, T., op. cit.

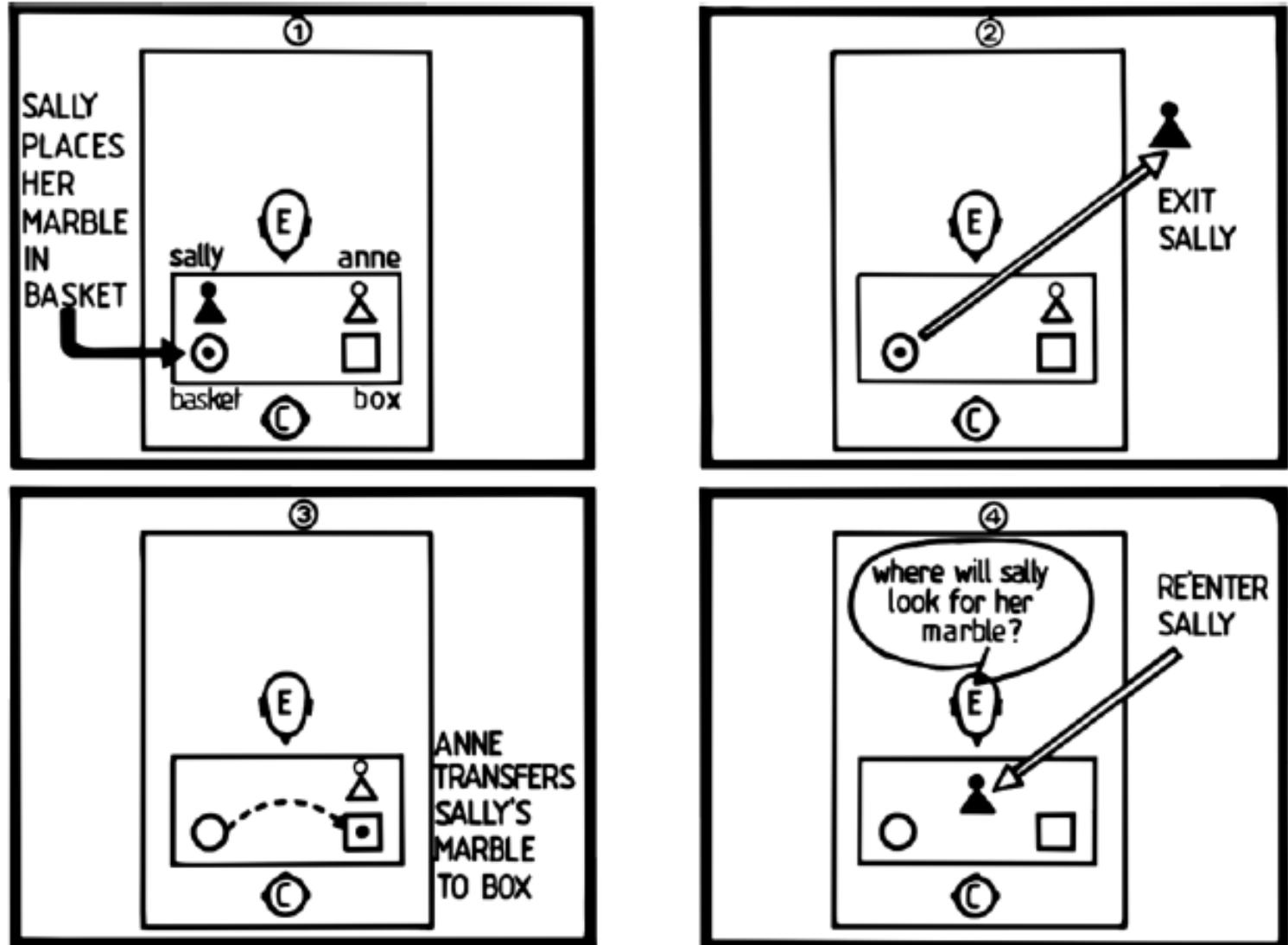
Experimental Findings



94 percent of the subjects engaged in first-order reasoning, 72 percent in second-order reasoning, 45 percent in third-order reasoning, and 20 percent in fourth-order reasoning.

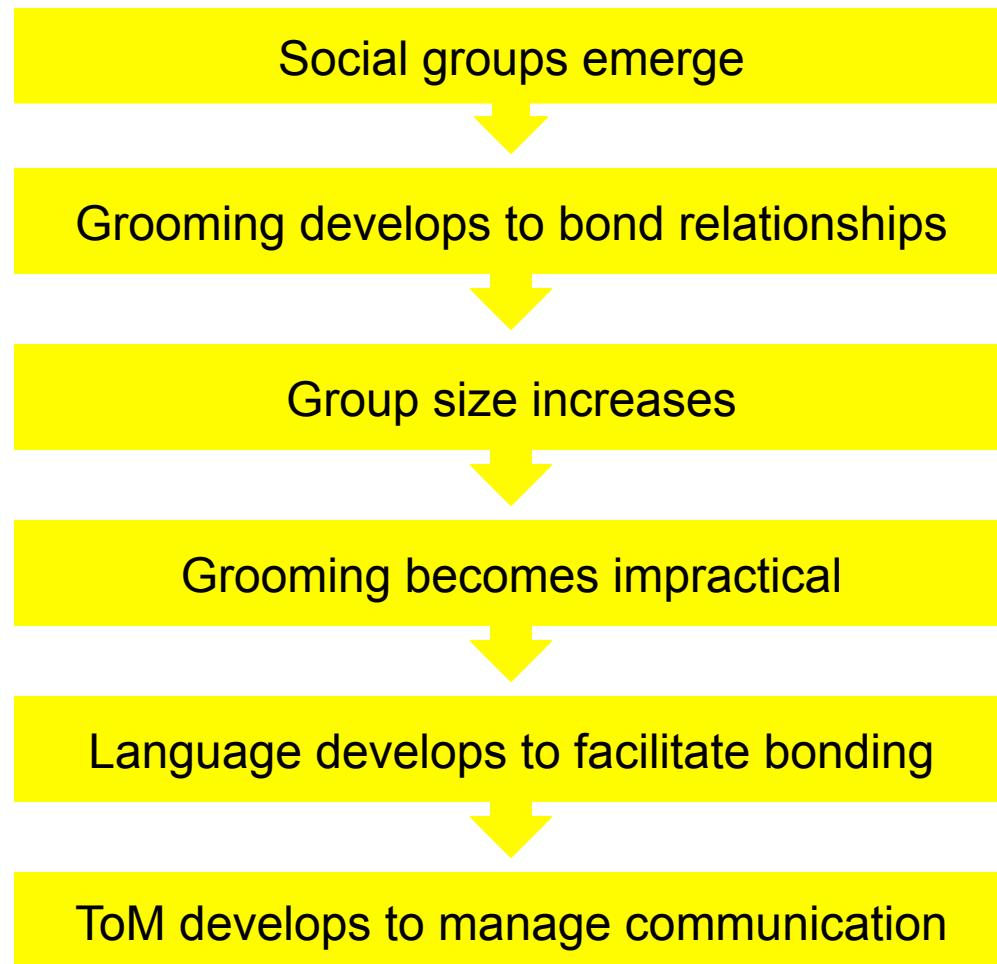
From: Kneeland, T., op. cit., with permission.

False Belief Test



From: Baron-Cohen, S., A. Leslie, and U. Frith, "Does the Autistic Child Have a 'Theory of Mind?'" *Cognition*, 21, 1985, 37-46

Evolution of Theory of Mind



From: Dunbar, R., "Theory of Mind and the Evolution of Language," in Hurford, J., Studdert-Kennedy, M., and C. Knight (eds.), *Approaches to the Evolution of Language: Social and Cognitive Bases*, Cambridge University Press, 1998, 92-110

The Social Brain Hypothesis

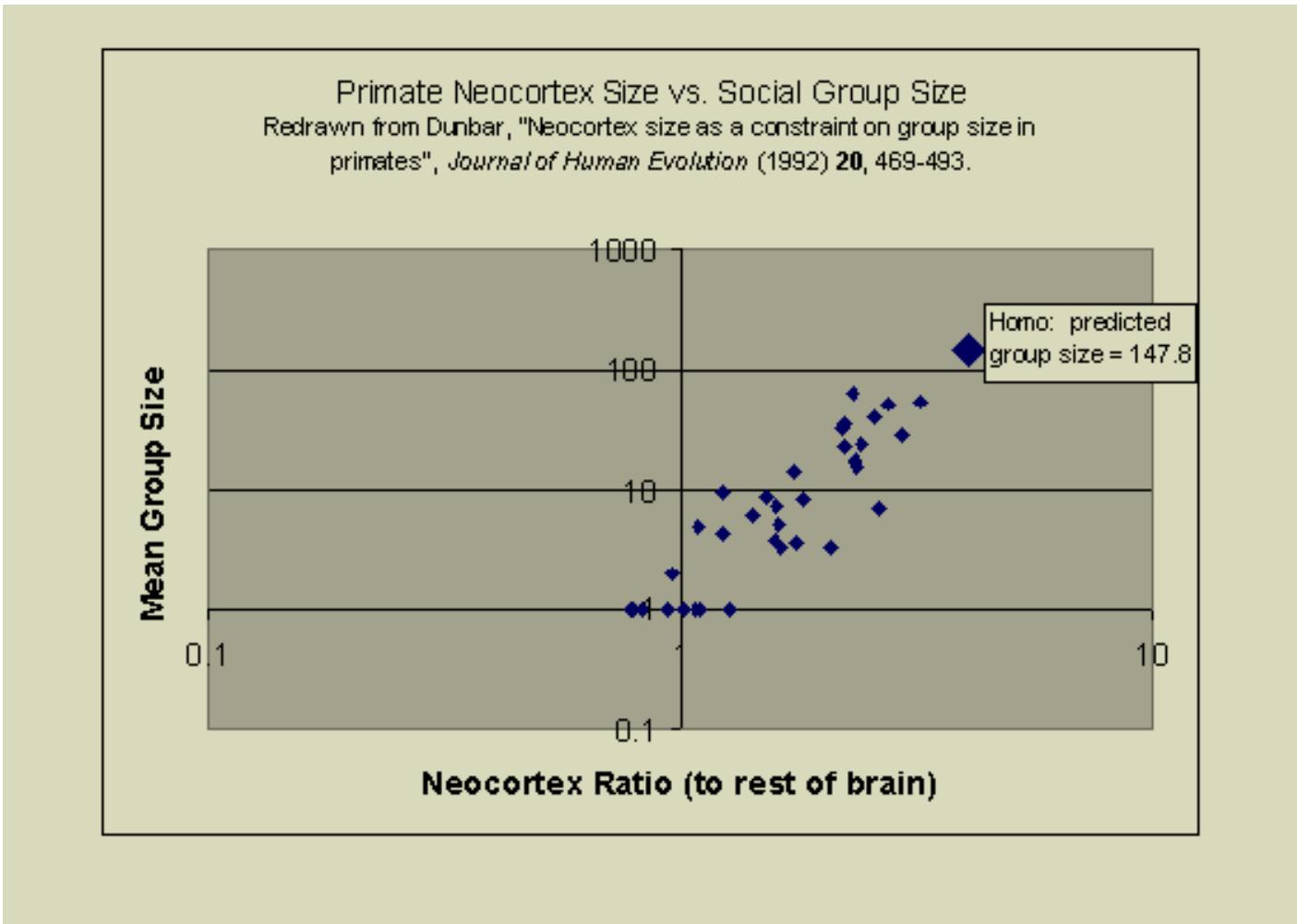


Image: http://pubpages.unh.edu/~jel/512/512-04notes/Primates_R_social.htm
Source: Dunbar, R., "Neocortex Size as a Constraint on Group Size in Primates," *Journal of Human Evolution*, 20, 1992, 469-493

Novelists

"I understood it all. Frank knew, but Maxim did not know that he knew. And we all stood there, looking at one another, keeping up these little barriers between us."

-- From?

Game Theory and History: “The Great Game”



Picture: Persia-Afghanistan 1848 (?), from Wikimedia Commons

aka “The Tournament of Shadows”

“Russia’s seemingly inexorable expansion into Central Asia did not save the Tsar or his Communist heirs, nor did it undermine British rule in India.... What did happen, however, was dramatic enough. Persistent British suspicions of Russian motives brought about two Afghan wars, the invasion of Tibet, and a full-scale mobilization during a frontier dispute in 1885. These fears also led to the subjugation of Egypt and the partition of Persia into spheres of influence....

To alarmists, it seemed likely that the Russians were carrying out a master plan whose eventual object was the direct invasion of India....

Russians could justly point to their own security concerns in Central Asia, whose open grasslands historically served as highways of conquest for Mongol invaders.”

--*Tournament of Shadows: The Great Game and the Race for Empire in Central Asia*, by Karl Meyer and Shareen Blair Brysac, Counterpoint, 1999, pp.xviii-xx

The Cold War

It is clear now, though, that the Truman administration's assumptions—that Mao should logically fear the Russians more than he did the Americans, and would therefore welcome opportunities to improve relations with the United States—were incorrect. The Sino-Soviet Treaty of 1950 was what Mao wanted: it was in no way imposed on him, as the Soviet Union's alliances with its East European neighbors had been. It was a means of discouraging what Mao believed to be an immediate dangerous adversary [viz., the U.S.] by seeking the protection of another great power that might someday become a danger but was now.

In this sense, it had an analog in the North Atlantic Treaty of April 1949, in which West Europeans had invited the Americans to guarantee their security against a feared Soviet invasion.... Both [treaties] were directed against the threat of an attack that was in fact remote, if it ever existed at all. But statesmen operate on the basis of what they believe at the time, not what historians may conclude decades later.

--We Now Know: Rethinking Cold War History, by John Lewis Gaddis, Oxford University Press, 1997, pp.69-70; see also The Cold War: A New History, by John Lewis Gaddis, Penguin, 2005

Epistemic Game Theory vs. Nash Game Theory

"Adam Brandenburger's work on the knowledge requirements implicit in game theory has become classic. These are of profound importance in understanding the relevance of game theory and, indeed, economic theory in general to the real economy. It is very good to have them collected, with an introduction that brings out the underlying themes."

Kenneth J. Arrow
Stanford University, USA

"Three hundred years ago, Francis Waldegrave found the first minimax solution of a matrix game. But in his correspondence with mathematicians Pierre Rémond de Montmort and Nicolas Bernoulli, Waldegrave counseled that epistemic considerations involving knowledge, beliefs, uncertainty, and incomplete information also mattered. The principal practitioners of game theory, with the notable exceptions of John Harsanyi and Robert Aumann, have ignored this advice. In recent years, these two theorists have been joined by Adam Brandenburger, whose work on epistemic game theory has been collected in this splendid volume. Eight classic papers by Brandenburger with a number of co-authors present an authoritative view of the field while an insightful introduction provides a roadmap to research both present and future."

Harold W. Kuhn
Princeton University, USA

"This book features a collection of foundational papers by Adam Brandenburger in epistemic game theory. Though still evolving, this approach marks a tectonic shift in game theory by offering a new, epistemic dimension which might be compared to the introduction of synchronized sound to motion pictures in the early 20th century; it might not immediately provide a complete picture, but it has the potential of changing the field forever."

Sergei N. Artemov
The Graduate Center of the City University of New York, USA

This volume contains eight papers written by Adam Brandenburger and his co-authors over a period of 25 years. These papers are part of a program to reconstruct game theory in order to make how players reason about a game a central feature of the theory. The program — now called epistemic game theory — extends the classical definition of a game model to include not only the game matrix or game tree, but also a description of how the players reason about one another (including their reasoning about other players' reasoning). With this richer mathematical framework, it becomes possible to determine the implications of how players reason for how a game is played. Epistemic game theory includes traditional equilibrium-based theory as a special case, but allows for a wide range of non-equilibrium behavior.

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Vol. 5

THE LANGUAGE OF GAME THEORY

Brandenburger

World Scientific Series in Economic Theory – Vol. 5

THE LANGUAGE OF GAME THEORY

Putting Epistemics into the Mathematics of Games

Adam Brandenburger

Foreword by Eric S. Maskin

Series Editor-in-Chief

World Scientific

Shaping What You Think, What You Think I Think,

...

Step 1:

What each player thinks about the game, what each player thinks other players think about the game, ..., matters

Step 2:

Players can try to shape or influence what other players think

The Golden Bear

"J.C. Snead once said, "When you go head to head against Nicklaus, he knows he's going to beat you, you know he's going to beat you, and he knows you know he's going to beat you." That may be a little over the top, but there is no question that, coming down the stretch in my best years, I knew exactly how intimidating I was to most of the other players. And it gave me a huge competitive edge. I knew that if I kept the pressure on and didn't do anything stupid, I would often win.

This might sound like arrogance, but it really wasn't. I recognized that many of my opponents had physical skills equal or even superior to mine, but I also knew that few of them had the mental or emotional capability to use them as effectively as I generally could mine."

--*Jack Nicklaus: My Story*, by Jack Nicklaus with Ken Bowden, Simon and Schuster, 1997, p.427

Charlie Klein, Stern MBA, kindly brought this quote to my attention

Star Wars

“Whether it [SDI] works, celestially speaking, is nowhere near as important as what it does cerebrally”



--Barney Oldfield, USAF, Ret., in *Dutch: A Memoir of Ronald Reagan*, by Edmund Morris, Random House, 1999, p.601

Rituals

Q: Why did Apple advertise the Macintosh during the 1984 Super Bowl?
Why was the Discover card introduced with six ads during the 1986 Super Bowl?

Q: Why does a high-traffic website like Yahoo have trouble getting the ad dollars a TV show with the same audience would draw?

Q: Why don't people have a wedding by just sending out a fax to everybody?



"Woman throwing hammer" is owned by Apple Corporation

<http://www.youtube.com/watch?v=OYecfV3ubP8>

From: *Rational Ritual*, by Michael Suk-Young Chwe, Princeton University Press, 2001; this description taken from Economic Scene, by Virginia Postrel, *The New York Times*, 04/25/02