
Session 5

Balancing conflict and cooperation

- Battle of Sexes Games -

What you will learn today: Our objectives

- **How can we balance competition and cooperation in situations in which others' interests are opposed as well as coincident with ours? How should we act in those situations, not knowing which of several possibilities for coordination the others will use?**
 - **The classical game and its equilibrium**
- **How can we use these insights to explain how people behave in more complex situations?**
 - **Extensions**
- **How can we make sure that our own interests are more relevant for coordination than the ones of the other parties?**
 - **Strategic moves**

Our path to succeed: Course outline for today

- **The classical game and its equilibrium**
 - **O. Henry “The Gift of the Magi”**
- **Extensions: Couples with varying conflicts, that mistake each other mutually, and the battle for standardization**
 - **Hollywood, the Japanese and concessions to the rival**
- **Strategic moves: One-sided communication, taking the initiative, relying on conventions, and more sophisticated moves**
 - **The US Constitution as a result of bargaining**
 - **Woody Allen “Manhattan Murder Mystery”**

The classical story of the battle of the sexes

- A newlywed couple visits a bigger city. In the evening he wants to go to a boxing event while she prefers to see a ballet. Being on their honeymoon they certainly do not want to spend the evening separately, but before they can decide where to go together they accidentally lose each other in some turmoil downtown. Unfortunately the boxing arena and the ballet theatre are at opposite ends of the city so that they only can get to one of the two venues for the evening.
- If they both meet at the boxing arena (ballet theatre) he is happy with 3 (only 1) units, whereas she is happy with only 1 (3) units. If they both do not meet at the boxing arena (ballet theatre) they have both 0 units.



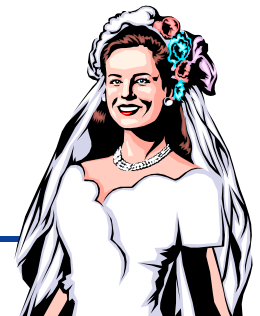
Husband

boxing

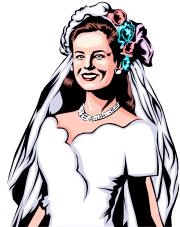

ballet

	<i>boxing</i>	<i>ballet</i>
<i>boxing</i>	3,1	0,0
<i>ballet</i>	0,0	1,3

Wife



How to behave in battle of sexes games: Choose a focal point

			
		<i>boxing</i>	<i>ballet</i>
	<i>boxing</i>	3,1	0,0
	<i>ballet</i>	0,0	1,3
Husband			

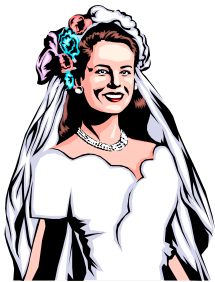
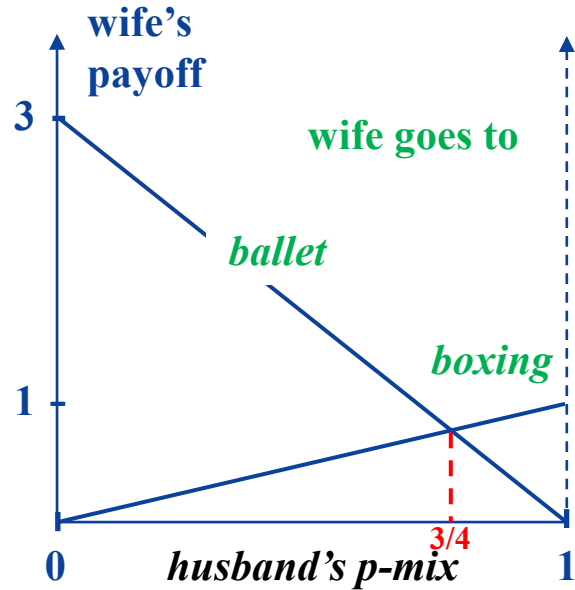
Definition:

A 2x2 **battle-of-sexes game** is a game with three equilibria: one symmetric equilibrium in mixed strategies and two asymmetric equilibria in pure strategies. Both players have different rankings of the pure-strategy equilibria but both prefer to coordinate.

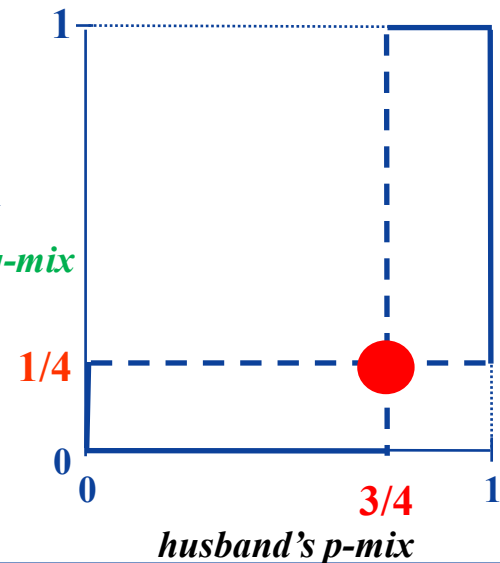
Definition: A **focal point** is an outcome in which players have a common understanding that, of all the possible equilibria of the game, this one is the obvious one to choose.

How to behave in the battle of sexes : ...or choose a mixed strategy

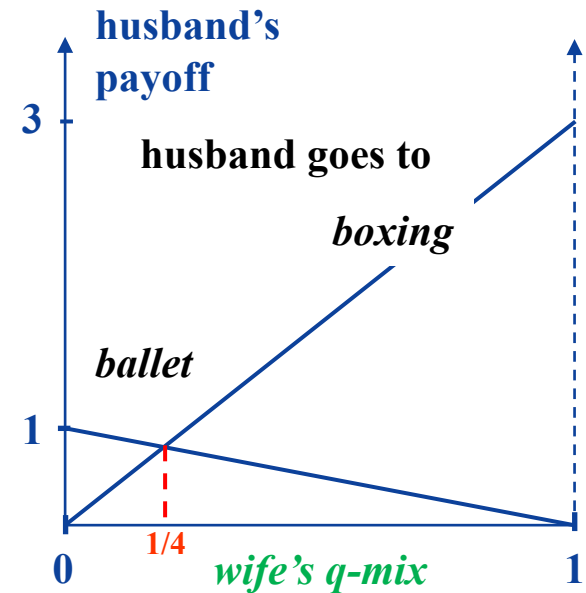
Wife's best response



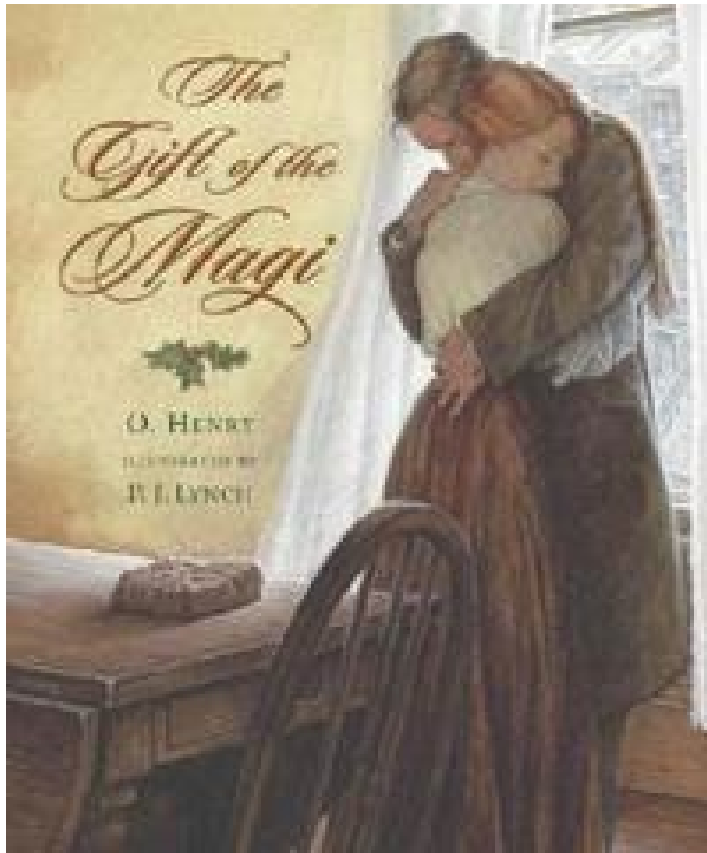
	<i>boxing</i>	<i>ballet</i>	
<i>boxing</i>	3,1	0,0	p
<i>ballet</i>	0,0	1,3	$1-p$
	q	$1-q$	



Husband's best response



Case study: O. Henry's "The Gift of the Magi" and love's surprises



Front cover art for the book *The Gift of the Magi*, retrieved from en.Wikipedia.org, copyright belongs to P. J. Lynch

The plot:

This short story is about a young married couple, Della and Jim, and how they deal with the challenge of buying secret Christmas gifts for each other with very little money. Della would sell her hair to get Jim a chain for his heirloom watch, and Jim would sell the watch to buy a comb for Della's beautiful hair.

		<i>Jim</i>	
		<i>sell watch</i>	<i>keep watch</i>
<i>Della</i>	<i>keep hair</i>	1,2	0,0
	<i>sell hair</i>	0,0	2,1

In the story, both sold the item for which the other has bought the gift.

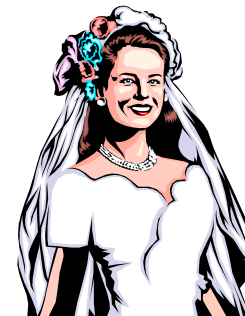
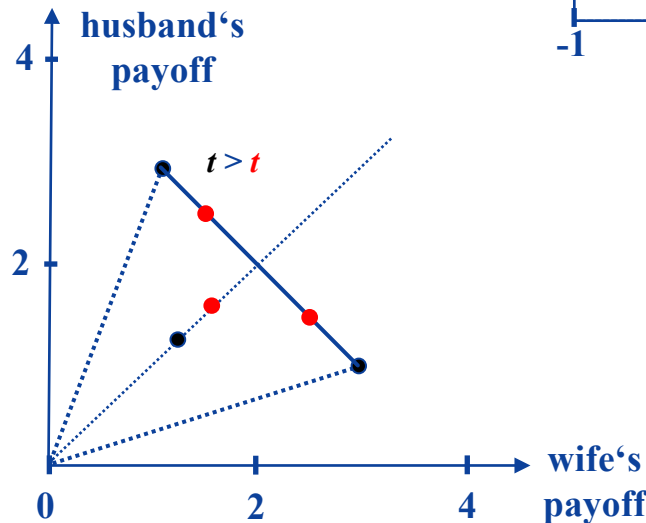
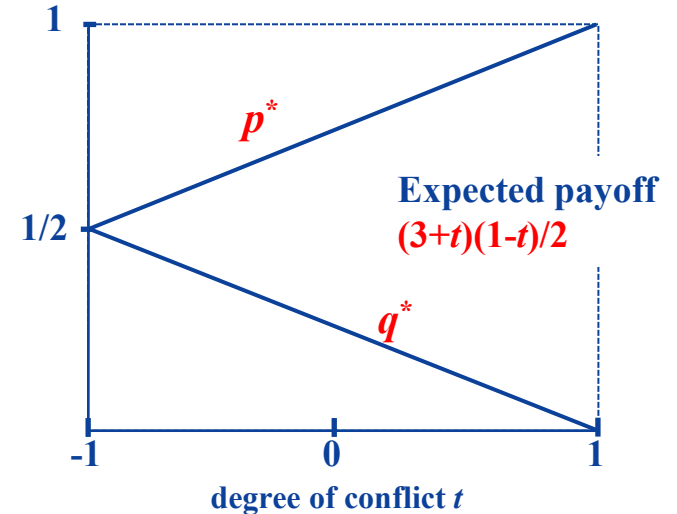
Extending the classical game: Couples with varying degrees of conflict

Let $t \in [-1,1]$ be a measure of the degree of conflict

Nash equilibrium in mixed strategies

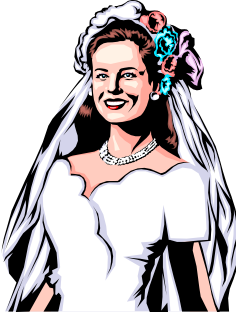

$$p^* = (3+t)/4, \quad q^* = (1-t)/4$$

	<i>boxing</i>	<i>ballet</i>	
<i>boxing</i>	$3+t, 1-t$	$0, 0$	p
<i>ballet</i>	$0, 0$	$1-t, 3+t$	$1-p$
	q	$1-q$	



Extending the classical game: Couples that mistake each other mutually...

- Suppose our newly married couple is unsure about each other's preferences: He (she) is uncertain whether her (his) happiness about meeting at the boxing arena (ballet theatre) is actually 3 units or more – with uniform distribution:

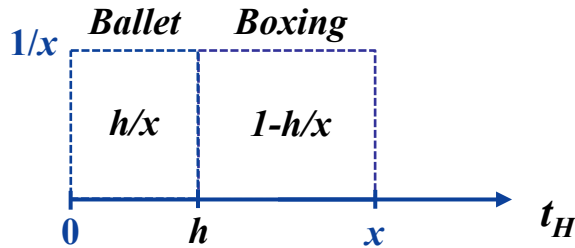
		Wife		
		<i>Boxing</i>	<i>Ballet</i>	
 Husband	<i>Boxing</i>	$3+t_H, 1$	$0, 0$	with $t_W \in [0, x]$, $t_H \in [0, x]$
	<i>Ballet</i>	$0, 0$	$1, 3+t_W$	

Let h , w be two critical values such that

- The husband goes to boxing if $t_H \geq h$, otherwise he chooses ballet
- The wife goes to ballet if $t_W \geq w$, otherwise she chooses boxing

... but find each other with surprise

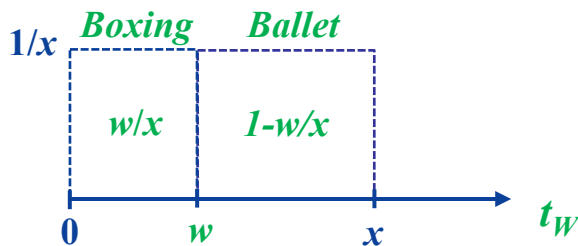
- If the husband goes to boxing, that is, if $t_H \geq h$



then the wife goes to ballet if

$$(1-h/x) \cdot 0 + h/x \cdot (3+t_w) \geq (1-h/x) \cdot 1 + h/x \cdot 0 \implies t_w \geq x/h - 4 = w$$

- If the wife goes to ballet, that is, if $t_w \geq w$



then the husband goes to boxing if

$$w/x \cdot (3+t_H) + (1-w/x) \cdot 0 \geq w/x \cdot 0 + (1-w/x) \cdot 1 \implies t_H \geq x/w - 4 = h$$

	Boxing	Ballet
Boxing	$3+t_H, 1$	$0, 0$
Ballet	$0, 0$	$1, 3+t_w$

$$h = w \text{ and } w/x = \frac{-3 + \sqrt{9 + 4x}}{2x} \rightarrow \frac{1}{3} \text{ for } x \rightarrow 0$$

Extending the classical game: The battle for standardization

- In network markets where users want to buy products compatible with those bought by others, choosing how to compete is essential. Suppose there are two incompatible technologies available.
- Then two forms of competition are possible:

- Intra-technology competition:**
Compatibility between the products' technologies is important to increase market demand.



battle within the market
with compatible technologies

- Inter-technology competition:**
Compatibility between the products' technologies is likely to dissipate potential industry profits.



battle for the market with
incompatible technologies

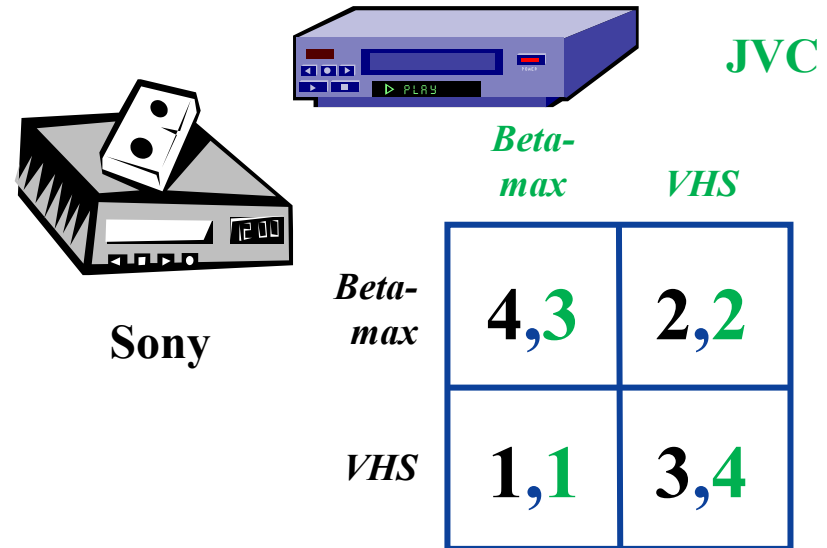
		Firm 2	
		Techno- logy 1	Techno- logy 2
Firm 1	Techno- logy 1	x, y	$0, 0$
	Techno- logy 2	$0, 0$	y, x

$$x > y > 0$$

Firm 1	Techno- logy 1	$0, 0$	x, y
	Techno- logy 2	y, x	$0, 0$

Case study: Hollywood, the Japanese and concessions to the rival

- The first videocassette recorder (VCR) appeared in the early 70s. After several variations, Sony introduced in 1975 the Betamax standard, whereas JVC introduced the VHS standard in 1976. Although there would be little market demand unless both agreed on a standard, Beta and VHS machines were incompatible.
- JVC's strategy was to share future product developments with manufacturers. Sony, however, believed that it would dominate the market due to its strong position in consumer electronics and its better technology. By the end of the 80s, Sony ceased producing Beta machines.



Using one-sided communication as strategic move in a dating game



- Susan and Roberto work at the same office building in a small town and are both hungry after work. There are two eateries in town, the Spanish and Japanese eatery. They want to eat together, but they have different eating preferences. Susan likes Japanese food, whereas Roberto goes for Spanish food:



Roberto

Japanese Eatery Spanish Eatery

Susan

Japanese Eatery

3,2

1,1

Spanish Eatery

0,0

2,3

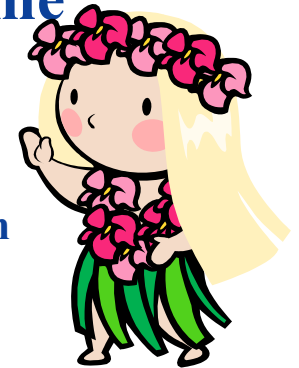
- Susan and Roberto are leaving from the same parking garage, using separate cars parking next to each other. Suppose Susan says: “I’m off to the Japanese!”

This message is

- **self-signaling:** Susan wants to say it if and only if it is true
- **self-committing:** If believed by Roberto, Susan has an incentive to go there

Taking the initiative as strategic move in a court game

- Tonight, there is once again a WHU party in the vaulted cellar. You and your friend, wearing your fanciest beach outfits for the Hawaii theme, enter the party. Straightaway you notice the girl that you have a crush on since the beginning of the semester. You want to ask her for a dance, but know that your friend feels exactly the same about her.
- If you ask her and your friend does not, you will most probably end up dating her and your friend will be happy for you. In contrast, if both of you approach her, no one will get the girl and you will end up in a fight. If no one asks, nobody has won, but at least you stay friends.



	<i>ask</i>	<i>don't ask</i>
<i>ask</i>	-1,-1	3,1
<i>don't ask</i>	1,3	0,0



	<i>ask</i>	<i>don't ask</i>
<i>ask</i>	-1,-1	3,1

no initiative

initiative

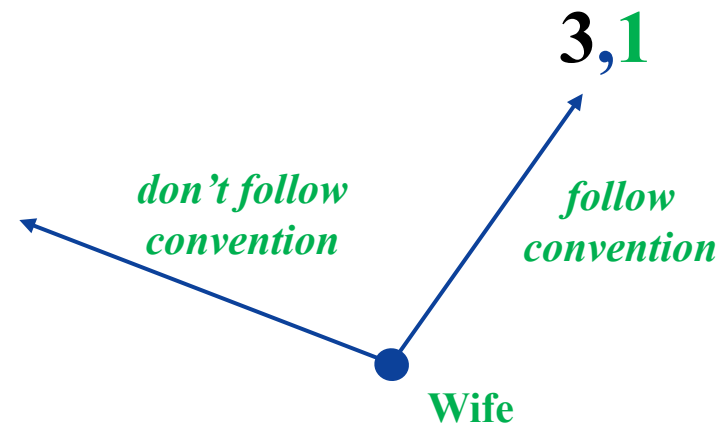


Relying on conventions as strategic move



„Women always walk behind men and carry the bag!“

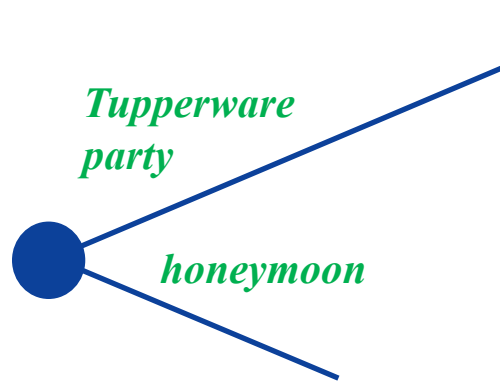
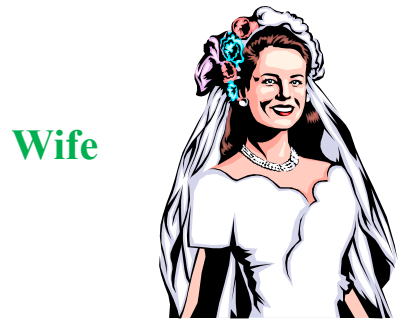
		Wife	
		<i>boxing</i>	<i>ballet</i>
Husband	<i>boxing</i>	3,-1	0,-3
	<i>ballet</i>	0,-3	1,0



„Behind every great man is an even greater woman“

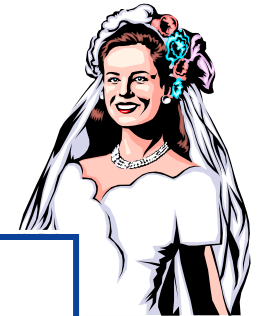
Creating an outside option as strategic move

„Instead of going with you on honeymoon, I could have also joint my best friend on her Tupperware party “



0,2

Wife



boxing

ballet

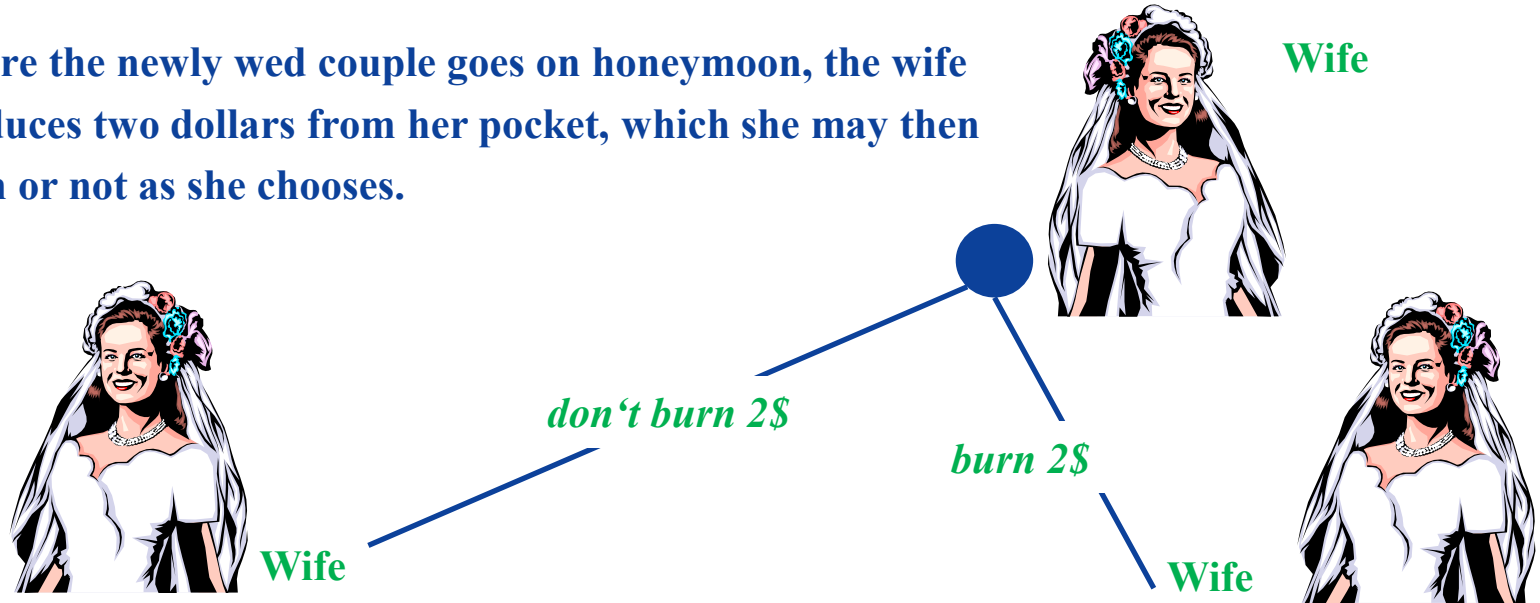
	boxing	ballet
boxing	3,1	0,0
ballet	0,0	1,3





Husband

Burning money as strategic move

- Before the newly wed couple goes on honeymoon, the wife produces two dollars from her pocket, which she may then burn or not as she chooses.



		<i>boxing</i>	<i>ballet</i>
 Husband	<i>boxing</i>	3,1	0,0
	<i>ballet</i>	0,0	1,3

		<i>boxing</i>	<i>ballet</i>
 Husband	<i>boxing</i>	3,-1	0,-2
	<i>ballet</i>	0,-2	1,1

Case study: The US Constitution as a result of bargaining



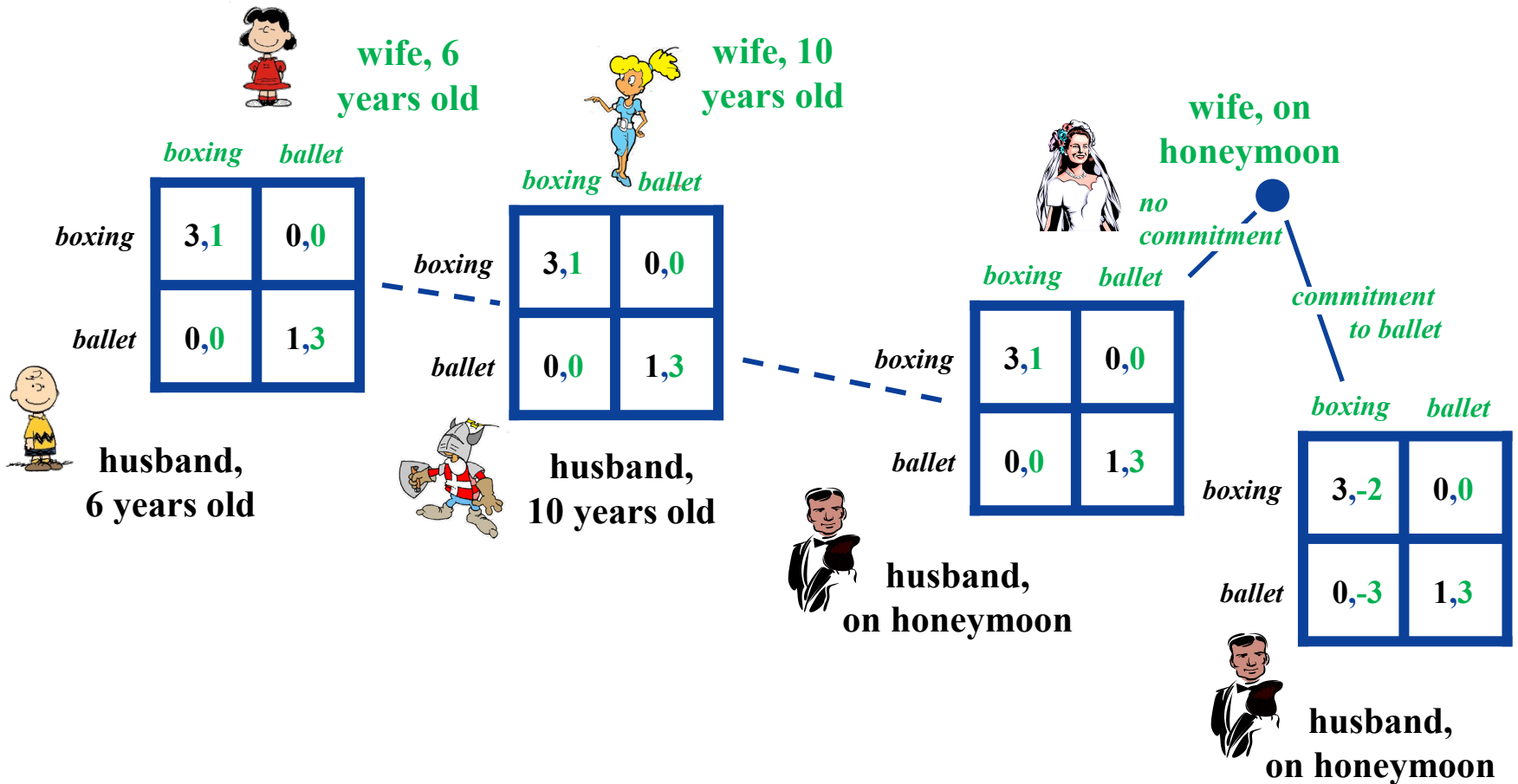
Constitutional Convention, Philadelphia, 1787

- While waiting for the other delegates, James Madison produced the Virginia plan which proposed a structure of the US Government consisting of two chambers and the idea of population-weighted representation.
- As a response William Paterson proposed the New Jersey plan, which kept the one-vote-per-state representation under one legislative body.
- In the “Connecticut Compromise” every state was given equal representation in the House of Representatives and proportional representation in the Senate.

	Virginia plan	New Jersey plan
Less populous states	3,4	1,1
More populous states	1,1	4,3

Building reputation as strategic move

„Before we get married we should get used to each other“



Peter-J. Jost – Thinking Strategically

Case study: Repeated Battles of Sexes in Woody Allen's Manhattan Murder Mystery

This is a poster for Manhattan Murder Mystery. The poster art copyright is believed to belong to TriStar Pictures.



Hockey scene - Woody Allen's reminder:

“Remember our deal. You stay here with me for the entire hockey game, and next week I will come to the opera with you and stay until the end.”

Opera scene – Diane Keaton's reminder:

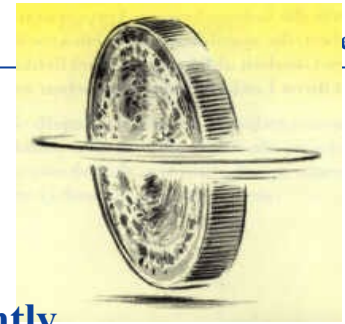
“What about your deal? I stayed to end of the hockey game, and so you were supposed to stay till the end of the opera.”

Opera scene – Woody Allen's answer:

“You know I can't listen to too much Wagner. At the end of the first act I already felt the urge to invade Poland.”

Peter-J. Jost – Thinking Strategically

Delegating joint decision-making as strategic move



- Suppose that Della and Jim in Henry's short story do not independently mix their behavior but toss a coin, and depending on the outcome decide who gives and who receives.

Independent mixing of behavior:

$$\text{Jim: } 2 \cdot (1-p) = 1 \cdot p$$

$$\text{Della: } 1 \cdot q = 2 \cdot (1-q)$$



$$p^* = q^* = \frac{2}{3}$$



Expected outcome = $(\frac{2}{3}, \frac{2}{3})$

Joint mixing of behavior:

$$\frac{1}{2} \cdot (1, 2) + \frac{1}{2} \cdot (2, 1) = (1\frac{1}{2}, 1\frac{1}{2})$$

Surprise, however, is lost!

		Jim		
		<i>sell watch</i>	<i>keep watch</i>	
Della	<i>keep hair</i>	1, 2	0, 0	$1-p$
	<i>sell hair</i>	0, 0	2, 1	p
		q	$1-q$	

Battle of Sexes Games: What we learned today

- **Battle of the Sexes games are situations in which parties have common as well as conflicting interests. They want to coordinate their behavior but each prefers a different coordination.**
- **Those situations with mixed motives are pervasive in everyday life and arise whenever people have different preferences over alternatives but are mutually dependent.**
- **There are several strategic moves a player can use to accomplish his interests such that the others have to follow his decision, for example, communication, burning money or creating an outside option. Important, however, is to be the first who uses those tactics.**

Further readings

- **Jost, P.-J. & U. Weitzel, 2007. Strategic Conflict Management. Edward Elgar: Chapters 2.1.5, 2.2.5.**
- **Dixit, A. & S. Skeath, 1999. Games of Strategy. Norton: Chapters 4.11, 5.4, 10.5.**
- **Schelling, T. C., 1990. The Strategy of Conflict. Harvard University Press: Chapter 5.**