

Presentation 2: What is discourse?

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Why do people talk?

Answer

To carry out **joint activities**

Argument

1. **Joint activities** require **coordination**
2. **Coordination** requires **communication**
3. Communication uses both **linguistic and extra-linguistic signals**



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Two slogans

Whenever you see people communicating, look for their joint activity

Whenever you see people in a joint activity, look for their communication

Communication is for joint activities

Joint activities require communication

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Solo vs. joint activities

Solo



Joint



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What is a joint activity?

Solo vs. joint activities

Solo



Joint



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Solo vs. joint activities

Solo



Joint



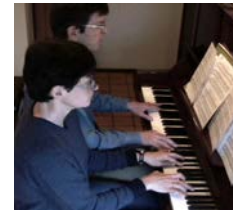
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Solo vs. joint activities

Solo



Joint



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Assembling a TV cart

Solo



Joint



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Joint activity defined

1. Two or more participants
2. Mutually recognized set of goals
3. What each person does depends on what the others do

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Projection problem

The problem

How do people **coordinate** their individual actions?

The solution

People arrange *in advance* what to do when

The issue

What do people arrange **when**, and **how**?

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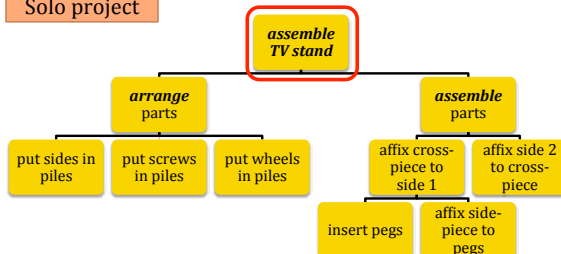
Partitioning of joint activities

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Newell & Simon
"means-ends analysis"

Solo project

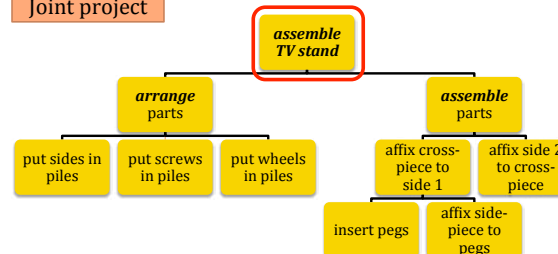


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Newell & Simon
"means-ends analysis"

Joint project



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Solo vs. joint projects



Solo project
Peter forms *private commitments*
What to do when
How fast
When to start, stop



Joint project
Ann & Burton form *joint commitments*
What to do when
How fast
When to start, stop

Ann & Burton *negotiate*
Who is to do what when
How fast
When to start, stop

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Ann, Burton assemble TV stand

(Heiser, Tversky, Clark)



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Ann, Burton assemble cross-piece

Ann's actions

1. A gets cross-piece
2. A holds cross-piece
3. A affixes cross-piece
4. A inserts peg
5. A affixes side-piece

Burton's actions

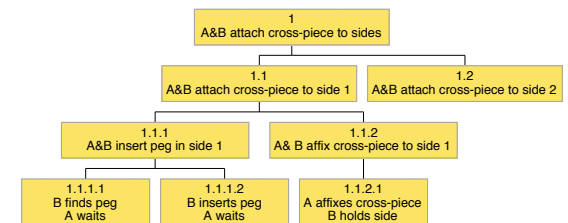
1. B holds side-piece
2. B inserts peg
3. B holds side-piece
4. B holds side-, cross-piece
5. B holds side-, cross-piece

Joint action

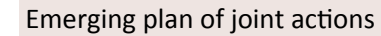
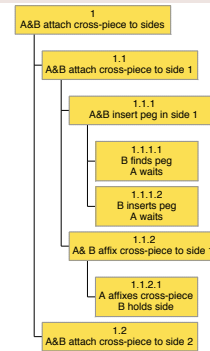
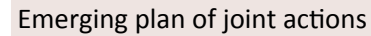
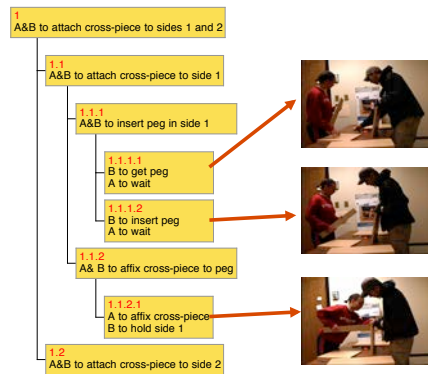


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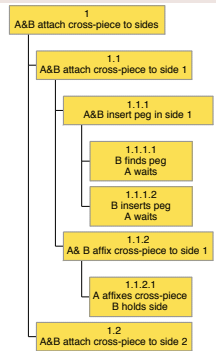
Emerging plan of A & B's joint actions



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14. A Should we put this in, this, this little like kinda cross bar, like the T? like the I bar?
15. B Yeah we can do that
16. A So, you wanna stick the screws in. Or wait is, is, are these these things, or?
17. B That's these things I bet. Because there's no screws.
18. A Yeah, you're right. Yeah, probably. If they'll stay in.
19. B I don't know how they'll stay in but
20. A Right there.
21. B Is this one big enough?

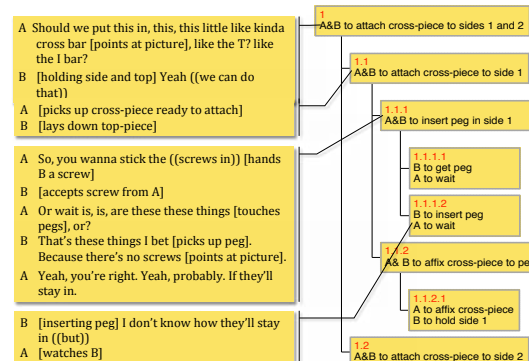
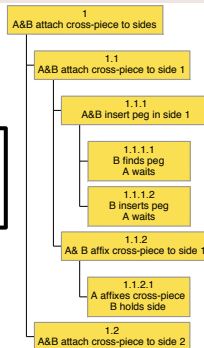


Emerging plan of joint actions

14. A Should we put this in, this, this little like kinda cross bar, like the T? like the I bar?
15. B Yeah we can do that

Part 1: A *proposes* a joint action
"Should we put this in the I bar"
Part 2: B *takes* up A's proposal
"Yeah we can do that"

joint commitment



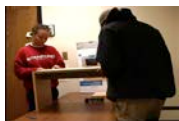
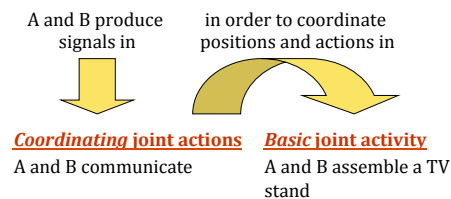
Joint activity → two lines of action

0. Basic joint activity

Basic activity that A & B are **jointly** engaged in
(*assembling TV stand*)

1. Coordinating joint actions

Communicative acts by which A & B coordinate **basic activity**



Two sides of the coin



What do A and B commit to?

1. Joint positions

Burton Okay, so, this [pointing] is the bottom

Ann That's the, yeah, that's the lower part

Joint commitment to a certain **position**:
"This is the bottom, lower part"

2. Joint actions

Ann: Should we put this in the I bar?

Burton: Yeah we can do that

Joint commitment to a **future action**:
"We can put this in the I bar"

Main basis of joint activity

Action-based

Assembling TV stand
Assembling a lego model
Buying book at bookstore
Playing tennis, football
Playing piano duets

Position-based

Gossiping
Narrating a story
Negotiating a contract
Arguing
Exchanging information

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Messiness and complications

Interleaved activities

A and B have lunch *while* doing business
A and B engage in *small talk* while assembling TV stand

Interruptions, resumptions

A breaks off a narrative to B to speak to C, then returns

Changing participants

Discussion with people entering and leaving

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Common ground

Puzzle: What do you need to carry out a joint activity?
Like playing chess

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Representations needed for a joint activity

1. Initial common ground

As people enter a joint activity, the set of background facts, assumptions, and beliefs

2. Current state of the activity

At any point in the joint activity, what the participants presuppose to be the state of the activity at the moment.

3. Public events so far

The public events leading up to the current state

All of these are in **common ground** of the participants

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Representations in playing chess

1. Initial common ground

2. Current state of game

3. Public events so far



White (Morphy)	Black (Anderssen)
1. P — K4	P — Q4
2. P X P	Q X P
3. Kt — QB3	Q — QR4
4. P — Q4	P — K4
5. P X P	Q X Pch

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But just what is common ground?

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Two types of common ground

1. Personal common ground

- Communications together
- Joint perceptual experiences

2. Communal common ground

Membership in same cultural communities

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Communal common ground

We all belong to multiple cultural communities

Inherent categories

Gender	men
Age cohort	teenagers
Ethnicity	Asians

Acquired categories

Nationality	Belgians
Language	Dutch speakers
Dialect	Limburgish speakers
Residence	UK residents
Religion	Lutherans

Chosen categories

Education	university graduates
Profession	lawyers
Employment	IBM senior scientists
Politics	Liberal Democrats
Hobby	classical musicians
Clubs	Masons

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<i>Basis for community</i>	<i>examples of person category</i>
Gender	men, women
Cohort	teenagers, 30-year-olds
Ethnicity	Chicanos, Frisians
Nationality	Canadians, Brits
Language	English, Dutch speakers
Dialect	Limburgish Dutch speakers
Residence	Londoners, San Franciscans
Religion	Lutherans, Jews
Education	university graduates
Profession	lawyers, miners
Employment	IBM scientists, Oxford readers
Politics	Republicans, Liberal Democrats
Hobby	birders, baseball fans
Club	Masons, girl scouts

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Communal common ground

Common ground for US lawyers

<i>Knowledge</i>	laws, penal codes, regulations
<i>People, places</i>	Learned Hand, Supreme Court
<i>Appearances</i>	court room, jury box, legal brief
<i>Practices</i>	petitions, filings, court etiquette
<i>Lexicon</i>	<i>recusal, tort, voir dire</i>

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Who can use *recusal, tort, voir dire*?

A to B: "Will you take part in the *voir dire*, or will you *recuse* yourself?"

A presupposes that A and B *share* these words

A and B presuppose a *shared vocabulary*, or *communal lexicon*

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Communal lexicons

Each community has set of *lexical entries* common to that community

Lexical entries for community "physicists"

<i>herz</i>	"cycles per second"
<i>charm</i>	"one of six flavors of quark"
<i>meson</i>	"subatomic particle"
<i>tesla</i>	"unit of magnetic flux density"
...	

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Problems of word choice and interpretation

Physicist to Hollywood actor: "I study charms"

Physicist's lexicon	"one of six flavors of quark"
General lexicon	"quality of giving delight"

Physicist to Donald Trump: "I study mesons"

Physicist's lexicon	"subatomic particle"
General lexicon	[nothing]

Biologist to lawyer: "I study rare *fruits*"

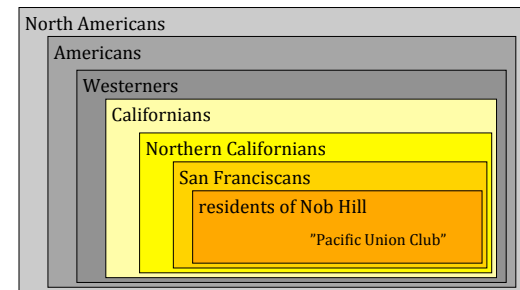
Biologist's lexicon	"seed-bearing structure of plant"
English lexicon	"sweet, fleshy product of plant eaten as food"

Brit to American: "I grew up in *Jersey*"

British lexicon	"the island of Jersey"
American lexicon	"the state of New Jersey"

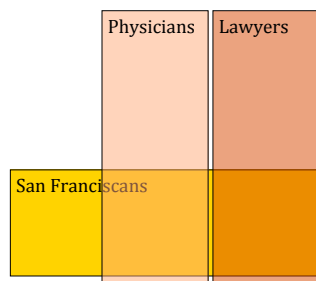
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Nesting of communities and lexicons



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Cross-cutting communities, lexicons



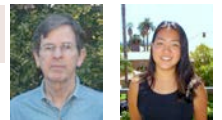
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Communal lexicon ⇔ communal expertise

<i>herz, meson, charm</i>	⇔	expertise in physics
<i>recusal, tort, voir dire</i>	⇔	expertise in US law
<i>Nob Hill, Crissy Field, the Castro</i>	⇔	expertise in San Francisco

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Establishing shared communities



At party in Palo Alto

A: Hi, I'm Herb
 B: Oh hi, I'm Leila
 A: I'm in psychology at Stanford.
 And you?
 B: I'm at Google. You must have known Cliff Nass. I was a student of his. I work in human-computer interaction.
 A: Ah, so you must know Stu Card.

Inferable communities

Herb
 Men, middle-aged (appearance)
 European-American (appearance, accent)
 W. American English (accent)
 Stanford professor, psychologist

Leila
 Women, 30's (appearance)
 Asian-American (appearance, accent)
 W. American English (accent)
 Stanford community (Department of Communications)
 HCI community
 Google community

(Svinnivig, 1999)

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Establishing shared communities



At party in Palo Alto

H: Hi, I'm Herb
K: Hi, I'm Kismet
H: I'm in psychology at Stanford. And you?
K: I'm at MIT. You must know Cynthia Breazeal at the Media Lab? I work for her.
H: Ah, so you must know Sandy Pentland.

Inferable communities

Herb
Men, middle-aged (appearance)
European-American (appearance, accent)
W. American English (accent)
Stanford professor, psychologist
Kismet
No age, no gender (appearance)
No ethnic group (appearance)
E. American English (accent)
MIT employee (Media Labs)

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Robots are "community-incomplete"

What communities does Kismet belong to?

Gender? Age? Ethnic group?
Nationality? Residence? Political party? Religion?
Red Sox fan? Classical music?

What communities does Kismet infer I belong to?

Gender? Age? Ethnic group?
How would I know?

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Communal common ground

If robots are *community-incomplete*, they cannot presuppose or infer ...

Communal lexicons
Communal expertise
Perspectives common to a community
Community-wide interests
Emotional responses
Conventional practices

A *severe limitation* on communication

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Personal common ground

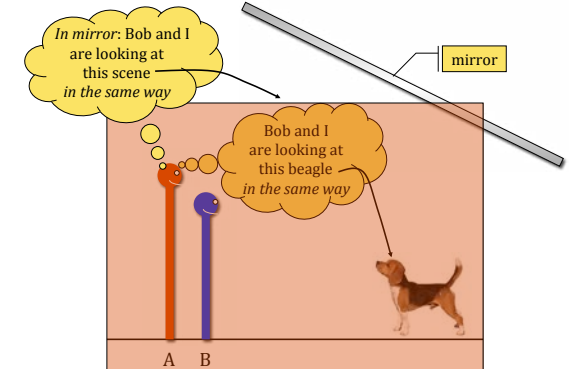
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Personal common ground is based on *joint experience*

1. **Perception:** visual, auditory, tactual of joint scenes
2. **Emotion:** emotional reactions to joint events
3. **Goals:** hierarchy of goals in joint activity
4. **Communication:** via voice, gesture, placement

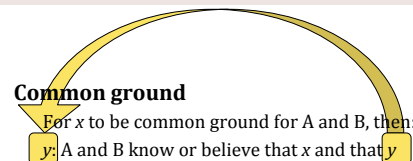
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Mutual beliefs about visual scene



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Common ground as reflexive belief



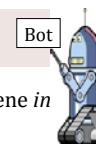
Requirements

A believes B "knows or believes that x and that y" *the same way* as A does
A believes B "sees" things *the same way* as A sees them
A believes B categorizes objects, events *the same way* as A does

For logic of reflexive beliefs, see Barwise & Etchemendy (1987)

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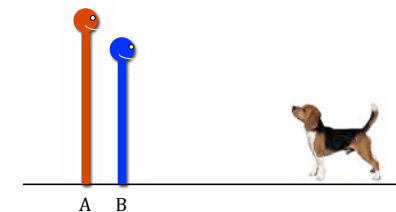
Joint experience with robot?



1. **Perception:** Does Bot see, hear, feel a scene *in the same way* I do?
2. **Emotion:** Does Bot have the *same* emotional reaction as I do?
3. **Goals:** Do Bot and I have *same* set of joint goals?
4. **Communication:** Have Bot and I *succeeded* in communicating?

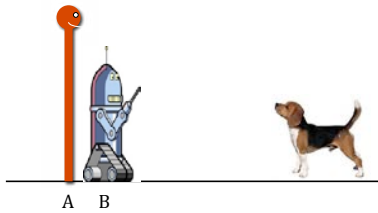
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Basis for common experience:
Visual, auditory co-presence with dog



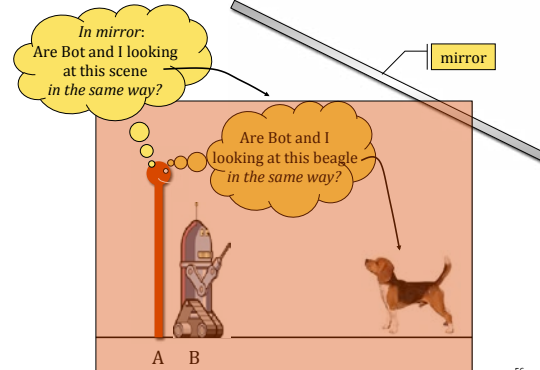
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Basis for common experience:
Visual, auditory co-presence with dog



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Mutual beliefs about visual scene



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Does robot think the way I think?

Common ground

For x to be common ground for A and B, then:

y : A and B know or believe that x and that y

[a self-referring belief]

Requirements

I believe robot "knows or believes that x and that y " in *the same way* as I do

I believe robot "sees" things *the same way* I see them

I believe robot categorizes objects, events *the same way* I do

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To communicate = to "make common"

Is it possible for you and me?

1. Common communities? *Many*
2. Common experiences? *Many*
3. Grounding what is communicated? *Depends on 1, 2*

Is it possible for a robot and me?

1. Common communities? *Never completely*
2. Common experiences? *Doubtful, perhaps never*
3. Grounding what is communicated? *Depends on 1, 2*

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