

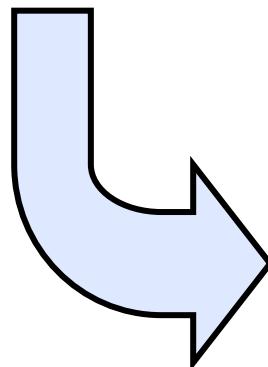
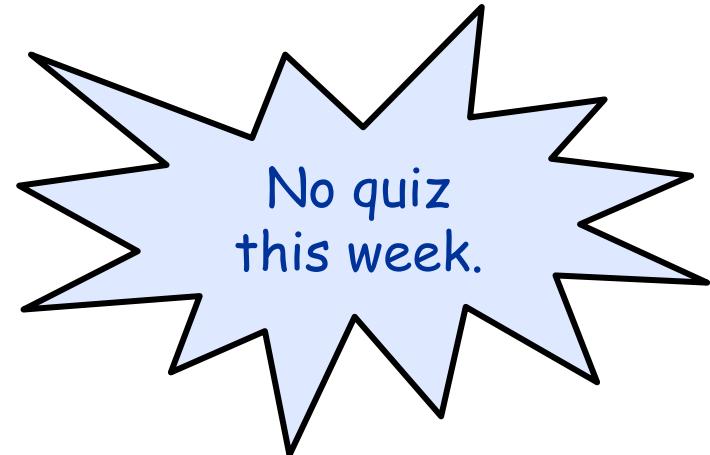
# CS5127/6027: Requirements Engineering (Fall 2024)

Prof. Nan Niu ([nan.niu@uc.edu](mailto:nan.niu@uc.edu))

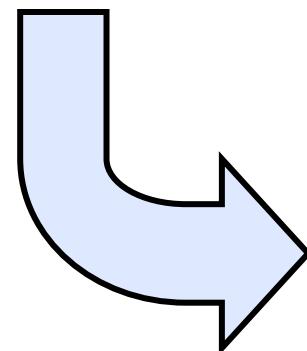
Office Hours: 10am-11am, Mondays, Rhodes 832

# Today's Menu

Last Lecture (Friday 11/1):  
ASN3 Released



This Lecture (Monday 11/4):  
Req.s Negotiation



Next Lecture (Friday 11/8):  
Req.s Prioritization

## Requirements Engineering: A Roadmap

**Bashar Nuseibeh**

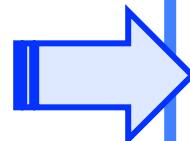
Department of Computing  
Imperial College  
180 Queen's Gate  
London SW7 2BZ, U.K.  
Email: ban@doc.ic.ac.uk

**Steve Easterbrook**

Department of Computer Science  
University of Toronto  
6 King's College Road  
Toronto, Ontario M5S 3H5, Canada  
Email: sme@cs.toronto.edu

ME@.ac.jp: doc@.ac.jp: u.k.  
U.K. 2BS LWS nospam

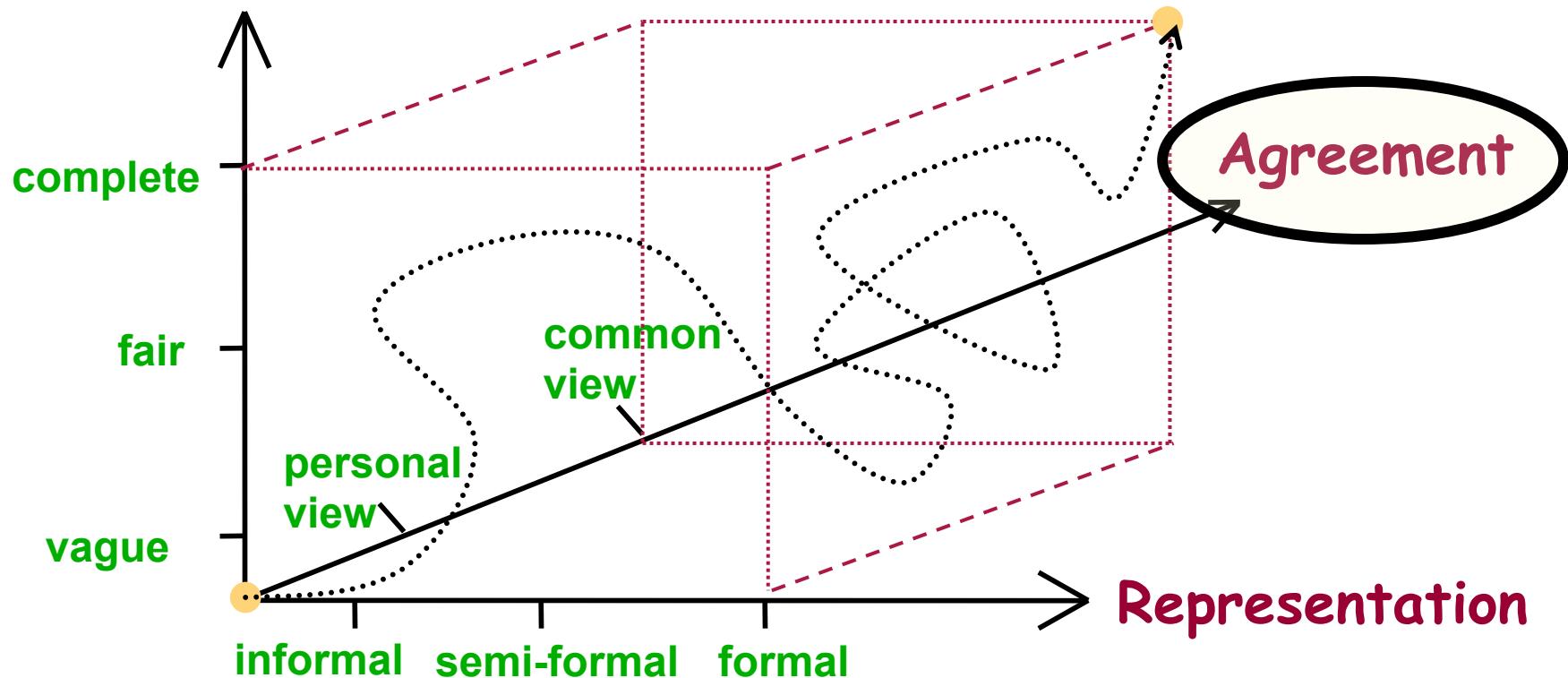
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- *eliciting requirements,*
- *modelling and analysing requirements,*
- *communicating requirements,*
- *agreeing requirements, and*
- *evolving requirements.*

# A requirements life cycle

## Specification



## Why negotiating?

- Req.s = Stakeholders' needs & desires
- Terminological interferences
- Diverging goals
- Different priorities
- ... (*yet, consensus needs to be made*)

# Try to negotiate with your neighbors

→ Context: group dance

↳ Req1: all treated equally

↳ Req2: designated leader

↳ Your task: 2-3 people → reach consensus & tell us the MAIN STRATEGY/OBSERVATIONS



# Basic Approaches to Conflict Resolution

## → Education

## → Negotiation

- ↳ ...is collaborative exploration:
  - participants attempt to find a settlement that satisfies all parties as much as possible.
- ↳ also known as:
  - integrative behaviour
  - constructive negotiation
- ↳ distinct from:
  - distributive/competitive negotiation

## → Competition

- ↳ is maximizing your own gain:
  - no regard for the degree of satisfaction of other parties.
  - but not necessarily hostile!
- ↳ extreme form:
  - when all gains by one party are at the expense of others
  - i.e., a zero-sum game.

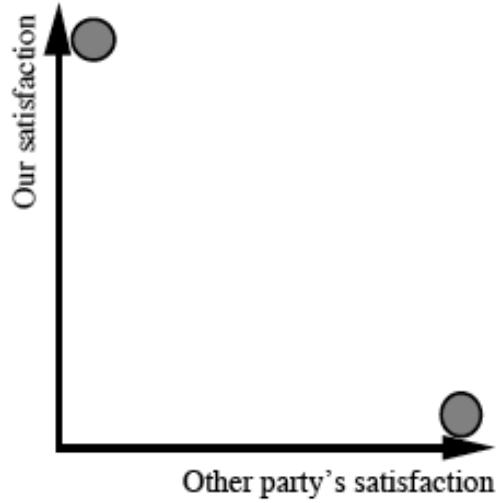
## → Third Party Resolution

- ↳ participants appeal to outside source
  - the rule-book, a figure of authority, or the toss of a coin.
  - can occur with the breakdown of either negotiation or competition as resolution methods.
- ↳ types of third party resolution
  - judicial: cases presented by each participant are taken into account
  - extra-judicial: a decision is determined by factors other than the cases presented (e.g. relative status of participants).
  - arbitrary: e.g. toss of a coin

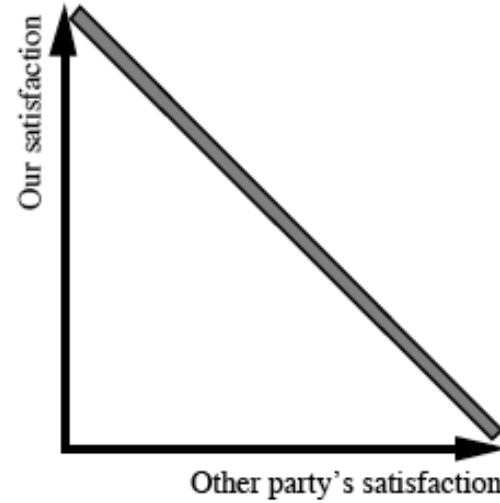
## → Bidding and Bargaining

- ↳ Bidding:
  - participants state their desired terms
- ↳ Bargaining:
  - participants search for a satisfactory integration of bids.

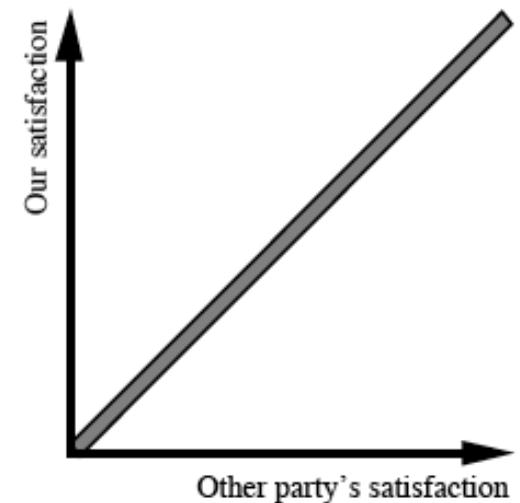
# Joint Outcome Space



**win/lose conflict**

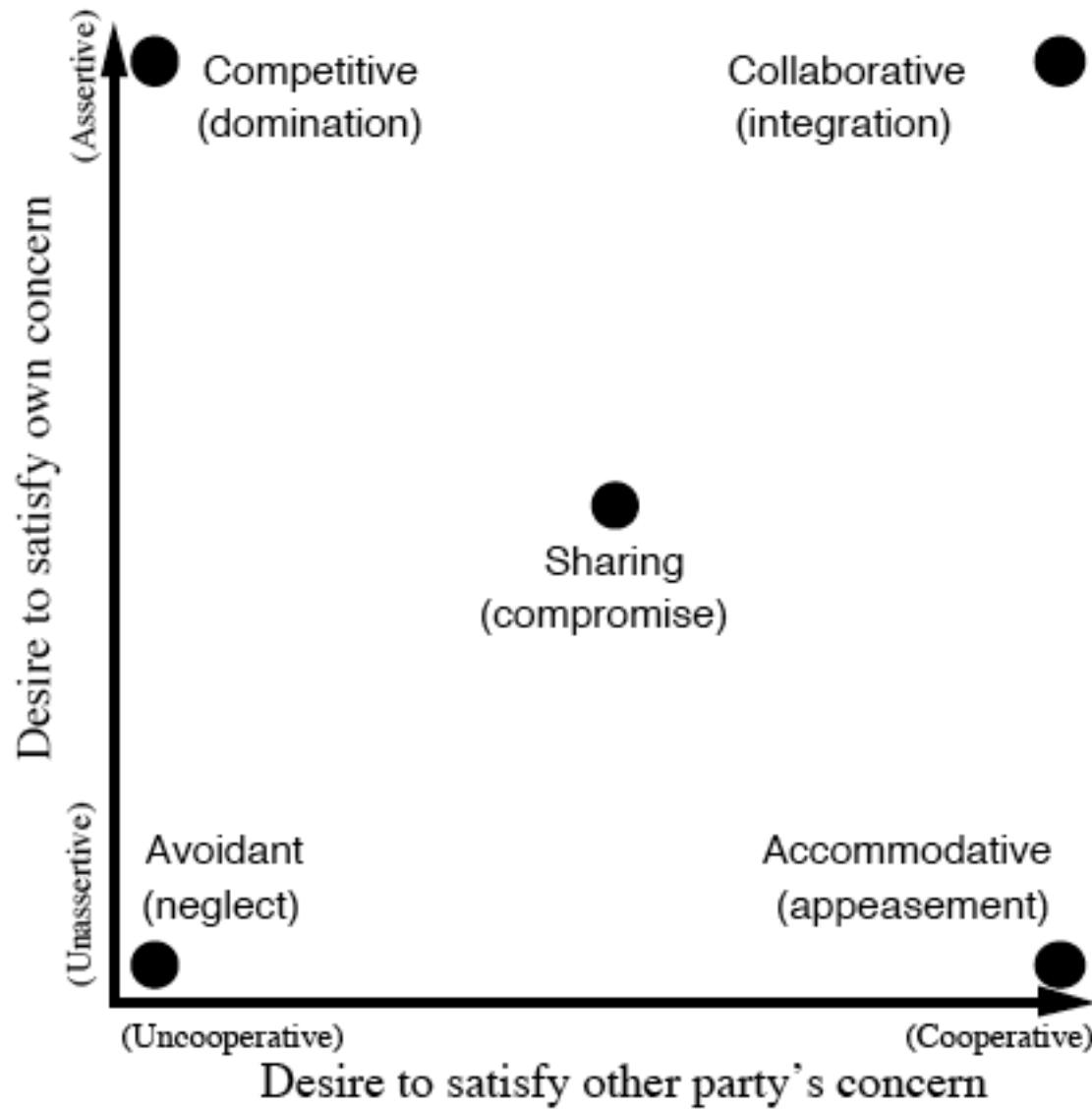


**zero-sum conflict**



**reciprocal**

# Desire to Satisfy One's Concern



## About 1 month ago



Actor	A	voice out together & then resolve disagreement
Resource	D	take turns & reach consensus (database / repo)
Goal	A	<b>facilitator</b> involvement (hard / binary goal)
Softgoal	C	<b>arbitration</b> (spinning a pen)
Task	D	voice out & unanimous

# Using Different Communication Media in Requirements Negotiation



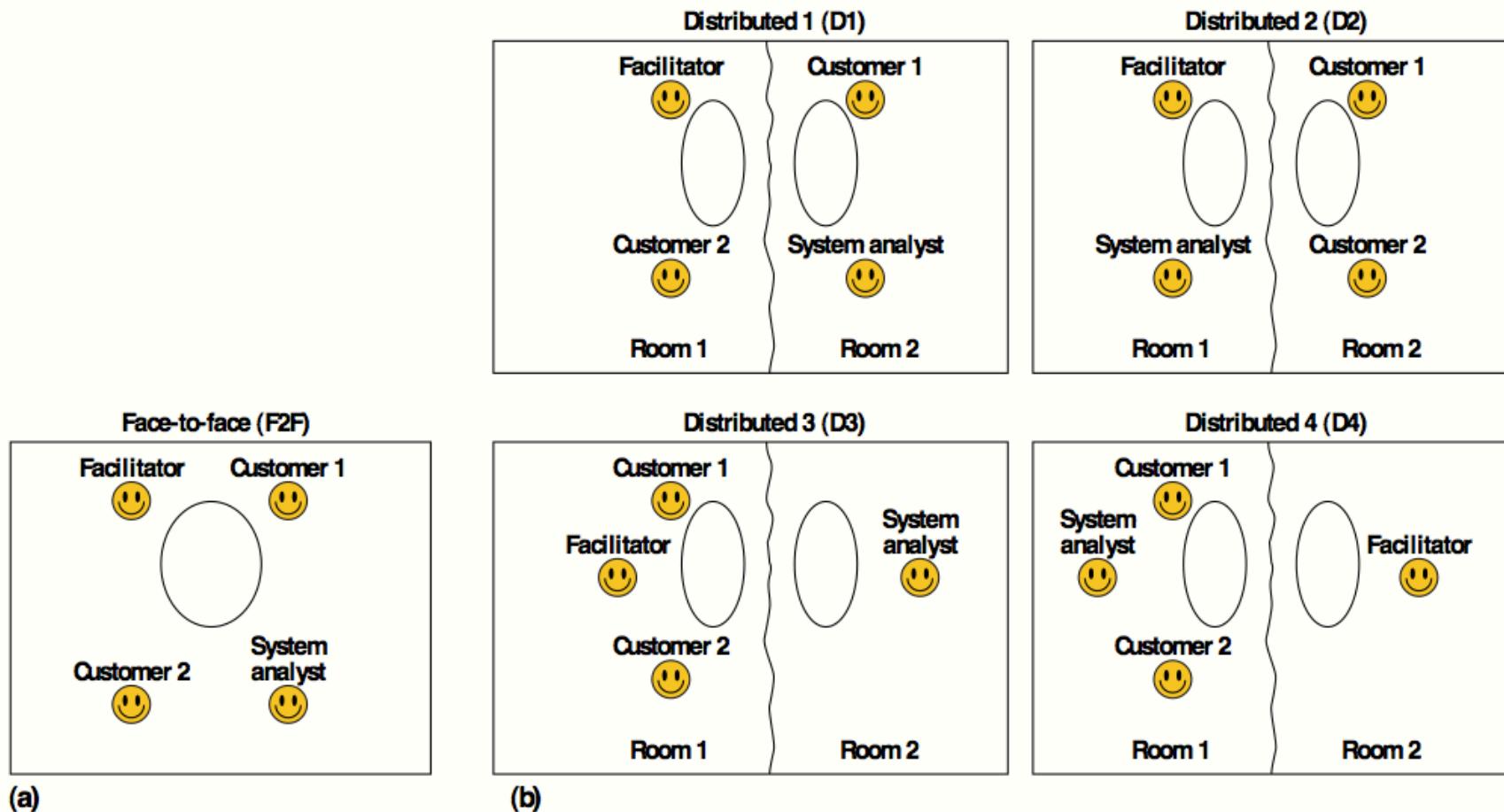
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## GOALS:

- (1) To investigate the communication media's effect on group performance in negotiating requirements; and
- (2) To identify a setting that's most conducive to requirements negotiation.

# Communication Media



# Experiment

- 45 Univ. of Calgary students
  - ↳ 16 females & 29 males
  - ↳ Prerequisite: experience in software eng. or negotiation
- 3 professional facilitators also volunteered
- Tasks
  - ↳ Negotiate a set of functional requirements for a banking management system, which has a fixed 21-week development time
  - ↳ 2 customer roles (perspectives)
    - Bank teller
    - Personal banking representative

# 12 requirements prioritized by roles

Priority	Teller	Personal Banking
Critical	(1) Browse client's list of accounts	(2) Open and inactivate accounts
	(3) Access client's banking account profile (owner, balance, etc.)	(4) Update terms of credit accounts
	(5) Access client's credit account profile	(1)
	(6) Pay bills and deposit transfer, and withdraw funds	(7) Obtain transaction history on client's credit accounts
High	(8) Obtain transaction history on client's banking accounts	(5)
	(9) Obtain list of due dates on client's credit	(10) Obtain overdue payments on client's credit account
	(11) Order new checks	(12) Obtain credit rating from an external agency
Medium	(7)	(3)
Low	(2)	(6)
	(4)	(11)

Select due to only 8 reqs jointly  
 due to limited resources.

# Variables

## → Independent variable

↳ Communication media: F2F, D1, D2, D3, D4

## → Dependent variables

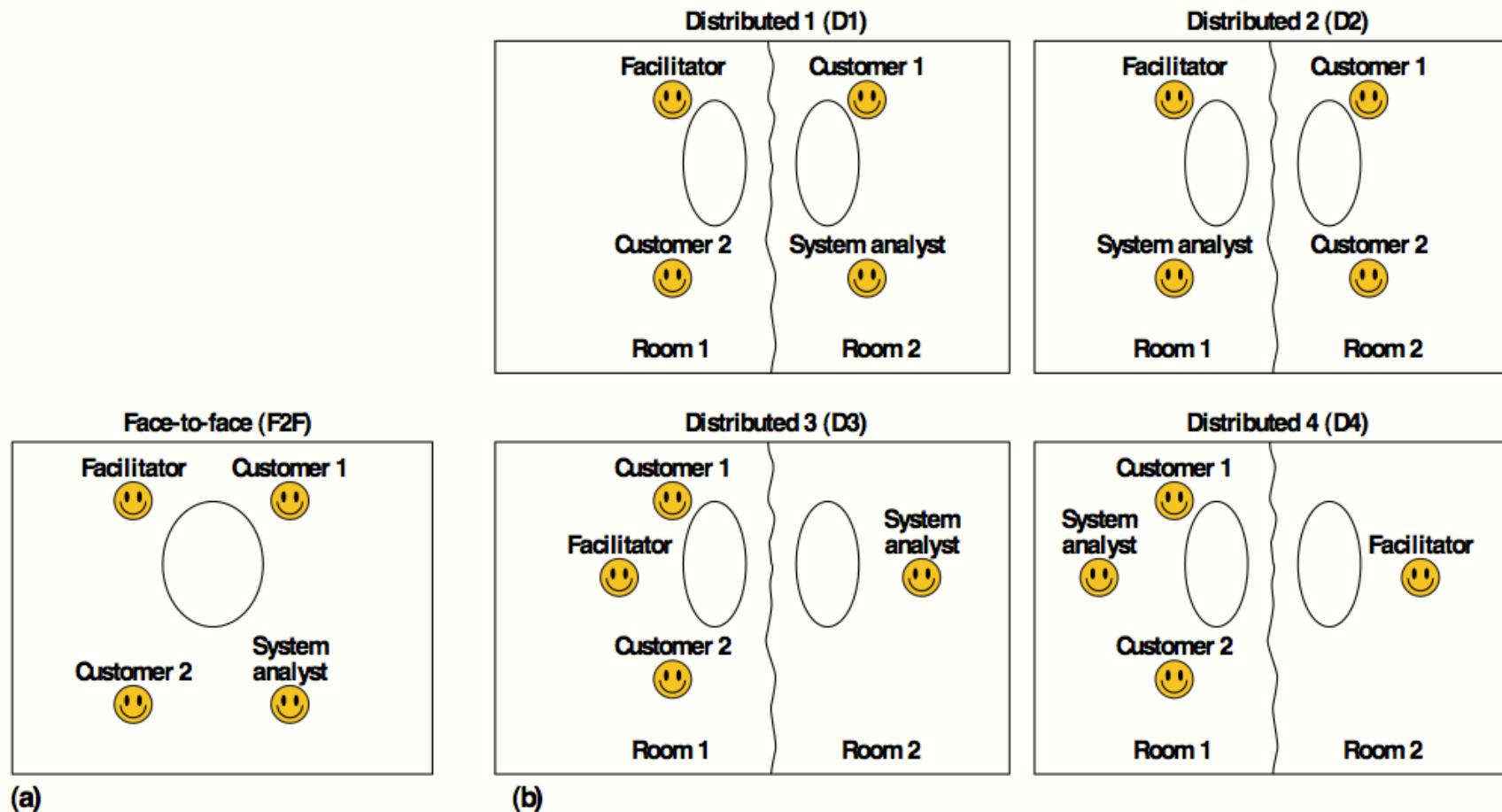
↳ Group performance

- Distributive negotiation behavior: “Your loss is my gain” (zero-sum)
- Integrative negotiation behavior: incorporating opposing goals (used here)

↳ Personal perception

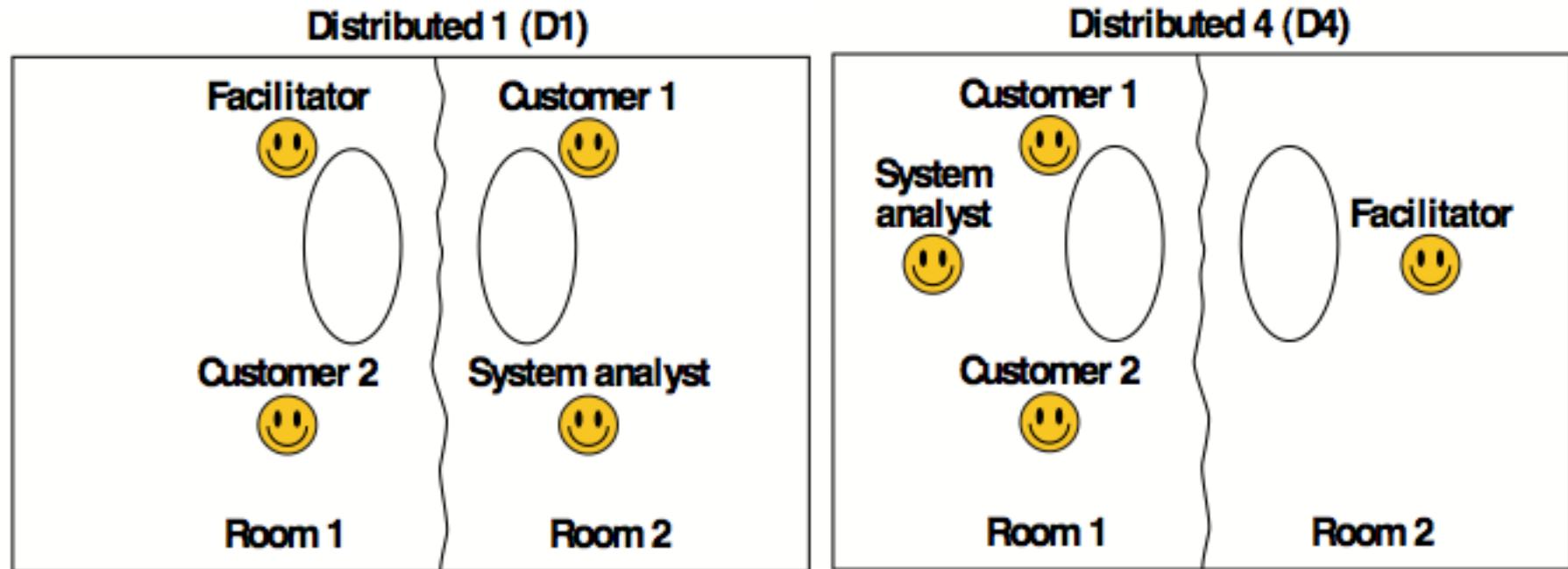
- 5-point Likert-scale rating on: polite, rational, predictable, confident, trustworthy, dominant, sociable, emotional, cooperative, argumentative, active, formal, & competitive

# What do you think?



## Main Results

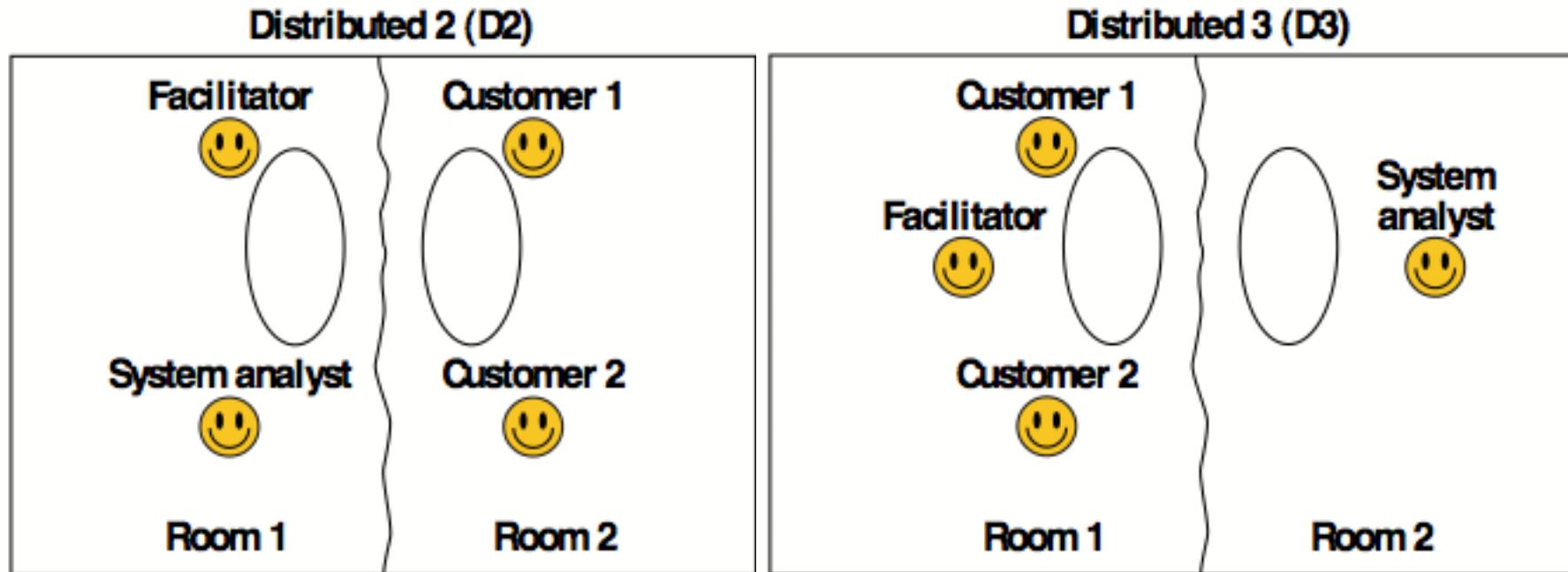
- All groups in D1 reached agreements that were equal to or better than those in F2F groups.



- Groups in D4 perform most like those in F2F groups: no agreement was reached & widest variety of negotiation outcomes.

## Other Results

- D2 & D3: customers are colocated & separated from the system analyst.



- Local individuals are regarded as more emotional, argumentative, and competitive than those encountered remotely through computer conferencing.

# Using Different Communication Media in Requirements Negotiation



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RE is not only about inventing  
“new” stuff, but also  
inherently empirical.

# Conflict vs. Inconsistency

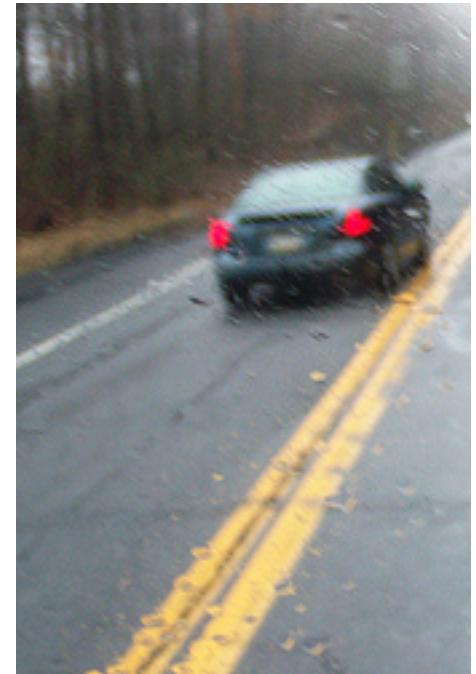
## → Conflict

- ↳ Adverse interference with interests
- ↳ Fight, battle, war



## → Inconsistency

- ↳ Rule is broken
- ↳ Not compatible with another fact or claim
- ↳ “two parts of a specification do not obey some relationship that should hold between them”. (Easterbrook & Nuseibeh, 1995)



## → Scenario

# Lessons about inconsistency in practice

- some inconsistencies never get fixed
  - ↳ because the cost of changing the documentation outweighs the benefit
  - ↳ humans are good at inventing workarounds
- living with inconsistency means continuously re-evaluate the risk
  - ↳ risk factors change, so the risk must be constantly re-evaluated
- some consistency checks are not worth performing
  - ↳ waste of money to establish consistency where change is anticipated
  - ↳ ... also where documents are early drafts, or are full of known errors
- inconsistency is deniable
  - ↳ e.g. because of face saving and defensiveness - inconsistency seen as bad!
  - ↳ e.g. because you can always question the formalization!



## Today's Take-Aways

→ Negotiation strategies and tactics

- ↳ Distributed negotiation: pros & cons
- ↳ Conflict versus inconsistency

→ To-do

- ↳ Review today's slides
- ↳ Continue doing ASN3 (due: Wednesday, Nov 20)
- ↳ In two weeks' time, graduate project video presentation is due (Friday, Nov 15)
- ↳ Attend the “req.s prioritization” lecture on Friday (Nov 8)