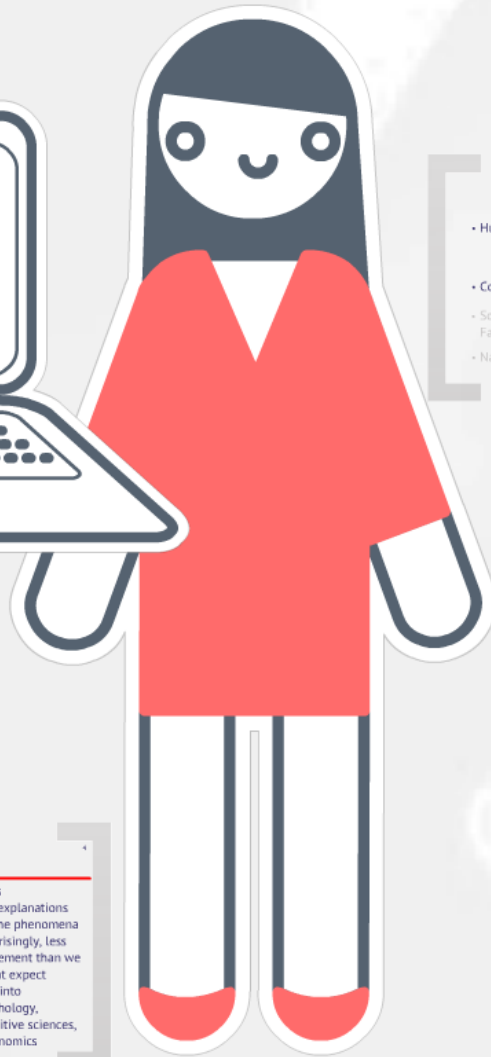




**CS 4249 - Phenomena and Theories  
Capstone 3**

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Kan Min-Yen



**Outline**

- Human Information Processing
  - Memory and Attention
  - Human Abilities
- Cognitive Models
  - Social, Emotional and Affective Factors
  - Navigation and Wayfinding

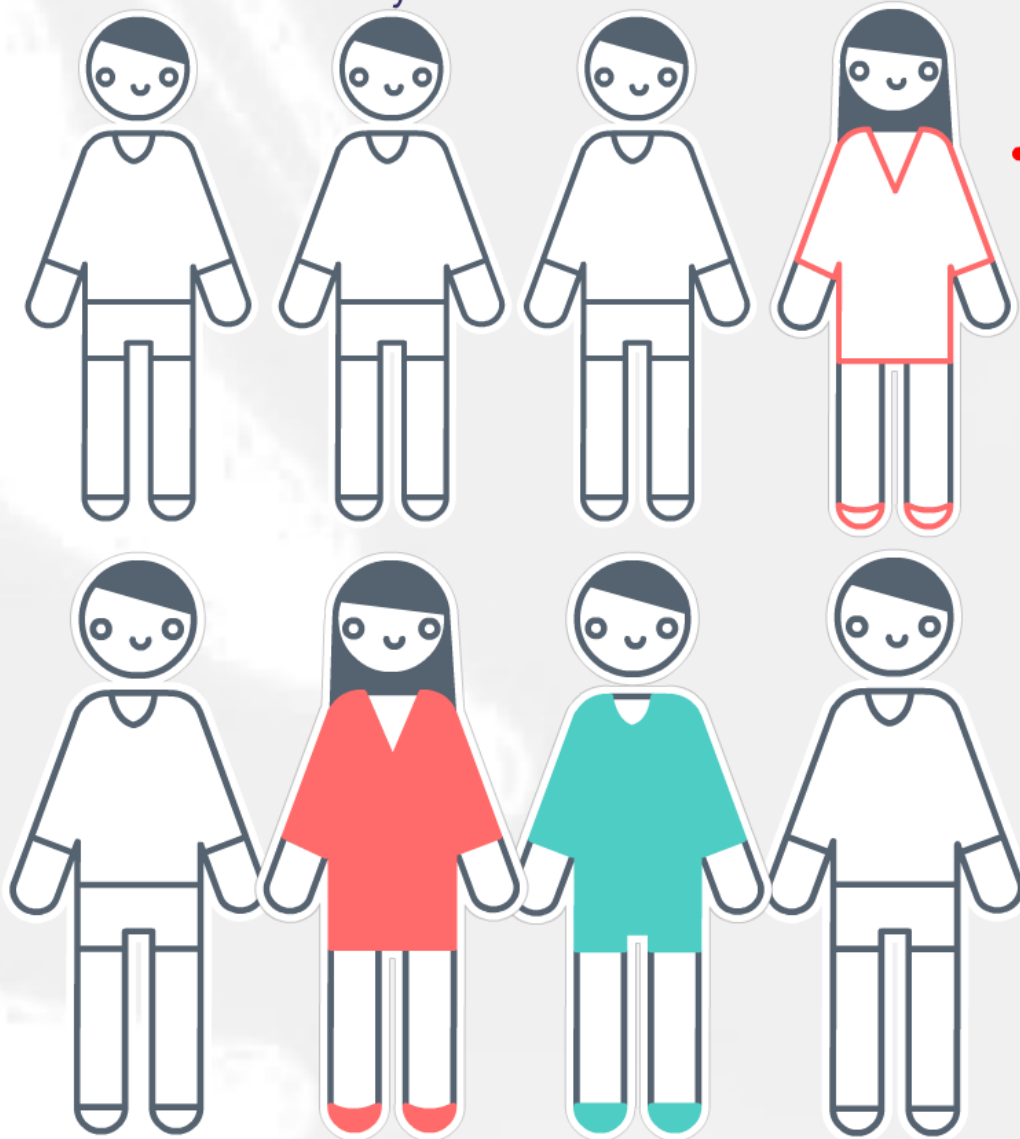
**Foundations: phenomena and theories**

- HCI design requires understanding both computers and humans
- Student presentations have and will present the basic component theories in HCI
- This week and Week 10 will bring these theories together so that we'll better understand ourselves

**Human Factors**

- |   |   |
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|---|---|
- Leads us to:
- Guidelines, frameworks and heuristics for usability

Collective Effort Model  
 Social Loafing  
 Conversational Analysis



# Social Interaction

Human communication

Group Dynamics

Challenges in Computer  
 Supported Collaborative Work

**Human Communication**

Discourse and Conversational Analysis

Affords to not only content but also  
 prosody (stress, intonation), Paralinguistic

Also includes non-verbal  
 communication (body)

- Facial expressions
- Gestures
- Body language, posture

**Group Formation and Norms**

How do groups form? (1) Forming, (2) Storming, (3) Norming, (4) Performing, (5) Adjourning

Group norms and its broad differences (of Hofstede)

- Individualism/Collectivism, "Individuality" vs "Group"
- Power distance (hierarchy)
- Uncertainty avoidance
- Long/short term orientation
- Masculinity/femininity

**Computer Supported Collaborative Work (CSCW)**

Individuals are already part of them in their work and lives, this is complex in group environments.

Group (CSCW) challenges, interaction dynamics

1. Supportiveness work and benefit
2. Critical mass (group size and peer work)
3. Social and motivational factors of social loafing
4. Supportive norms of social loafing
5. Independence use
6. Evaluation (social, linguistic, individual)

**Spatial and Temporal Mosaic**

	Solve	Difficult
Time	1:1P meetings Meeting support tools	Online Email Project Management / Version Control
Space		Email Journals Shared Information Spaces threaded discussions

**Trajectories between awareness and privacy**

3 principles of social transparency

1. Visibility: how easy was to get into and observe. Can generate group issues, opacity
2. Awareness: Situational awareness of the system and aware context (situated action)
3. Accountability: knowledge awareness (achieve identity social loafing)

**Summary**

Understanding social phenomena is still very much work in progress. We are informed by studies about the group work 20 years are still covering new ground.

Social loafing, information this, profile management, etc. are also variables.

To fix it (hard): We're certainly not at the logical endpoint towards "social" and other "IT" in systems. Instead of awareness and privacy, what more can be done?

# Important structures of CA

---

Conversational  
Analysis

```
graph TD; CA[Conversational Analysis] --- T[Turn-taking]; CA --- AP[Adjacency pairs]; CA --- IU[Intersubjective understanding]; CA --- R[Repair];
```

Turn-taking

Adjacency pairs

Intersubjective  
understanding

Repair

# Human Communication

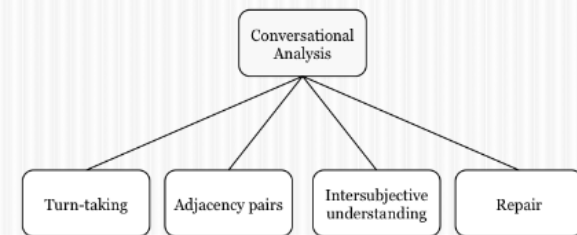
## Discourse and Conversational Analysis

Attend to not only content but also prosody (pauses, intonation, rhythm).

Also includes non-verbal communication (NVC):

- Facial expressions
- Gesture
- Body language, posture

## Important structures of CA



## Usefulness in HCI?

- Nature Language Processing
  - Enabling computers to derive meaning from human or natural language input
- Artificial Intelligence
  - Enabling the construction of autonomous machines
- Interactive Responses



# Group Formation and Norms

How do groups form? a) Forming, b) Storming, c) Norming, d) Performing and e) Decay

30 Aug 2017 CS 4269: Principles and Theory of HCI 11

### Marshmallow Challenge

TALKER  
Tom Wujec: Build a tower, build a team



<http://vimeo.com/14849444>

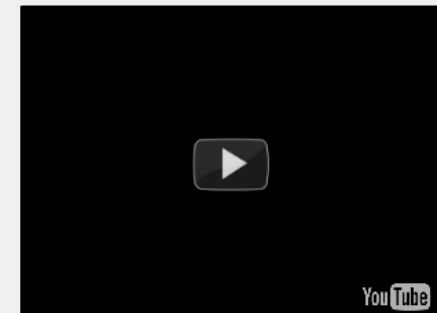
4 Sep 2012 CS 4269: Principles and Theory of HCI 4

### Stanford Prison Experiment



- 24 male students recruited in 1971
- 12 randomly assigned as guards, 12 as prisoners
- Recruited ex-convict to inform staff about the environment
- Created a functional simulation of a prison
- Prisoners, guards and outsiders (parents and prison warden) fell into their own roles

[www.psy.berkeley.edu](http://www.psy.berkeley.edu)

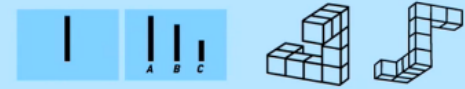


Asch Conformity Experiment

Group norms and cultural differences (cf Hofstede):

- Individualism/Collectivism "Conformity": Asch
- Power distance (Hofstede)
- Uncertainty avoidance
- Long/Short Term Orientation
- Masculinity/Femininity

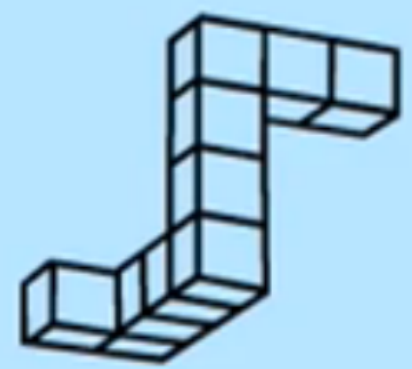
Distortion	Aware of conflict?	Believe group to be:	Brain areas:
Perception	No	Right	Parietal/Occipital
Judgement	Yes	Right	Orbitofrontal Cortex
Action	Yes	Wrong	Anterior Cingulate Cortex





You Tube

<b><i>Distortion</i></b>	<b><i>Aware of conflict?</i></b>	<b><i>Believe group to be:</i></b>	<b><i>Brain areas:</i></b>
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# Group Formation and Norms

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30 Aug 2017 CS 4269: Processes and Dynamics of I/O 11

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TOMWUJEC

<https://www.youtube.com/watch?v=9Bb0u00R808>

4 Sep 2017 CS 4269: Processes and Dynamics of I/O 4

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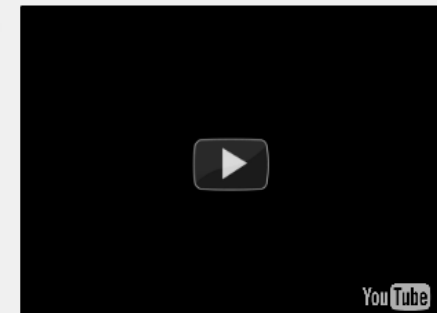


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[www.psyf.com/psd/](http://www.psyf.com/psd/)


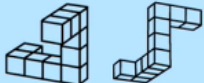


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## Computer Supported Collaborative Work (CSCW)

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Individuals are already quite different in their workflow and values, this is compounded in group environments.

Grudin's (1994) challenges, informed by Ackerman:



1. Disparity between work and benefit
2. Critical mass (under- and over-use)
3. Social and motivational factors (cf social loafing)
4. Exception as normal (cf availability)
5. Independent use
6. Evaluation (i.e., longitudinal evaluation)

## Spatial and Temporal Matrix

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### Time

Same

Different

### Space

Same

F2F meetings  
Meeting support tools

Stickies  
Email  
Project Management /  
Version Control

Different

Tele-conference  
Collaborative editors  
Instant messaging

Email  
Letters  
Shared Information Spaces  
Threaded discussions

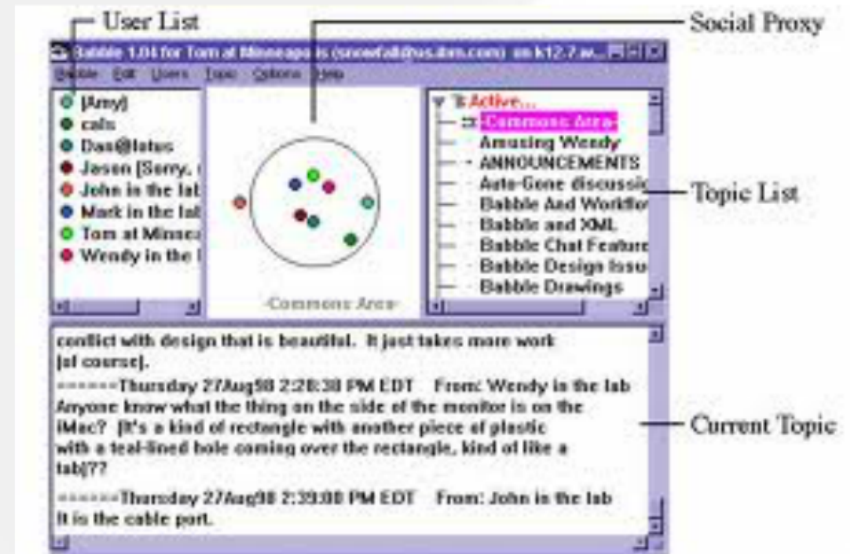
## Tradeoffs between awareness and privacy

3 principles of **social translucence**:

1. Visibility: two-way, both participant and observers. Can generate privacy issues. Opacity.

2. Awareness: Situational awareness of the system and actors' context (situated action)

3. Accountability: Knowledge connecting actions to identity (social loafing)



# Summary

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Understanding social phenomena is still very much work in progress. We are informed by studies of culture, but global Web 2.0 sites are still covering new ground.

Social bookmarking, information trails, profile management, likes, +1 are also examples.

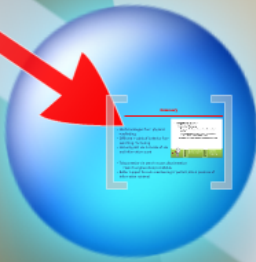
**To think about:** We're certainly not at the logical endpoint towards "likes" and other "+1" like systems. In terms of awareness and privacy, what more can be done?

## The Collective Effort Model

- Factors that decrease social loafing (based on CEM)
  - Increased indentifiability
  - Increased attractiveness of group
  - Increased attractiveness of task
  - Increased uniqueness of effort
  - Smaller group size
  - Expectation that others will perform poorly



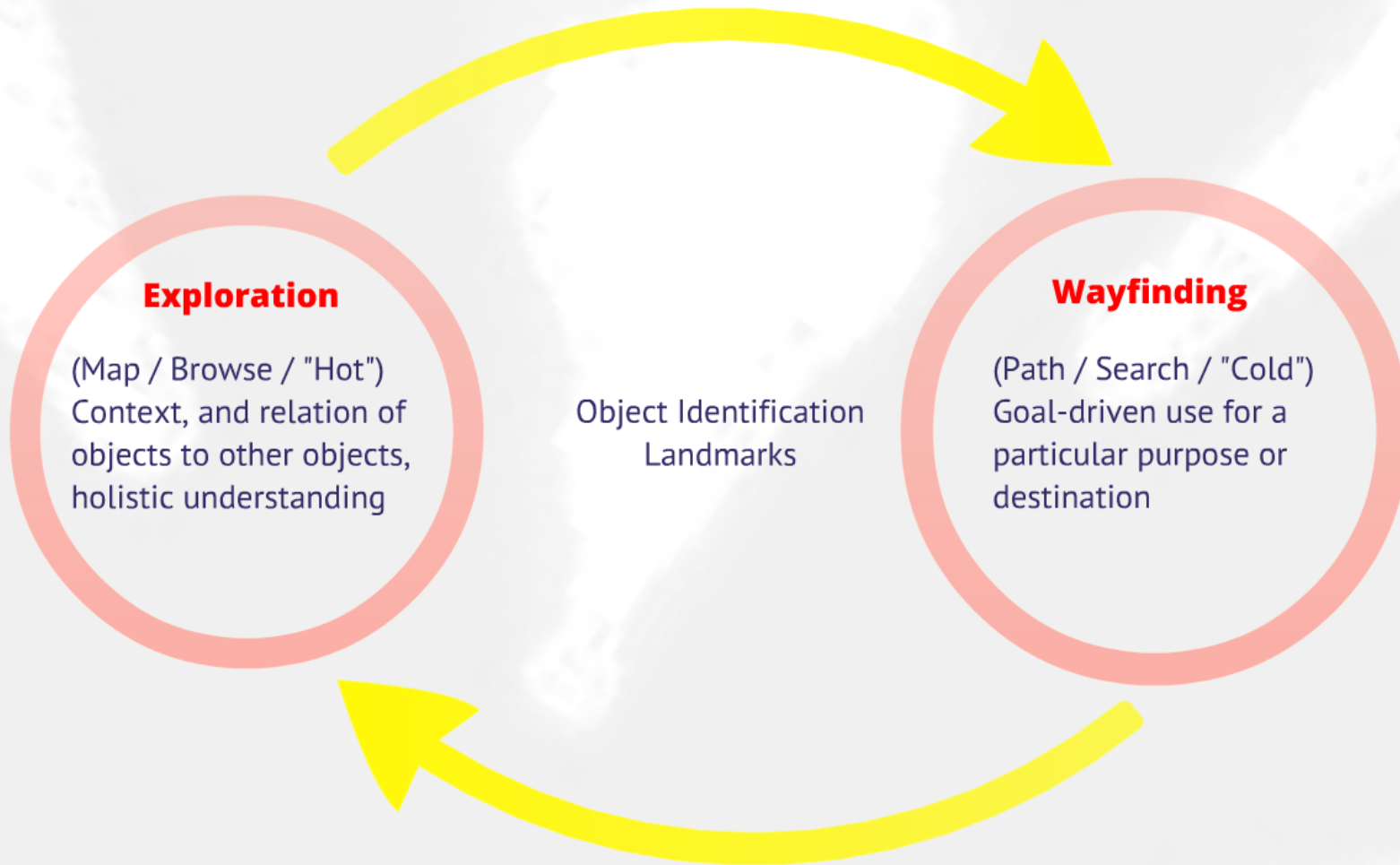
# Navigation



Understanding  
how people  
make sense of  
their physical  
and virtual  
environments

# Navigation

---



# Information Foraging and Berrypicking

- For tasks that are not completely well-formed.
- Rely on multiple sources, use strategies that work in other contexts.
- Connections to distributed cognition and CSCW.

- Change of source after taking some information

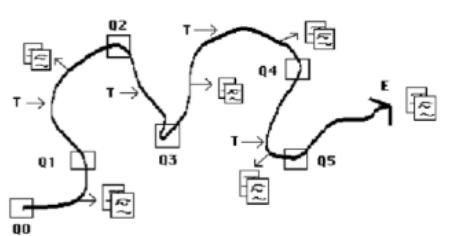


Image courtesy of <http://pages.gseis.ucla.edu/faculty/bates/berrypicking.html>



Berrypicking

Traditional Search Model  
Evolutional Search Model  
Applications to HCI

Information Foraging  
Diet Selection  
Patch Leaving  
Information Scint  
Application to HCI

- Six strategies widely used
  - Footnote chasing
  - Citation searching
  - Journal run
  - Area scanning
  - Subject searches in bibliographies and abstracting and indexing (A & I) services
  - Author searching

What are the related methodologies in (web) information seeking tasks?



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Traditional Search Model  
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Information  
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Patch Leaving  
Information Scent  
Application to HCI

View of the World from 9th Avenue  
The New Yorker, Saul Steinberg



## Designing for navigation

---

Account for the different activities that people undertake in a space.  
A focus of other disciplines that we can piggyback from:  
urban planning, interior design.

Paths - "Pave the cowpath"

Signage - Show landmarks, and paths by use

Landmarks - In guiding others, people overwhelmingly use these in their directions, whether in a map or path context.

**Quick Question 1:** There are also big differences between web and physical navigation. What's one of the largest differences?

**Quick Question 2:** What's the connection between landmarks and social networking systems?

# Summary

- Useful analogies from physical wayfinding
- Different models of behavior from searching / browsing
- Not only past use but ease of use and information scent

- Things to Take Away

- Information Foraging

- People prefer the *easiest* and *most beneficial* source
    - Must create a good *scent*, *clearly* suggesting to users a source has what they need
    - Retain users loyalty by encouraging user to stay



- Teleportation via search causes disorientation
  - Search engines always available
- Better support for web orienteering important, also a province of information retrieval.



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