Lecture 9:
CS 5306 / INFO 5306: Crowdsourcing and Human Computation
Who will win Best Actor

Answered: 38   Skipped: 0

Bryan Cranston  Matt Damon  Leonardo DiCaprio  Michael Fassbinder  Eddie Redmayne

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Who will win Best Actress?

Answered: 38  Skipped: 0

- Cate Blanchett
- Brie Larson
- Jennifer Lawrence
- Charlotte Rampling
- Saoirse Ronan

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Amazon Mechanical Turk Accounts

1. Fill out web page to request becoming an Mturk worker
   - Requires either a social security number (SSN) or an individual tax identification number (ITIN).

2. Contact MTurk support at contactus@mturk.com using the email address that you used to sign up for the MTurk account
   - Tell them the account is for your Cornell Crowdsourcing and Human Computation course
   - Following instructions given by Amy J at Mturk to course TA Moontae Lee

• Please do this within the next 48 hours
• If you have problems let me know
The other alternatives may be reserved for a later inquiry; but the first of the alternatives suggested—that the people at large should be sovereign rather than the few best—would appear to be defensible, and while it presents some difficulty it perhaps also contains some truth. There is this to be said for the Many. Each of them by himself may not be of a good quality; but when they all come together it is possible that they may surpass—collectively and as a body, although not individually—the quality of the few best. Feasts to which many contribute may excel those provided at one man’s expense. In the same way, when there are many who contribute to the process of deliberation each can bring his share of goodness and moral prudence; and when all meet together the people may thus become something in the nature of a single person who—as he has many feet, many hands, and many senses—may also have many qualities of character and intelligence. This is the reason why the Many are also better judges than the few of music and the writing of poets: some appreciate one part, some another, and all together appreciate all.
We may note that this combination of qualities, which gives the Many their merit, can also be traced in cases of individual merit. The thing which makes a good man differ from a unit in the crowd—as it is also the thing which is generally said to make a beautiful person differ from one who is not beautiful, or an artistic representation differ from ordinary reality—is that elements which are elsewhere scattered and separate are here combined in a unity. It is this unity which counts; for if you take the elements separately, you may say of an artistic representation that it is surpassed by the eye of this person or by some other feature of that.
It is not clear, however, that this combination of qualities, which we have made the ground of distinction between the many and the few best, is true of all popular bodies and all large masses of men. Perhaps it may be said, "By heaven, it is clear that there are some bodies of which it cannot possibly be true; for if you included them, you would, by the same token, be found to include a herd of beasts. That would be absurd; and yet what difference is there between these bodies and a herd of beasts?" All the same, and in spite of this objection, there is nothing to prevent the view we have stated from being true of some popular bodies.
John Rawls, *A Theory of Justice*

Nevertheless, we normally assume that an ideally conducted discussion among many persons is more likely to arrive at the correct conclusion (by a vote if necessary) than the deliberations of any one of the them by himself. Why should this be so? In everyday life the exchange of opinion with others checks our partiality and widens our perspective; we are made to see things from their standpoint and the limits of our vision are brought home to us. But in the ideal process the veil of ignorance means that the legislators are already impartial. The benefits from the discussion lie in the fact that even representative legislators are limited in knowledge and ability to reason. No one of them knows everything the others know, or can make all the same inferences that they can draw in concert. Discussion is a way of combining information and enlarging the range of arguments. At least in the course of time, the effects of common deliberation seem bound to improve matters.
Deliberation Seems Like a Good Thing

• Get information from the smartest person
• Aggregate distributed information
• Synergy and learning
Deliberation Often Isn’t a Good Thing

• Deliberating groups are no better than statistical groups
Deliberation Often Isn’t a Good Thing

• Deliberation gives false sense of security about decisions
Deliberation Often Isn’t a Good Thing

• Groups members feel “majority pressure”
  – Informational influences:
    if everyone else agrees, perhaps I’m wrong
  – Social influences:
    I want to be liked

Can be framed economically – private benefits vs social benefits
Deliberation Often Isn’t a Good Thing

• Group members of “low social status” (in appropriate circumstances less educated people, women) speak less and have less influence in the group compared to higher-status members
Evidence for a Collective Intelligence Factor in the Performance of Human Groups

Arla Williams Wamsley,† Christopher F. Grahn,‡ Alex Perchant,‡ Nada Hamlíček,§ Thomas W. Schelling

Psychologists have repeatedly shown that a single statistical factor—often called "group intelligence"—arises from the interactions among people’s performance on a wide variety of cognitive tasks. But now we have systematically examined whether a similar kind of "collective intelligence" exists for groups of people. In two studies with 99 people working in groups of two to five, we find emerging evidence of a general collective intelligence factor that explains a group’s performance on a wide variety of tasks. This "I factor" is strongly correlated with the average or median individual intelligence of the group members and is correlated with the average social centrality of group members, the equality in distribution of conversational turn-taking, and the proportion of females in the group.

A key research tactic, and many other well-developed tools of science, are increasingly accomplished by groups—ranging from both face-to-face and virtually (J–J)—that is, more important to accommodate the determinants of group performance. Over the past century, psychologists have endeavored to understand the behavior of individuals (I). We have used the statistical approach over for individual intelligence to systematically studied the intelligence of groups. Even though social psychologists and others have studied for decades how well groups perform specific tasks (I), they have not attempted to measure group intelligence in the same way. Individual intelligence is measured—by assessing how well a single group can perform a wide range of different tasks and using that information to predict how that same group will perform other tasks in the future. The goal of the research reported here was to test whether groups, like individuals, have characteristics that are the essence of measurable "group intelligence," which can be measured and used to predict the group’s performance on a wide variety of tasks.

Although controversy has surrounded this concept of measurable "group intelligence," there is a fast that is still as remarkable as it was when it first documented in 1904.
Evidence for a Collective Intelligence Factor in the Performance of Human Groups
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- Intelligence: “People who do well on one mental task tend to do well on most others, despite large variations in the tests’ contents and methods of administration.”
Evidence for a Collective Intelligence Factor in the Performance of Human Groups

• Collective Intelligence factor (c):
  – Analogous to human IQ – “the general ability of the group to perform a wide variety of tasks
  – A group that performs well on a set of tasks are more likely to perform well on other tasks
Evidence for a Collective Intelligence Factor in the Performance of Human Groups

• Their results show that there is a single dominant factor $c$ in group performance

• Not strongly connected to average or maximum member intelligence, nor to group cohesion, motivation, or satisfaction
Other Measures

• **Group satisfaction.** Agreement with statements such as “I have been very satisfied working on this team”.

• **Motivation.** Agreement with statements such as “I would feel bad and unhappy if our team has performed poorly”.

• **Social cohesiveness.** Agreement with statements such as “Members of this group would enjoy being at a party together”.

• **Psychological Safety.** Agreement with statements such as “It is difficult to ask other members of this team for help”.
Evidence for a Collective Intelligence Factor in the Performance of Human Groups

• It was significantly correlated with:
  – Average social sensitivity of group members
    • Used “Reading the Mind in the Eyes” test “
  – More turn taking
  – Proportion of females
    • Known to exhibit better social sensitivity and turn taking
Reading the Mind in the Eyes
Sociometric Badges
McGrath Task Circumplex

Quadrant I: Generate
- Type 1: Planning tasks
- Type 2: Creativity tasks
- Type 3: Intuitive tasks
- Type 4: Decision-making tasks
- Type 5: Cognitive conflict tasks
- Type 6: Mixed-motive tasks
- Type 7: Conflict/negotiation/competitive tasks
- Type 8: Performance/psycho-motor tasks

Quadrant II: Choose
- Generating ideas
- Solving problems with correct answers
- Deciding issues with no right answer
- Resolving conflicts of viewpoints

Quadrant III: Negotiate
- Generating plans
- Executing performance tasks
- Resolving conflicts of power
- Resolving conflicts of interest

Quadrant IV: Execute
- Conceptual
- Behavioral
• **Quadrant I.**
  – *Brainstorming.* 10 minutes brainstorming possible uses for a brick.
  – *Word completions.* 10 minutes to come up with words beginning with "s" and ending with "n".

• **Quadrant II.**
  – *Group Matrix Reasoning.* Raven’s Advanced Progressive Matrices.
  – *Spatial problems.* 10 minutes generating ways to fit 6 3D rectangles into a 3D container.
  – *Group Moral Reasoning.* Decide on disciplinary actions in a case where a college basketball player bribed an instructor to change his grade on an exam.
  – *Incomplete words.* 10 minutes to complete a set of 36 words with 2-3 letters missing (" _ ech _ que" / "technique").
  – *Estimation Problems.* 10 minutes to estimate 20 quantities ("What was the median age in the U.S. in 2009?")
• **Quadrant III.**
  – *Plan shopping trip.* Plan a shopping trip as if they were all residents of the same house sharing a single car. Each member had a different list of groceries and various constraints such as better and worse places to buy the different items.

• **Quadrant IV.**
  – *Group typing.* 10 minutes to simultaneously type into a shared online document.
  – *Reproducing art.* Duplicate a hard copy of a picture created by coloring cells in a spreadsheet, the picture as accurately as possible using a shared online spreadsheet tool

• **Criterion tasks:**
  – *Video checkers.* +1 point for each move, +2 for each piece captured, +3 for each king.
  – *Architectural design.* Design and build a house, garage, and pool out of a limited set of building blocks subject to constraints
Raven’s Advanced Progressive Matrices
NEO Personality Inventory
(The “Big Five” Personality Traits)

• Neuroticism
  – Anxiety
  – Hostility
  – Depression
  – Self-Consciousness
  – Impulsiveness
  – Vulnerability to Stress

• Extraversion
  – Warmth
  – Gregariousness
  – Assertiveness
  – Activity
  – Excitement Seeking
  – Positive Emotion

• Openness to experience
  – Fantasy
  – Aesthetics
  – Feelings
  – Actions
  – Ideas
  – Values

• Agreeableness
  – Trust
  – Straightforwardness
  – Altruism
  – Compliance
  – Modesty
  – Tendermindedness

• Conscientiousness
  – Competence
  – Order
  – Dutifulness
  – Achievement Striving
  – Self-Discipline
  – Deliberation
Wonderlic Personnel Test

Which of the following is the earliest date?


LOW is to HIGH as EASY is to ___.

J) SUCCESSFUL  K) PURE  L) TALL  M) INTERESTING  N) DIFFICULT

A featured product from an Internet retailer generated 27, 99, 80, 115 and 213 orders over a 5-hour period. Which graph below best represents this trend?

A B C D E

What is the next number in the series?

29 41 53 65 __

J) 75  K) 88  L) 89  M) 98  N) 99

One word below appears in color. What is the OPPOSITE of that word?
She gave a complex answer to the question and we all agreed with her.

A) long  B) better  C) simple  D) wrong  E) kind
“Four Big Problems” for Deliberating Groups

• Amplifying (“architectural”) errors
• Hidden profiles and (favoring) common knowledge
• Cascades and polarization
• Group polarization
“Architectural” Errors

Daniel Kahneman

Amos Tversky
“Architectural” Errors
“Architectural” Errors

• “We use heuristics, or rules of thumb, that lead us to make predictable errors.”

• Availability heuristic:
  – Familiarity: biases perceptions in terms of what we know (“If you can think of it, it must be important” – Wikipedia)
  – Salience: television vs print news, recency

  – “Imagine if <candidate> was President”
“Architectural” Errors

• Framing effects:
  – “Of those who have this procedure, 90 percent are alive after five years” vs “Of those who have this procedure, 10 percent are dead after five years”
  – Write down the last two digits of your SSN. How much would you pay for X?
“Architectural” Errors

• Representativeness heuristic:
  – Estimate quantities based on how representative it is in your own experience
  – If you’ve only met people from CT who were rich, when asked if CT people are rich you might say yes because of your experience, not because of the true numbers
“Architectural” Errors

• Conjunction errors:
  – Linda is 31 years old, single, outspoken, and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.

Which is more probable?

– Linda is a bank teller.
– Linda is a bank teller and is active in the feminist movement.
“Architectural” Errors

• Egocentric bias:
  – We believe others are like us
    • What percentage of people like computers?

• Hindsight bias:
  – Our estimation of what we would have done knowing the outcome doesn’t match what we would have done
    • Would the Giants win the Superbowl?
Amplifying “Architectural” Errors

• Groups that deliberate amplify the effects of these architectural errors
  – Amplify reliance on the representativeness heuristic
  – Increase framing effects
  – More conjunction errors
Amplifying “Architectural” Errors

• Groups are more likely than individuals to escalate commitment to a wrong path
  – Increases with great identification with the group
Amplifying “Architectural” Errors

- Groups lead to decreased use of the availability heuristic
- Groups lead to decreased use of the egocentric bias
- Groups are less susceptible to hindsight bias
Hidden Profiles and Common Knowledge

• Hidden profiles: Information that is present across group members but that they do not find
• Common knowledge: Groups focus on the information that they share rather than the information that they don’t
• People with the most common knowledge “usually have a disproportionate influence in discussion”
Hidden Profiles and Common Knowledge

• “when key information is unshared, groups are more likely to select a bad option after discussion than would their individual members before discussion”

• Increases with group size
Hidden Profiles and Common Knowledge

• Low-status individuals are less likely to provide hidden information

• Group diversity impacts group deliberation
Cascades and Polarization

• Informational cascades:
  – Imagine polling people one by one
    • Person A: Answers X
    • Person B: Answers X
    • Everyone thereafter now faces an X bias, even if the two X’s were random chance.
Cascades and Polarization

• Reputational cascades:
  – Imagine polling people one by one
    • Person A: Answers X
    • Person B: Answers X
    • You might not want to risk your reputation to disagree with them.
    • This cascades onward
Group Polarization

• Members of a deliberating group typically end up in a more extreme position in line with their tendencies before deliberation began
• Heightened with a sense of shared group identity
• In-group members have more force than out-group members