# ORGANIZATIONAL BEHAVIOR AND HUMAN RESOURCE MANAGEMENT

prof. Giovanni Masino
University of Ferrara

Lesson 19

# Group Dynamics (part 2):

## Tools and Techniques to improve the effectiveness of groups

# What are we going to talk about

- **THE VALUE OF STATISTICAL GROUPS AND OTHER COLLECTIVE DECISION MAKING TECHNIQUES**
- **SPECIFIC TECHNIQUES TO IMPROVE GROUP DISCUSSION**
- **THE METHODOLOGICAL RESPONSIBILITY OF GROUP LEADERS**

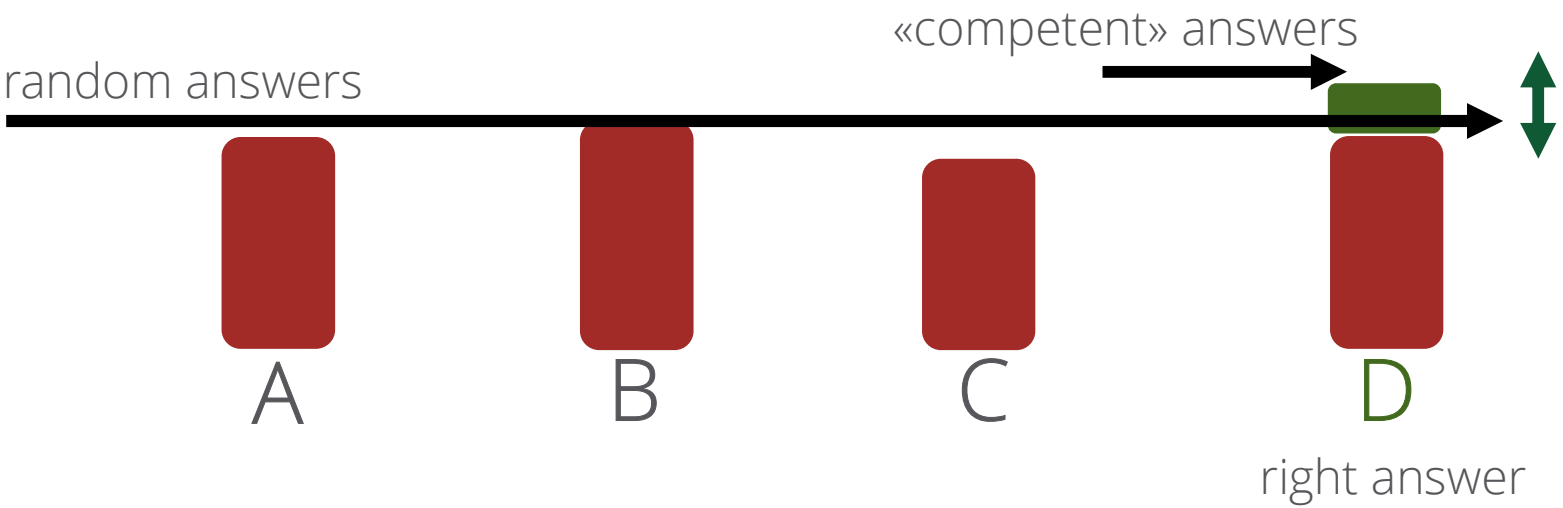
# STATISTICAL GROUPS

# A simple metaphor …



# A simple metaphor

- "Who Wants to Be a Millionaire"
  - how often, percentage wise, the majority response of the audience is correct?
    - if this was a random process, it would be 25% of the times
    - do you think it's more or less 50%?
  - audience majority provides on average 91% of correct answers
  - WHY? HOW DOES IT HAPPEN?




this is a simple example of a «STATISTICAL GROUP»: a group of individuals who do not talk / debate / communicate, but just provide separate individual answers / ideas / solutions, and these are then summarized with some statistical procedure into a «collective answer» (for example, a simple average, a weighted average etc)

# Why does it work? A generalization

- EXAMPLE (the Condorcet Jury Theorem)
- A group of individuals needs to decide about a certain issue
- The probability that each individual will respond correctly is > 50% (even just slighlty over 50%)
- **The probability of a correct answer, by the majority of the group, will increase toward 100% as the group size increases**

- **IN GENERAL:**
  - **statistical groups will do better than individuals, and large groups better than small groups, if 2 conditions are met:**
    - **1: the majority rule is used for making the collective decision**
    - **2a: each member is more likely to be correct (than not to be)**
    - **2b: or, if a «core» of members are more likely to be correct (than not) and the others' errors are random**

# Bracketing and diversity (why diversity helps)

- For example: our goal is to estimate or predict a value
- How many products will we sell next year? (true value: 192)
  - Individual A: 250
  - Individual B: 150
  - Average estimate: 200
  - **The two estimates «bracket» the true value** (150 < 192 < 250)
  - the two individual errors are 58 (250 – 192) and 42 (192 – 150)
  - **The average individual error is 50** (avg of 58 and 42)
  - **The error of the average is 8 (200-192)**
  - If the individual estimates **bracket** the truth, the error of the average estimate will always be **lower** than the average individual error
  - If the individual estimates **do not bracket** the truth, the error of the average estimate will always be **equal** to the average individual error
  - **so, the average estimate of a group will improve if the group «bracket» the truth (the right solution).**
  - ***How can we make sure of that? What condition will increase the probability that the truth will be «bracketed» by the group?***
  - **THE MORE DIVERSE THE GROUP, THE MORE LIKELY THAT THE INDIVIDUAL ESTIMATES WILL BRACKET THE TRUTH**

# bracketing vs non bracketing: an example

| | BRACKETING | | | NON BRACKETING | |
|---|---|---|---|---|---|
| **TRUTH** | **IND. ESTIMATE** | **IND. ERROR** | | **IND. ESTIMATE** | **IND. ERROR** |
| **100** | 90 | 10 | | 90 | 10 |
| | 68 | 32 | | 68 | 32 |
| | 123 | 23 | | 95 | 5 |
| | 66 | 34 | | 66 | 34 |
| | 115 | 15 | | 78 | 22 |
| | 88 | 12 | | 88 | 12 |
| | | | | | |
| **AVG ANS** | **92** | | | 81 | |
| | **ERR of AVG = 8** | **AVG ERR = 21** | | **ERR of AVG = 19** | **AVG ERR = 19** |

**bracketing estimates allow for opposite errors to compensate each other**

# Essential conditions for the effectiveness of statistical groups

- It is crucial that members are as **independent** as possible from each other, as **diverse** as possible, and at least some of them possess a good degree of **competence** on the issue
- **please notice the «negative case»**: when groups that are **too conformist** (non independent), **too homogeneous** (non diverse), and **too incompetent**, the statistical group answer will be very distant from the truth

# STATISTICAL GROUPS VS INDIVIDUAL EXPERTS

- **WHAT IF A GROUP CAN RELY ON A VERY GOOD EXPERT?**
- **Even when experts are available, relying on a statistical group decision (the average answer from a group of experts) is often more accurate than relying on an individual expert**
- Many examples in several studies:
  - forecasting and assessing tasks such future prices of commodities, company earnings, economic trends, survival of patients, political polling etc
- Obviously, this is more or less true depending on the «environment» of the decision. **Relying on individual experts may be preferable when**:
  - when there is a lot of **urgency**
  - when there are **large differences in expertise** among group members
  - when the group **does not bracket** the truth
  - when it is **easy to identify the person with the perfect idea** (**but this is, in practice, extremely difficult and often illusory**)

# CHASING THE (INDIVIDUAL) EXPERT

- While averaging answers often leads to better outcomes, **many people (including managers) have the tendency to chase after the «BEST» answer (relying on individual experts)** rather than trusting the «AVERAGE» answer
  - The WSJ financial forecasting game played by MBAs
    - 80% of them relied on single experts that they trusted
    - but their performance was significantly worse than the average of all experts
  - **Research shows that averaging experts is often the best option**
    - Depending on the above mentioned conditions
  - The outcome is even better if we weight the experts by their track record
    - however, we need to be careful about how we weight: self-evaluation of experts, for example, is not a good method for weighting

# PRACTICAL EXAMPLES:
# TOURNAMENTS AND PREDICTION MARKETS

# The story of Innocentive (1)

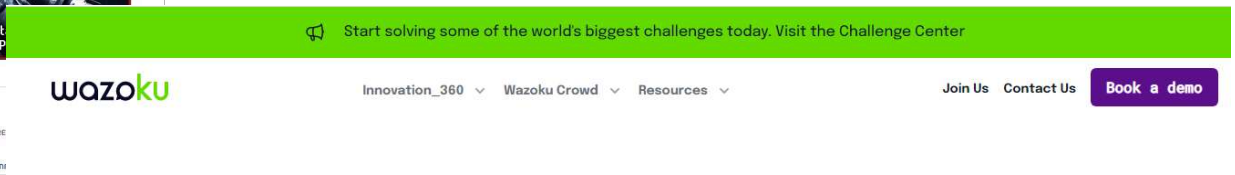
- A. Bingham, head of R&D at Eli Lilly
- Massive research labs, with thousands of scientists working at the edge of science and technology
- In the 90s, massive investments in R&D, but not great results
  - *"After spending years on a problem, we'd often end up with a solution that was so imperfect it was virtually useless," he says. "And those failures weren't cheap."*
- In 2001 he decides to make these «impossible» scientific problems *public*
  - He published them on a webiste, and promised a reward to anyone who would come up with a solution
  - *"Mostly we just put up these really hard organic chemistry problems. I assumed there was little competitive risk, since a lot of these technical problems had also bedeviled our competitors. Frankly, I didn't expect many of these challenges to ever get solved"*
- After a month, the first solution arrived. And then more and more and more.
  - *"The answers just started pouring in. We got these great ideas from researchers we'd never heard of, pursuing angles that had never occurred to us. The creativity was simply astonishing."*

# The story of Innocentive (2)

- By 2003, the idea was so succesful that Innocentive became a spin-off from Eli Lilly
- Now it features technical and scientific challgenges from hundreds of corporations of all industries, in all scientific fields
- 200.000 «solvers» registered today; about 40% of challenges are solved within 6 months. Sometime within a few days. How is this possible?
  - the power of numbers
  - the power of diversity: most solutions come from people that are NOT expert in the specific field that originates the problem, but from people from different, adjacents fields.
    - *A company was trying to invent a polymer with a very unique and perplexing set of chemical properties. "Nobody was optimistic that InnoCentive could help the client," However, after a few months, solvers on the website came up with 5 different solutions to the problem. "The company paid for all the solutions. They paid awards to a person who studies carbohydrates in Sweden, a small agribusiness company, a retired aerospace engineer, a veterinarian, and a transdermal-drug-delivery-systems specialist. I guarantee that they would have found none of those people within their own company. They would have found none of those people if they had done a literature search in the field of interest. They would have found none of them by soliciting input from their consultants. And they probably wouldn't have hired any of these people anyway, because none of them were qualified*


What do we learn from Innocentive?

(now «WAZOKU»)




Could the same approach work for individual companies?


# The Netflix case

- In 2006 Netflix promised a reward of 1 million $ for whoever was able to develop a recommendation algorithm that could beat by at least 10% the effectiveness of their own algorithm for movies recommendations
  - all the conditions for the competition were specified in great detail (criteria for admission, length of the competition, performance measurement, same data provided to all participants, etc)
  - in 4 days (!!) a competitor beat Netflix's algorithm by 10%
  - the competition ran for 3 years
  - over 20.000 teams participated from 150 nations
  - a very small investment (1m $) generated a huge creative effort, much greater than what an in-house R&D investment could have produced
- Other examples:
  - General Electric in 2013 posted the «GE Engine Bracket Challenge» (20k $ prize)
    - the company was able to develop engine brackets for an aircraft engine that was 80% lighter
  - Pentagon, The Obama Administration (challenges from dozens of public agencies, with significant success)

# Some general reflections on «innovation tournaments»

- the dispersion of independent participants eliminates the problem of conformity
- the «winner-take-all» approach encourages divergent strategies (hence, increasing diversity)
- the clarity and specificity of the «rules of the game» creates trust about fairness and focus on the problem of interest
- a reputational effect probably generate interest that goes beyond the monetary prize
- while in tournements there is no «rational» advantage in sharing information with other competitors, in some situation information sharing may emerge nonetheless
  - it happened in the Netflix case, where several teams decided to pool their resources to increase their chances to find a solution
- how many participants?
  - large numbers increase the possibility to solving the problem (the «parallel-paths» effect)
  - However, cases when too many participants are expected or present may be discouraging and reduce the effort or the interest in participating
    - however, do not underestimate the power of human over-confidence …
    - studies show that the more complex the problem, the larger the «parallel-paths» effect, and the smaller the discouraging effect

# prediction markets examples




- BEST BUY established a prediction market called «TagTrade» in which employees may wager on the outcome of external and internal events (eg sales projections etc)
  - »the accuracy of TagTrade is better than the company sales experts
- HEWLETT PACKARD
  - »a variety of people involved, from different areas of the company
  - »sales predictions more accurate than top HP's sales experts
- other companies: Microsoft, Eli Lilly and others
- The «HOLLYWOOD STOCK EXCHANGE»
  - –in which people buy and sell the «price» of specific predictions about the movie industry (Oscar winners, box-office figures etc). Predictions are remarkably accurate



20

# Why prediction markets are (often) effective?

- Markets, under the right conditions, are able to integrate and summarize a large and diverse set of information from many participants into one, simple synthetic information: price
- Many individual market participants are biased
  - »they have incomplete / wrong information
  - »they are over-confident about their own judgments, etc
- Markets are able to compensate all these different biases and errors, especially if there is a group of individuals who are less biased
  - »the «marginal trader hypothesis»: if most biases counteract each other, the judgment of a relatively small group of unbiased trader are able to have a disproportionately large, accurate effect on prices

- Markets (in general) and, similarly, prediction markets, are not a panacea: inaccurate / wrong estimates do occur
  - »for example, «bubbles» and «crashes» may happen and do happen, due to cascades effects



21

# TECHNIQUES AND TOOLS FOR SMALL GROUPS

# key approaches, tools and techniques

## the ones we will talk about

- general «group culture» emphasis:
  - methodological awareness
  - psychological safety
  - group composition
- specific tools and techniques
  - role playing
  - devil's advocates
  - plussing
  - red teaming and subgroups
  - delphi
  - brainstorming
  - pre-mortem analysis

# Margaret Heffernan's TED speech

https://www.youtube.com/watch?v=PY_kd46RfVE

# KEY POINTS from HEFFERNAN's SPEECH

- Solving complex problems often requires group efforts
- A good group effort requires that we are able to **separate «conflict between ideas»** from **«conflict between people»** (*«dare to disagree»* is the title of Heffernan's speech)
  - «CONFLICT BETWEEN IDEAS»: it supposed to be a healthy, useful, fact-based, competence-based conversation that tries to leverage all the information and intelligence at the group's disposal
- This is **not easy**, because **we tend to confuse the two**. For example, **we tend to attach our personal identity and dignity to our ideas**

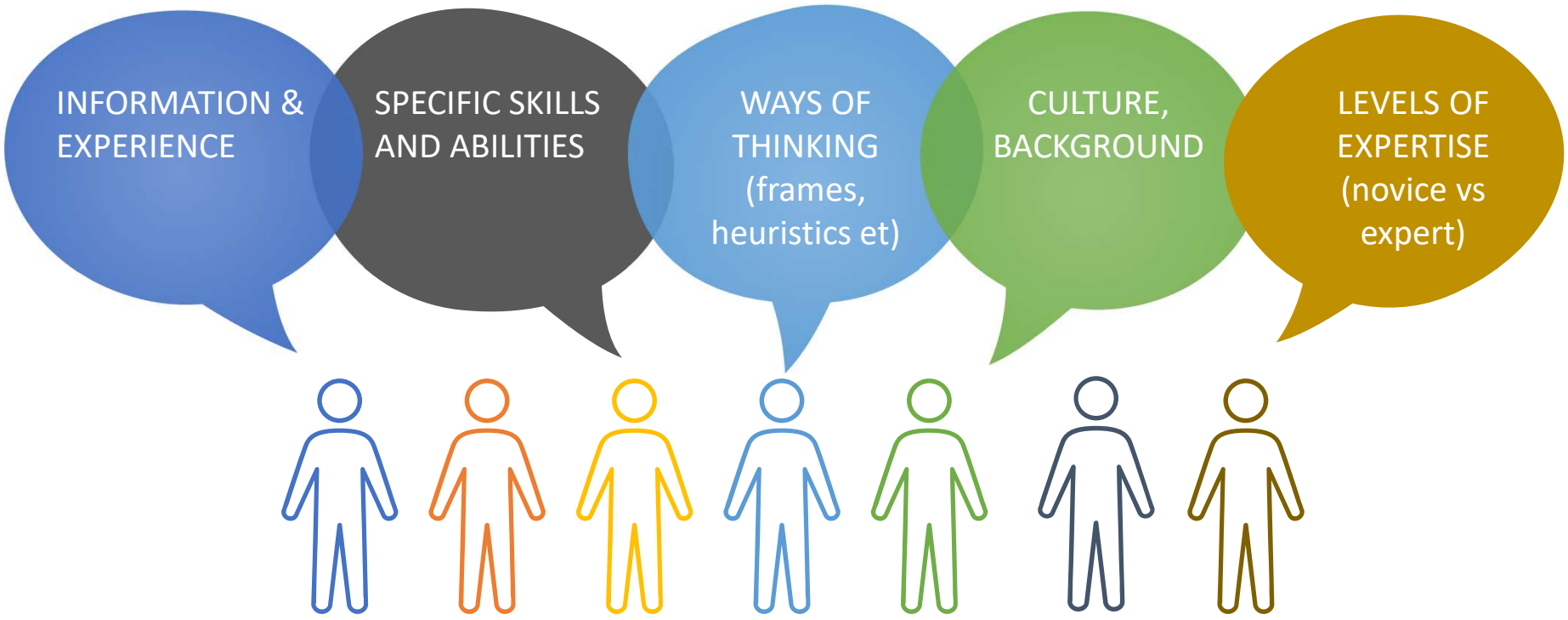
- **Diversity helps** (a lot): that is what nurtures the possibility of comparing different ideas
- However, diversity needs to be:
  - **GENERATED**, because it is not always easily available
  - **MANAGED**, becase it may lead to conflict between people
  - **PROPERLY UTILIZED**, because diversity alone may not generate good ideas
- There are tools and techniques that help us to do all that

# Some general «conditions» for group effectiveness

- **diversity / heterogeneity**
  - diversity of ideas, knowledge, information, points of view, frames, reasoning etc.
  - theoretically, too much diversity may have negative consequences, but this is less common in real world organizations
- **independence**
  - reducing the negative effects of social influence
  - conformity, suppression of dissent, lack of critical thinking are always the main danger
- **decentralization**
  - diversity must be not just present, but also fully utilized
  - if the decision is centralized, diversity is not used at all
  - centralization is easy and efficient, but is (very often) not very effective
  - the effort necessary to reach an actual agreement beteween different points of view makes groups less efficient but much more effective
  - decentralization requires effort, effort leads to effectiveness
- **convergence mechanisms to avoid «stalling»**
  - voting, authority, negotiation
  - these mechanisms should be the «last resort», not the «normal» working of the group

# DIFFERENT KINDS OF DIVERSITY / heterogeneity

cognitive, epistemic, cultural diversity: they all are useful!



# AN EXPERIMENT ABOUT DIVERSITY AWARENESS

- about 300 people were asked to discuss, in small group, homicide cases
- each group member was given some info that was only known to him / her, and nobody else, plus some other info known to all members

- 1) IN SOME GROUPS all members knew that every member had some exclusive knowledge, and were aware of its potential usefulness

- 2) IN OTHER GROUPS, members were unaware of such different potential contributions among them

- in the first case, groups become much more effective in sharing information and allowing the «exclusive» information to emerge: **PERFORMANCE INCREASES**

- in the second case, groups focused much more on the info that everyone possess (the «public» information), and struggled to allow the «exclusive» («private») information to emerge

# THE IMPORTANCE OF METHODOLOGICAL AWARENESS

Members need to be able to reciprocally recognize the validity and specificity of each others' expertise

**IT IS IMPORTANT THAT THE LEADER EMPHASIZES THE DIFFERENCES AND THEIR VALUE**

- in order to decrease individual overconfidence
- in order to help dissenters and minorities to express themselves and decrease self-censorship

**THE RELEVANCE OF METHODOLOGICAL AWARENESS IS A GENERAL ONE**

**when individuals understand WHY they are using a certain technique for group deliberation, such technique becomes much more effective**

**WHY?**

# WHY METHODOLOGICAL AWARENESS IS USEFUL

when group members are methodologically aware (they know the purpose, the rationale, the benefits, the mechanisms of the techniques they are using in group interaction), the usefulness of such techniques improve because:

1. **MA Reduces Ritualism and Symbolic Use**
   - When people apply a technique without understanding its purpose, it often becomes ritualistic or performative
2. **MA Promotes Intentional and Adaptive Use**
   - Awareness allows group members to adapt techniques to context, instead of applying them mechanically
3. **MA Encourages Participation and Ownership**
   - Understanding why a tool is used fosters psychological engagement and increases perceived legitimacy
4. MA Enables Meta-Cognition and Group Learning
   - Methodological awareness promotes meta-cognitive reflection: groups can think about how they think and make decisions.

# WHAT IF SUFFICIENT DIVERSITY IS NOT AVAILABLE?

## ROLE PLAYING: De Bono's 6 thinking hats

# ROLE PLAYING: why it's useful

- **Increasing Cognitive Diversity**
  - role playing pushes people to think and act in diverse ways, so that the natural homogeneity of group members can be to some extent reduced by overriding individual **default thinking patterns**
- **Disrupting Role Lock-in**
  - homogeneous groups often fall into **stable interaction patterns** (e.g., one member always criticizes, another always supports etc)
  - with role playing, these **habitual roles are disrupted**, giving everyone license to explore unfamiliar modes of thinking
- **Protecting Minority Views**
  - the method **institutionalizes dissent** (via the Black Hat) and **creativity** (via the Green Hat), thereby **creating cognitive "permission"** to question or innovate

# ROLE PLAYING: different implementation methods

- **SYNCHRONOUS MODE ("Same Hat at the Same Time")**
  - All group members "wear" the same hat for a set time. The facilitator controls the transitions (e.g., “Let’s all put on our Black Hats now”).
- **Best for:**
  - **Large groups**, or groups unfamiliar with the method
  - Teams that tend toward **conflict or status games** (it reduces adversarial dynamics)
  - **Structured evaluations** (e.g., project assessments, strategic planning).
- **Advantages:**
  - Easy to **facilitate** and follow
  - Promotes **shared focus** and alignment
  - Encourages **thoroughness** by forcing exploration of each perspective
- **Drawbacks:**
  - Can feel **rigid or artificial** to creative or fast-moving teams
  - Risk of **conformity within a hat phase**

# SYNCHRONOUS MODEL: an example

- **Define the Problem Clearly** (Blue Hat)
  - The facilitator introduces the issue and sets the goals
- **Explore the Facts** (White Hat)
  - Participants list known facts, data, and information gaps
- **Share Reactions/Intuition** (Red Hat)
  - Each person states their emotional response (no justification needed)
- **Identify Risks and Pitfalls** (Black Hat)
  - Participants explore flaws, risks, potential failures, worst case scenarios
- **Explore Positive Possibilities** (Yellow Hat)
  - Focus on strengths, advantages, benefits, best-case scenarios
- **Generate New Ideas** (Green Hat)
  - Think divergently, propose alternatives or lateral ideas
- **Reflect and Decide** (Blue Hat again)
  - Summarize, reflect on outcomes, and plan next steps

# ROLE PLAYING: different implementation methods (2)

- **ASYNCHRONOUS (ROLE-BASED) MODE ("one hat per person")**
  - Each participant is assigned a specific hat and **remains in that role throughout** the discussion
- **Best for:**
  - **Small, more homogeneous groups**
  - Teams with **dominant voices or groupthink risk**
  - **Brainstorming sessions** needing diversity of views
- **Advantages:**
  - Forces **divergent thinking** even in homogeneous teams
  - Encourages **participation from quieter members** (e.g., assigning Green Hat to introverts)
  - Stimulates **debate and discovery** without personal conflict
- **Drawbacks:**
  - Can crystallize roles or limit **cognitive and empathic flexibility**
  - Requires clear instructions and practice to avoid caricature

# ROLE PLAYING: different implementation methods (3)

- **ROTATIONAL MODE ("One Hat at a Time per Person, Changing Roles")**
  - Each individual takes on a different hat during different phases of the discussion (e.g., round-robin), rotating through multiple roles
- **Best for:**
  - **Advanced users** or reflective teams
  - Teams exploring **complex, ambiguous problems** where perspective-taking is essential
- **Advantages:**
  - Builds **empathy and critical flexibility**
  - Reduces risk of **over-identification** with a single mode of thinking
  - Exposes individuals to **the full cognitive range**
- **Drawbacks:**
  - Requires **time** and strong facilitation
  - Can become **confusing** if roles are not clearly managed

# OTHER ROLE PLAYING TECHNIQUES

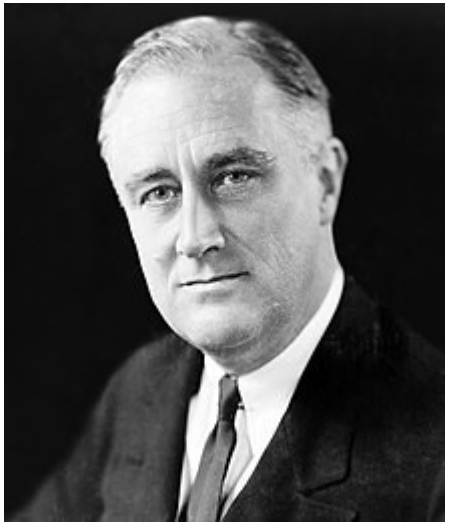
- **PERSONA-BASED ROLE PLAYING**
- **Purpose**: Generate ideas by stepping into the shoes of fictional or real users/stakeholders
- **How It Works**:
  - Participants are given detailed user personas (e.g., “Anna, 72, digital novice”).
  - They tackle the problem as if they were that person
- **SYSTEMS THINKING ROLE-PLAYING:**
- **Purpose:** Understand complex problems by assigning roles representing parts of a system
- **How It Works**:
  - Participants take on roles such as "Customer," "Supplier," "Regulator," or "Environment.“
  - They model feedback loops, unintended consequences, etc
- **STAKEHOLDER ROLE PLAYING:**
- **Purpose**: Explore conflicts and trade-offs from multiple external viewpoints
- **How It Works**:
  - Each participant plays a key stakeholder (e.g., union leader, investor, NGO, community member etc).
  - They debate, negotiate, or collaborate on the problem at hand

# DEVIL'S ADVOCATE

It's probably the most important «role», as it concern the attempt to find critical aspects, weaknesses, alternatives to the current consensus

Robert Kennedy and Ted Sorensen played devil's advocate during the Cuban crisis in 1962

**Good leaders often play devil's advocate, or appoint members to explicitely play that role**



Theodore Roosvelt's trick:

- sometimes, he privately suggested his agreement to members of his group with diverging opinions
- that gave such members the motivation and confidence to express openly their ideas and to give the group their best arguments (because they thought that the President was on their side)
- thus, members were more encouraged to play each other's devil advocate

# «RED TEAMING»: the collective devil's advocate

Red-Teaming refers to the deliberate assignment of a group (the "red team") to **challenge assumptions, stress-test plans, identify vulnerabilities, and simulate adversarial or alternative perspectives** (especially when a certain perspective is supported by the majority of the group).

It is widely used in military, intelligence, cybersecurity, corporate strategy, and increasingly, organizational decision-making

It's a sort of «collective devil's advocate

It helps avoiding (or decreasing the risk of):

- GROUPTHINK:
  - because red-teaming introduces dissent ina structural, formalized way, and it undermines illusions of unanimity and invulnerability
- POLARIZATION:
  - Prevents one-sided echo chambers by forcing the group to consider opposing or skeptical views

# «RED TEAMING»: example in a cybersecuirty company

## RED TEAM

- Simulated cyber attacks
- Intrusion attempts
- Insider threat
- Remote attacks from internet
- VPN based attacks
- DNS tunneling
- ICMP Tunneling
- HID Attack
- Simulated Physical intrusion to sensitive areas
- Access card copy and strength test
- Identity Spoof

## BLUE TEAM

- Identify the intrusions on alert systems.
- Identify the type of attacks
- Block the attacks before its success
- Alert the teams for reactive/ preventive action once detected.
- Activation of runbooks for the incident response.
- Activate the hunting and containment of the infected PCs
- Identify and train the physical security teams for identity spoof
- Enhance the access card security.

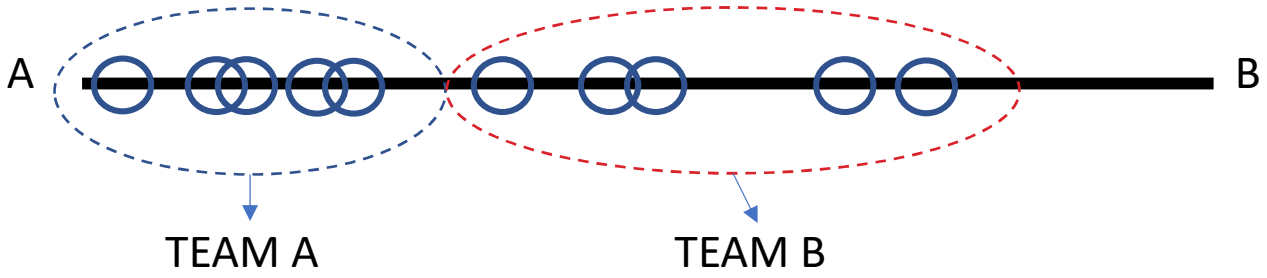
**The Red team simulates attackers trying to breach a system by looking for vulnerabilities**

**The Blue team tries to defend the system from the attack**

# REDUCING POLARIZATION THROUGH SUBGROUPS

RED AND BLUE TEAMS are a particular case of a more general approach, which is useful to decrease or avoid group polarization: creating two (or more) subgroups with the specific task of playing each other devil's advocate


One team plays the role of «Supporter of A», and the other is the «supporter of B». We will have two polarized groups, but in opposite directions, so it will be easier to generate a balanced mix of arguments for / against both options.



# Other variations of using «Sub-Groups»

- **Dialectical Inquiry through sub-groups**
  - Group is divided into two or more subgroups who develop and argue alternative solutions
  - not necessarily in stark contrast with each other (like in red-teaming)
  - This approach creates structured competition of ideas
- **Parallel sub-groups with later integration**
  - Different subgroups independently analyze the same problem before reconvening
  - avoids early anchoring and premature consensus
- **Nominal (sub-)Group Technique**
  - subgroups generate ideas in isolation, then share them without judgment
  - ideas are then ranked or evaluated through some predefined-criteria
  - minimizes influence of dominant views early in the process

- **The "CORE PRINCIPLES" are always the same**
  - disrupting reinforcement loops and conformity
  - delaying premature convergence
  - encouraging divergence
  - legitimizing and normalizing dissent

# from «divergence» to «convergence»: the DELPHI method

- The **DELPHI** method is an example of a «CONVERGENCE» mechanism for group decision making
  - the goal is to **help the group to reach a consensus** (to converge) in an effective, un-biased way
  - to **refine, select, filter, compare, evaluate** existing ideas
  - typically used in **later stages** of a decision making process
  - it is usually **time-consuming** (so, it's not great when speed is crucial)
  - it requires that involved individuals already possess a **good degree of expertise**
  - often used for forecasting and planning (but not only)

- as opposed to «**DIVERGENCE**» techniques (such as brainstorming») which are designed to help the group to generate many, different ideas, solutions, etc
  - typically used in **earlier** stages of a decision making process

# the DELPHI method: principles and process example

- **ANONYMITY** (prevents status influence and social conformity)
- **CONTROLLED FEEDBACK** (feedback allows mutual learning)
- **ITERATIVE ROUNDS** (allows revision of ideas based on feedback)
- **AGGREGATION of RESPONSES** (allows to leverage the effectiveness of collective consensus)

EXAMPLE

1. All individual are asked to express, anonymously, their estimate, and to provide their reasoning that such estimate is based on (what logic, what evidence they used etc)
2. All members can see and evaluate each other estimates and reasoning (again, anonymously)
3. Also, members are allowed to provide feedback (anonymously) to other members
4. A second round of estimate is performed.
   - This time, individuals know all other estimates, so that they may reconsider based on what they have learned from others
   - Also, they are asked to express an estimates within a more narrow range than the one that emerged in the first round (for example, within the middle quartiles)
5. Again, the new anonymous estimates are communicated to all members
6. Again, more rounds of estimates are performed (repeat step 3), so that, progressively, the group converges towards a narrow range of estimates

# Techniques for DIVERGENCE

**Key principles:**

**SEARCHING** among already available ideas

- ideas coming from other sectors / organizations and simply applying them to one's context by analogy
- ideas that were abandoned in the past and can be recuperated

**ADAPTING**

- begin from existing ideas and adapting / changing / fine-tuning them to one's context or problem

**INVENTING**

- generate completely new ideas

**GUIDELINES:**

1. **start from broad, general (but explicit) criteria of acceptability**
2. **be careful in clearly separating the divergent (creative) phase to the convergent (selective) phase (ie: do not evaluate)**
3. **insist on the sense of freedom that subjects should embrace**
4. **allow people time to re-elaborate**
5. **promote diversity of ideas**
6. **take notice / write down all emerged ideas**

# CLASSIC BRAINSTORMING

**Guidelines for brainstorming:**

***EXPRESS YOURSELF FREELY***

***POSTICIPATE EVALUATION***

***LOOK FOR QUANTITY***

***PIGGYBACK IDEAS***

**DOES IT WORK? YES, but it must be integrated with a subsequent convergent phase**

- **Research suggests that:**
- Classic brainstorming by itself does increase creativity, but not to a great extent (when compared to groups that do not follow specific instructions or guidelines)
- However, groups that use brainstorming followed by (or integrated with) an assessment phase improve much more significantly their ability to achieve solutions that are, at the same time, novel and useful (see the Crit Sessions in Pixar)

# The «SCAMPER» technique

It’s a framework to help individuals to think more creatiely and generate new ideas.
Each letter prompts a creative lens to transform an idea
Esepcially used for product innovation, process design, business model tweaking etc

| | | |
|---|---|---|
| **S** | **Substitute** | **What can be replaced?** |
| **C** | **Combine** | **What ideas/products can be merged?** |
| **A** | **Adapt** | **What can be borrowed from elsewhere?** |
| **M** | **Modify** | **What can be changed?** |
| **P** | **Put to another use** | **What are new uses for existing things?** |
| **E** | **Eliminate** | **What can be removed or simplified?** |
| **R** | **Reverse/Rearrange** | **What happens if the order or flow is flipped?** |

# the «PRE-MORTEM» technique

- A pre-mortem analysis is a **prospective thinking** technique used by teams and organizations to anticipate potential failures before they happen
- The key principles:
- **Prospective Hindsight**
  - imagining that a project or decision has already failed and then working backward to determine what potentially led to that failure
  - this activates critical thinking: finding possible issues and failures is the **explicit goal**
- **Decreasing Overconfidence**
  - Pre-mortems counteract overconfidence by making failure **salient** *and* **psychologically safe to discuss**
- **Encouragement of Dissent**
  - It encourages members to surface concerns they may otherwise suppress

Because members are discussing an **imaginary future**, it becomes easier to explore possible failures while avoiding that the exploration generate conflict

# the «PRE-MORTEM»: an application example

- **Step 1: Frame the Exercise**
  - Tell the team: “Imagine that it's 6 months from now, and our project has completely failed. It’s been a disaster. Take 10 minutes to write down all the reasons this might have happened.”
- **Step 2: Group sharing and discussion**
  - Facilitate a round where members share their failure scenarios.
  - Group them thematically (e.g., communication issues, unrealistic timelines, unclear roles, external risks, etc.)
  - Discuss what risks seem more significant and/or likely and why
- **Step 3: Prioritize Risks**
  - Use voting or another prioritization method to identify the most critical risks.
- **Step 4: Action Planning**
  - For each high-priority risk, the team brainstorms preventive actions or contingency plans

  - **Repeat periodically, especially at project milestones or when goals or other significant contextual elements change**

# the «PRE-MORTEM» examples: Nasa

- Aviation and space organizations like **NASA** and **Boeing** have long used pre-mortem-style planning to prevent catastrophic failure
  - a similar approach is used for pilots training, through simulators

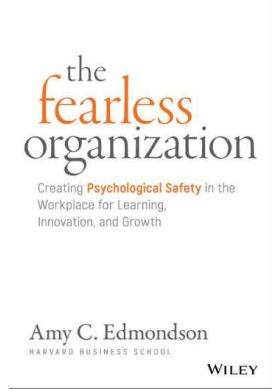
- **NASA's example:** before every major mission, NASA teams conduct what is essentially a **formalized pre-mortem**:
    - *"Let's assume the mission ends in failure. What are the possible causes?"*
    - Teams brainstorm failure scenarios from engineering (fuel leaks, telemetry failure) to organizational (miscommunication, rushed timelines)
    - They document and **simulate failures** in mission control rehearsals, exposing psychological blind spots in advance
    - NASA also uses **"Black Team" simulations**, where a subgroup plays the role of saboteurs or unforeseen systemic risk

# the «PRE-MORTEM» examples: Mayo Clinic

- Mayo Clinic is one of the most a renowned, not-for-profit medical center and research institution, globally recognized for its advanced care and cutting-edge research
- Mayo Clinic (and other top hospitals) have adopted a formal pre-mortem-style methods called **Failure Mode and Effects Analysis (FMEA)**
  - adapted from engineering and military practice.

- Before launching a new clinical protocol (e.g., introducing robotic surgery, changing ICU workflows), an **interdisciplinary team** (doctors, nurses, technicians) performs a structured pre-mortem session
- They assume the **protocol fails**, then ask:*"What are all the ways this could go wrong?", "What would be the consequences if it did?"*
- Each potential "failure" is **rated** for severity, likelihood, and detectability.

# Promoting psychological safety




**Definition of "PSYCHOLOGICAL SAFETY":** (Edmondson 1999, 2019)

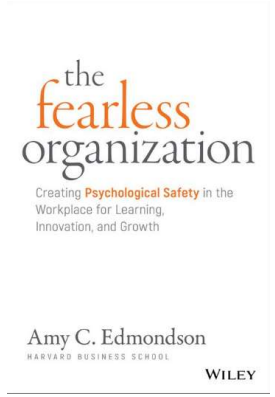
- "*A shared belief held by members of a team that the team is safe for interpersonal risk-taking*"
- **4 interpersonal risks** that psychological safety helps mitigate

| | |
|---|---|
| Being seen as **ignorant** | "If I ask a question, I'll look stupid." |
| Being seen as **incompetent** | "If I admit a mistake, people will doubt my ability." |
| Being seen as **negative** | "If I critique this plan, I'll be labeled difficult." |
| Being seen as **disruptive** | "If I suggest a different approach, I'll upset the group." |

Available studies show that:

- Teams with **higher psychological safety** are more likely to report errors, learn from them, and improve performance.
- Teams with **low psychological safety** often underreport problems, leading to poorer learning outcomes — not necessarily because they made fewer mistakes, but because they didn't talk about them

# How leaders can improve psychological safety




- according to Edmondson (2019):
- **Model Fallibility**: leaders should admit their own mistakes and uncertainties to signal that it's okay to not have all the answers
- **Invite Participation**: actively ask questions like: "*What do you think?*" "*Do you see any risks we haven't covered?*" *"Is there something we're overlooking?*" etc.
- **Respond Appreciatively to Input**: thank people who speak up, especially when they dissent, and avoid dismissiveness or punishment: "*Thanks for raising that, I hadn't considered it that way*."
- **Use Structured Methods**: anonymous feedback tools, pre-meeting surveys, or rotating "devil's advocate" roles help institutionalize safety and encourage contribution without fear

# A notable (and structured) example: Bridgewater

- Bridgewater (one of the largest hedge funds in the world) implemented a culture of "**radical transparency**"
  - all meetings are recorded, and employees rate each other's ideas and performance openly
  - dissent is not just tolerated, it's expected and formalized.
  - during meetings, they use the "Dot Collector" tool, a software that allows anonymous, structured feedback in real time, making dissent depersonalized and data-driven.
  - critique is seen as collective and developmental, not punitive.
  - **Bridgewater credits this culture for its success in managing uncertainty and avoiding consensus traps (cascades, groupthink)**

**Let's watch Ray Dalio talk about it:**

https://youtu.be/HXbsVbFAczg?si=Z-whT32Eh4zwrYO0

# a summary: what these techniques have in common?

- statistical groups
- methodological awareness
- role playing
- plussing, devil's advocates
- red teaming and subgroups
- delphi
- brainstorming
- pre-mortem analysis
- psychological safety

WHAT DO THEY HAVE IN COMMON?

WHAT ARE THE FUNDAMENTAL GOALS AND LOGIC?

WHAT ARE THE GENERAL PRINCIPLES THEY ARE BASED ON?

# THE GENERAL PRINCIPLES (1)

1. **Promoting dissent and critical thinking**
   - e.g., devil's advocate, red teaming, pre-mortem, subgroups, all are designed to counteract conformity, premature consensus, and groupthink
2. **Channeling disagreement productively while preserving cohesion and avoiding personal conflict**
   - e.g. plussing, psychological safety, Delphi etc
3. **Promoting cognitive / epistemic / cultural diversity**
   - e.g. role playing, red-teaming, sub-groups etc
4. **Promoting learning**
   - e.g. pre-mortems, role playing, sub-groups (and all the other ...)
5. **Separating different phases: idea generation (divergence) from idea evaluation and selection (convergence)**
   - e.g. Delphi, brainstorming etc

# THE GENERAL PRINCIPLES (2)

6. **Reducing status and hierarchy effects**
   - e.g Delphi, red-teaming
7. **Externalizing reasoning and assumptions**
   - e.g. Devils' advocate, role-playing, red-teaming etc
8. **Slowing down decision-making**
   - e.g. all of them to some extent, but especially pre-mortem
9. **Creating "psychological distance" from ego and identity**
   - e.g. role playing, devil's advocate, red teaming
10. **Emphasizing the relevance of the process (the methodology)**
    - all of them

**SO, IF THE METHDOLOGY IS SO IMPORTANT, WHO SHOULD HAVE THE METHODOLOGICAL RESPONSIBILITY? let's talk about LEADERSHIP**