Organizational structure and the aggregation of individual-level beliefs
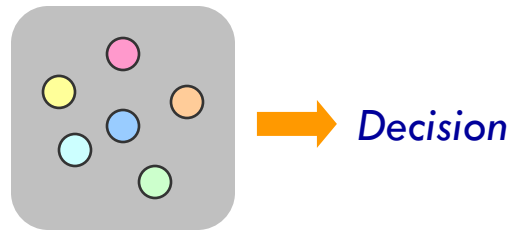
Felipe Csaszar

U. of Michigan – Strategy Department

Organization Science Winter Conference
February 8, 2013

What is information aggregation

- Anytime *N* individual-level opinions are converted into one organization-level decision


- Consistent with central concepts of the Carnegie tradition

  - Organizations as information processing devices

  - Organizational structure as
    who reports to whom + process used to make decisions

Why information aggregation is relevant

- Information aggregation is pervasive:
    - TMTs, boards of directors, partners in a VC fund

- Particularly pervasive in strategic decision-making:
    - The more relevant a decision, the more likely that that decision will not be made by a single individual

- Allows to compare the performance of very different organizational structures:
    - Hierarchies, Committees, Markets, Individuals

- Sheds light on important open questions:
    - Rumelt, Schendel, and Teece (1994:42): one fundamental question of strategy is *how* firms make decisions
    - Finkelstein, Hambrick, and Cannella (2009:115): there is a huge gulf between executive characteristics and organizational outcomes

"How organizational structure can compensate for flawed mental representations"
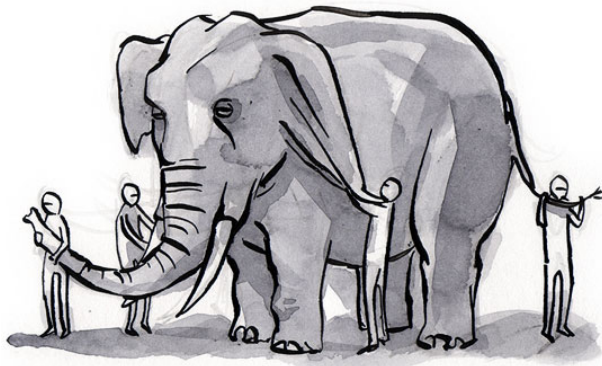
Blind men and the elephant

CEO of car co.

I am not an expert in either Marketing or Engineering. What should I do?

- Do what the most relevant VP is telling me? (**Delegation**)
- Approve only if both agree? (**Unanimity**)
- Average their opinions? (**Averaging**)

This project will be a **great success**

VP Marketing

This project will be a moderate failure

VP Engineering

Research questions

1. Which decision-making structure is most appropriate for which environment?

2. Are there situations where a structure employing individuals with flawed mental representations can perform as well as an individual with a correct mental representation?

3. The opposite: Are there situations where the only way to achieve high performance is by relying on individuals with the correct mental representation?
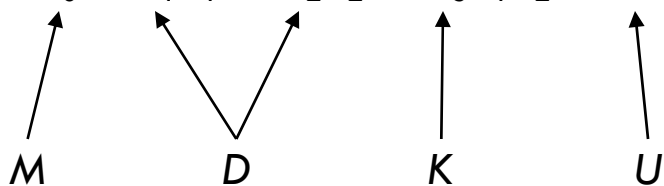
Model

Egon Brunswik

1 **Environment**

2 **Projects**
(that have characteristics)

3 **Individuals**
(that have mental representations and have opinions about the projects)

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_1 x_2 + \varepsilon$$

x_1

x_2

$$y^A = \beta_0^A + \beta_1^A x_1 + \varepsilon$$

$$y^B = \beta_0^B + \beta_2^B x_2 + \varepsilon$$

Individuals estimate their mental representation based on the N projects they have seen in the past (N = experience)

M (munificence)   D (dominance)   K (complexity)   U (uncertainty)

4 **Structures**
(that aggregate opinions)

5 **Organizational Performance**

Delegation: approve if ($D<0$ and $\hat{y}_A>0$)
or if ($D\geq0$ and $\hat{y}_B>0$)

Unanimity: approve if $\hat{y}_A>0$ and $\hat{y}_B>0$

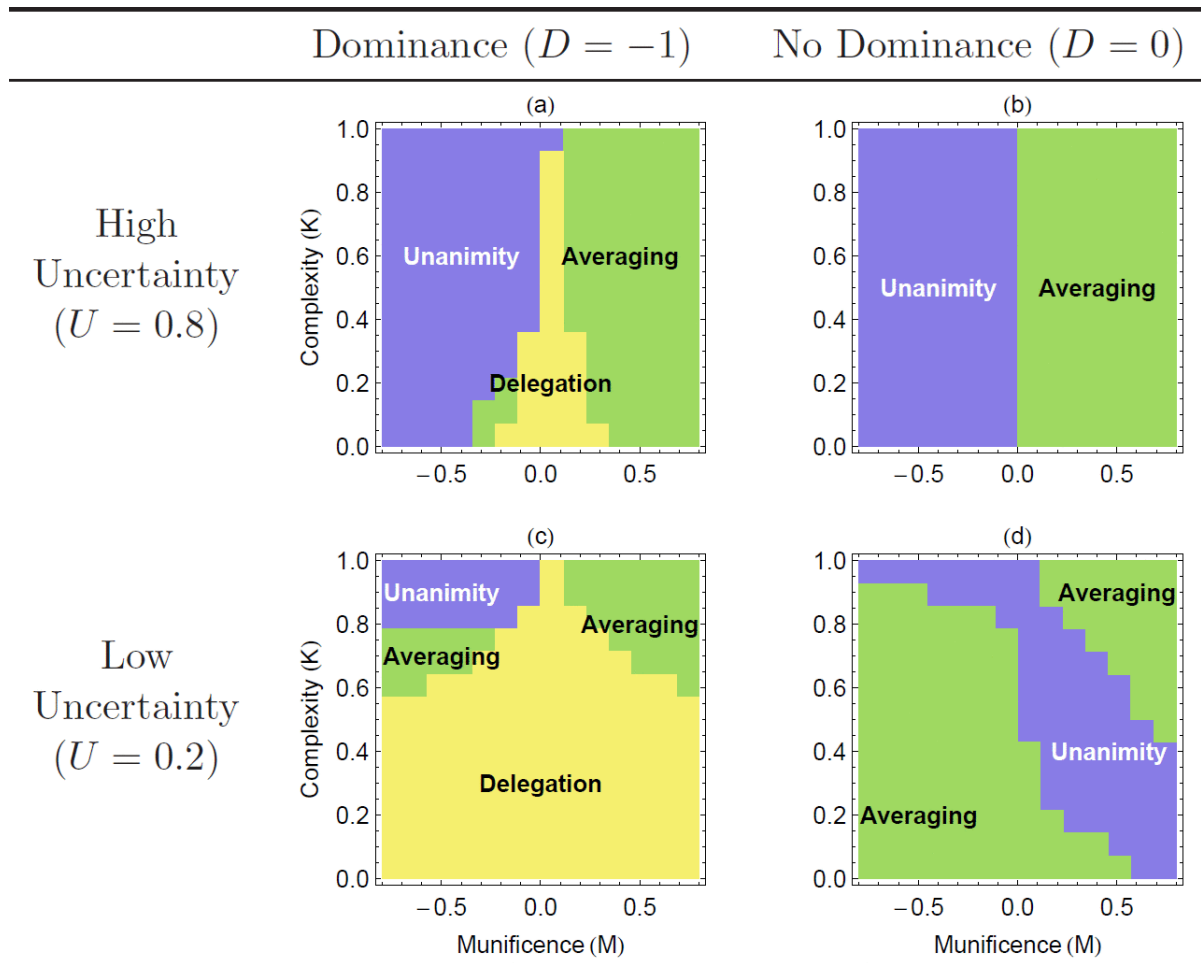**Averaging:** approve if $(\hat{y}_A + \hat{y}_B)/2 > 0$

Average quality of approved projects under a given structure s in a given environment (M,D,K,U) employing individuals with experience N
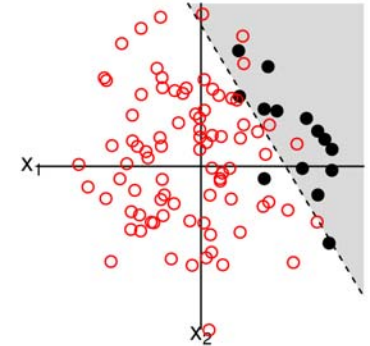
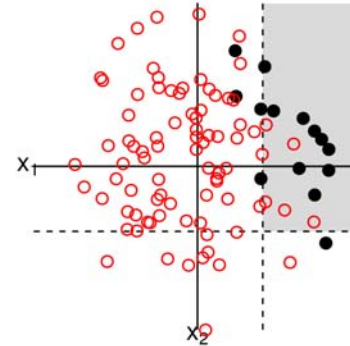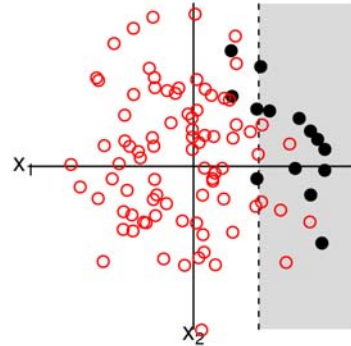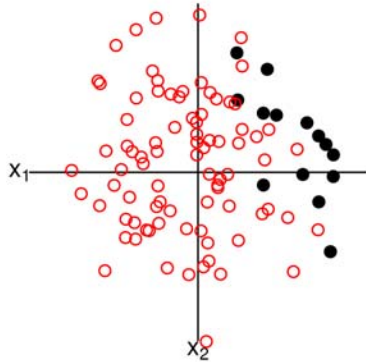$$\pi_s(M,D,K,U,N) = \frac{\sum y}{\text{\# of screened projects}}$$

6

What is the best performing structure as a function of the environment

Complex interactions, non-trivial results

What is the underlying mechanism: matching environments to structures

The environment's parameters (M,D,K,U) affect the location of good and bad projects in "project space"

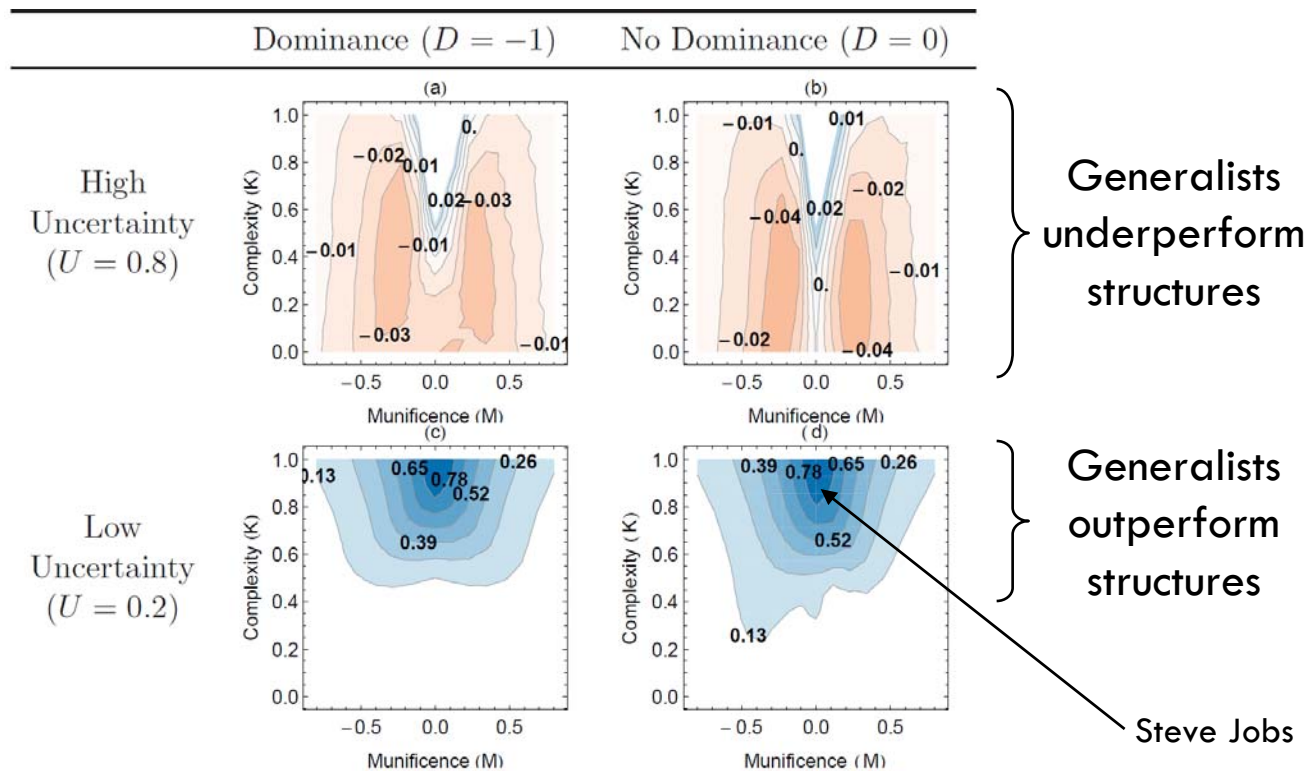Delegation   Unanimity   Averaging

A structure defines the shape of a project selection area

Performance depends on choosing the structure that makes the least errors in a given environment

Best structure	Delegation	Unanimity		Averaging		Generalist
Archetypal project space						
	One dimensional	Mostly negative	Rectangular	Mostly positive	Diagonal	Disjointed
Environmental conditions leading to such a project space	• High $|D|$ and Low U and Low/Med K	• Low M and High U	• High $|D|$ and Low U and High K and Low M	• High M and High U	• High $|D|$ and Low U and High K and High M • Low $|D|$ and Low U (unless High K and Med M)	• Low U and High K and Med M

When do generalists add value?

Generalist: individual with the right mental representation, $y^G = \beta_0^G + \beta_1^G x_1 + \beta_2^G x_2 + \beta_3^G x_1 x_2 + \varepsilon$

Generalists underperform structures

Generalists outperform structures

Steve Jobs

Conclusions

1. There are some non-trivial interactions between the environment, decision-making structure, and mental representations

2. In many cases, structures can fully compensate for flawed mental representations

3. In some cases (low U, high K, and medium M) only generalists can achieve high performance

4. Information aggregation is a promising and underexplored research avenue