Leadership and Decisions: Managing Tradeoffs

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PKAL Summer Institute
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Three Approaches

• Normative (idealized math)
• Descriptive (empirical behavior)
• Prescriptive (practical advice)
Two Decision-Making Axioms

• Transitivity:
  If prefer A to B and B to C, then …?

• Independence of Irrelevant Alternatives:
  If prefer A to B, then C becomes possible, the new best should be either…?
An Effective Decision Making Approach

- It focuses on what’s important
- It is logical and consistent
- It acknowledges both subjective and objective factors
- It blends analytical with intuitive thinking
- It requires only as much information and analysis as is necessary
- It encourages and guides the gathering of relevant information and informed opinion
- It is straightforward, reliable, easy to use, and flexible
One such process is due to Hammond, Keeney, & Raiffa
The Elements of “Smart Choices”

<table>
<thead>
<tr>
<th>Elements</th>
<th>Abbreviation</th>
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</thead>
<tbody>
<tr>
<td>Problem</td>
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<td>Objectives</td>
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<td>Consequences</td>
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<td>Tradeoffs</td>
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</tbody>
</table>
The Elements of “Smart Choices”

- Problem
- Objectives
- Alternatives
- Consequences
- Tradeoffs
- Uncertainty
- Risk Tolerance
- Linked Decisions

Certainty

Uncertainty

Uncertainty
Eight Keys to Effective Decision Making

- Work on the right decision problem
- Specify your objectives
- Create imaginative alternatives
- Understand the consequences
- Grapple with your tradeoffs

- Clarify your uncertainties
- Think hard about your risk tolerance
- Consider linked decisions
How to use the PrOACT Approach

• Cycle quickly through the eight elements
• Organizing your decision this way may resolve it
• Focus thinking on the critical elements
• Following this advice does not guarantee
  – a smart choice or
  – a good consequence
  – but it certainly helps.
Problem

Objectives
Alternatives
Consequences
Tradeoffs

Uncertainty
Risk Tolerance
Linked Decisions
Working on the Right Problem

• The way you state your problem frames your decision
• Posing the right problem drives everything else
  – The alternatives you consider
  – The way you evaluate them
  – What information you seek
• The way you state your problem frames your decision
• Posing the right problem drives everything else
  – The alternatives you consider
  – The way you evaluate them
  – What information you seek

• A good solution to a well-developed frame is better than an excellent solution to a poorly developed frame
Triggering Events

Why this problem now?
Does the trigger distort the problem that you should be addressing?
Are the constraints really applicable?
Is the scope not too large and not too small?
Be Flexible

• Don’t get locked into your initial perception of your problem
• Be flexible enough to re-frame your problem as you go along
• Now may be the time you should be creative
Learning from Others

- Think hard alone before getting the advice of others
- How is this problem related to other problems?
- How have others formulated similar problems?
• Einstein: “In the middle of difficulty lies opportunity.”

• No matter how bad the “problem” seems to be always ask yourself:
  – What can I gain from this situation?
  – What are the opportunities here?
Objectives: The Basics

- Objectives express what you are trying to achieve
Objectives: The Basics

- Objectives express what you are trying to achieve
- Objectives play a central role ("value-focused thinking")
  - If you don’t care, you don’t have a problem
  - If you don’t know where you’re going, you might end up somewhere else
Why Study Objectives

- Gets you to understand yourself
- Gets you to properly frame and scope your decision problem
- Gets you to generate creative alternatives
- Gets you to evaluate alternatives
What are objectives?

Objectives

- Interests
- Wish List
- Fears
- Wants
- Needs
Let Your Objectives Be Your Guide

- The process of thinking through and writing down your objectives goes a long way towards making a smart choice
- Objectives guide all phases of the decision making process (including what information to seek and what other people to involve)
Let Your Objectives Be Your Guide

- Objectives can help you explain your choice to others
- Objectives determine a decision’s importance and, consequently, how much time and effort it deserves
The Art of Identifying Objectives

- **Step 1:** Write down all the concerns (interests, fears, hopes) you hope to address through your decision
- **Step 2:** Convert your concerns into succinct objectives (verb + object)
- **Step 3:** Separate ends from means to establish your fundamental objectives
- **Step 4:** Clarify what you mean by each objective
- **Step 5:** Test your objectives to see if they capture your interests
Techniques to Identify Objectives

- Create a wish list
- Think about alternatives
- Describe problems and shortcomings
- Imagine possible consequences
- Identify goals, constraints and guidelines
- Consider different perspectives
- Think about strategic objectives
- Use generic objectives
- Structure your objectives
Objectives, Goals, Constraints

• An **objective** is a statement of something that one desires to achieve

• A **goal** sets a level or a standard with respect to a particular objective

• A **constraint** is a standard used to screen out unacceptable alternatives
Means and Ends

- Means objectives are important since they help to achieve other objectives
- Means objectives can be used to create alternatives
- Fundamental objectives are important because they capture what you ultimately care about
- Only fundamental objectives should be used to evaluate and compare alternatives
- Always ask yourself: *why* do I care about this?
Example: Fundamental Objectives Related to Distance Education

Exercise: Propose some fundamental (or evaluative) objectives.

Example: Fundamental Objectives Related to Distance Education

- Maximize product **quality**
- Minimize **cost**
- Minimize **time** to receive product
- Minimize **time spent**
- Maximize **enjoyment**
- Maximize **privacy**
- Minimize **environmental impact**
- Maximize **convenience and access**

Example: Means-Ends Objectives Network for Internet Commerce

- **Product Availability**
- **Product Variety**
- **Ease of Use**
- **Access to Information**
- **Comparison Shopping**
- **Product Information**
- **Impulsive Buying**
- **Better Purchase Choices**
- **Reliable Delivery**
- **Accuracy of Transaction**
- **Fraud**
- **System Security**
- **Misuse of Credit Card**
- **Misuse of Personal Information**
- **Personal Interaction**
- **Personal Travel**

**Fundamental Objectives To Maximize Customer Satisfaction**

- Product Quality
- Cost
- Time to Receive Product
- Convenience
- Time Spent
- Privacy
- Shopping Enjoyment
- Safety
- Environmental Impact
Final Advice about Objectives

- Objectives are personal
- Fundamental objectives for similar problems should remain relatively stable over time
- If you feel uncomfortable with a decision you might have overlooked an important objective
Problem
Objectives
Alternatives
Consequences
Tradeoffs
Uncertainty
Risk Tolerance
Linked Decisions
Alternatives

- Alternatives are the potential choices for pursuing your objectives.
- Two important facts about alternatives:
  - You can’t choose an alternative you haven’t considered
  - No matter how many alternatives you have, your chosen alternative can be no better than the best of the lot.
How to Generate Better Alternatives

• Use your objectives - ask “How?”
• Challenge constraints
• Set high aspirations
• Do your own thinking first
How to Generate Better Alternatives

• Use your objectives - ask “How?”
• Challenge constraints
• Set high aspirations
• Do your own thinking first
• Learn from experience
• Ask others for suggestions
• Give your subconscious time to operate
• Create alternatives first, evaluate them later
• Never stop looking for alternatives
Some Special Alternatives

• Process alternatives (e.g., to insure fairness)
• Win-win alternatives
• Information-gathering alternatives
• Time-buying alternatives
• Insurance and hedging
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</table>
Understand the Consequences

• To compare decision alternatives you need to describe their consequences on each objective
• Make sure that you really understand all consequences before you make a choice
Understand the Consequences

• Thinking hard about the consequences will help you
  – understand and maybe refine your problem
  – further develop your objectives
  – think through inevitable tradeoffs
  – make a smart choice
Pitfalls in Describing Consequences

- Be careful about placing too much trust in numbers.
- Only certain kinds of conclusions can be drawn from certain scales.
- What is the average word of all the words in the dictionary? Is St. Louis cooler or warmer than Boston? What is your GPA?
Consequences

• Knowing where you want to go (objectives) and having means to get there (alternatives) allows you to describe and understand your destinations

• Lay out all consequences in a matrix that describes how each alternative performs on each objective
## Consequences Table: Objectives by Alternatives

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>Alt. 1</th>
<th>Alt. 2</th>
<th>Alt. 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obj. 1</td>
<td>C-11</td>
<td>C-12</td>
<td>C-13</td>
</tr>
<tr>
<td>Obj. 2</td>
<td>C-21</td>
<td>C-22</td>
<td>C-23</td>
</tr>
<tr>
<td>Obj. 3</td>
<td>C-31</td>
<td>C-32</td>
<td>C-33</td>
</tr>
<tr>
<td>Obj. 4</td>
<td>C-41</td>
<td>C-42</td>
<td>C-43</td>
</tr>
</tbody>
</table>
Consequences Table

- A consequences table summarizes all consequences
- A consequences table is extremely useful to describe the “essence” of the decision problem
Building a Consequences Table

- **Step 1:** Mentally put yourself into the future
- **Step 2:** Create a free-form description of the consequences of each alternative
- **Step 3:** Eliminate any clearly inferior alternatives
- **Step 4:** Organize descriptions of remaining alternatives into a consequences table
## Example: Consequences Table (1)

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Job A</th>
<th>Job B</th>
<th>Job C</th>
<th>Job D</th>
<th>Job E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly salary</td>
<td>$2,000</td>
<td>$2,400</td>
<td>$1,800</td>
<td>$1,900</td>
<td>$2,200</td>
</tr>
<tr>
<td>Flexibility of work schedule</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business skills development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacation (annual days)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benefits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enjoyment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<tr>
<td>Flexibility of work schedule</td>
<td>Moderate</td>
<td>Low</td>
<td>High</td>
<td>Moderate</td>
<td>None</td>
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<td>Computer</td>
<td>Manage people, computer</td>
<td>Operations, computer</td>
<td>Organization</td>
<td>Time management, multiple tasking</td>
</tr>
<tr>
<td>Vacation (annual days)</td>
<td>14</td>
<td>12</td>
<td>10</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Benefits</td>
<td>Health, dental, retirement</td>
<td>Health, dental</td>
<td>Health</td>
<td>Health, retirement</td>
<td>Health, dental</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>Great</td>
<td>Good</td>
<td>Good</td>
<td>Great</td>
<td>Boring</td>
</tr>
</tbody>
</table>
Measurement Scales

- You need to know how well you achieve your objectives
- Some objectives can be expressed on natural scales (e.g. dollars, %, days, …)
- A “proxy” is closely related to the real objective (e.g. emissions rather than impacts on health)
- Sometimes scales must be carefully constructed (e.g. aesthetics)
The Art of Describing Consequences

• Use common scales.
• Don’t just rely on hard data. Don’t let the hard drive out the soft. Aesthetics, fun, … also count.
• Use experts wisely.
• Use the appropriate level of precision.
Problem
Objectives
Alternatives
Consequences
*Tradeoffs*

Uncertainty
Risk Tolerance
Linked Decisions
Tradeoffs Among Conflicting Objectives

• Making wise tradeoffs is one of the most important and most difficult challenges in decision making.

• It requires basic judgments.
Grapple With Your Tradeoffs

• Usually no one alternative outperforms all others on each objective
Grapple With Your Tradeoffs

- Finding the best (albeit not perfect) alternative requires tradeoffs
Grapple With Your Tradeoffs

• Tradeoffs depend on how you prioritize your objectives
• Multiple objectives, criteria, attributes make life interesting.
Dominated Alternatives

An alternative is *dominated* if there exists another alternative that is conditionally better on all evaluative objectives.

Or slightly weaker: … another alternative that is at least as good on all evaluative objectives and better on some.

*Dominated Alternatives are non-contenders*
## Consequence Table: Conditional Rankings

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>Alt 1</th>
<th>Alt 2</th>
<th>Alt 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obj 1</td>
<td>1</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Obj 2</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Obj 3</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Obj 4</td>
<td>1.5</td>
<td>3</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Alt-3 dominates Alt-2: Alt-2 is a non-contender
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</table>

There is a tie on Obj-4; Eliminate Obj4
### Consequence Table: Conditional Rankings

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>Alt 1</th>
<th>Eliminated</th>
<th>Alt 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obj 1</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
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**Reduced Consequence Table**
Find and Eliminate Dominated Alternatives

• If Alternative A is better on some objectives than alternative B and no worse on any objectives then A “dominates” B

• Eliminate dominated alternatives
  – it saves you time and effort
  – it simplifies your problem
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Example: Ranking Table for Drew Morgan’s Job Decision

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<th>Job A</th>
<th>Job B</th>
<th>Job C</th>
<th>Job D</th>
<th>Job E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Salary</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Flexibility of Work Schedule</td>
<td>2 (tie)</td>
<td>4</td>
<td>1</td>
<td>2 (tie)</td>
<td>5</td>
</tr>
<tr>
<td>Business Skills</td>
<td>4</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Vacation (annual days)</td>
<td>2</td>
<td>3 (tie)</td>
<td>5</td>
<td>1</td>
<td>3 (tie)</td>
</tr>
<tr>
<td>Benefits</td>
<td>1</td>
<td>2 (tie)</td>
<td>5</td>
<td>4</td>
<td>2 (tie)</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>1 (tie)</td>
<td>3 (tie)</td>
<td>3 (tie)</td>
<td>1 (tie)</td>
<td>5</td>
</tr>
</tbody>
</table>

Job B dominates E -- eliminate E
Example: Ranking Table for Drew Morgan’s Job Decision (Reduced)

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Job A</td>
</tr>
<tr>
<td>Monthly Salary</td>
<td>2</td>
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<tr>
<td>Enjoyment</td>
<td>1 (tie)</td>
</tr>
</tbody>
</table>
## Even Swaps: Example 1

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Franchising</th>
<th>Not Franchising</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profit (in millions)</td>
<td>$10</td>
<td>$25</td>
</tr>
<tr>
<td>Market Share</td>
<td>26%</td>
<td>21%</td>
</tr>
</tbody>
</table>
## Even Swaps: Example 1 (cont.)

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Alternatives</th>
<th></th>
<th>Not Franchising</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Franchising</td>
<td></td>
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</tr>
<tr>
<td>Profit (in millions)</td>
<td>$10</td>
<td></td>
<td>$25 $10</td>
</tr>
<tr>
<td>Market Share</td>
<td>26%</td>
<td></td>
<td>21% 24%</td>
</tr>
</tbody>
</table>
Even Swaps: Example 1 (cont.)

Graphically,

Share

*(10, 26) F

*(25, 21) NF

Profit
Even Swaps: Example 1 (cont.)

Graphically,

\[(10, 26) \text{ F} \]
\[(10, 24) \text{ MU } \sim \text{ NF} \]
\[(25, 21) \text{ NF} \]
Even Swaps

- If all alternatives perform equally well on an objective, this objective becomes irrelevant and can be eliminated
• The “Even Swaps” method makes an alternative equal in value to another alternative on one objective by changing value-equivalent amounts on another objective
Even Swaps

• Iterating through the even swaps method eliminates objectives (by “irrelevance”) and alternatives (by “dominance”)
Steps in Even Swaps

• Step 1: Determine the change necessary to cancel out an objective
Steps in Even Swaps

• Step 1: Determine the change necessary to cancel out an objective

• Step 2: Assess what change in another objective would compensate for the needed change
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• Step 1: Determine the change necessary to cancel out an objective
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• Step 3: Make the even swap
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• Step 3: Make the even swap
• Step 4: Cancel out the now-irrelevant objective
Steps in Even Swaps

- Step 1: Determine the change necessary to cancel out an objective
- Step 2: Assess what change in another objective would compensate for the needed change
- Step 3: Make the even swap
- Step 4: Cancel out the now-irrelevant objective
- Step 5: Eliminate the dominated alternative
### Even Swaps: Example 2

#### Choice of an office

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Parkway</th>
<th>Lombard</th>
<th>Baranov</th>
<th>Montana</th>
<th>Pierpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute (min.)</td>
<td>45</td>
<td>25</td>
<td>20</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>Client access (%)</td>
<td>50</td>
<td>80</td>
<td>70</td>
<td>85</td>
<td>75</td>
</tr>
<tr>
<td>Office services (constructed)</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>A</td>
<td>C</td>
</tr>
<tr>
<td>Office size (sq. ft.)</td>
<td>800</td>
<td>700</td>
<td>500</td>
<td>950</td>
<td>700</td>
</tr>
<tr>
<td>Monthly cost (dollars)</td>
<td>1,850</td>
<td>1,700</td>
<td>1,500</td>
<td>1,900</td>
<td>1,750</td>
</tr>
</tbody>
</table>
### Even Swaps: Example 2 (cont.)

#### Rankings

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Parkway</th>
<th>Lombard</th>
<th>Baranov</th>
<th>Montana</th>
<th>Pierpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commute (min.)</td>
<td>5</td>
<td>2 (tie)</td>
<td>1</td>
<td>2 (tie)</td>
<td>4</td>
</tr>
<tr>
<td>Client access (%)</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Office services (constructed)</td>
<td>1 (tie)</td>
<td>3</td>
<td>4 (tie)</td>
<td>1 (tie)</td>
<td>4 (tie)</td>
</tr>
<tr>
<td>Office size (sq. ft.)</td>
<td>2</td>
<td>3 (tie)</td>
<td>5</td>
<td>1</td>
<td>3 (tie)</td>
</tr>
<tr>
<td>Monthly cost (dollars)</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

Note: Lombard dom Pierpoint; and M is clearly better than Parkway.
## Even Swaps: Example 2

### Reduction 1

<table>
<thead>
<tr>
<th>Objectives</th>
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<th>Baranov</th>
<th>Montana</th>
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### Even Swaps: Example 2

#### Reduction 2

<table>
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<td>1,500</td>
<td>1,900</td>
</tr>
</tbody>
</table>

### Objectives Lombard Baranov Montana

- **Client access (%)**
  - Lombard: 80
  - Baranov: 70
  - Montana: 85

- **Office services (constructed)**
  - Lombard: B
  - Baranov: C
  - Montana: A

- **Office size (sq. ft.)**
  - Lombard: 700
  - Baranov: 500
  - Montana: 950

- **Monthly cost (dollars)**
  - Lombard: 1,700
  - Baranov: 1,500
  - Montana: 1,900
### Even Swaps: Example 2
### Reduction 3

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Lombard</th>
<th>Montana</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Client access (%)</td>
<td>80</td>
<td>85</td>
</tr>
<tr>
<td>Office size (sq. ft.)</td>
<td>700</td>
<td>950</td>
</tr>
<tr>
<td>Monthly cost (dollars)</td>
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<td>1,900</td>
</tr>
<tr>
<td></td>
<td>1,950</td>
<td>1,800</td>
</tr>
</tbody>
</table>

Now eliminate Office Size. Montana Dominates!
Practical Advice for Making Even Swaps

• Make the easier swaps first
• Concentrate on the amount of the swap, not on the perceived importance of the objective
• Value an incremental change based on what you start with
• Seek out information to make informed swaps
• Practice
Dear Sir,

In the affair of so much importance to you, wherein you ask my advice, I cannot, for want of sufficient premises advise you what to determine, but if you please I will tell you how.
<table>
<thead>
<tr>
<th>PRO</th>
<th>CON</th>
</tr>
</thead>
<tbody>
<tr>
<td>aaaaaaa</td>
<td>qqqqqq</td>
</tr>
<tr>
<td>bbbbbbbb</td>
<td>ssssss</td>
</tr>
<tr>
<td>ccccccccccc</td>
<td>ttttttt</td>
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<td>uuuuuuuuu</td>
</tr>
<tr>
<td>eeeeeeeeeeeeee</td>
<td>vvvvvvvv</td>
</tr>
<tr>
<td>fffffff</td>
<td>wwwwwww</td>
</tr>
<tr>
<td>gggggggg</td>
<td>zzzzzzzzz</td>
</tr>
<tr>
<td>hhhhhhh</td>
<td></td>
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<tr>
<td>PRO</td>
<td>CON</td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------</td>
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<tr>
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<td>ttttttttt</td>
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<td>ffffffff</td>
<td>wwwwwwwww</td>
</tr>
<tr>
<td>gggggggggg</td>
<td>zzzzzzzzzz</td>
</tr>
<tr>
<td>hhhhhhhh</td>
<td></td>
</tr>
</tbody>
</table>
BF’s Advice for Choosing A over B

**PRO**

- aaaaaaaaa
- bbbbbbbb
- eeeeeeeeeeee
- ddddd
- eeeeeeeeeeeeee
- ffffffff
- ggggggggg
- hhhhhhh

**CON**

- qqqqqq
- sssssss
- tttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttttt
BF’s Advice for Choosing A over B

**PRO**
- aaaaaaa
- dddddd
- eeeeee
- hhhhhh

**CON**
- qqqqqq
- uuuuuuuuu
- wwww

Now it might be clear that the remaining pros outweigh the remaining cons.
Moral or Prudential Algebra

“And though the weight of reasons cannot be taken with the precision of algebraic quantities, yet when each is thus considered, separately and comparatively, and the whole lies before me, I can judge better, and am less liable to make a rash step, and in fact I have found great advantage from this kind of equation, in what may be called *moral or prudential algebra.*”
### BF’s Prudential Algebra vs Equal Swaps

<table>
<thead>
<tr>
<th>–PRO</th>
<th>–CON</th>
</tr>
</thead>
</table>

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