Interplay of Decision Styles and Attitudes Toward Privacy in a Large Patient Cohort

By: Sneha Lakshmanan
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DBMI Summer 2019

This research was supported by grant T15LM011271

UC San Diego
School of Medicine
Department of BioMedical Informatics
About Me

- 3rd year UC San Diego undergraduate student
- Study Biology with a specialization in bioinformatics
- Worked at a Molecular Biology lab researching the effect of mutations that are associated with cancer in vitro
- Found interest in DBMI to gain dry lab experience and learn about data analysis

This research was supported by grant T15LM011271
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Big Data

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This research was supported by grant T15LM01127.
Big Data

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Research Topic

- examine the relationship between decision styles and privacy attitudes and observe demographic variants that may affect privacy attitudes.

This research was supported by grant T15LM011271
DSS: Decision Styles Scale

- Measures the decision making process, specifically how much of a rational decision maker one is and how much of an intuitive decision maker one is.

Subscales:

- **Rational**: “characterized by a thorough search for and logical evaluation of alternatives” using facts and analysis.

- **Intuitive**: “characterized by a reliance on hunches and feelings”.

Katherine Hamilton, Shin-I Shih, Susan Mohammed

The Development and Validation of the Rational and Intuitive Decision Styles Scale

This research was supported by grant T15LM011271
1. I prefer to gather all the necessary information before committing to a decision
2. I thoroughly evaluate decision alternatives before making a final choice
3. In decision making, I take time to contemplate the pros/cons or risks/benefits of a situation
4. Investigating the facts is an important part of my decision-making process
5. I weigh a number of different factors when making decisions

1. When making decisions, I rely mainly on my gut feelings
2. My initial hunch about decisions is generally what I follow
3. I make decisions based on intuition
4. I rely on my first impressions when making decisions
5. I weigh feelings more than analysis in making decisions

This research was supported by grant T15LM011271
IUIPC: Internet Users’ Information Privacy Concerns

It measures the...

❖ “Individual’s perceptions of fairness/justice in the context of information privacy”

Subscales:

❖ **Control factor:** measures how a person feels about how much control they have over their private data

❖ **Awareness factor:** measures how a person feels about how aware they are of how their private data is being used

❖ **Collection factor:** measures how a person feels about how and how much their private data is being collected

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Naresh Malhotra, Sung Kim, James Agarwal  IUIPC: The Construct, Scale, and a Causal Model

This research was supported by grant T15LM011271
<table>
<thead>
<tr>
<th>Control</th>
<th>Awareness</th>
<th>Collection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Consumer online privacy is really a matter of consumers’ right to</td>
<td>1. Companies seeking information online should disclose the way the data</td>
<td>1. It usually bothers me when online companies ask me for personal</td>
</tr>
<tr>
<td>exercise control and autonomy over decision about how their information</td>
<td>are collected, processed, and used</td>
<td>information</td>
</tr>
<tr>
<td>is collected, used, and shared</td>
<td>2. A good consumer online privacy policy should have a clear and</td>
<td>2. When online companies ask me for personal information, I sometimes</td>
</tr>
<tr>
<td></td>
<td>conspicuous disclosure</td>
<td>think twice before providing it</td>
</tr>
<tr>
<td></td>
<td>3. It is very important to me that I am aware and knowledgeable about how</td>
<td>3. It bothers me to give personal information to so many online companies</td>
</tr>
<tr>
<td></td>
<td>my personal information will be used</td>
<td>4. I’m concerned that online companies are collecting too much personal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>information about me.</td>
</tr>
<tr>
<td>1. Consumer control of personal information lies at the heart of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>consumer privacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. I believe that online privacy is invaded when control is lost or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>unwillingly reduced as a result of a marketing transaction</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This research was supported by grant T15LM011271
PatientsLikeMe (PLM)

This research was supported by grant T15LM011271
Results

This research was supported by grant T15LM011271
Rational Total Score
Mean: 21.21/25 Max: 25
SD: 3.67 Min: 5

Intuitive Total Score
Mean: 14.76/25 Max: 25
SD: 4.29 Min: 5

This research was supported by grant T15LM011271
IUIPC Total Score
Subscale Total Score
Mean: 61/70, Max: 70
Mean: 17.32, Max: 21
SD: 8.12, Min: 10
SD: 3.73, Min: 3

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Awareness Subscale Total Score
Mean: 19.73 / 21
Max: 21
SD: 2.18
Min: 3

Collection Subscale Total Score
Mean: 23.94 / 28
Max: 28
SD: 4.55
Min: 4

This research was supported by grant T15LM011271
Rational Decision Making vs. Intuitive Decision Making

This research was supported by grant T15LM011271

- Spearman Correlation: -0.23
- P-value: < 0.001
Rational Decision Making vs Privacy Concerns (IUIPC)

- Spearman Correlation: 0.23
- P-value: < 0.001

This research was supported by grant T15LM011271
Rational Decision Making vs. Control, Awareness, Collection

- Spearman Correlation: 0.17
- P-value: < 0.001

- Spearman Correlation: 0.24
- P-value: < 0.001

- Spearman Correlation: 0.21
- P-value: < 0.001

This research was supported by grant T15LM011271
Intuitive Decision Making vs. Privacy Concerns (IUIPC)

This research was supported by grant T15LM011271
Intuitive Decision Making vs. Control, Awareness, and Collection

This research was supported by grant T15LM011271
Awareness Graphs for both Rational and Intuitive Decision Making

This research was supported by grant T15LM011271
Demographics

This research was supported by grant T15LM011271
Women: 308 | 70%
Men: 123 | 28%
Other: 4 | 0.9%

P-value = 0.0026

P-value = < 0.01

This research was supported by grant T15LM011271
Women: 308 | 70%  
Men: 123 | 28%  
Other: 4 | 0.9%

❖ P-value = 0.084

This research was supported by grant T15LM011271
Significant Kruskal-Wallis tests:

- P-value: 0.010 between $100 - $149,999 and under $25k
- P-value: 0.026 between $100 - $149,999 and $25 - $49,999
- P-value: 0.014 between $100 - $149,999 and $50 - $99,999
- P-value: 0.022 between $150 - $199,999 and under $25k
- P-value: 0.03 between $150 - $199,999 and $25 - $49,999
- P-value: 0.029 between $150 - $199,999 and $50 - $99,999

<table>
<thead>
<tr>
<th>Income</th>
<th>Count</th>
<th>N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $25k</td>
<td>116</td>
<td>26%</td>
</tr>
<tr>
<td>$25 - $49,999</td>
<td>94</td>
<td>21%</td>
</tr>
<tr>
<td>$50 - $99,999</td>
<td>109</td>
<td>25%</td>
</tr>
<tr>
<td>$100 - $149,999</td>
<td>53</td>
<td>12%</td>
</tr>
<tr>
<td>$150 - $199,999</td>
<td>23</td>
<td>5.2%</td>
</tr>
<tr>
<td>$200 - $249,999</td>
<td>6</td>
<td>1.4%</td>
</tr>
<tr>
<td>$250 - $299,999</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$300k+</td>
<td></td>
<td></td>
</tr>
</tbody>
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### Intuitive Decision Making Style Means for Education Levels

<table>
<thead>
<tr>
<th>Education</th>
<th>N(%)</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>no hs diploma</td>
<td>0.7%</td>
<td>3</td>
</tr>
<tr>
<td>hs diploma/GED</td>
<td>9.8%</td>
<td>43</td>
</tr>
<tr>
<td>some college</td>
<td>25%</td>
<td>110</td>
</tr>
<tr>
<td>2 year college</td>
<td>14%</td>
<td>62</td>
</tr>
<tr>
<td>4 year college</td>
<td>19%</td>
<td>85</td>
</tr>
<tr>
<td>some post college</td>
<td>19%</td>
<td>41</td>
</tr>
<tr>
<td>masters degree</td>
<td>16%</td>
<td>71</td>
</tr>
<tr>
<td>professional degree</td>
<td>4.1%</td>
<td>18</td>
</tr>
</tbody>
</table>

Significant Kruskal-Wallis Tests

- Completed Masters degree and completed masters degree
  - P-value 0.0024
- Completed some college and completed masters degree
  - P-value 0.0355
- Completed some college and graduated from 4-year college
  - P-value 0.0017
- Completed some college and graduated from 4-year college
  - P-value 0.0484

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## IUIPC Means for Education Levels

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<td>19%</td>
</tr>
<tr>
<td>some post college</td>
<td>41</td>
<td>9.3%</td>
</tr>
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</tr>
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<td>professional degree</td>
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**Significant Kruskal-Wallis Tests**

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<th>Count</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School Graduated</td>
<td>0</td>
<td>0.039</td>
<td>0.741</td>
<td>1.264</td>
<td>0.413</td>
</tr>
<tr>
<td>2-year college</td>
<td>0</td>
<td>0.000</td>
<td>0.787</td>
<td>0.972</td>
<td>0.416</td>
</tr>
<tr>
<td>Masters degree</td>
<td>0.668</td>
<td>0.882</td>
<td>0.107</td>
<td>0.166</td>
<td>0.000</td>
</tr>
<tr>
<td>4-year college</td>
<td>0.416</td>
<td>0.882</td>
<td>0.107</td>
<td>0.166</td>
<td>0.000</td>
</tr>
<tr>
<td>some post-college</td>
<td>0.668</td>
<td>0.882</td>
<td>0.107</td>
<td>0.166</td>
<td>0.000</td>
</tr>
<tr>
<td>professional or Ph.D</td>
<td>0.416</td>
<td>0.882</td>
<td>0.107</td>
<td>0.166</td>
<td>0.000</td>
</tr>
<tr>
<td>some college</td>
<td>0.668</td>
<td>0.882</td>
<td>0.107</td>
<td>0.166</td>
<td>0.000</td>
</tr>
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Counts:

- 18-29: 0 | 0%
- 30-39: 24 | 5.4%
- 40-49: 72 | 16%
- 50-64: 222 | 50%
- >65: 115 | 26%

Significant Kruskal-Wallis Tests

- 30-39 and >65  P-value: < 0.005
- 40-49 and >65  P-value: < 0.001
- 50-64 and 30-39 P-value: < 0.005
- 50-64 and 40-49 P-value: 0.0152

This research was supported by grant T15LM011271
Significant Kruskal-Wallis Test:

- 40-49 and >65  P-value 0.027

Counts:

- 18-29 : 0 | 0%
- 30-39 : 24 | 5.4%
- 40-49: 72 | 16%
- 50-64: 222 | 50%
- >65: 115 | 26%

This research was supported by grant T15LM011271
Significant Kruskal-Wallis Test:
- Asian and White   P-value: 0.018

Significant Kruskal-Wallis Test:
- Asian and White   P-value: 0.036
How does this help explain privacy attitudes as a whole?

This research was supported by grant T15LM011271
Decision Making and Privacy Concerns (IUIPC)

This research was supported by grant T15LM011271
Skills Learned

❖ R programming language
❖ SPSS (Statistical Package for Social Sciences)
❖ Data Analysis using R and SPSS
❖ Data Visualization techniques
❖ Statistics
❖ Communicating my results
❖ Working Collaboratively
❖ Initial research on a topic
❖ Analyzing data and interpreting results
❖ Thinking big-picture significance
❖ Problem-solving/Troubleshooting

This research was supported by grant T15LM011271
Questions?

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