



Decision Making Constructs in a Distributed Environment (DCODE)

Dr. Robert A. Fleming
SPAWAR Systems Center, San Diego

bobfleming@navy.mil

bobfleming@gmail.com *

619.553.3628

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Organization:

- **(1) Objectives**
 - DCODE Concepts/Issues
- **(2) Experiments**
 - NPG School
 - Colorado State
- **(3) Expected Final Product**
- **(4) Demos/Validations**
 - Camtasia AVIs
 - Cortex
 - HSI Lab
- **(5) Software Development**
- **(6) Publications**
- **(7) Lessons Learned**

(1) Objectives

- **Overall Objective: the development of computer-based methods for obviating the **problems of the exchange, sharing and integration of uniquely held information among decision participants in a distributed, asynchronous collaborative team environment.****
 - The project proposes an integration of EWall technologies with Knowledge Elicitation Tools and develops a simplified subjective assessment template for knowledge elicitation.
- **This year: The specific objectives for this year are (1) to complete a **“shrink-wrapped” version of the DCODE** software with (2) the appropriate **audio-visual training tools** for how to use and apply the DCODE technology and (3) **continued experimental validation** of the efficacy of the DCODE approach to individual and group decision making.**



DCODE



Decision Making Application Areas

- Information Fusion, Analysis and Situation Assessment
- Option Generation/Selection
- Course of Action (COA) Recommendations
- Consensus Building

Multiple Options, Multiple Information Items About Each Option

Two Problem Areas Addressed



The most important, high impact items



#1 How do we improve the process of getting to here...

#2 How do we form an aggregate opinion from conflicting inputs.

1000's of possible decision relevant information items....





DCODE Approach

- Improve the ability of both individual and group decision makers to:
 - Abstract
 - Encapsulate
 - Assess
 - Share
- ...all decision relevant information items.

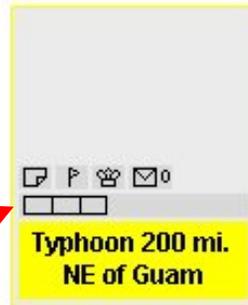
EWall & DCODE

- **EWall:** Architecture for the Abstraction, Encapsulation and Sharing of information.

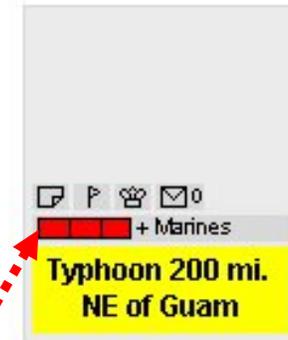
Original Document



EWall Icon



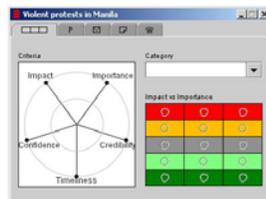
(1.5 x 2.0 in.)



Information Object (IOB)

DCODE: Process for capturing and displaying the cognitive **assessments** of each information item (“what does this mean?”)

The DCODE assessment “bar”



The DCODE assessment template

Cognitive Assessments

4 Major Categories

(1) Which Option?

e.g. SEALS, Marines, Army

(2) Impact on Option? (Color)

Very Negative Negative Positive Very Positive

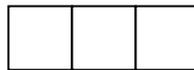
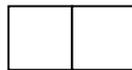


(3) Importance of Information? (Size)

Average

High

Very High

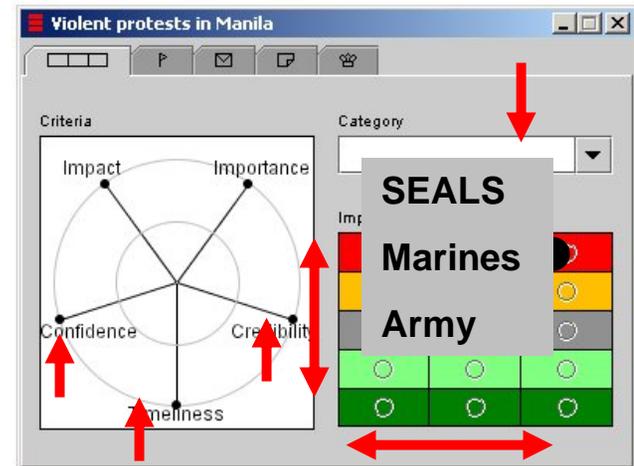
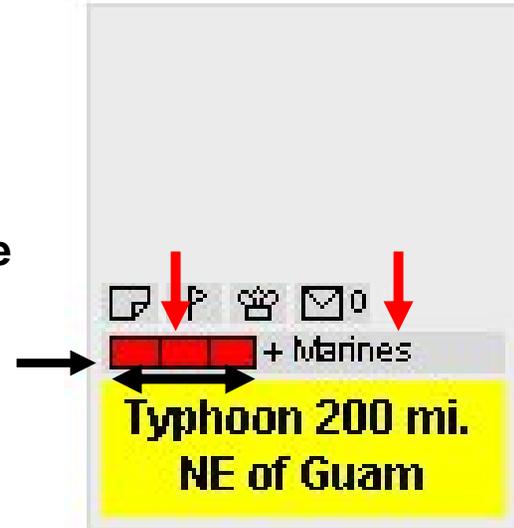


(4) Quality of Information?

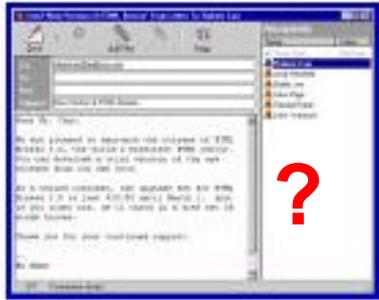
Confidence

Timeliness

Credibility



Information Abstraction, Encapsulation and Assessment



“Typhoon has serious and very negative effect on using the Marines”



Perform DCODE assmt. on IOBs that are retained for use/sharing in final decision making. **(Assessment)**



Convert candidates from original format into EWall IOBs **(Abstraction, Encapsulation)**



IOB format can be tailored to specific decision tasks

0
 + Marines
 Sep-29-04 2:22PM PST
 Fleming
Helos Grounded

Icon/Text area

Admin
DCODE Bar
Date/Time
Author
Heading

SpaceShipOne safely landed in California's Mojave Desert today, after a brief, wild ride to suborbital space. The craft rolled more than 30 times shortly after the rockets fired, but pilot Mike Melvill shut off the engines and kept going up. Radar showed the flight reached 358,000
 0

 Sep-29-04 11:06AM PST
 Jones
SpaceShip One's Flight

0
 SEALS
zodiac
7 man
15 mph

0

 Aug-17-04 2:23PM PST
 Jones
SH-60

Brown
 Cassidy
 Deward
 Kippton
 Larsen
 Longstreet
 McGuire
 Muldone
 Norris
 Porter
 Psomas
 Sander
 Wolf
 0
20 May Rpt.

0

 Aug-17-04 2:24PM PST
 Jones
Next meeting

0
 + OP "Cobra"
 Sep-29-04 11:26AM PST
 Jones
"JT" sighted arriving at LAX 2300 9/17

0
 SEALS
zodiac
7 man
15 mph

can only go 15 mph, hold 7 people
 0

 Aug-17-04 1:52PM PST
 Jones
Zodiac

0

 Aug-17-04 2:25PM PST
 Jones
Sell now

#1754 Failed equipment: Portable generator Cause: Sand grit \$9,800
 0

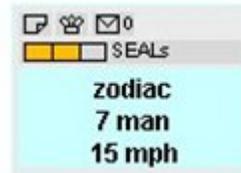
 Sep-29-04 11:11AM PST
 Jones
Possible fraudulent claim?



Sample Use of DCODE (AVI)



Why do we Recommend this IOB Configuration?



- **Display Real Estate**
- **Use of Pictures**
- **Color Conflict**

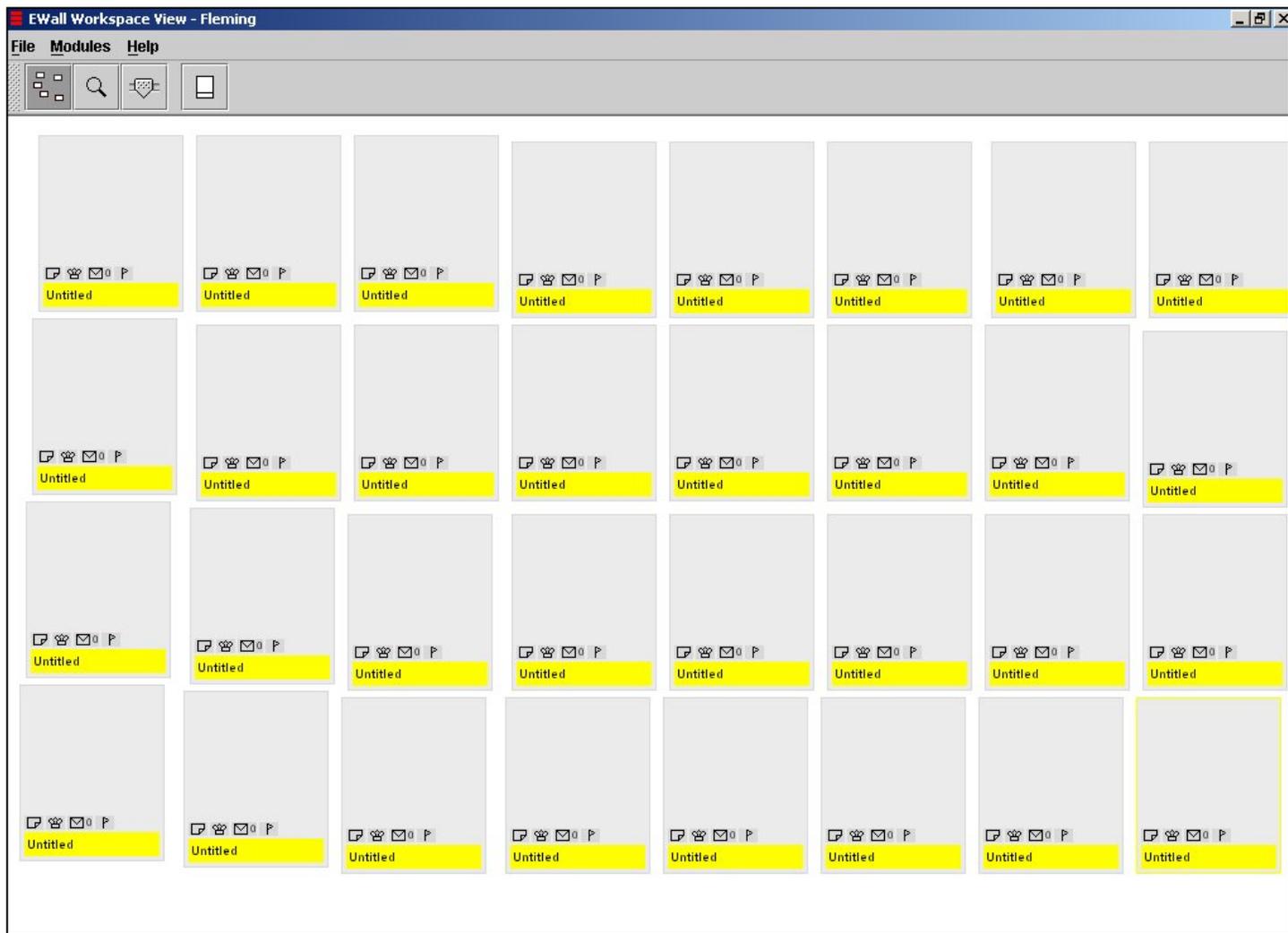


Real Estate

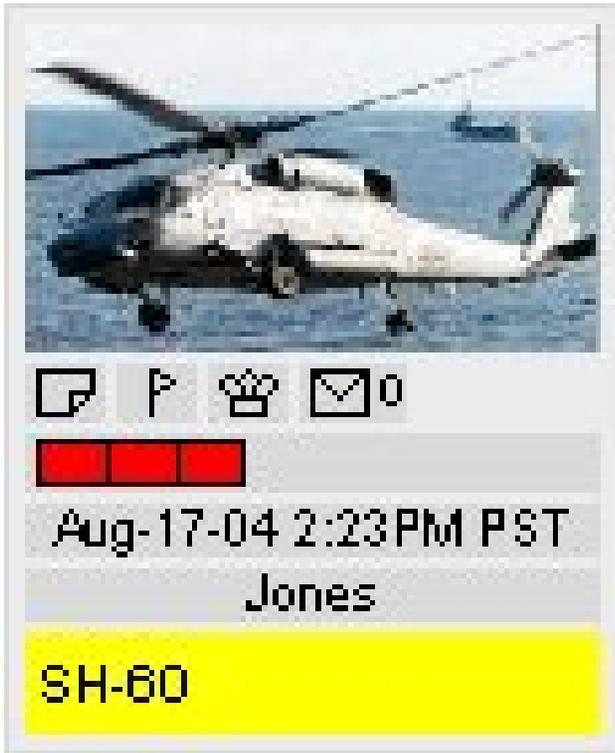
- Example: Three possible decision options, 12 relevant information items for each option. “Big Picture” requires display of **36 IOBs.**



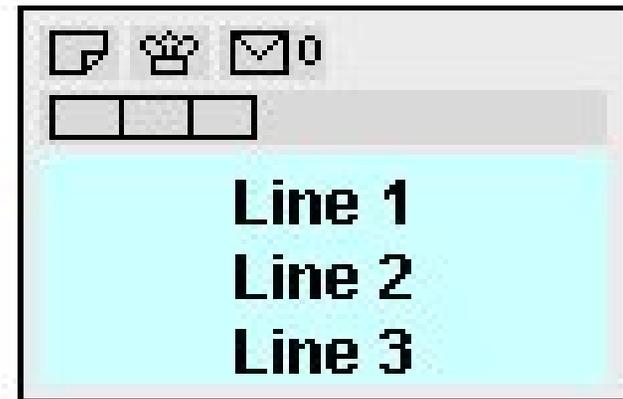
Default Cards, 32 on 1024 x 768 monitor



Reduce size/eliminate picture...



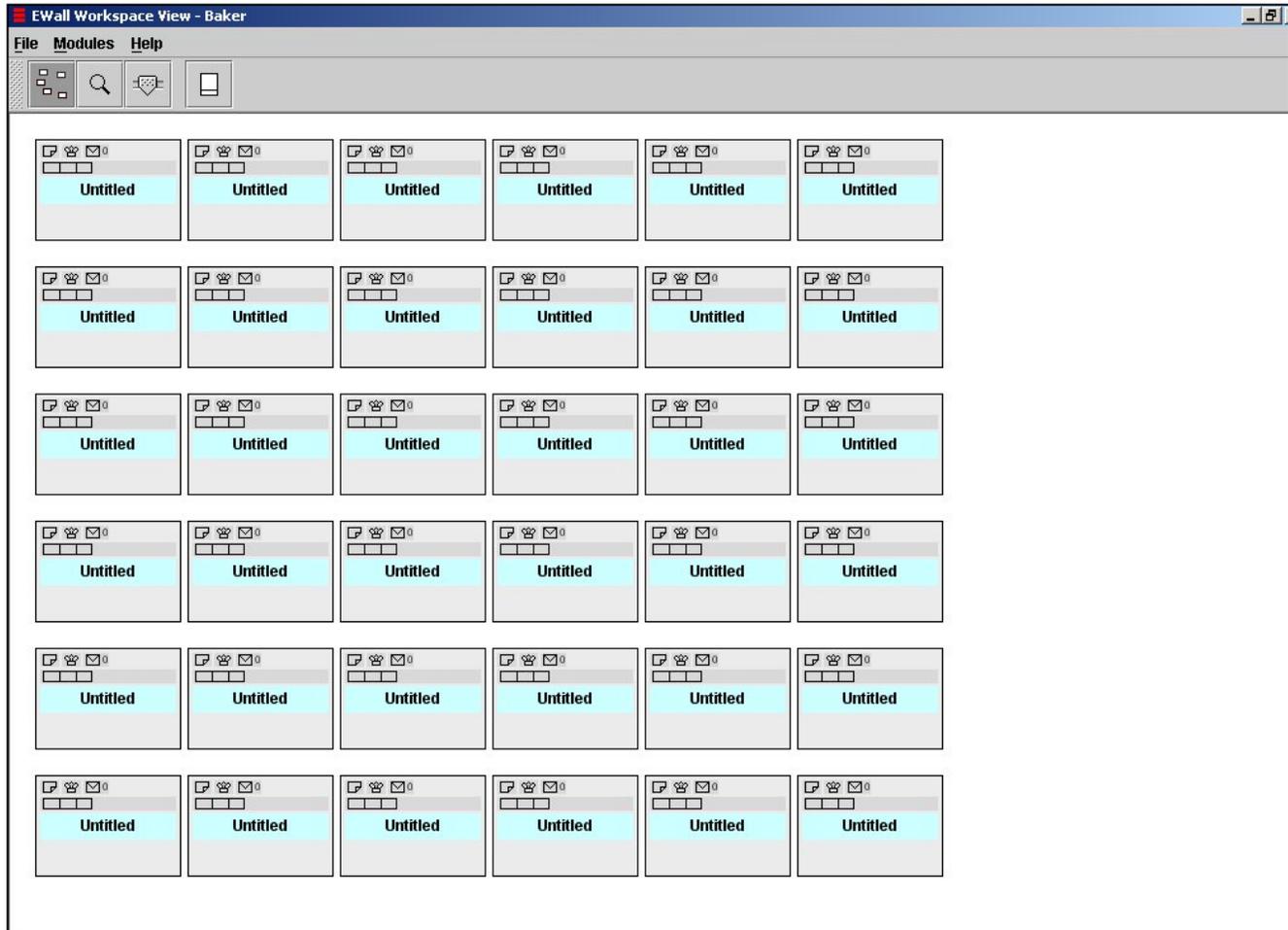
115 x 140 pixels



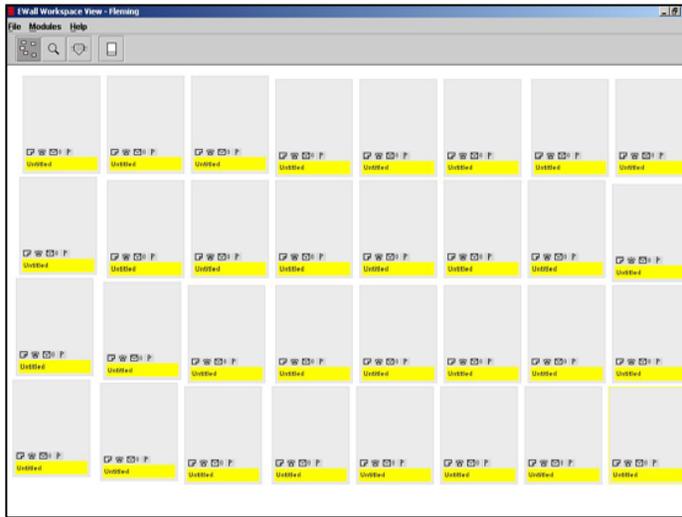
Eliminate Picture area
Go to 115 x 80 pixels



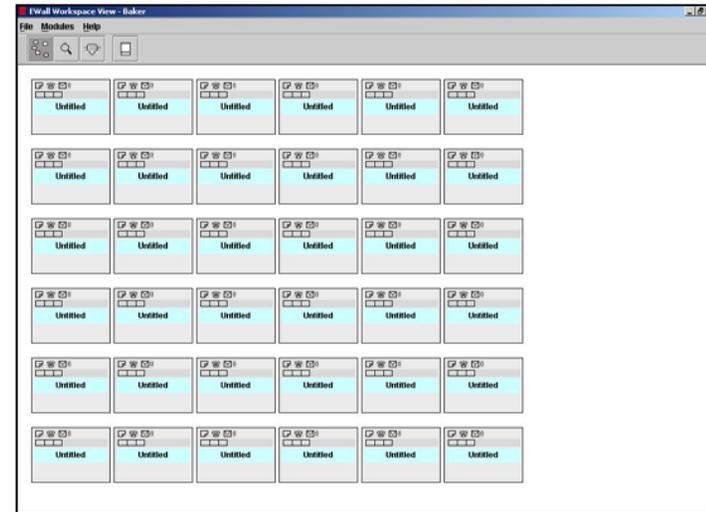
Display of 36 IOBs on 1024 x 768 Monitor



Default Cards vs. Reduced Size



32 Cards



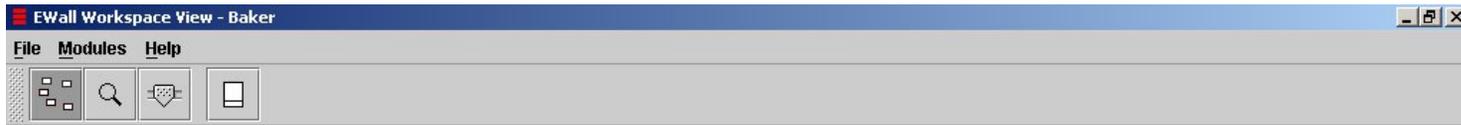
36 Cards

Sorting the Workspace

<p>zodiac 7 man 15 mph</p>	<p>2 workers are injured</p>	<p>Rebels have Stinger missiles. 5 mi range</p>	<p>Rebels have land mines</p>
<p>West side of Island in friendly hands</p>	<p>SEALs Need local translator</p>	<p>located on the USS Enterprise.</p>	<p>trained as medics.</p>
<p>Coral reefs passible only at high tide</p>	<p>High tide between 7-9 am or 8-10 pm</p>	<p>45 min from shore to church</p>	<p>Night vision capability</p>
<p>Enterprise 200 mi east of church</p>	<p>DRAPO topography</p>	<p>helo can be heard for 5 mi</p>	<p>Navy Seahawk all waether night</p>
<p>Seahawk 184 mph, range 395 mi, fuel in air</p>	<p>rebels have no night vision capab</p>	<p>minimize contact with enemy</p>	<p>morning of January 15 heavy fog</p>
<p>Rain forest terrain</p>	<p>Sunrise 6 am sunset 7 pm</p>	<p>USS Enterprise has full medical facilities</p>	<p>SEALs are very covert</p>

“OK, what is this saying?”

Reduced Size Helps Between-Option Comparisons



**A vs. B
Most Impt.
Items**

**A vs. B
Average Impt.
Items**

Another Approach

EWall Workspace View - Baker

File Modules Help

Most Positive Items

Most Negative Items

A B A B

Eliminate IOB Pictures?

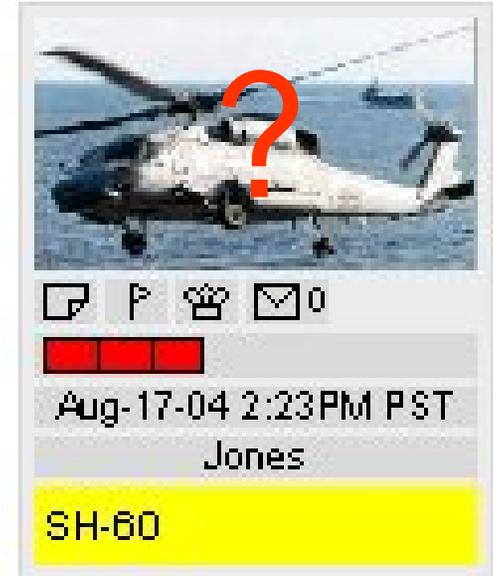
It will take 2 days to repair the Stennis catapult.

The reef is only passable at high tide.

China has detained two Taiwanese fishing vessels.

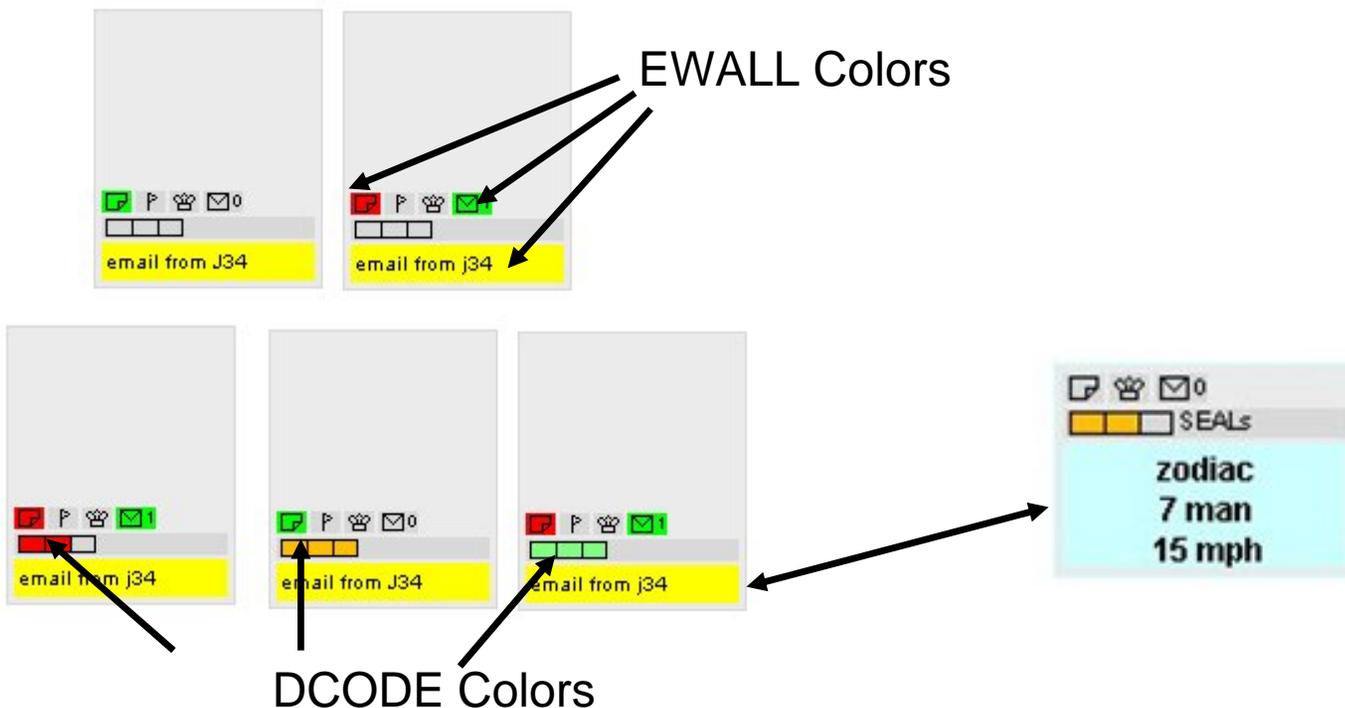
Typhoon Leoni is veering away from ops area.

Philippine Minister of Defense will run for President.



**Does the IOB need a picture?
If so, what picture?
Where do we get the picture?
Is it worth the time/lost space?**

Color Conflict





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(2) Experiments & Findings



NPG School Experiment 18 Officers



- Display: Text vs. IOBs
- Decision: Positive vs. Negative

		Display		
		Text Only	IOBs	
Decision	Positive	N=5	N=5	N=10
	Negative	N=4	N=4	N=8
		N=9	N=9	N (tot)=18



Task:

- Volcanic disaster in the Pacific
- Should we recommend Islandia as the refugee site?
 - Sees 30 information items (randomized)
 - 5 decision criteria
 - 6 items per criteria



The Five Decision Criteria



[**COM**munications - **TSP**ortation - **LAB**or - **ADM**istration - **SAN**itation]

- **Communications Facilities (COM):** Assess the communication facilities that are available in Islandia, including land telephone systems, radio, TV, cellular phone availability and coverage, etc.
- **Transportation Facilities (TSP):** Assess the transportation facilities that are available in Islandia, including roads, docks, airports, etc.
- **Labor Pool (LAB):** Assess the labor pool that would be available to staff the camp in Islandia, including size of the pool, quality of workers, work ethic/tradition, etc.
- **Administrative Requirements (ADM):** Assess the administrative requirements needed to set up the camp in Islandia, including, permits, fees, environmental considerations, bureaucratic red tape, graft, bribes, etc.
- **Sanitation/Health/Medical conditions (SAN):** Assess the sanitation, health and medical conditions expected in Islandia, including drinking water, sewerage disposal, medical facilities, infectious diseases, etc.

Decision Tasks:

	Very Neg.				Very Pos.
COM:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TSP:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LAB:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ADM:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SAN:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall Recommendation:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="button" value="Submit"/>		<input type="button" value="Reset"/>			

5 Criteria Decisions

1 Overall Decision

Text Condition (9 subjects)

1/30

...A cultural tradition in Islandia is that each worker is given a single two month vacation each year, which he can take any time during the year. All the employee has to do is give the employer a one week notice before going on vacation. This has caused unexpected and disrupted work shortages when several employees elect to take the vacation at the same time....

Criterion:

COM <input type="radio"/>	TSP <input type="radio"/>	LAB <input type="radio"/>	ADM <input type="radio"/>	SAN <input type="radio"/>
------------------------------	------------------------------	------------------------------	------------------------------	------------------------------

Submit >

[**COM**munications - **TSP**ortation - **LAB**or - **ADM**istration - **SAN**itation]

- **Communications Facilities (COM):** Assess the communication facilities that are available in Islandia, including land telephone systems, radio, TV, cellular phone availability and coverage, etc.
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- **Sanitation/Health/Medical conditions (SAN):** Assess the sanitation, health and medical conditions expected in Islandia, including drinking water, sewerage disposal, medical facilities, infectious diseases, etc.

Read this, then assign it to one of the five criteria

(do 30 of these)

IOB Condition (9 subjects)

1/30

The environmental protection effort in Islandia is poorly organized and has had little effect. Environmental impact is not a consideration in any awarding of construction permits.

Title:

Criterion: COM TSP LAB ADM SAN

Effect: Very Neg. Neg. Pos. Very Pos.

[**COM**munications - **TSP**ortation - **LAB**or - **ADM**istration - **SAN**itation]

- **Communications Facilities (COM):** Assess the communication facilities that are available in Islandia, including land telephone systems, radio, TV, cellular phone availability and coverage, etc.
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Read this, then:

Assign a keyword

Assign it to a criterion

Evaluate its effect on the criterion

(This experiment uses only the subjective assessment of EFFECT, does not tap Importance, Credibility, etc.)

IOBs Explained

INSTRUCTIONS

You have now evaluated all 30 items. Your last task is to assign rating scores to each criterion, as well as one final overall rating. Your previous scoring of the items has been used to create an "Information Object" (IOB) for each information item.

This IOB includes the information you previously assigned, i.e. the key words, the criterion and the rating. The key words are hyperlinked to the original text item so that you can call it up for review by simply clicking on the key words. When you do this, the text will appear in a window to the right of the display. The effect you selected for each item is represented by the color bar in the IOB. A sample IOB is presented below:



67: [Construction](#)
TSP

Your Keyword
Your criterion Assignment
Your assessment of the Effect on selecting Islandia

The image shows a sample IOB entry. It consists of a text box containing '67: Construction' where 'Construction' is a blue hyperlink, and 'TSP' below it. A green horizontal bar is positioned to the right of 'TSP'. Three red arrows point from text labels on the right to these elements: 'Your Keyword' points to 'Construction', 'Your criterion Assignment' points to 'TSP', and 'Your assessment of the Effect on selecting Islandia' points to the green bar.

The IOB items are available to you for review using a drop-down sorting menu that can present all the IOBs associated with all the criterion or you can elect to see only the IOBs associated with one individual criterion.



View: All Go
All
Communications
Transportation
Co Labor S
Administration
68: Sanitation

How to sort your data

The image shows a web interface for sorting IOBs. It features a 'View:' label followed by a drop-down menu currently set to 'All' and a 'Go' button. The drop-down menu is open, showing a list of criteria: 'All', 'Communications', 'Transportation', 'Co Labor S', 'Administration', and '68: Sanitation'. A red arrow points from the text 'How to sort your data' to the 'All' option in the menu.

Decision Display: IOB

View:

Communications

104: 77 COM	109: 99 COM	95: 666 COM
114: 567 COM	121: rttt COM	99: 11 COM
120: ertt COM		

Transportation

100: 22 TSP	105: 775 TSP	96: 777 TSP
94: ports TSP	93: 666 TSP	92: 66 TSP
112: 777 TSP	118: dfgg TSP	

Very Neg. Very Pos.

COM:					
TSP:					
LAB:					
ADM:					
SAN:					
Overall Recommendation:					

Click on the hyperlinked titles in the IOB to display the original text here.

Hyperlinked

Decision Display: Text

View:

Communications

The environmental protection effort in Islandia is poorly organized has has little effect. Environmental impact is not a consideration is any awarding of construction permits.

A recent disaster simulation exercise in Islandia showed that the Emergency Medical were very inadequate in terms of handling anything other than the smallest disaster situation.

... The major ports of Islandia are less than three days sailing from the primary disaster recovery supply center at Naha. Naha also has three supply ships that are permanently loaded to be used in quick response assistance...

Every small town in Islandia has at least one phone

...The major air route to Islandia is from Chenche. That route, however, requires that we fly over the nation of Gambist, and Gambist has denied permission to fly over their airspace. The two options are to modify the flight plan or to use another departure airport. Both of these options results in excessively long flights, limits cargo capacity, and reduces the daily amount of supplies that can be transported to Islandia...

Very Neg. Very Pos.

COM:	<input type="radio"/>				
TSP:	<input type="radio"/>				
LAB:	<input type="radio"/>				
ADM:	<input type="radio"/>				
SAN:	<input type="radio"/>				
Overall Recommendation:	<input type="radio"/>				

The items the subject assigned to the Communications criterion



IOB Subjective Assessment

One Last Request: Please select one of the options below in terms of how useful the IOBs were in making your scoring decision (this would be as versus just seeing the text listing of the items you assigned to each criterion)

Somewhat distracting	No Effect	Helped Somewhat	Helped a lot
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
			<input type="submit" value="Submit"/>



Positive vs Negative

1/2 of Subjects should make a decision that is **Positive:**

3 of 5 criteria are Positive

1/2 of Subjects should make a decision that is **Negative:**

3 of 5 criteria are Negative

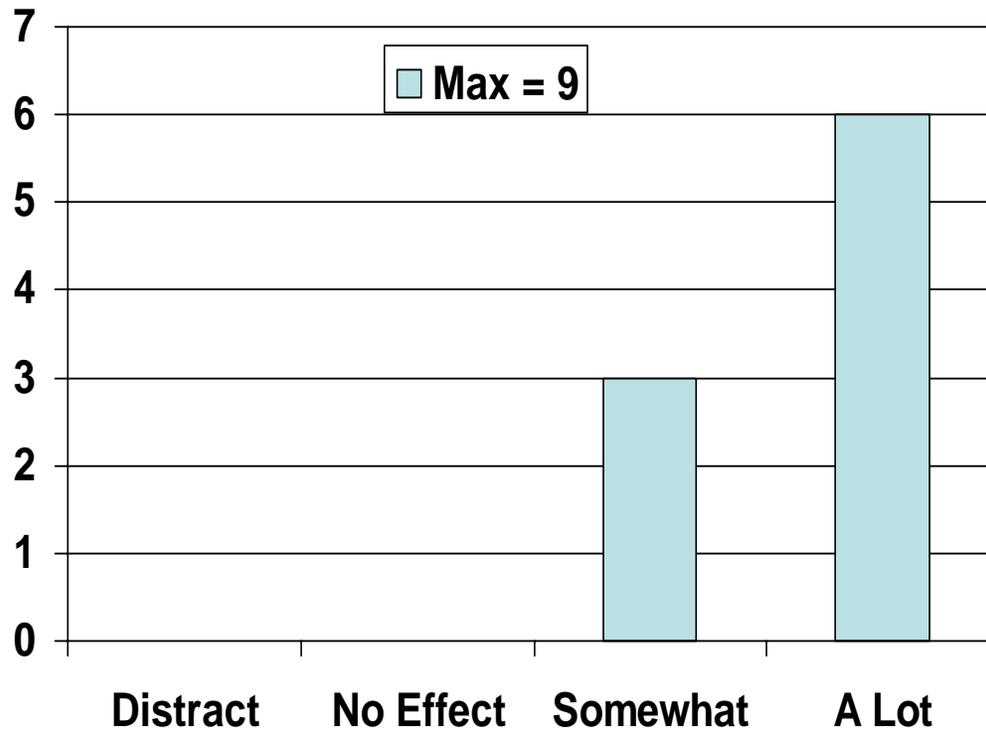
Positive Criterion: 4 of the 6 statements are positive

Negative Criterion: 4 of the 6 statements are negative



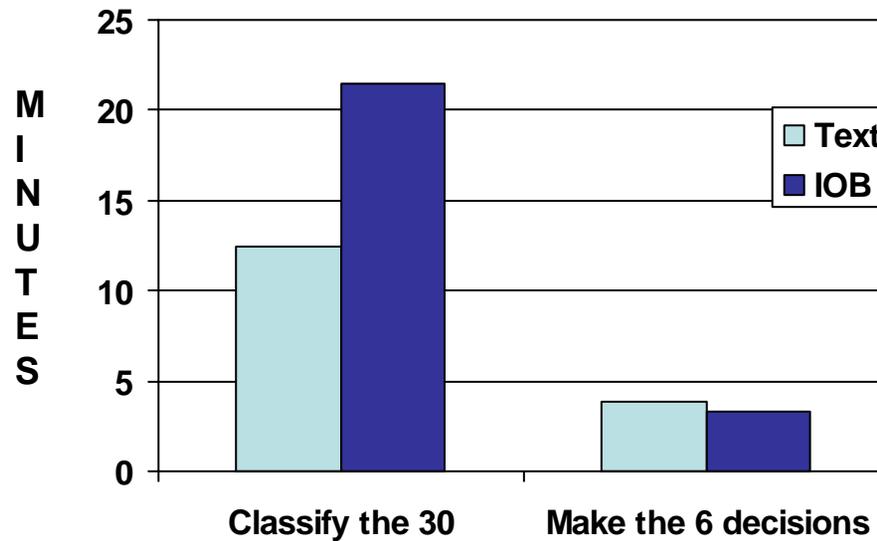
RESULTS

Subjective Assessment



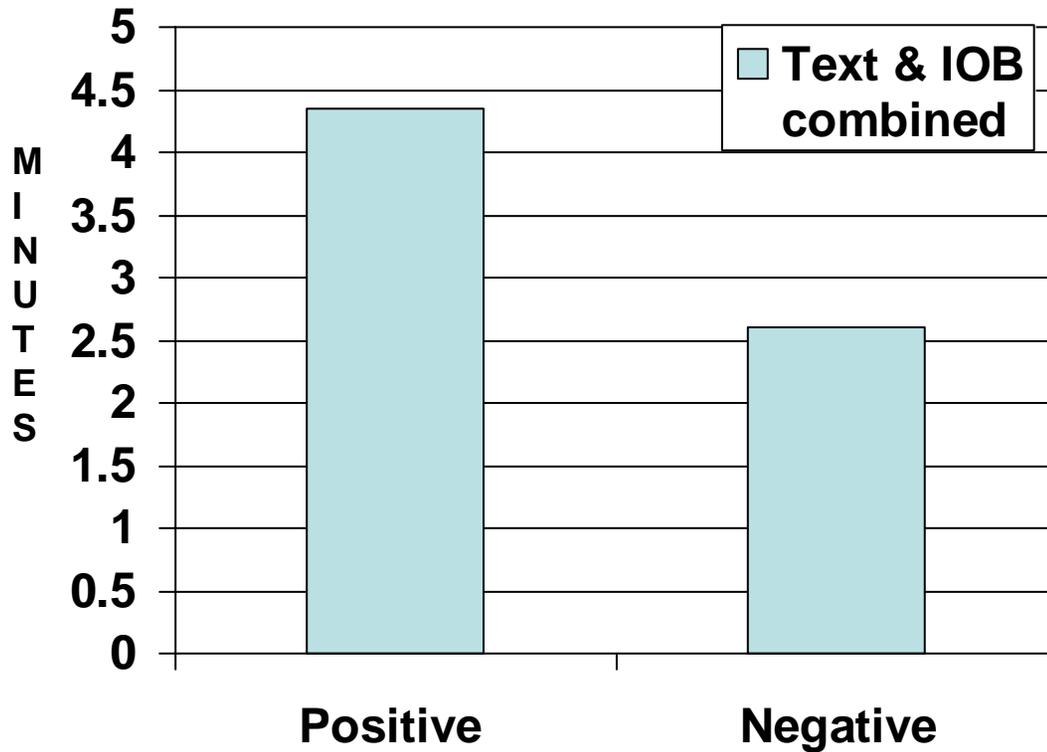
IOBs HELP?

Time Factor



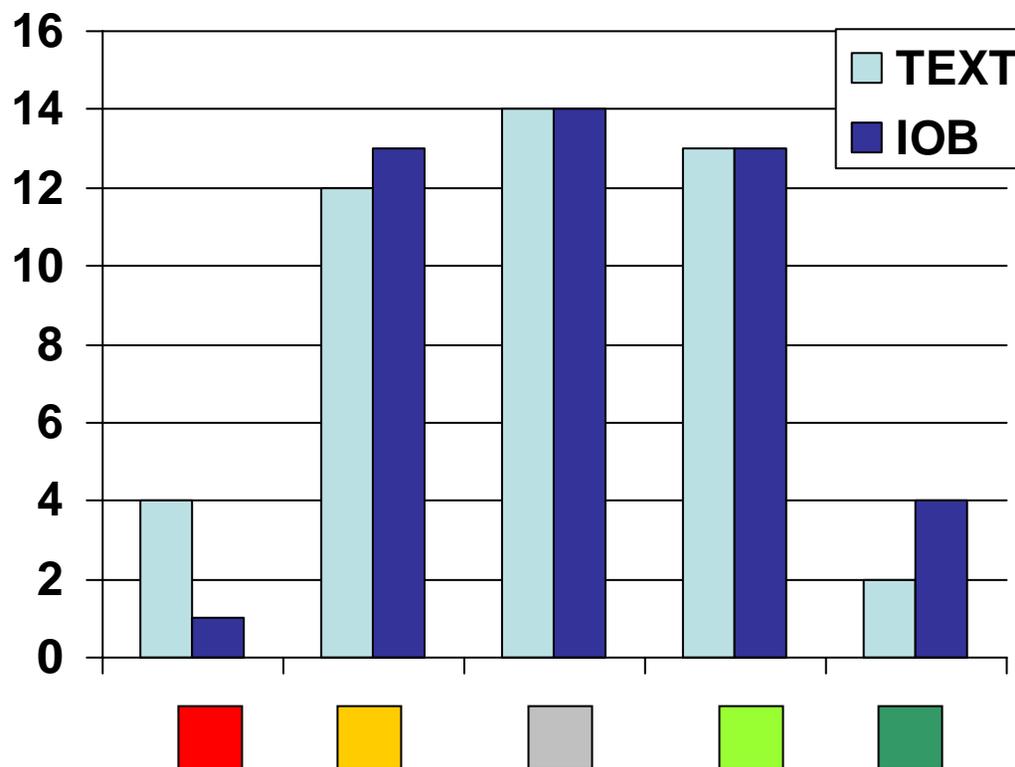
IOB subjects took an average 18 seconds longer per item to enter keyword and make evaluation

TIME TO MAKE THE 6 DECISIONS



Significant Difference

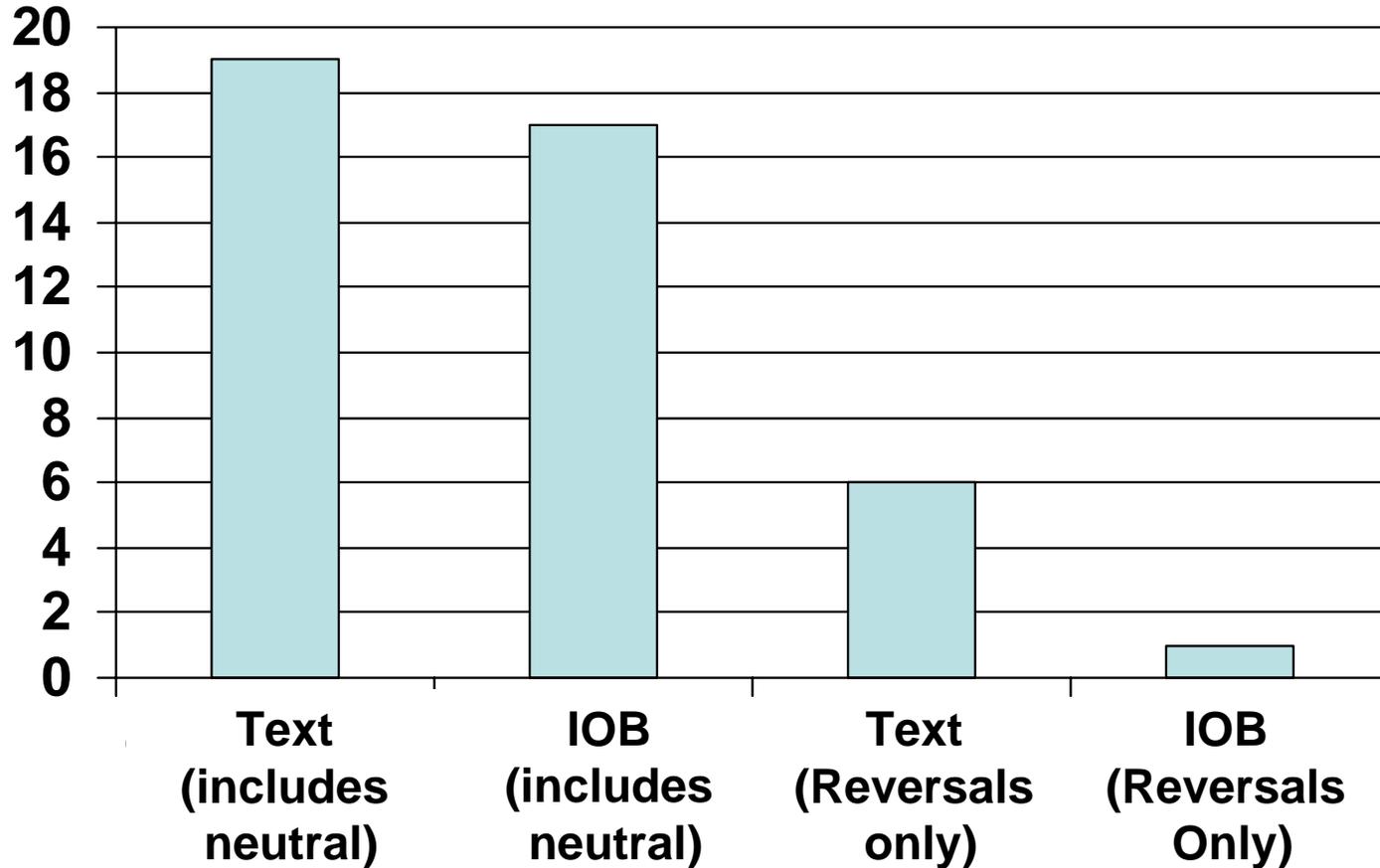
Score Assignment to Criteria



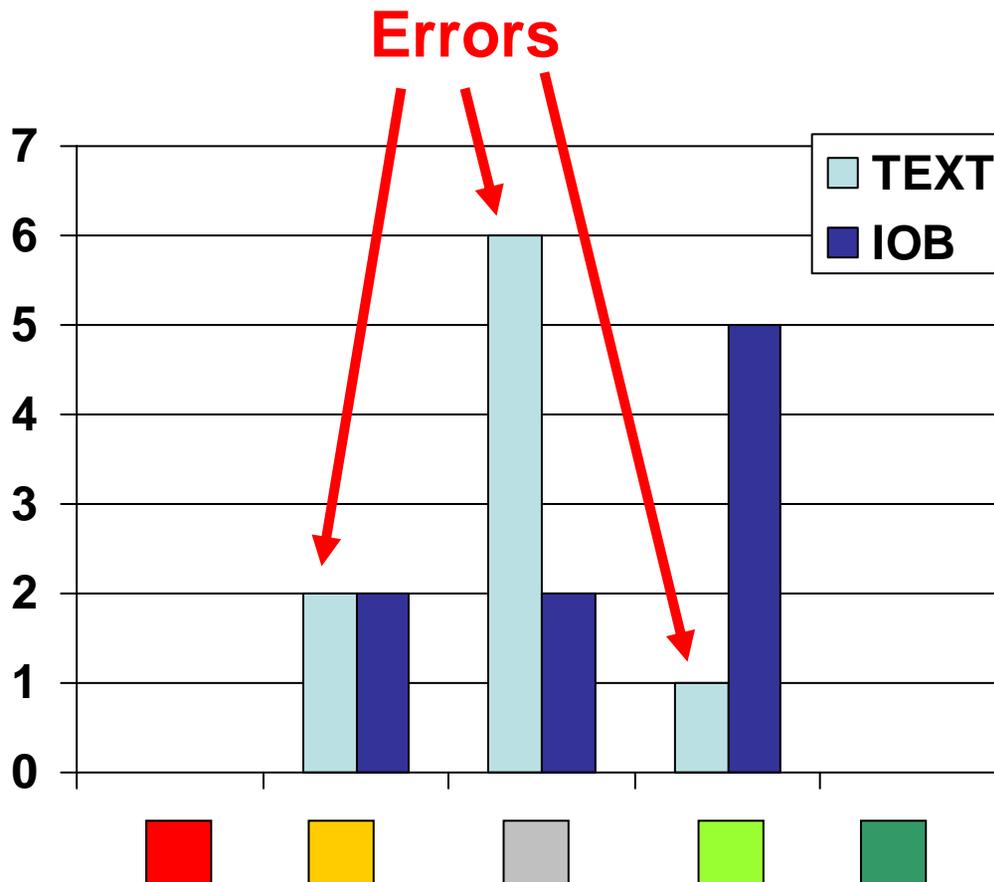
Errors:

- All criteria should have been scored as either positive or negative
 - Assignment of a **neutral rating is scored as an error**
 - For the IOB subjects, whether the correct decision was Positive or Negative was based on the subject's ratings
 - For the Text subjects, correct decision was based on experimenter's classification
 - **Reversal Error (most serious):** Positive group of information given a Negative rank (or vice versa)

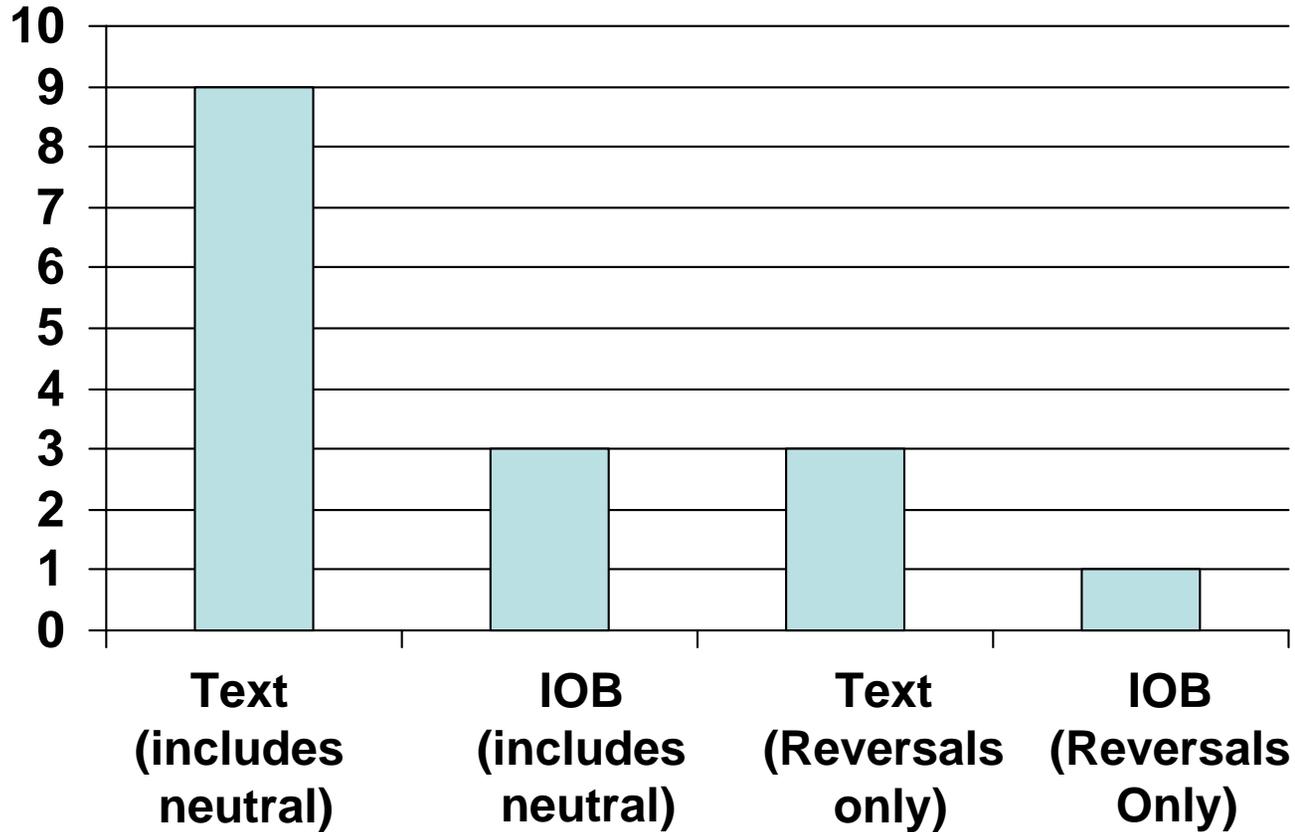
Errors in Criterion Scoring



Score Assignment to Overall

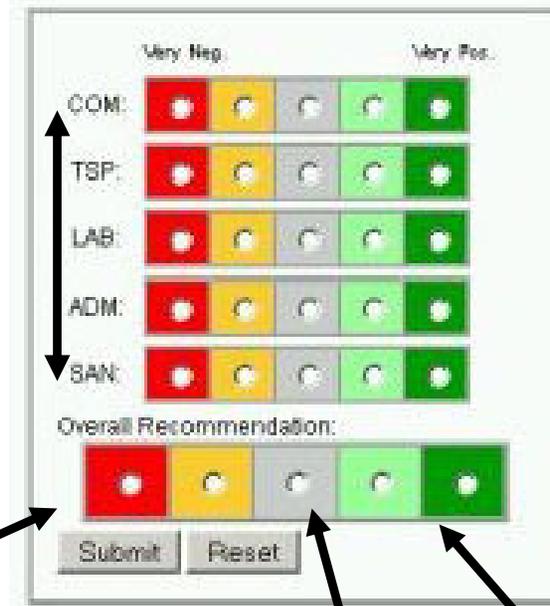


ERRORS OVERALL



Summary of Results

No Differences between
Text and IOBs



	Very Neg.	Neg.	Neutral	Pos.	Very Pos.
COM:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
TSP:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LAB:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ADM:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SAN:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Overall Recommendation:	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Six of the 9 IOB subjects
made the correct assignment.

None of the 9 Text subjects
made the correct assignment.

6/9 of the IOB subjects
showed unwillingness to commit
to a decision. Other 3 made
reversal errors.



Summary

- No members of the Text group made a correct Overall decision:
 - Preferred the neutral rating
- Six of the nine IOB group made a correct Overall decision
- Subjects took longer to make a decision when preponderance of data was Positive
- IOB subjects gave favorable ratings to use of IOBs in decision making



The use of Information Objects (IOBs) and DCODE in decision making (Experiment at Colorado State 4/04)



Task

- Select the best company to invest in out of a group of three.*
- Read a report about each company
 - Profits, work force, CEO, new markets, etc.
- Create IOBs about each company
 - Instructed on how to create and use IOBs and the DCODE color bar options.
 - Creation, layout, contents, & DCODE options totally under subjects control.
- Make a final Rank Ordering of the 3 companies.
- \$ incentive for best performance

* A published, standardized task, correct answer based on consensus of SMEs



Overview

- 36 subjects participated
 - 14 Females
 - 22 Males
- 15 of the subjects used the DCODE color bar option



Subjects

	Males	Females	
DCODE Option available	13 (13)	8 (2)	21 (15)
No DCODE Option	9	6	15
	22	14	36

(XX) = # of subjects that actually used DCODE color Bar

DCODE/No DCODE

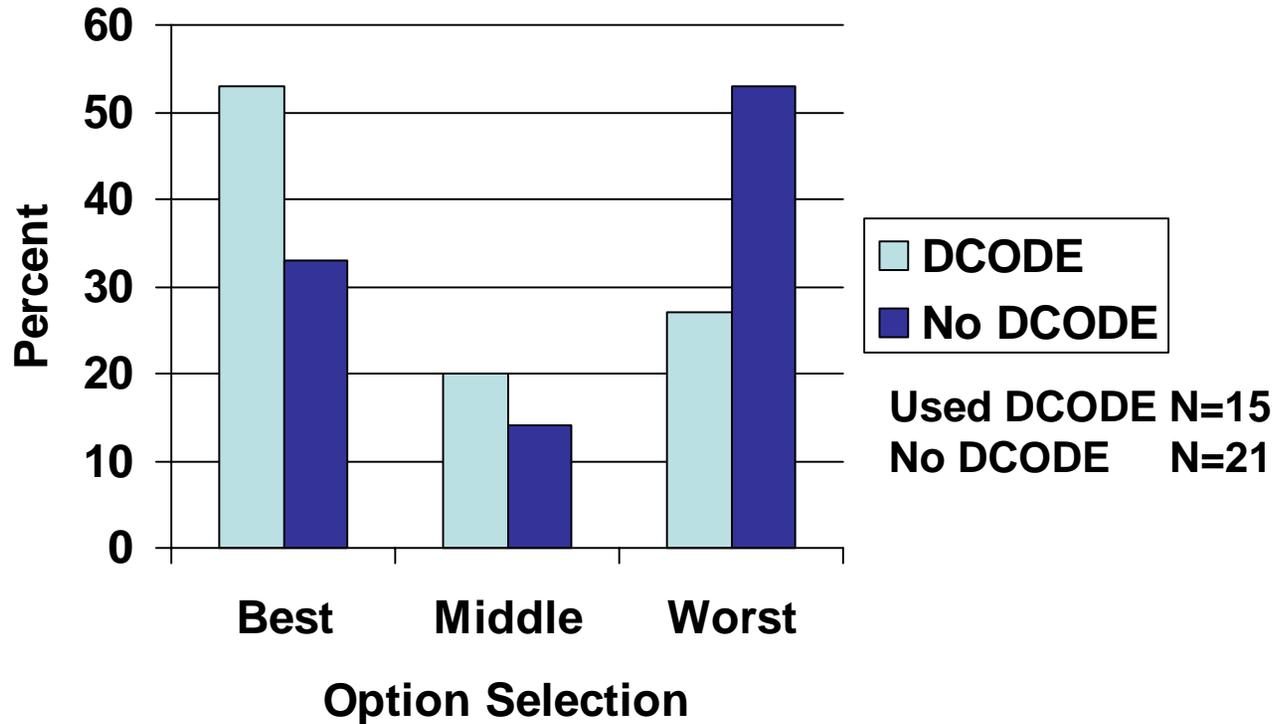
Example: Use of DCODE color bar

- best
- A
- not very but dominant in market shares
- \$4.4 billion in 2003
- plans to expand worldwide
- 4.4 billion - 2003
- 1.8 managers to workers
- future
- 12% over next 5 years
- 7.3 years

Example: No usage of DCODE color bar

- \$4.4 billion in 2003
- Expand its US and foreign food market
- dominant market shares in detergents soaps disposable diapers and shampoo
- increase research and development spending on new low calorie food
- High and stable volume of sales
- A - good low debt

Use of DCODE: Decision Performance (M & F combined)



54% of DCODE users ranked Best choice as #1

33% of non-DCODE users ranked Best choice as #1

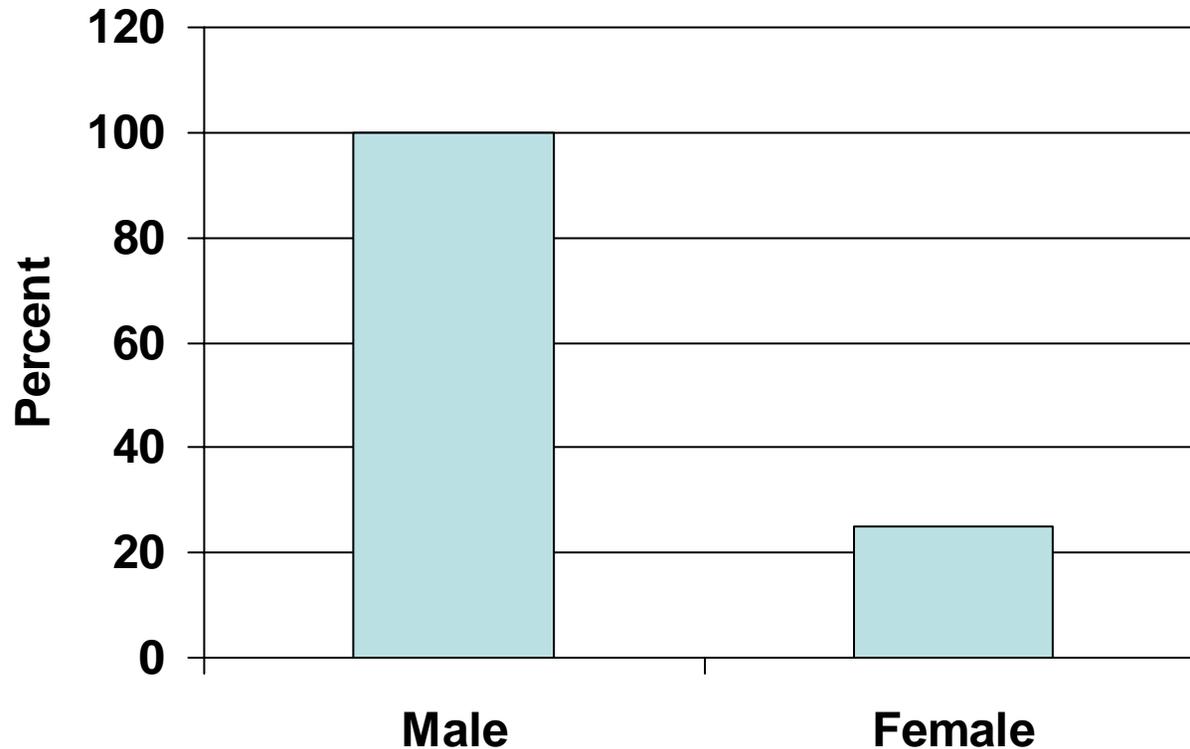
28% of DCODE users ranked Worst choice as #1

54% of non-DCODE users ranked Worst choice as #1



Male vs. Female

Use of DCODE color bar

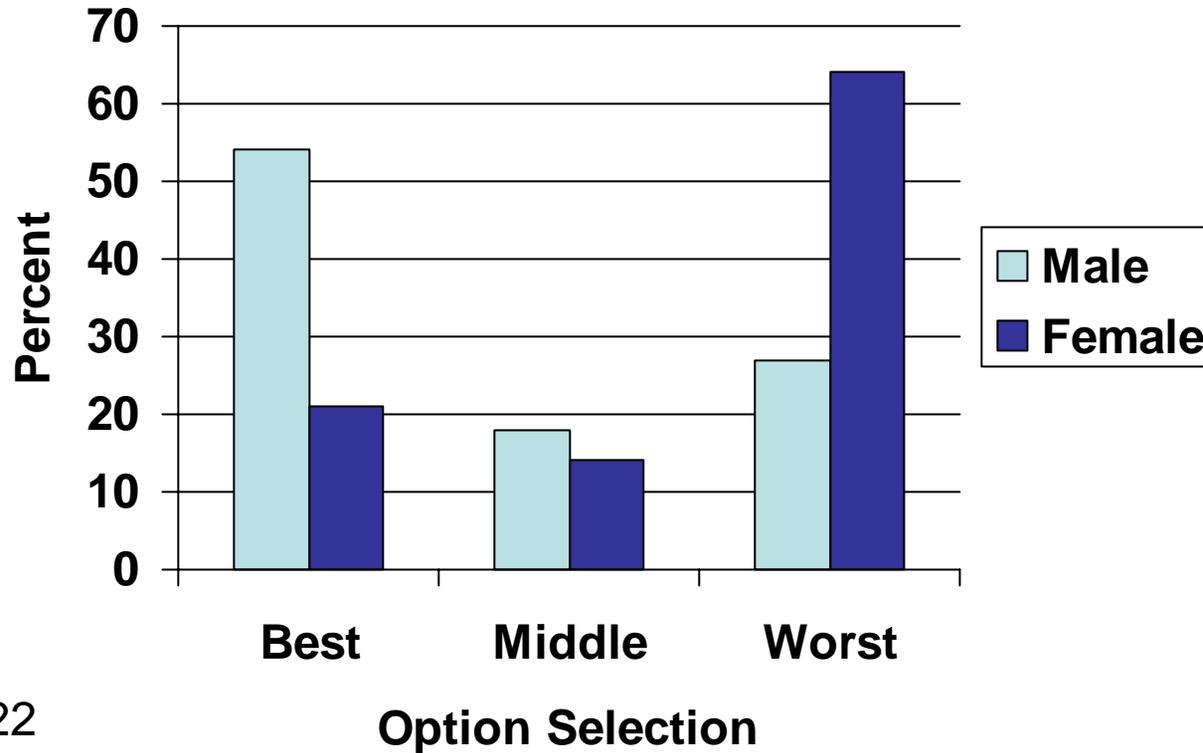


Male: N=13 13/13 100%

Female: N=8 2/8 25%

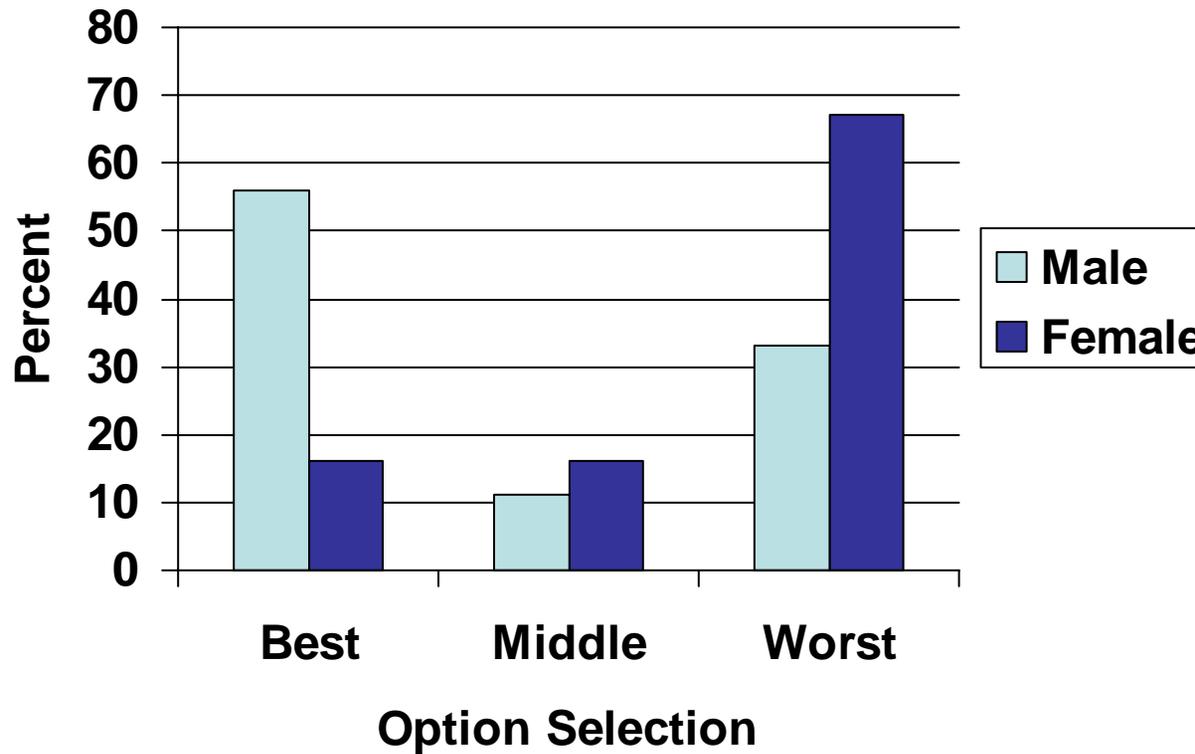


Decision Quality Male vs. Female



Male: N=22
Female: N=14

Male vs. Female (no DCODE)



Male: Rankings of the 9 males who did not use DCODE

Female: Rankings of the 12 Females who did not use DCODE



SUMMARY

- People made better selections using the DCODE option
- People were better at avoiding the worst option when they used DCODE
- Females were less likely to use DCODE
- Comparing performance of males vs. females who did not use DCODE, females performed more poorly than males.



Organization:

- **(1) Objectives**
 - DCODE Concepts/Issues
- **(2) Experiments**
 - NPG School
 - Colorado State
- **(3) Expected Final Product**
- **(4) Demos/Validations**
 - Camtasia AVIs
 - Cortex
 - HSI Lab
- **(5) Software Development**
- **(6) Publications**
- **(7) Lessons Learned**

(3) Expected Final Product

- Overall “concept of operations” of how to best use EWall-DCODE for selected decision making paradigms/tasks.
- Set of AVIs on how to create, sort and share IOBs.
- High-level marketing brief on application of DCODE to military/intelligence decision making.



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(4) Demos/Validations of Technology



- **Cortex**

Third Fleet Flag Briefing and Collaboration Facility (on Point Loma). Four Major packages:

1. Display Space Management (DSM)
2. Information Services (“KWEB”)
3. Geospatial Collaboration Service (GCS)
4. Geospatial Replication Service (GRS)



- Both an innovation and AND an operational command center.
- Expect to introduce DCODE technology into Cortex on a test basis in 2005

Composable FORCEnet Human Systems Integration Laboratory (CFnHSI)



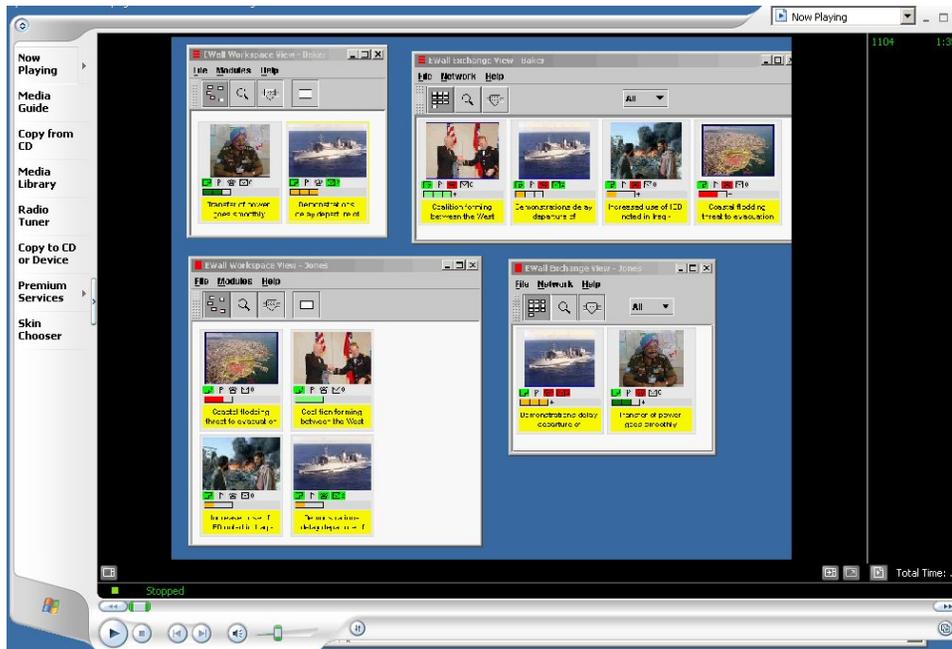
Located at SPAWAR Systems Center, San Diego, operated by SPAWAR Systems Command. EWall/DCODE already installed in facility, which is well designed for both individual and group testing of DCODE usability concepts.



Instructional AVIs



The good news: EWALL has many options (very flexible).
 The bad news: EWALL has many options (a lot to learn).



DCODE will produce a number of AVI tutorial aids to simplify the learning process.

- DCODE intro
- Creating IOBs
- DCODE Template
- Sorting IOBs
- Sharing IOBs
- Consensus
- Other Applications



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(5) Software Development and Other Supporting Tools

- Software development and configuration management is controlled by MIT.
- DCODE project has supplied software design recommendations for use and display of DCODE assessment template.
- DCODE has created a variety of AVI instructional videos introducing the DCODE concepts.



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(6) Recent & Planned Publications

- **Fleming, R. & Cowen, M. Improving Individual and Team Decisions Using Iconic Abstractions of Subjective Knowledge. Paper presented at Command and Control Research Technology Symposium (CCRTS), San Diego, CA, June 2004.**

- **Cowen, M. & Fleming R. A Knowledge Management Tool for Collaboration: Subjective Tagging of Information.” Paper presented at the 2004 TTCP HUM-TP9 Human Systems Integration Workshop, Ottawa, Canada May 2004.**

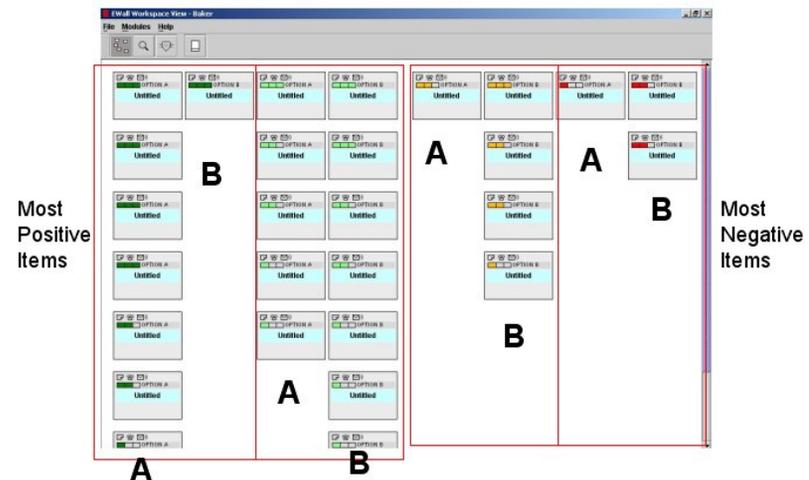
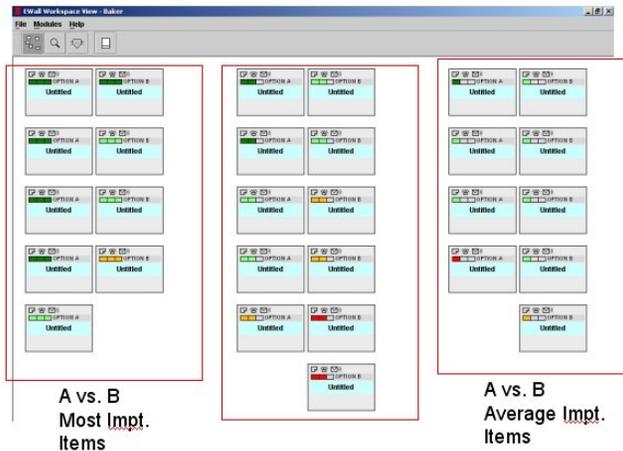


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(7) Lessons Learned

- Critical Missing Feature to DCODE is the **Absence of Automated Sorting Algorithms.**



These were moved and **sorted by hand.....**

Possible Sorting Interface

Wide variety of possibilities.

Options
Importance
Impact

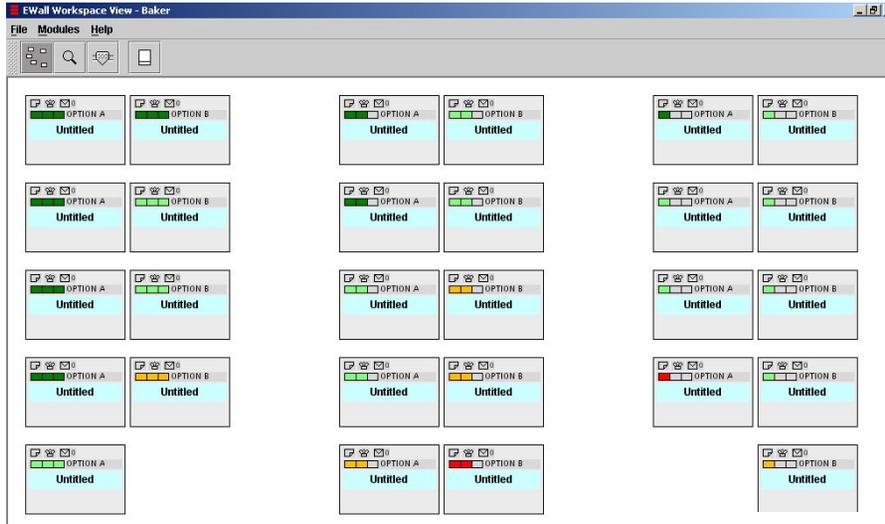
	<u>OPTIONS</u>	<u>IMPORTANCE</u>	<u>IMPACT</u>
<input type="radio"/>	A	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	B		
<input type="radio"/>	C		
<input type="radio"/>	ALL		



Compare Option A vs. Option B on Importance

<u>OPTIONS</u>	<u>IMPORTANCE</u>	<u>IMPACT</u>
● A	●	○
● B		
○ C		
○ ALL		

A vs B on Importance Parameter



A B
Very High

A B
High

A B
Average

Option A	Option B	Option A	Option B	Option A	Option B
All 15s	All 15s	All 14s	All 14s	All 13s	All 13s
All 12s	All 12s	All 11s	All 11s	All 10s	All 10s
All 6s	All 6s	All 5s	All 5s	All 4s	All 4s
All 3s	All 3s	All 2s	All 2s	All 1s	All 1s

Compare Option A vs. Option B on Impact

<u>OPTIONS</u>	<u>IMPORTANCE</u>	<u>IMPACT</u>
<input checked="" type="radio"/> A	<input type="radio"/>	<input checked="" type="radio"/>
<input checked="" type="radio"/> B		
<input type="radio"/> C		
<input type="radio"/> ALL		

Display

EWall Workspace View - Baker

File Modules Help

The screenshot displays two panels, each containing a grid of windows. The left panel is labeled 'Option A Pos to Neg' and contains 13 windows with 'OPTION A' status bars. The right panel is labeled 'Option B Pos to Neg' and contains 13 windows with 'OPTION B' status bars. Each window has a title bar with icons and a progress bar. The progress bars in the 'Option A' panel show varying levels of completion, while the 'Option B' panel shows a different set of completion levels. The windows are arranged in a grid that is roughly 5 columns wide and 3 rows high, with some missing windows in the bottom right of each grid.

Option A
Pos to Neg

Option B
Pos to Neg



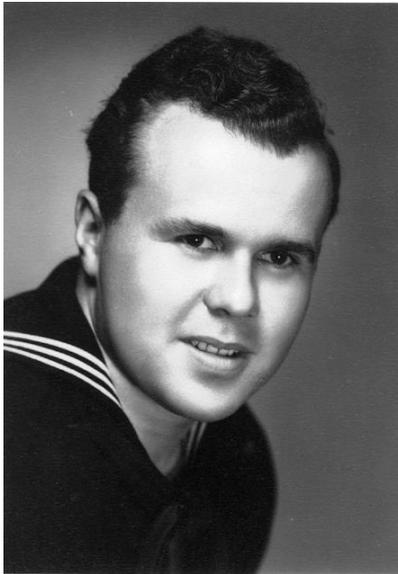
Summary



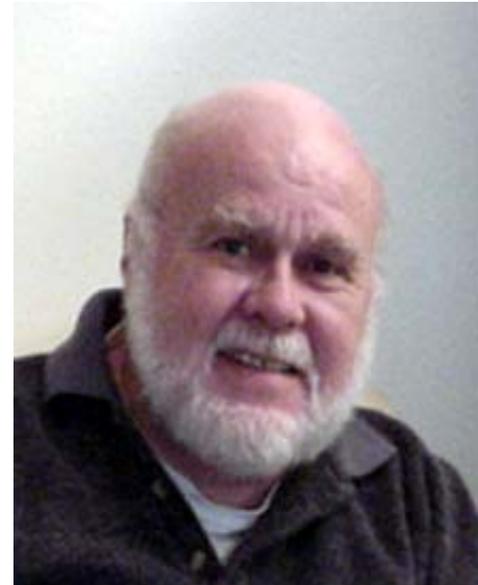
- **EWall** is a highly efficient approach to the **abstraction, encapsulation and sharing** of information.
- **DCODE** brings the critical element of **information assessment** to the decision making process.
- This added element significantly enhances the ability of an **individual** to form an overall **composite opinion** as well as for a **group** to reach **consensus** on option recommendation.

The Last.....

- Slide of this brief
- Brief of this Conference
- Brief of my Career



Jan 20, 1955



Jan 20, 2005