

# Utilizing Marketing and Psychology Methods to Test Health Messages

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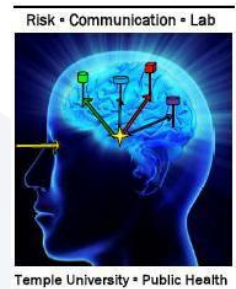


*A Case-Study of How Gaze Patterns and Psycho-Physiological Measures Can Be Used to Analyze Responses to a 'Dirty Bomb' Decision Aid in People with Limited Literacy*

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# Funding

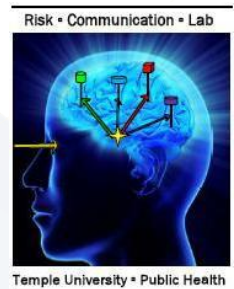
- Project funded by the National Institute of Biomedical Imaging and Bioengineering through the Health Literacy mechanism.
- Grant Number **R03EB009561-01A1**; PI **Sarah Bauerle Bass, Ph.D., MPH**



# Background

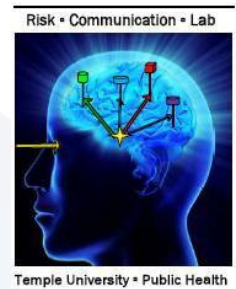
- Eye tracking/gaze pattern analysis, EKG and skin conductance are common methods of evaluation in marketing psychology.
- Monitor physical and psychological experiences “using” products or looking at images.
- Research indicates *the odds of effectively motivating behavior change go up with increased positive emotional arousal.* \*

\*Baumeister R, Vohs K. Handbook of Self-Regulation: Research, Theory and Applications. 2004. The Guilford Press: New York.



# Study Purpose

- To assess the feasibility of using these measures with populations with limited literacy.
  - Would content aimed at their reading/comprehension enhance experience?
- Assess whether measures could accurately differentiate eye tracking and EKG response when looking at materials written at high reading level vs. tailored lower literacy level.



# Study Content

- Addressed “Dirty Bombs” as content.
- CDC materials and fact sheets are high literacy.

We used the FAQ's as control and changed material based on formative evaluation and literacy needs.

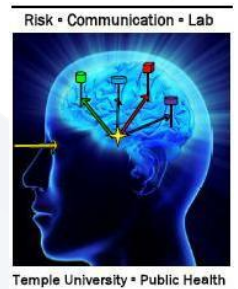
The screenshot shows a Windows Internet Explorer browser window displaying the CDC Radiation Emergencies website. The address bar shows the URL: <http://www.bt.cdc.gov/radiation/dirtybombs.asp>. The page title is "CDC Radiation Emergencies | Dirty Bombs". The main content area is titled "Frequently Asked Questions (FAQs) About Dirty Bombs". It includes a section "What is a dirty bomb?" which states: "A dirty bomb is a mix of explosives, such as dynamite, with radioactive powder or pellets. When the dynamite or other explosives are set off, the blast carries radioactive material into the surrounding area." It also includes a section "What are the main dangers of a dirty bomb?" which states: "The main danger from a dirty bomb is from the explosion, which can cause serious injuries and property damage. The radioactive materials used in a dirty bomb would probably not create enough radiation exposure to cause immediate serious illness, except to those people who are very close to the blast site. However, the radioactive dust and smoke spread farther away could be dangerous to health if it is inhaled. Because people cannot see, smell, feel, or taste radiation, you should take immediate steps to protect yourself and your loved ones." The page also includes a sidebar with navigation links and a search bar.



# Development of Decision Guide

- Completed three focus groups with urban residents in Philadelphia at community centers/Boys and Girls Club sites (n= 37).
- Also surveyed residents (n=100) about barriers/facilitators to complying with 'shelter in place' and general attitudes/knowledge about dirty bombs.

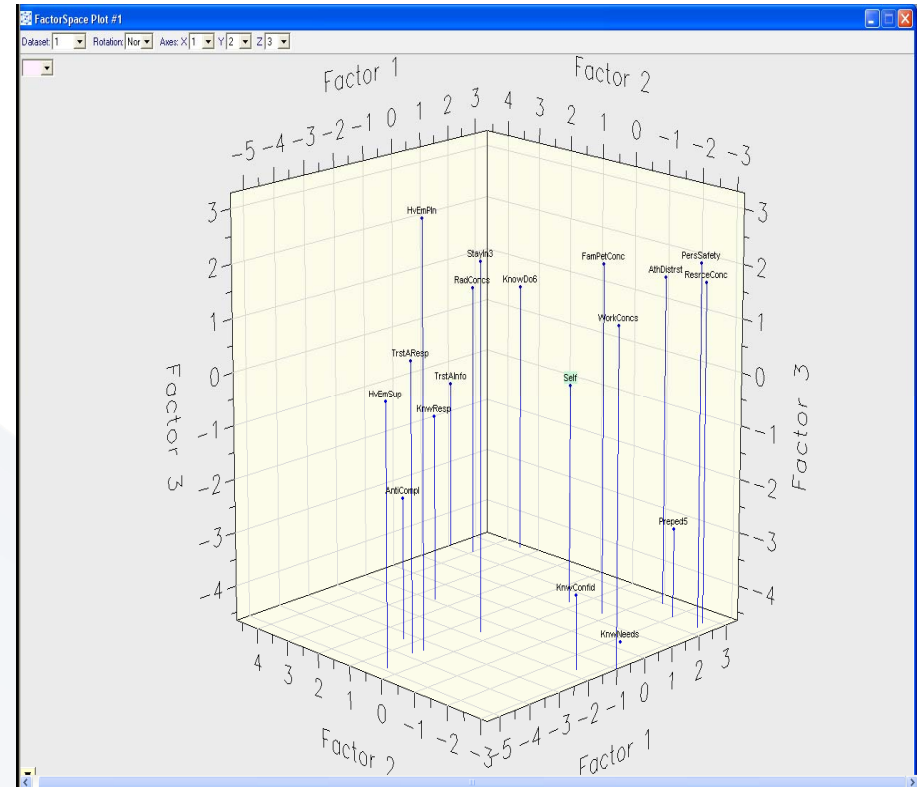
*All had limited literacy assessed using REALM-R.*





# Perceptual Mapping and Vector Modeling

- Conducted cluster analysis and then produced perceptual maps and vector models to develop key messages around dirty bombs.
- Result was computer based visual presentation with text written at <6<sup>th</sup> grade reading level.
- Tested in RCT using the biophysiological measures.



# Study Design

- Eligible participants were randomized to receive either a CDC “factsheet” on a “dirty bomb” (control, n=21) or a decision aid (intervention, n=29) written at a sixth-grade reading level.

**WHAT ARE “DIRTY BOMBS” AND HOW CAN I PROTECT MYSELF AND MY FAMILY?**



Frequently Asked  
Questions (FAQs) About  
Dirty Bombs

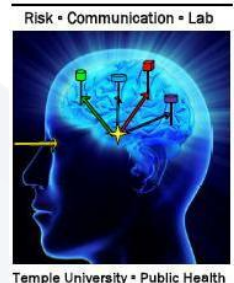
Centers for Disease  
Control and  
Prevention





# Recruitment and Eligibility

- Recruitment occurred in a variety of ways, including community canvassing, outreach at area organizations and marketing through posters and card handouts.
- Adults were assessed in person using the REALM-R or over-the-phone using Morris et al.'s SILS
  - › Eligible if scored a 5 or less on REALM-R or indicated they had trouble reading medical information on SILS.



*Subjects were shown the materials on a computer screen as their gaze pattern, pupil diameter, heart rate and pulse were measured.*



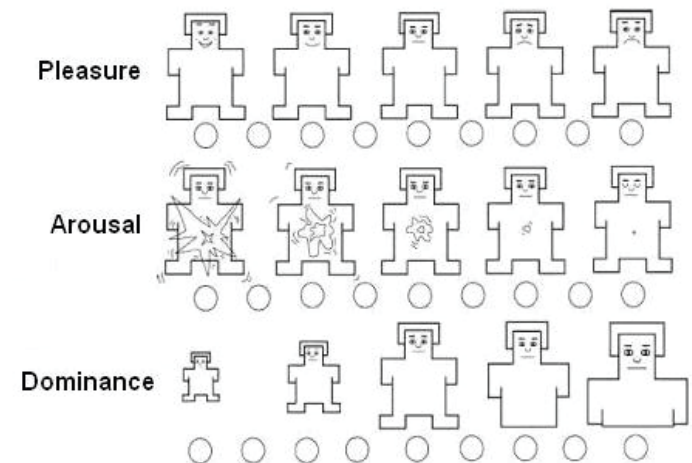
# Evaluation

- BioInfinity and Eyenal software programs were used to assess if there were differences between gaze patterns and bio-physical responses.
- Also did conventional statistical analysis using questionnaire:
  - › Knowledge/attitudes
  - › Decisional Conflict
  - › Intention to 'shelter in place'
  - › Acceptability of decision aid

# Emotional Response Evaluation

- ADSAM: Plots three dimensions of pleasure, arousal, and dominance
  - **Pleasure**: 'Extremely happy or elated to extremely unhappy or sad'
  - **Arousal**: 'Extremely excited or involved to very calm or bored'
  - **Dominance**: 'Weakness or being controlled to completely strong or 'in control''

## SAM: Self Assessment Manikin



# Results – Participants

- 50 participants:
  - 88% African American; 6% white; 6% other
  - 4% Hispanic
  - 52% male; 48% female
- Average REALM-R Score: 2.11 (range 0-5)
- Average age 45.7 (range 23-67)
- 32% did not graduate high school; 58% did graduate high school or GED



## WHAT ABOUT MY KIDS AND FAMILY?

**If they are with you, stay together. Do the same things for your family that you would for yourself.**

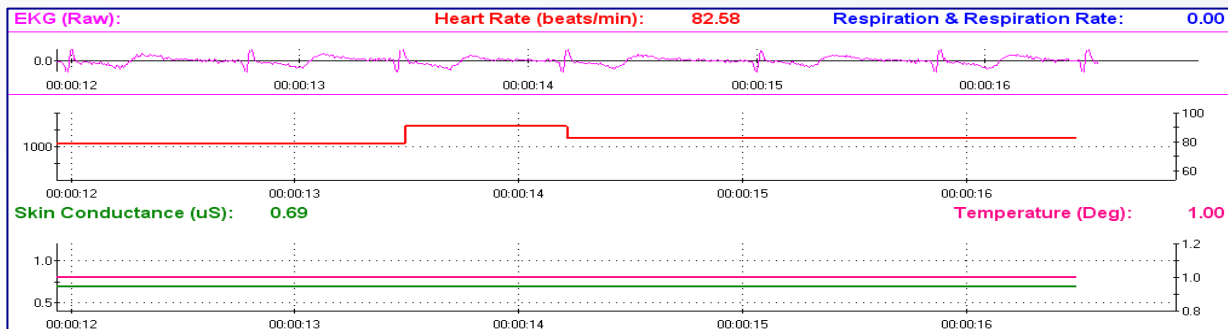
- **If your family isn't with you, they should stay where they are until you are told it is safe to go outside.**



## Intervention

- Clearly shows participant read material.
- Also looked at each face in the picture.

- Heart rate is 82.58; slightly elevated but not in distress
- No skin reaction





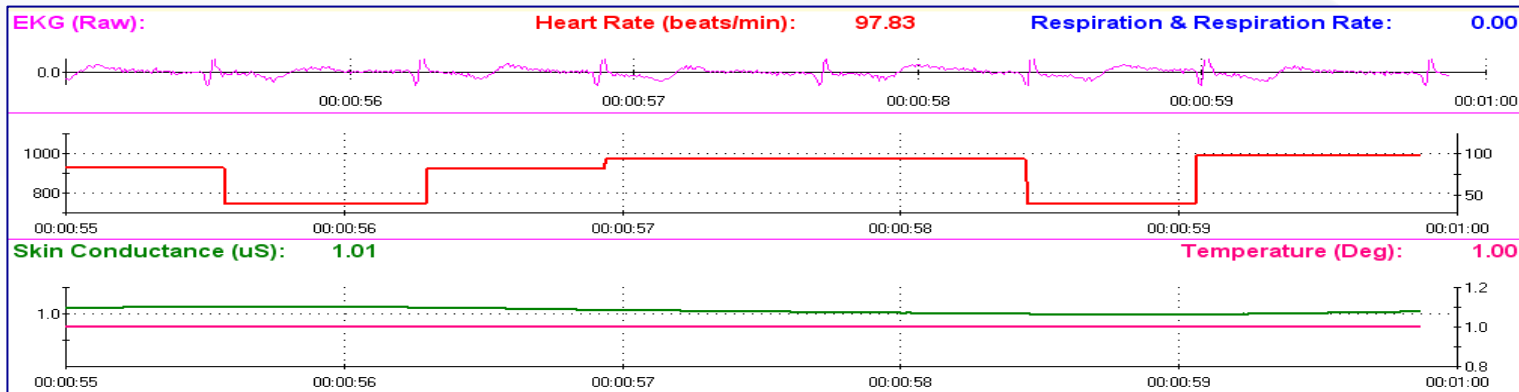
# Control

- Begins with title but not able to follow rest.
- Repeatedly looks away and then comes back.
- Goes on for almost two minutes.

- Heart rate is 97.83, over 15 beats higher than control.
- Participant may be feeling stress.
- Skin conductance is also slightly elevated.

## What should I do about my children and family?

- If your children or family are with you, stay together. Take the same actions to protect your whole family.
- If your children or family are in another home or building, they should stay there until you are told it is safe to travel.
- Schools have emergency plans and shelters. If your children are at school, they should stay there until it is safe to travel. Do not go to the school until public officials say it is safe to travel.



## WILL MY FOOD AND WATER BE SAFE?

- **Any food or drinks that were open and near where the bomb blew up should be thrown away. Put them in a plastic bag and seal it.**
- **Canned food and food in sealed bags are safe.**
- **Wash the outside of cans and bags before opening.**



## Intervention

- Similar to other Intervention slide.
- Reads information on sealed bags at least twice.
- Looks at picture for types of food

# Control

- Similar to other control slide.
- Begins with first paragraph but gives up quickly.
- Goes back and tries again.

## Will food and water supplies be safe?

- Food and water supplies most likely will remain safe. However, any unpackaged food or water that was out in the open and close to the incident may have radioactive dust on it. Therefore, do not consume water or food that was out in the open.
- The food inside of cans and other sealed containers will be safe to eat. Wash the outside of the container before opening it.
- Authorities will monitor food and water quality for safety and keep the public informed.

⏮ / ⏭ ➡

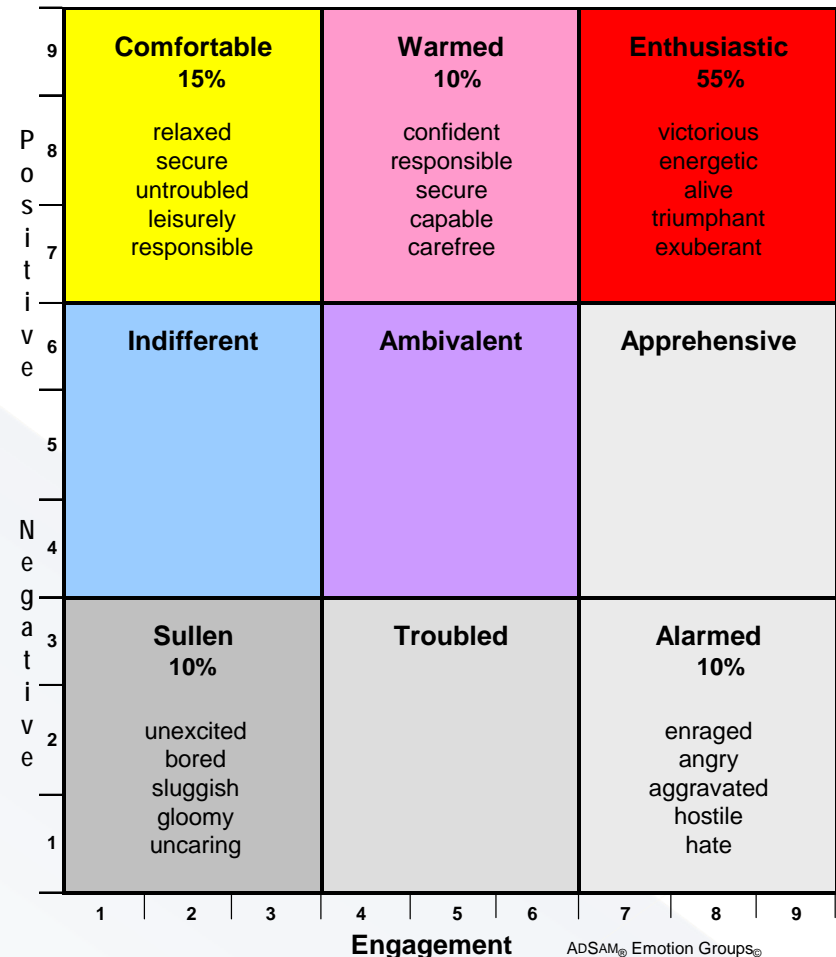
# How do you feel about your ability to protect yourself and your family in the event of a Radiation Emergency?

## Control Group

- > 20% of respondents are still in a negative emotional space; sullen/alarmed
- > 80%: comfortable/warmed, enthusiastic

- Substantial shift in responses compared to same question prior to reading Decision Aid

Control - samProtectAfter

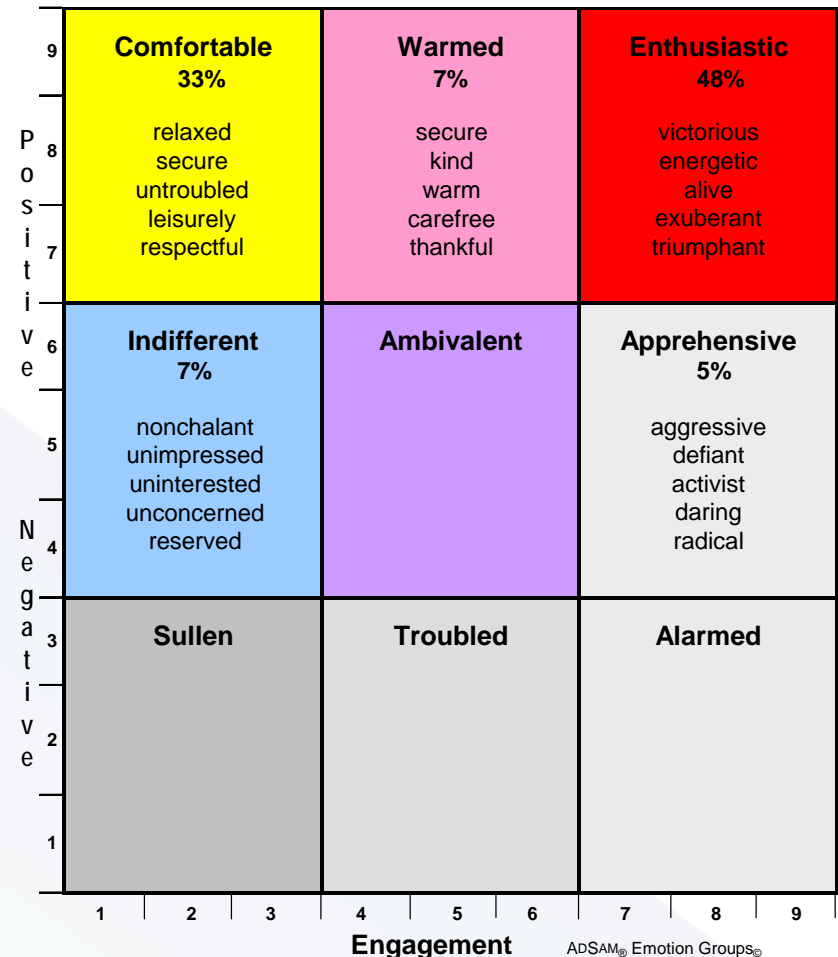


# How do you feel about your ability to protect yourself and your family in the event of a Radiation Emergency?

## ○ Intervention Group

- No respondents in negative space
  - 88%: comfortable/ warmed/ enthusiastic
  - 12%: indifferent/ apprehensive
- Substantial shift in responses compared to same question prior to reading Decision Aid

Intervention - samProtectAfter



# Conclusions

- Eye tracking/gaze pattern analysis and biophysiological measures proved to be feasible evaluation tools to assess ability of low literacy individuals to process written materials.
- Clear differences in abilities to read the information and evidence that this did effect emotional response and feelings of efficacy to be able to respond in the event of a dirty bomb.

