

# An Automated Personalized Health Coach

## A class experiment in health persuasive technologies

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# Generating Health Education with “Personality”

- In healthcare situations, ‘computerspeak’ is a deterrent to people’s willingness to accept computer-generated materials:
  - *You should always use sunscreen. You should always wear a hat.*
  - A little better: *You should always wear sunscreen and it’s good to wear a hat as well.*
- Our aim: Assisting physicians to provide personalized information to patients about their health and treatments.
- Goals: improved patient satisfaction, outcomes; improved use of physician time and hospital resources.



# Why We Need Personalized Health Information

- 'Generic' health information either says too little or too much. . .
- . . . and so isn't useful: patients don't get the advice they need.
- A brochure with only information relevant to **all** readers:
  - *Nine hundred different things could go wrong during your surgery.*
  - . . . is too superficial and doesn't tell you what you want to know.



## Why We Need Personalized Health Information (2)

- A brochure with all information relevant to **any** reader:
  - Complications of the surgery could include pain, scarring, swelling, infection, and discoloration. Numbness or neurologic problems may occur. The exact nature and duration of problems may not be determinable and may be irreversible. Other complications may involve inflammation of a vein, cardiovascular problems, injury to surrounding tissue, bone fractures, delayed healing, allergic reactions to drugs or medications, even **DEATH**. In those cases where bone cement is used to secure implants in place, adverse reactions, including deep and surgical wound infection and a temporary lowering of blood pressure, may occur.
  - Too much information wont even be read!



# Experiment: Generating Personalized Anti-smoking Letters

- Patients answered survey; later were sent personalized letter.
  - Letters were produced by combining snippets of text:
  - *You decided to quit smoking in order to make your clothes and breath smell better. By now everyone has probably noticed what a difference quitting has made. You should feel great about yourself now that your clothes and breath don't smell like cigarette smoke and other people will enjoy being around you more. Smelling better is only one of many good things that will happen now that you have quit.*
- Results: The recipients of personalized letters. . .
  - Read more of the document. And were three times more likely to quit smoking.



# But Mass Personalization is Hard for People

- All possible combinations of text snippets must make sense.
- All possible personalized brochures must sound well-written.
- This quickly becomes much too hard for humans to manage:
  - In the experiment on anti-smoking, human patient educators had to manage **55,000** possible combinations of text snippets!
- Our research:
  - Automating the large-scale generation of finely tailored persuasive health education materials.



# The Promise of Computational Rhetoric

- Most current Natural Language systems deal only with restricted language or use simplified methods of analysis, such as shallow parsing.
- While computational approaches to language have used the term “rhetoric”, the deep resources of classical rhetoric have only been tapped to a small degree.
- This tradition studies three attributes of texts we can formalize and use:
  - Style (lexical choice, syntactic structure, modes of address);
  - Purpose (description, persuasion, instruction);
  - Affect (trust, deference, anger).

