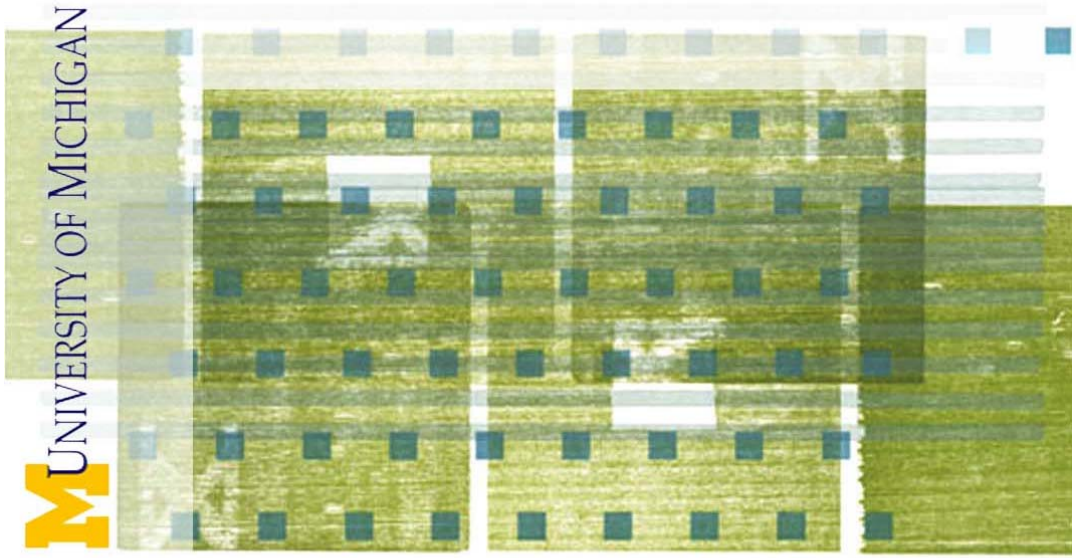

Distilling the Essential Ingredients for Tailored Communication in an Era of Personalized Medicine

CENTER for HEALTH COMMUNICATIONS RESEARCH

Presented by:

Victor J. Strecher, PhD, MPH

Associate Director for Cancer Prevention and Control

University of Michigan Comprehensive Cancer Center

www.chcr.umich.edu

CENTER for HEALTH COMMUNICATIONS RESEARCH

A NATIONAL CANCER INSTITUTE CENTER of EXCELLENCE

who we are

what we do

why we do it

how we do it

we are a dedicated team integrating behavioral science, technology, and art to create and research health interventions that

inspire informed health decisions,

broaden access to health information,

and advance the field of health communications.

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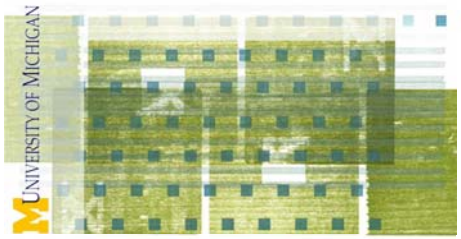
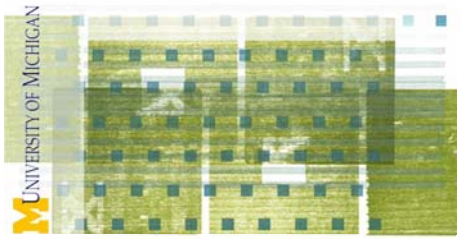


UM Center for Health Communications Research

- Large projects
- Developmental projects
- Core resources
- Summer tailoring workshop
- Web seminar series
- Pre- and post-doctoral training
- Direct dissemination



CHCR large studies

Project Quit: Active Elements of Web-Based Tailored Smoking Cessation
Victor Strecher, PhD

Eat for Life: Culture- and Motives-Based Tailored Materials for African-Americans
Ken Resnicow, PhD

Guide to Decide: Risk, Knowledge, & Decision-Making for Tamoxifen Prophilaxis
Peter Ubel, MD

Tailoring Depth for Smoking Cessation
Victor Strecher, PhD

MENU: Tailored Web and Telecounseling for Dietary Change
Christine Johnson, PhD

CHCR developmental studies

Non-responders: Design of Effective Web Data Collection for Cancer Prevention Studies
Mick P. Couper, PhD

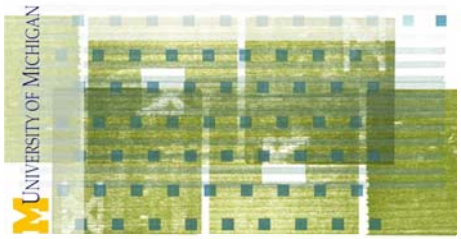
Experimentation Strategies for Time-Varying Treatment Components of Relapse Prevention
Susan A. Murphy, PhD

Automated Step-Count Feedback to Promote Physical Activity in Chronic Disease
Caroline R. Richardson, MD

Understanding information scatter on the Internet
Suresh K. Bhavnani, PhD

Cancer Screening Adherence through Technology-Enhanced Shared Decision Making
Masahito Jimbo, MD, PhD, MPH

Development of a Preference-Tailored Intervention for Increasing Colorectal Cancer Screening
Sarah T. Hawley, PhD, MPH



CHCR Core Resources

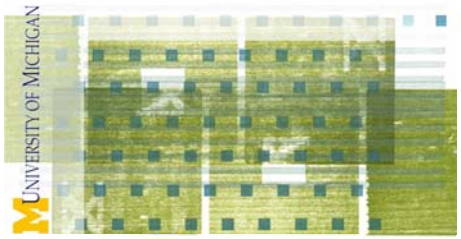
A. Administrative Core

B. Biostatistics Core

C. Theory Core

D. Tailoring Technology Core

E. Recruitment and Dissemination Core



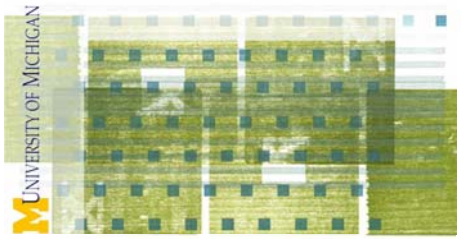
CHCR Summer Tailoring Workshop

Software and hardware for tailoring

- For programmers and software engineers
- Relevant software for data collection and tailoring
- Relevant hardware for data collection and tailoring

Content of tailoring

- Psychosocial content of tailoring
- Communications approaches to tailoring

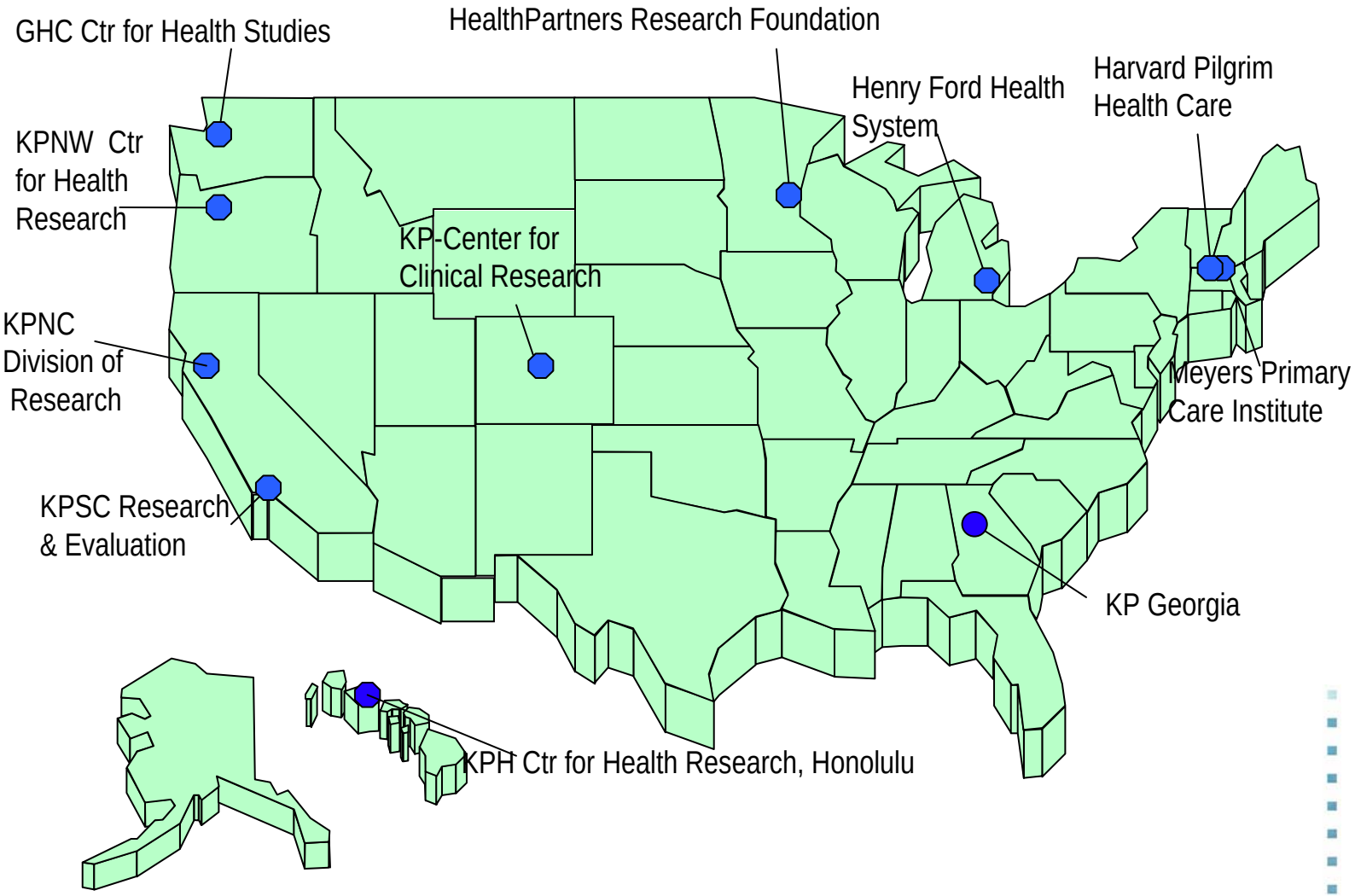


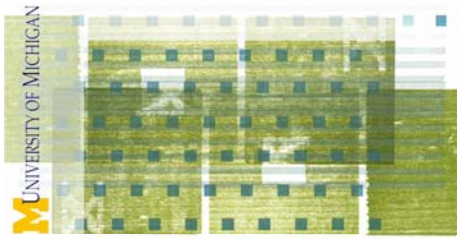
CHCR seminar series

CENTER for HEALTH COMMUNICATIONS RESEARCH

- Developments in Motivation to Change Health Behavior and Working Mechanisms of Computer-Tailored Interventions: Arie Dijkstra, PhD
- Individual Tailoring of Health Communications: Victor J. Strecher, PhD, MPH
- Intrinsic and Extrinsic Motivation: Geoffrey C. Williams, MD, PhD
- Nigrescence Theory & Cross Racial Identity Scale (CRIS): William E. Cross, Jr., PhD
- Motivational Interviewing in Medical and Public Health Settings: Kenneth A. Resnicow, PhD
- Causal Inference and Alternative Explanations: Susan A Murphy, PhD
- Little Things Matter: Designing Web Surveys: Mick Couper, PhD
- Health Communication Research and the Internet: Jay M. Bernhardt, PhD, MPH
- Cultural Sensitivity in Public Health: Kenneth A. Resnicow, PhD
- Eat for Life Psychometric Pilot Results: African American Ethnic Profiles: Kenneth A. Resnicow, PhD
- Leveraging Communication, Marketing, and Policy to Create Population-Based Health Behavior Change: Edward Maibach, PhD
- Following Up Nonrespondents in an Online Weight Management Intervention: Mick Couper, PhD
- Fractional Factorial Designs: A Tutorial: Vijayan N. Nair, PhD
- Risky Feelings: why 6% doesn't always feel like 6%: Peter A. Ubel, MD
- Results of Two Commercial Internet-Based Behavior Change Programs: Victor J. Strecher, PhD, MPH
- Using Interactive Technologies to Help People Quit Smoking: The Australian Experience: Ron Borland, PhD
- The Scatter of Healthcare Information: Suresh K. Bhavnani, PhD
- Testing the Impact of a Decision Aid on Patient-Physician Communication and Decision Making: A brainstorming session: Angela Fagerlin, PhD
- Tailored Health Communications in Public Health Promotion: content, context, and community: Marci K. Campbell, PhD, MPH, RD
- Developing a Preference-Tailored Tool for Increasing Colorectal Cancer Screening: Sarah T. Hawley, PhD, MPH
- Forever Free: Where We Are Now: Susan A. Murphy, PhD
- Multiphase Optimization Strategy (MOST): An Extension of Randomized Clinical Trials: Linda M. Collins, PhD
- Stepping Up to Health: Tailored step-count feedback to increase walking: Caroline R. Richardson, MD
- MENU Choices Incentive Study Results: Christine C. Johnson, PhD, MPH
- Weight-Related Health Issues in Social Contexts: Social Psychological Approaches to Studying Nutrition, Exercise, and Weight Loss: Heather A. Patrick, PhD

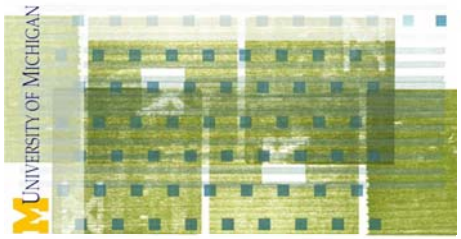
CHCR + Cancer Research Network





William Osler, 1892

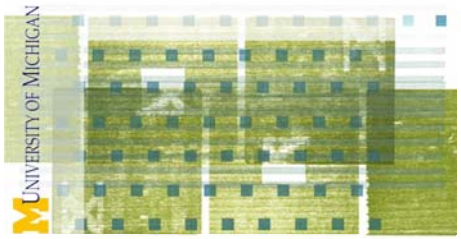
"If it were not for the great variability among individuals, medicine might as well be a science and not an art."



New approaches to drug trials…

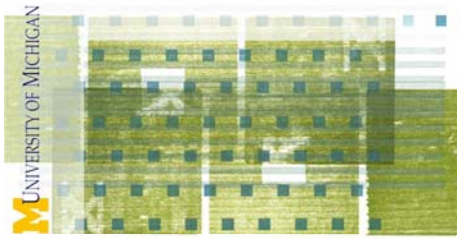
"I think there's a change in the air. That change is a growing recognition that there could be important differences between people, and trying to identify those differences and target treatments to the people most likely to benefit may be desirable."

Robert Temple, MD, Center for Drug Evaluation and Research, FDA, at Workshop on PGx and Co-Development, April 11, 2005



Individual variation understood and addressed by:

- Bioinformatics
- Medical informatics
- Consumer health informatics

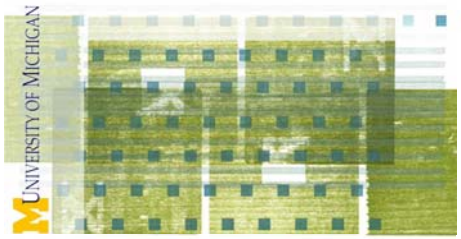


Why the Internet?

- Prototype for the future
- Internet use exceeds 75%*
- Spend over 12 hourse per week on the Internet*
- African-Americans, Latinos, and elderly are getting online*
- Over 60% use for health issues**
- Over 35% use for health issues weekly*
- 44% nutrition/diet; 36% exercise/fitness; 6% quitting smoking

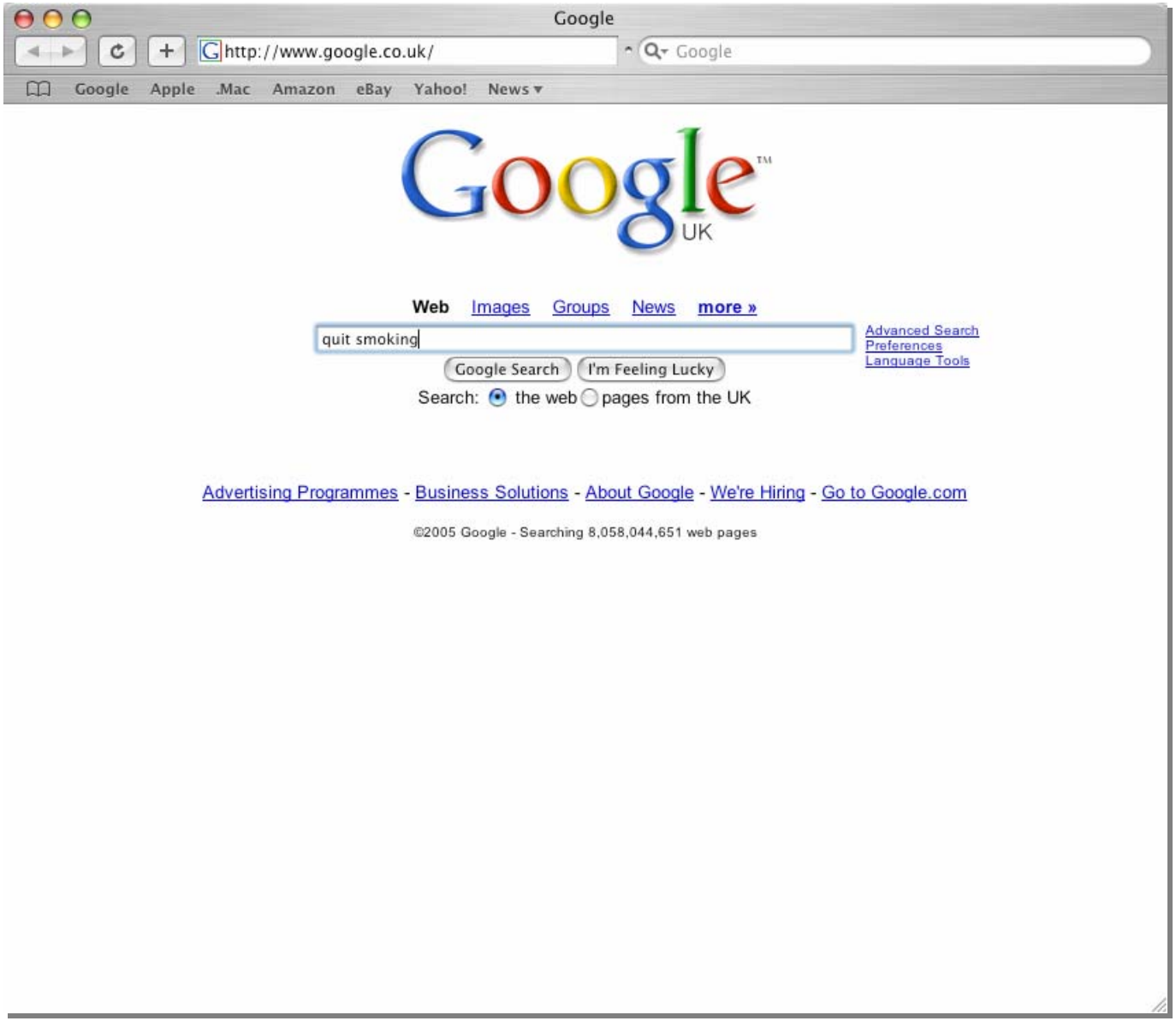
*The Digital Future Report. USC Annenberg School Center for the Digital Future. September, 2004.

**Fox S and Fallows D. Internet Health Resources: Health searches and email have become more commonplace, but there is room for improvement in searches and overall Internet access. Pew Internet and American Life Project. July 16, 2003. Available at pewinternet.org.



Why the Internet?

- High reach
- Low cost
- Effective?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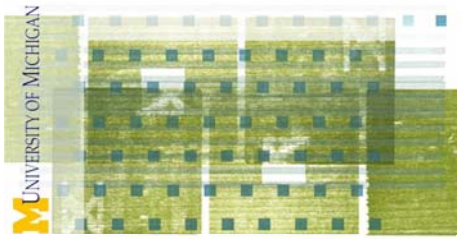
quit smoking
Advanced Search
Preferences
Language Tools
Google Search I'm Feeling Lucky
Search: the web pages from the UK
Advertising Programmes - Business Solutions - About Google - We're Hiring - Go to Google.com
©2005 Google - Searching 8,058,044,651 web pages

"The big invention was not the television… the big invention was the soap opera."

Isaac Azimov



RESEARCH REPORT

Randomized controlled trial of a web-based computer-tailored smoking cessation program as a supplement to nicotine patch therapy

Victor J. Strecher[1], Saul Shiffman[2,3] & Robert West[4]

University of Michigan, Ann Arbor, USA[1], University of Pittsburgh, Pennsylvania, USA[2], Pinney Associates, LLC[3] and University College London, London, UK[4]

Correspondence to:
Victor J. Strecher
University of Michigan Comprehensive Cancer Center
300 N. Ingalls, Room 5D-04 (0471)
Ann Arbor
MI 48109–0471
USA
Tel: 734 763 6099
Fax: 734 647 7343
E-mail: strecher@umich.edu

Submitted 22 June 2004;
initial review completed 16 August 2004;
final version accepted 22 November 2004

ABSTRACT

Aim To assess the efficacy of World Wide Web-based tailored behavioral smoking cessation materials among nicotine patch users.

Design Two-group randomized controlled trial.

Setting World Wide Web in England and Republic of Ireland.

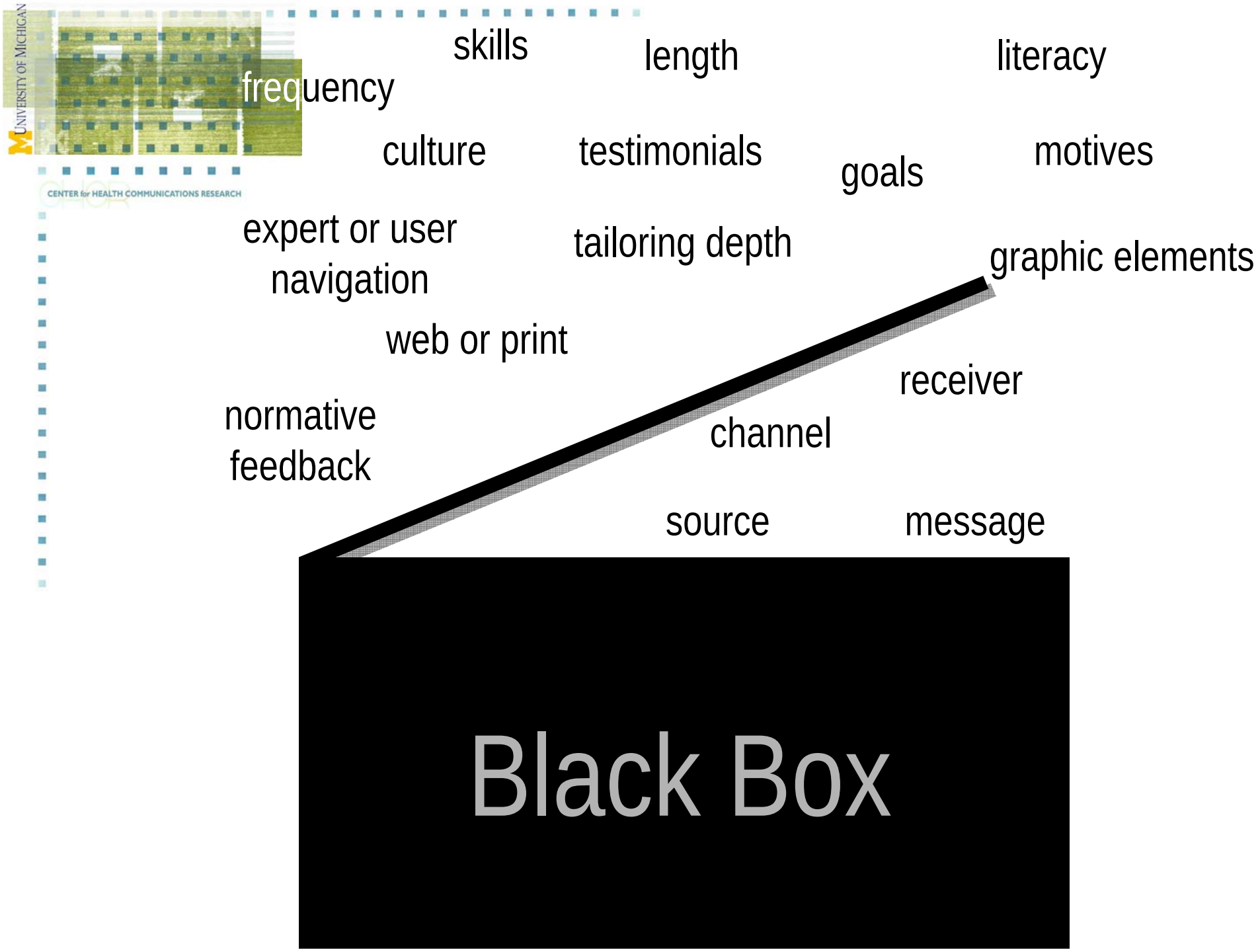
Participants A total of 3971 subjects who purchased a particular brand of nicotine patch and logged-on to use a free web-based behavioral support program.

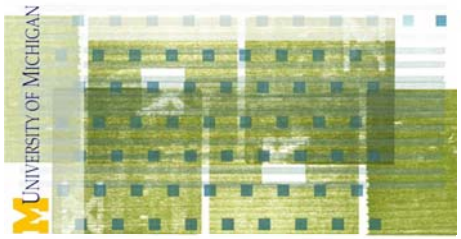
Intervention Web-based tailored behavioral smoking cessation materials or web-based non-tailored materials.

Measurements Twenty-eight-day continuous abstinence rates were assessed by internet-based survey at 6-week follow-up and 10-week continuous rates at 12-week follow-up.

Findings Using three approaches to the analyses of 6- and 12-week outcomes, participants in the tailored condition reported clinically and statistically significantly higher continuous abstinence rates than participants in the non-tailored condition. In our primary analyses using as a denominator all subjects who logged-on to the treatment site at least once, continuous abstinence rates at 6 weeks were 29.0% in the tailored condition versus 23.9% in the non-tailored condition (OR = 1.30; $P = 0.0006$); at 12 weeks continuous abstinence rates were 22.8% versus 18.1%, respectively (OR = 1.34; $P = 0.0006$). Moreover, satisfaction with the program was significantly higher in the tailored than in the non-tailored condition.

Conclusions The results of this study demonstrate a benefit of the web-based tailored behavioral support materials used in conjunction with nicotine replacement therapy. A web-based program that collects relevant information from users and tailors the intervention to their specific needs had significant advantages over a web-based non-tailored cessation program.


skills
length
literacy
frequency
culture
testimonials
goals
motives
expert or user
navigation
tailoring depth
graphic elements
web or print
receiver
normative
feedback
channel
source
message
Black Box



New approaches to drug trials…

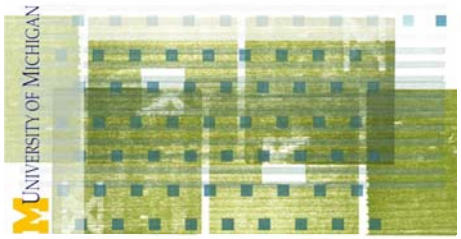
QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

"Clinical trials of drugs and diagnostics using pharmacogenomics will deviate from the standard empirical clinical trial model."

Robert Temple, MD, Center for Drug Evaluation and Research, FDA, at Workshop on PGx and Co-Development, April 11, 2005

Identifying the active elements…

Number of factors	Factorial design	Fractional factorial design
1	2	
2	4	
3	8	
4	16	
5	32	
6	64	16
7	128	
8	256	
9	512	
10	1024	



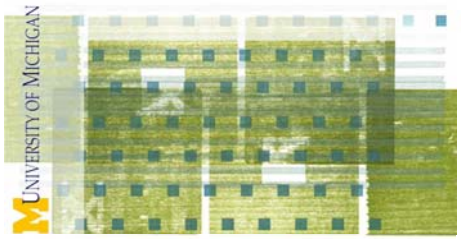
Fractional factorial designs

Key experimental design for manufacturing industries

- Metallurgy and material sciences
- Pharmaceuticals

Statistical methodology for systematically:

- Identifying important design variables (screening)
- Optimizing product or process design



A Strategy for Optimizing and Evaluating Behavioral Interventions

Linda M. Collins, Ph.D.
The Methodology Center
Department of Human Development and Family Studies
The Pennsylvania State University

Susan A. Murphy, Ph.D.
Institute for Social Research
Department of Statistics
University of Michigan

Vijay N. Nair, Ph.D.
Department of Statistics
Department of Industrial and Operations Engineering
University of Michigan

Victor J. Strecher, Ph.D.
Department of Health Behavior and Health Education
University of Michigan

ABSTRACT

Background: *Although the optimization of behavioral interventions offers the potential of both public health and research benefits, currently there is no widely agreed-upon principled procedure for accomplishing this.* ***Purpose:*** *This article suggests a multiphase optimization strategy (MOST) for achieving the dual goals of program optimization and program evaluation in the behavioral intervention field.* ***Methods:*** *MOST consists of the following three phases: (a) screening, in which randomized experimentation closely guided by theory is used to assess an array of program and/or delivery components and select the components that merit further investigation; (b) refining, in which interactions among the identified set of components and their interrelationships with covariates are investigated in detail, again via randomized experiments, and optimal dosage levels and combinations of components are identified; and (c) confirming, in which the resulting optimized intervention is evaluated by means of a standard randomized intervention trial. To make the best use of available resources, MOST relies on design and analysis tools that help maximize efficiency, such as fractional factorials.* ***Results:*** *A slightly modified version of an actual application of MOST to develop a smoking cessation intervention is used to develop and present the ideas.* ***Conclusions:*** *MOST has the potential to husband program development resources while increasing our understanding of the individual program and delivery components that make up interventions. Considerations, challenges, open questions, and other potential benefits are discussed.*

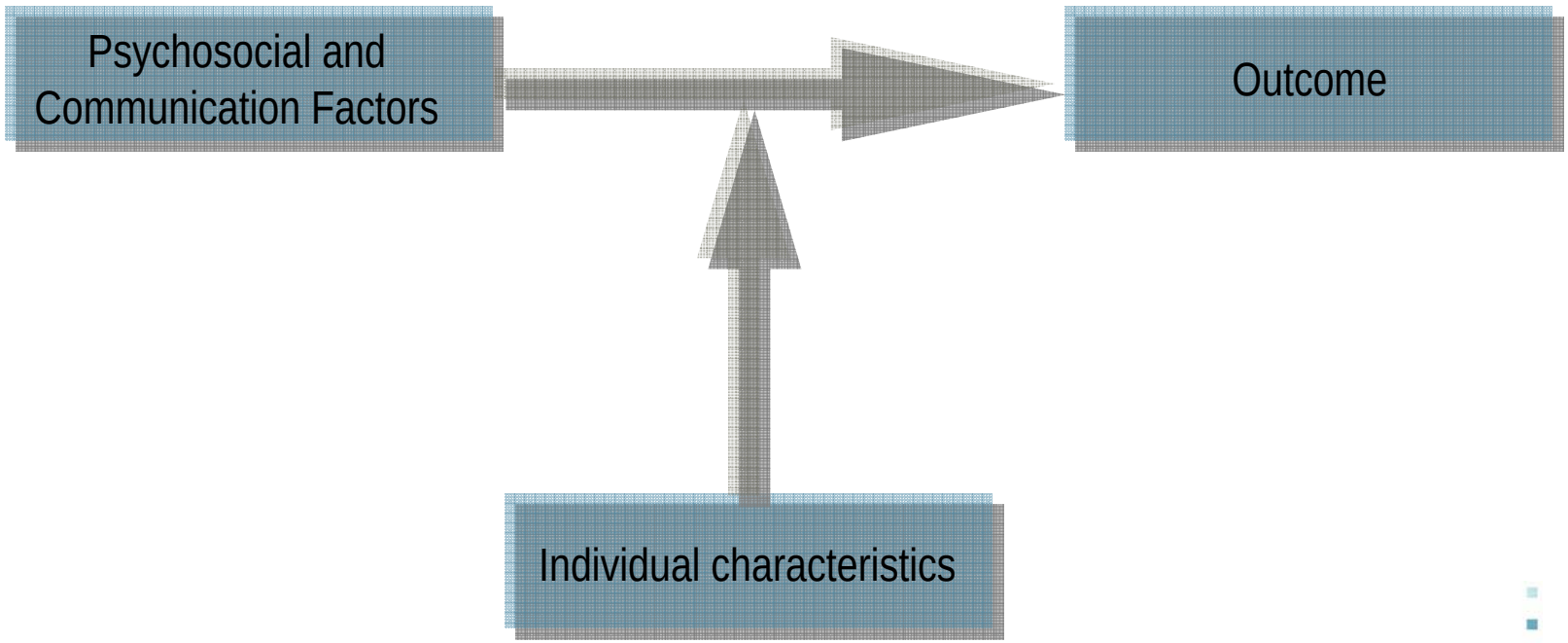
(**Ann Behav Med** 2005, *30*(1):65–73)

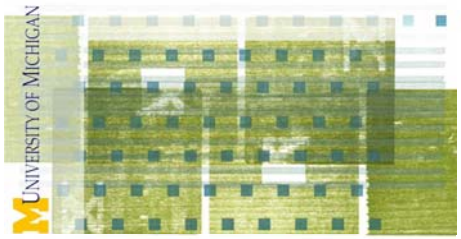
INTRODUCTION

Intervention researchers, intervention targets, health care providers, and other stakeholders would agree that optimizing the potency[1] of behavioral interventions is a worthy objective. Optimized interventions will offer public health advantages by reaching more people and having a greater and more lasting impact on those they reach. Moreover, optimized interventions will benefit research by leading to larger effect sizes and therefore improved statistical power for detecting genuine treatment effects. Although currently there is no widely agreed-upon procedure for optimizing an intervention and its delivery, it is clear that an efficient and scientifically rigorous method is needed for exploring the individual and joint operation of the components of an intervention. Here the term *components* is broadly defined to include both program (i.e., aspects of the intervention program itself) and delivery (i.e., aspects of the implementation)

This work has been supported by National Institute on Drug Abuse Grants P50 DA10075 (Dr. Collins and Dr. Murphy) and K02 DA15674 (Dr. Murphy), National Cancer Institute Grant P50 CA 101451 (Dr. Strecher, Dr. Murphy, and Dr. Nair), and National Science Foundation Grant DMS 0204247 (Dr. Nair). This article has benefited from discussion at the 2003 Snowbird Conference and the 2003 Society for Prevention Research Conference, particularly the comments of Gilbert

Conceptual approach to each project





Project 1: Determining the Active Ingredients of Web-Based Smoking Cessation Programs

Principal Investigator:

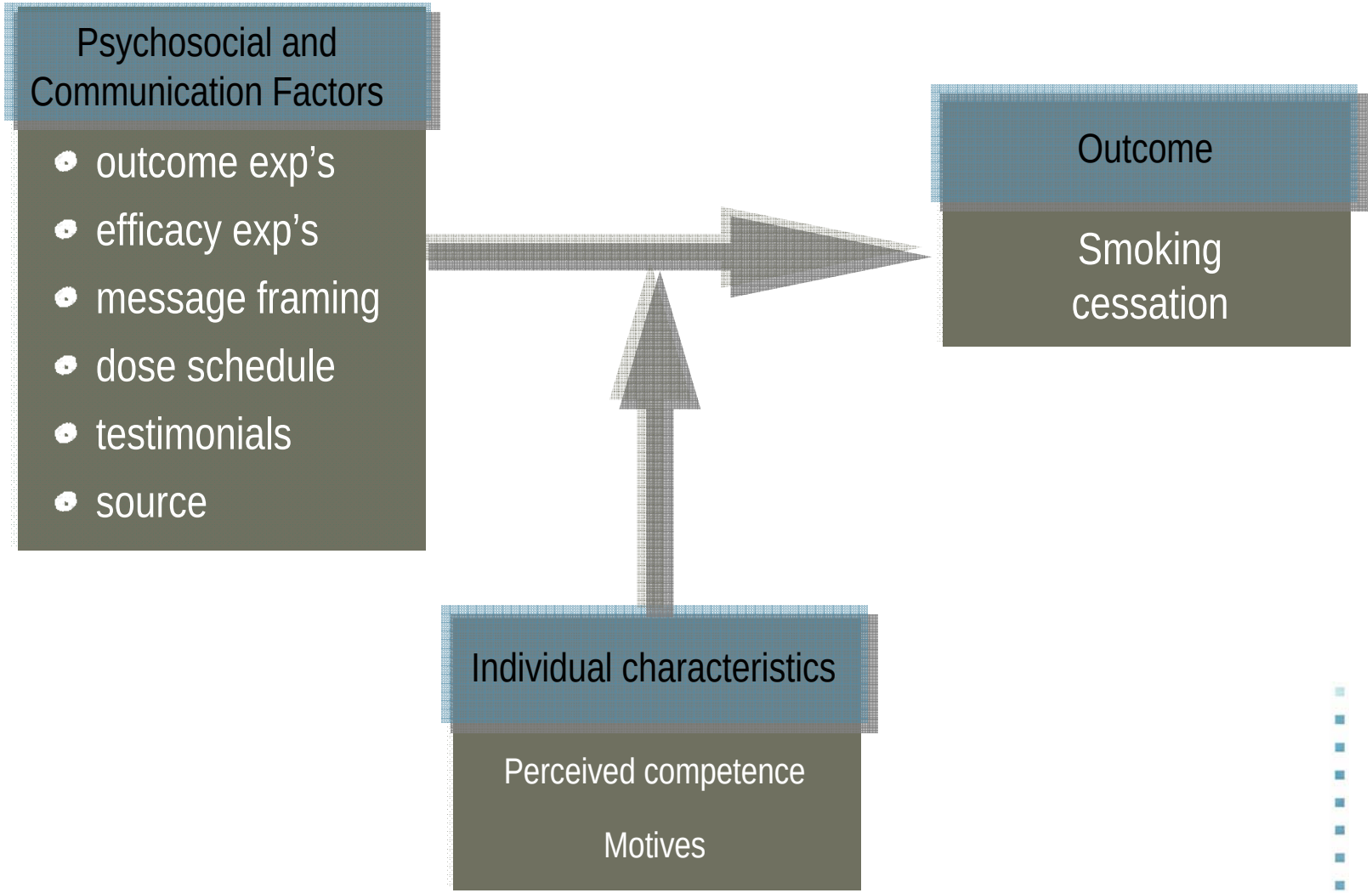
- Victor J. Strecher, PhD, MPH

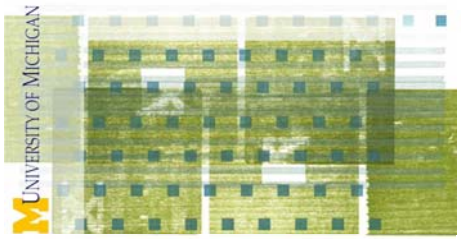
School of Public Health/Cancer Center, University of Michigan

Co-Investigators:

- Cynthia S. Pomerleau, PhD - Psychiatry, University of Michigan
- Ovide F. Pomerleau, PhD - Psychiatry, University of Michigan
- Jennifer B. McClure, PhD - Center for Health Studies, Group Health Cooperative
- Ronald F. Davis, MD - Cancer Center, Henry Ford Health System

Project 1 (Strecher)





Project 2: Ethnic and Motivational Tailoring

Principal Investigator:

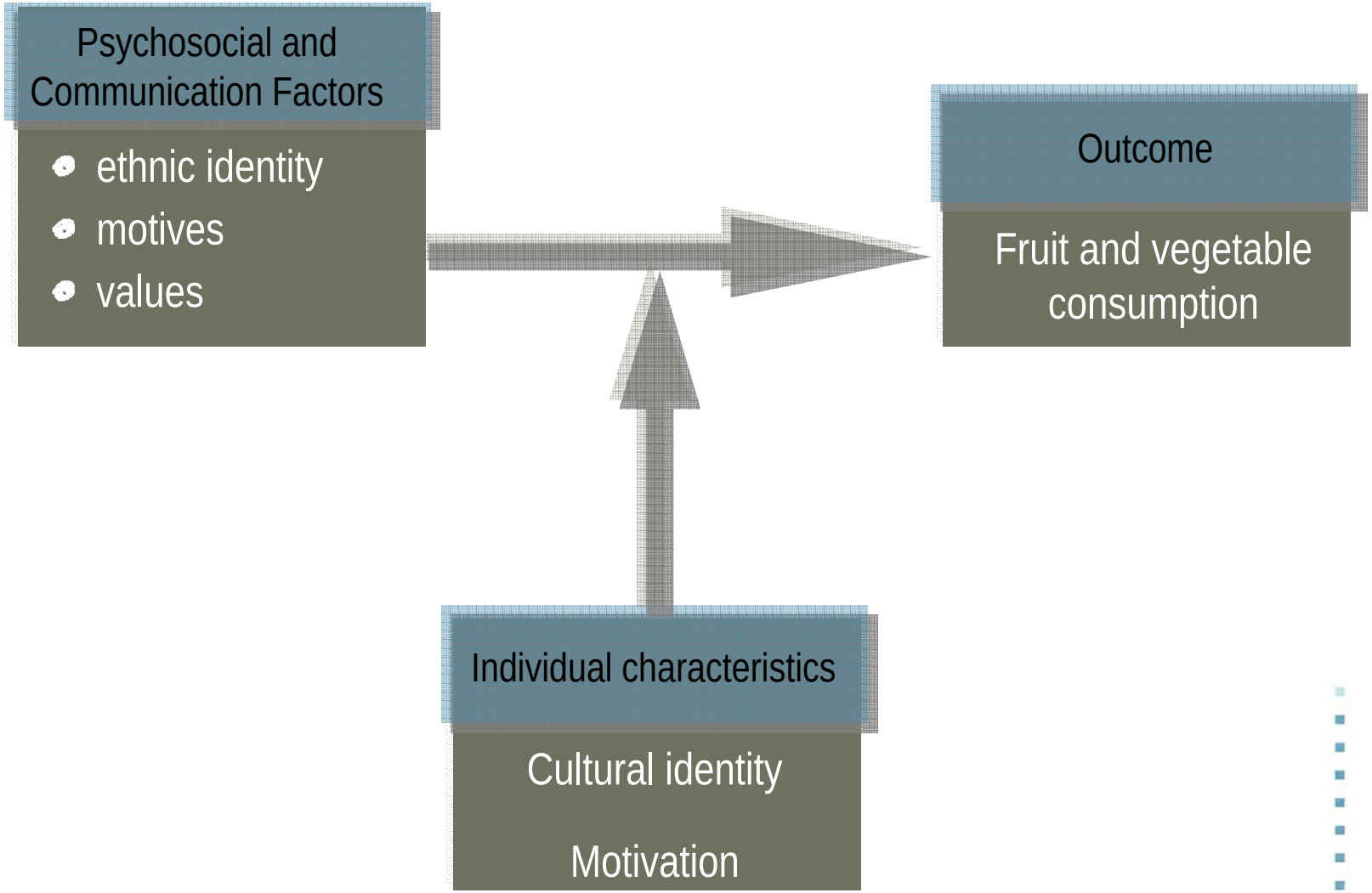
- Kenneth A. Resnicow, PhD

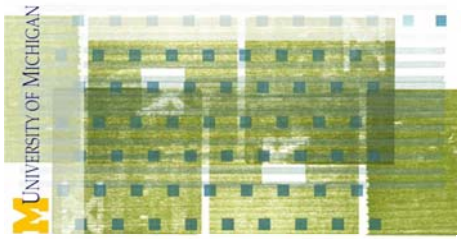
School of Public Health/ Cancer Center, University of Michigan

Co-Investigators:

- Victor J. Strecher, PhD - School of Public Health, University of Michigan
- Christine C. Johnson, PhD - Henry Ford Health System
- Dennis D. Tolsma, PhD - Psychology, University of Michigan
- Paula M. Lanz, PhD - Kaiser Permanente - Georgia

Project 2 (Resnicow)





Project 3: Risk Communication: A Tamoxifen Prophylaxis Decision Aid

Principal Investigator:

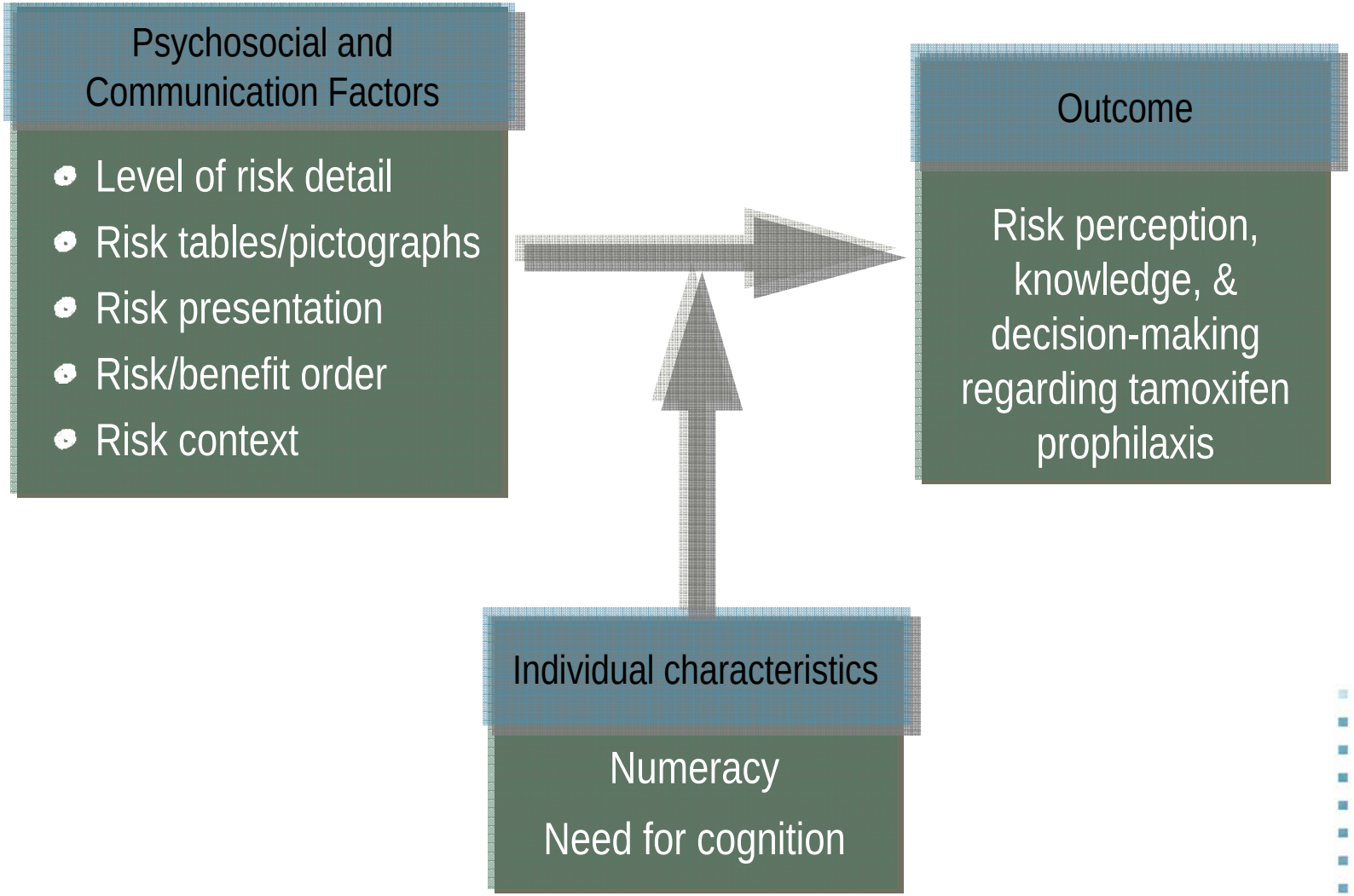
- Peter A. Ubel, MD

Internal Medicine, University of Michigan

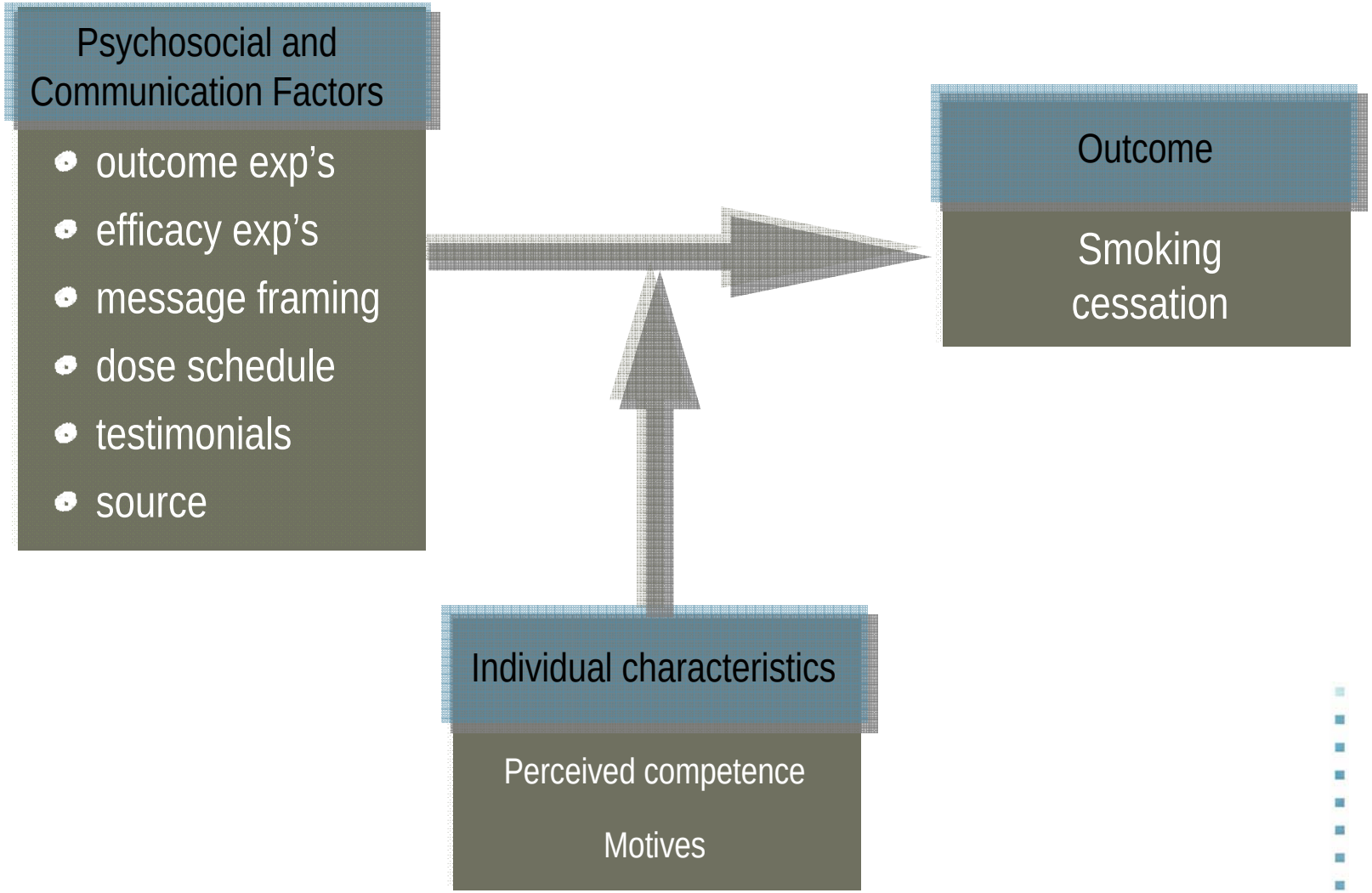
Co-Investigators:

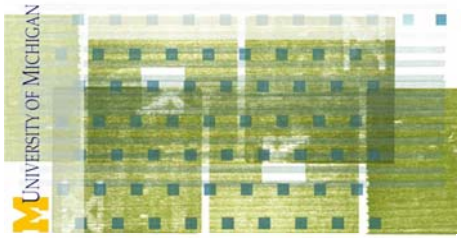
- Angela Fagerlin, PhD - Internal Medicine, University of Michigan
- Dylan M. Smith, PhD - Internal Medicine, University of Michigan
- Brian Zikmund-Fisher, PhD - Internal Medicine, University of Michigan
- Priti R. Shah, PhD - Psychology, University of Michigan
- Paula M. Lanz, PhD - Public Health, University of Michigan
- Daniel F. Hayes, MD - Internal Medicine, University of Michigan
- Jennifer B. McClure, PhD - Center for Health Studies, Group Health Cooperative
- Azadeh Stark, PhD – Henry Ford Health System
- Sharon A. Alford, PhD - Henry Ford Health System

Project 3 (Ubel)

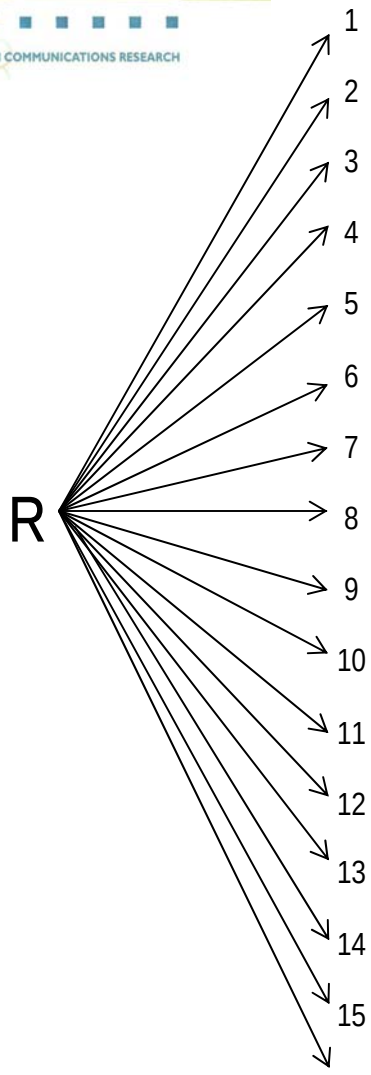


Project 1 (Strecher)





CENTER for HEALTH COMMUNICATIONS RESEARCH



Group	outcome depth	efficacy depth	message framing	dose schedule	testimonial depth	message source
1	no	no	gain	one	no	HMO
2	no	no	gain	five	yes	team
3	no	no	loss	one	yes	HMO
4	no	no	loss	five	no	team
5	no	yes	gain	one	yes	team
6	no	yes	gain	five	no	HMO
7	no	yes	loss	one	no	team
8	no	yes	loss	five	yes	HMO
9	yes	no	gain	one	no	team
10	yes	no	gain	five	yes	HMO
11	yes	no	loss	one	yes	team
12	yes	no	loss	five	no	HMO
13	yes	yes	gain	one	yes	HMO
14	yes	yes	gain	five	no	team
15	yes	yes	loss	one	no	HMO
16	yes	yes	loss	five	yes	team

Fractional factorial design…

QuickTime™ and a
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are needed to see this picture.

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Nicotine patch *plus*

TIFF (Uncompressed) decompressor
are needed to see this picture

Fractional factorial design… source

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Nicotine patch *plus*

TIFF (Uncompressed) decompressor
are needed to see this picture

Institution

[*The HMO*] wants to help you quit smoking…

Team

The team at [*the HMO*] wants to support your effort to quit smoking…

Fractional factorial design… outcome depth

QuickTime™ and a
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QuickTime™ and a
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Nicotine patch *plus*

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Low

Let's talk about your general motives for quitting…

High

Let's talk about the specific motives and types of motives you have for quitting…

Fractional factorial design… outcome framing

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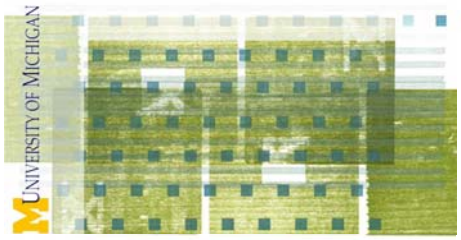
Loss

If you don't quit smoking, bad things will happen to you…

Gain

If you quit smoking, good things will happen to you…



Fractional factorial design… self-efficacy depth

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Low

Let's help you with your barriers to quitting…

High

Let's help you with your very specific barriers to quitting and strategies you use to cope…

Fractional factorial design… testimonial depth

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Low

Here's a story of a successful quitter…

High

Here's a story of a successful quitter who was a lot like you…

Fractional factorial design… exposure

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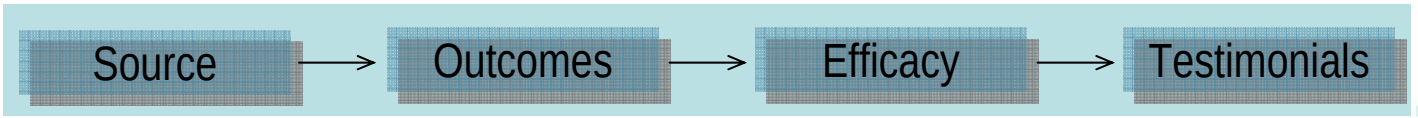
Single encounter

Multiple encounters



Introduction

Welcome back Brian! As we come to the end of your **Project Quit** guide, we'd like to leave you with some words of advice from Scott. Like you, he wanted to quit smoking but faced many challenges. Here's his story.

Why did you decide to quit?

I had several good reasons for quitting. First, I needed to save money for a new car and knew I was throwing a lot of money away buying cigarettes. Second, I didn't like leaving the fun when I'd have to step outside to smoke at places that didn't allow smoking inside. It made me feel like an outcast. Overall, I guess I just finally had enough.

How did you prepare for the change?

Well, I had read that you have to change things that you do and how you think to stop smoking. So, about two weeks before I quit, I decided to track all my cigarettes. Every time I wanted one, I'd first write down why I wanted it and when I wanted it. Then I'd write why I wanted to quit.

Did you do anything different as your quit day approached?

Yes. I usually smoked about a pack a day, but started cutting a few out each day just to see how I'd do. I'd play a game and would try to come up with 5 things I could be doing instead of sitting there idle, potentially smoking. Once I came up with the list, I could either reward myself and have a cigarette, or just go do something from the list. I also began to skip my "dessert" cigarette before bed.

Did tracking why you smoked help?

Definitely. When I looked back over what I had tracked about my smoke breaks, what stood out the most was that I didn't always have a good reason to be smoking. I was just smoking to smoke.

Did you ask for help?

Not initially, but once my friends and family knew how much I wanted to quit, they were very helpful, giving me lots of support. We spent a lot of time at the movies, sitting in the non-smoking sections of restaurants, visiting local stores and museums I hadn't been to in a while, and talking about how hard it is to quit. I can't believe how many people listened to me about how hard it was for me to quit.

Low Tailored Testimonial -

Tailoring Variable Used In This Case:
+ Gender

As we come to the end of your **Project Quit** guide, we'd like to leave you with some words of advice from Deb. Like you, she wanted to quit smoking but faced many challenges. Here's her story.

Why did you decide to quit?

I had several good reasons for quitting. First, we needed to save money to put towards a car that would actually work. Second, my husband wanted me to. Third, I didn't like leaving the fun when I'd have to step outside to smoke at places that didn't allow smoking inside. It made me feel like an outcast. Plus, it wasn't really fair to the kids for me to tell them not to smoke while I did. "Do as I say, not as I do" isn't such a great example to set.

How did you prepare for the change?

I had heard that you have to change what you do and how you think to stop smoking, so I wanted to try something I actually thought I could do to help me quit. So about two weeks before I was going to quit, I began to walk first thing in the morning. I don't normally smoke right before or after exercising, so that helped me delay my first smoke of the day.

Did you try anything else as your quit day approached?

Yes. I usually smoked about a pack a day, but started cutting a few out each day just to see how I'd do. I'd make a game out of it by trying to drive to work without a cigarette. Then if I really needed it, I'd have one on the way from the parking lot to the office. I also cut back on going to the bar and parties where I knew there would be a lot of smoking. And I began to skip my "dessert" cigarette before bed.

Did these things help?

Definitely. By the time I quit, I was walking three days a week and beginning to feel better already.

Did you ask for help?

I told my cousin Jason that I was going to need some help. If I say I'm going to do something, he doesn't cut me much slack until I do it, which is exactly what I needed. We spent a lot of time at the movies, sitting in the non-smoking sections of restaurants, and hanging out in other places that wouldn't tempt me. Of course, all I really needed to do was take one good look at my kids to make me feel good about my decision.

High Tailored Testimonial

Tailoring Variables Used In This Case:

+ Age
+ Gender
+ Ethnicity
+ Marital status
+ Smoking status of spouse
+ Child in home
+ Physically active
+ Number of cigs smoked
+ Job status
+ Barrier
+ **Social Support**

Project Quit

http://healthmedia.umich.edu/cgi-bin/WebObjects/Pr

Google

Google Apple .Mac Amazon eBay Yahoo! News (819) Apple (178) Wikipedia UM CHCR PubMed ejournals UM Directory C-Tools

PROJECT Quit






Welcome to Project Quit!

Project Quit is an online smoking cessation program being developed by researchers at the University of Michigan, Group Health Cooperative, and Henry Ford Health System. Funding for this program is provided by the National Cancer Institute.

GroupHealth COOPERATIVE

Henry Ford HEALTH SYSTEM

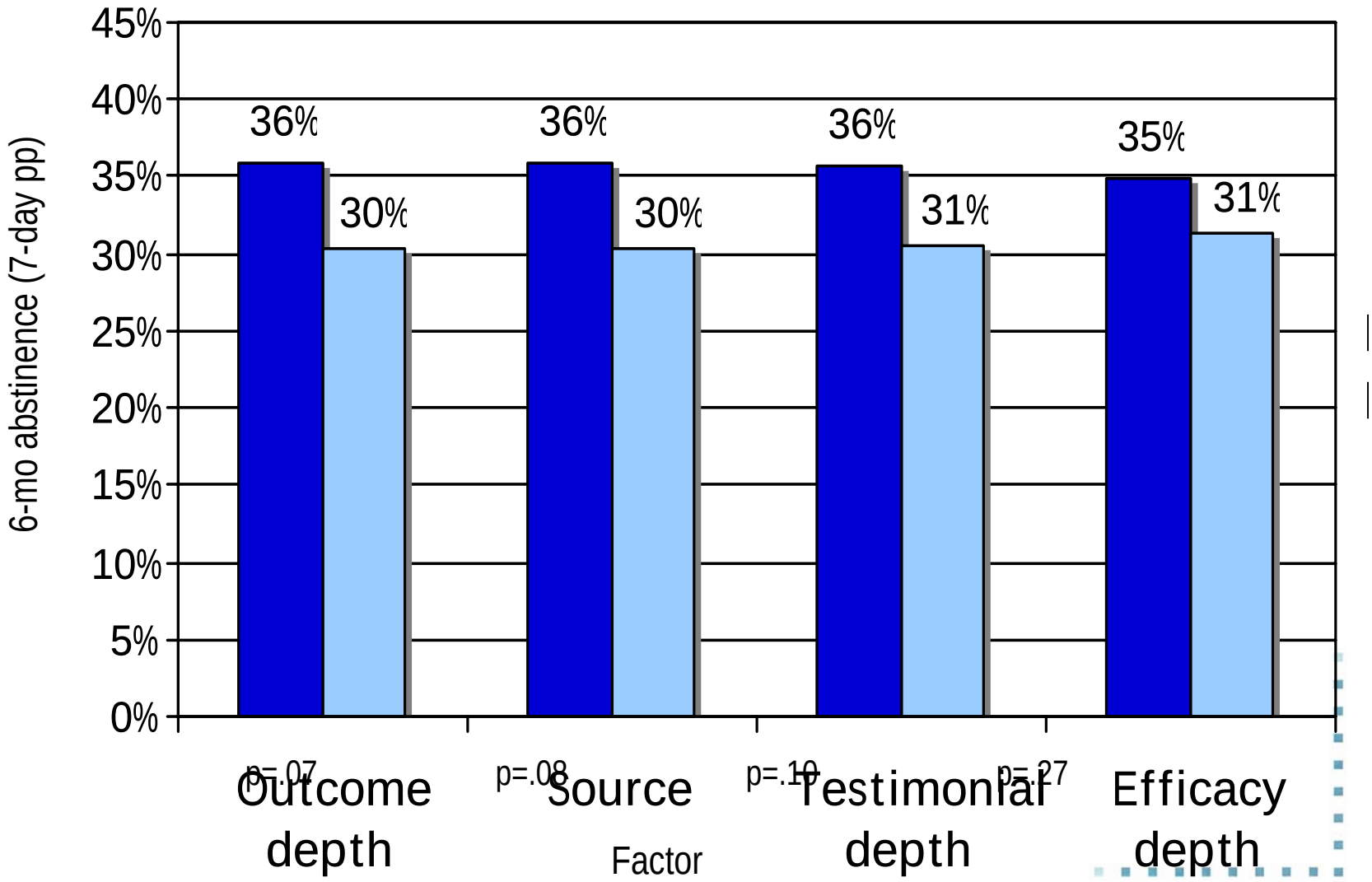
University of Michigan Health System

Phase I

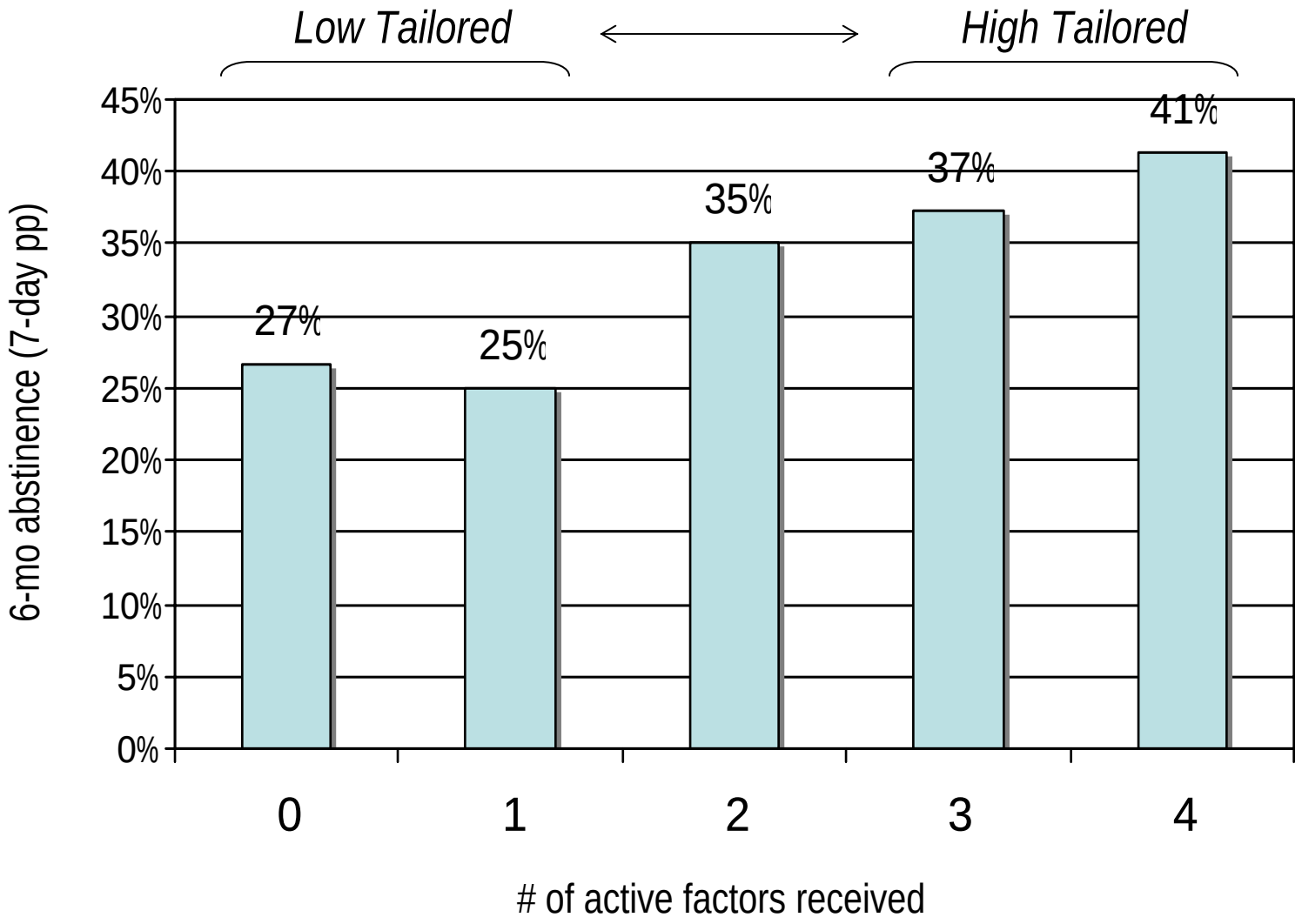
Preliminary Results

About Project Quit | Help | Contact Us

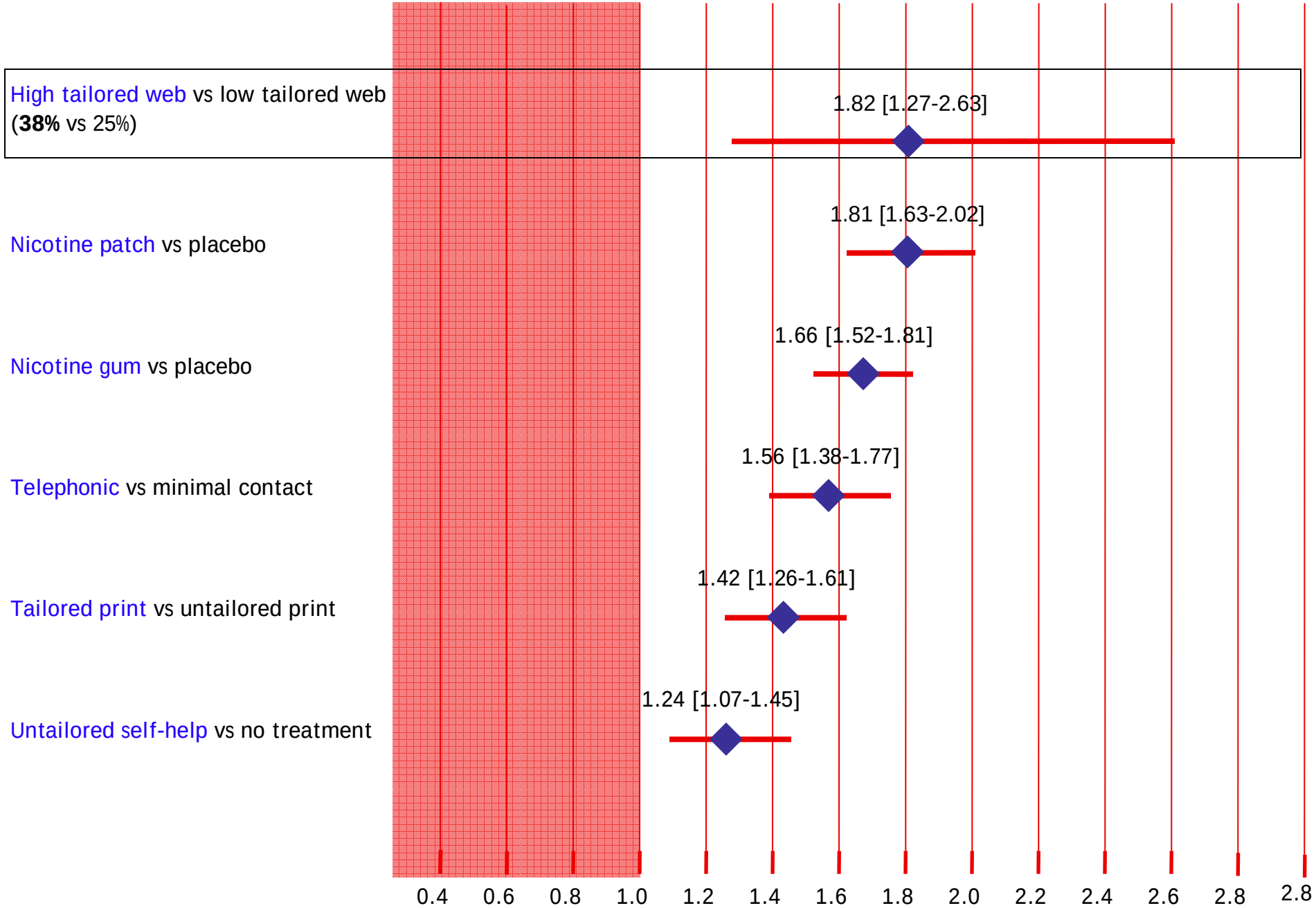
Effects of factor manipulations on 6-mo abstinence (7-day point prevalence). (n=958)

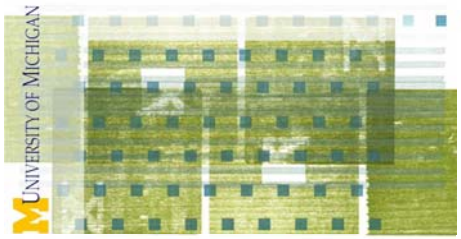


Number of active factors received (efficacy, outcome, source, testimonial) by 6-mo abstinence (7-day point prevalence). (n=958; Wald X^2=12.1; p<.02)



Comparison of smoking cessation treatments (Cochrane reports: odds ratios)





New approaches to drug trials…

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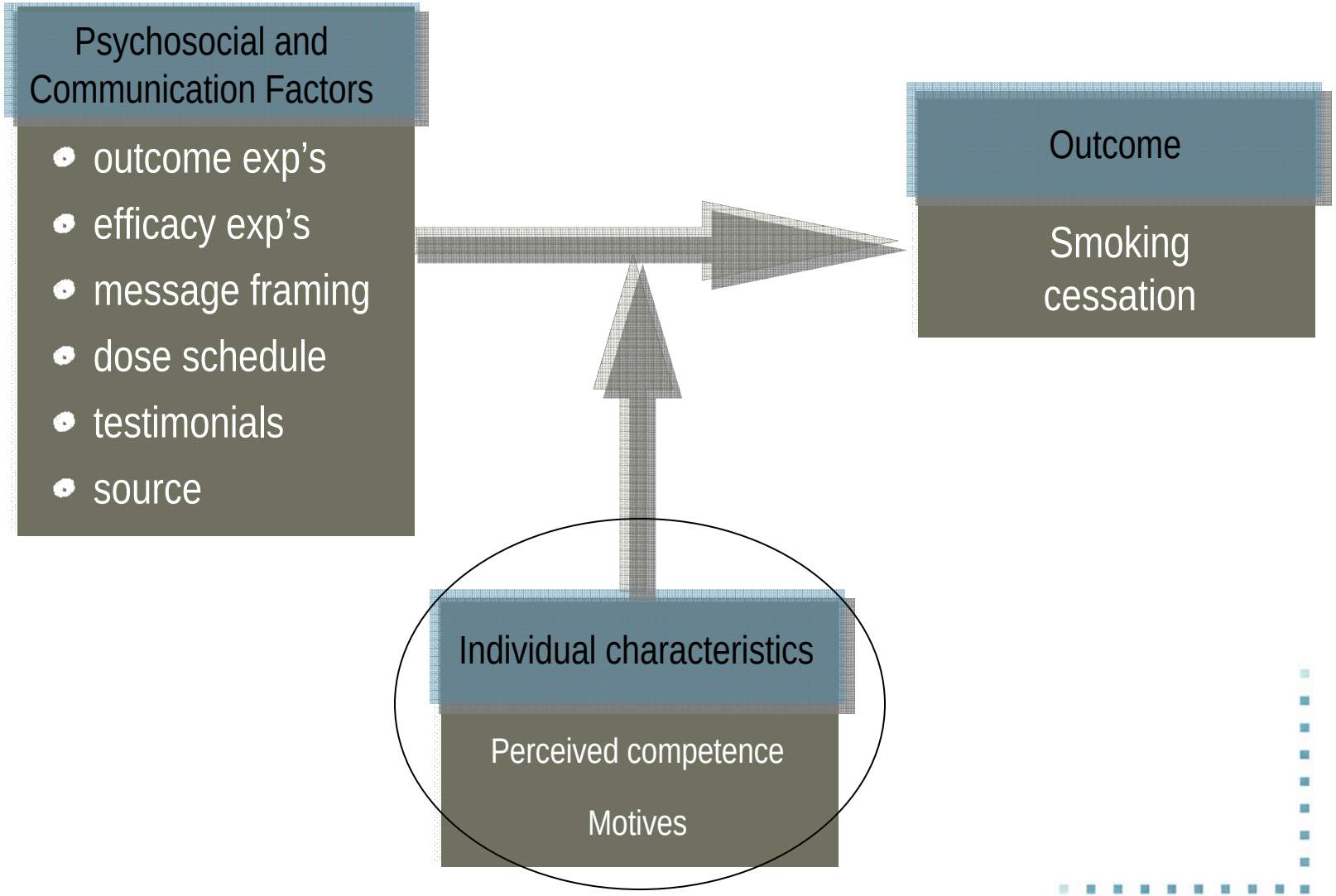
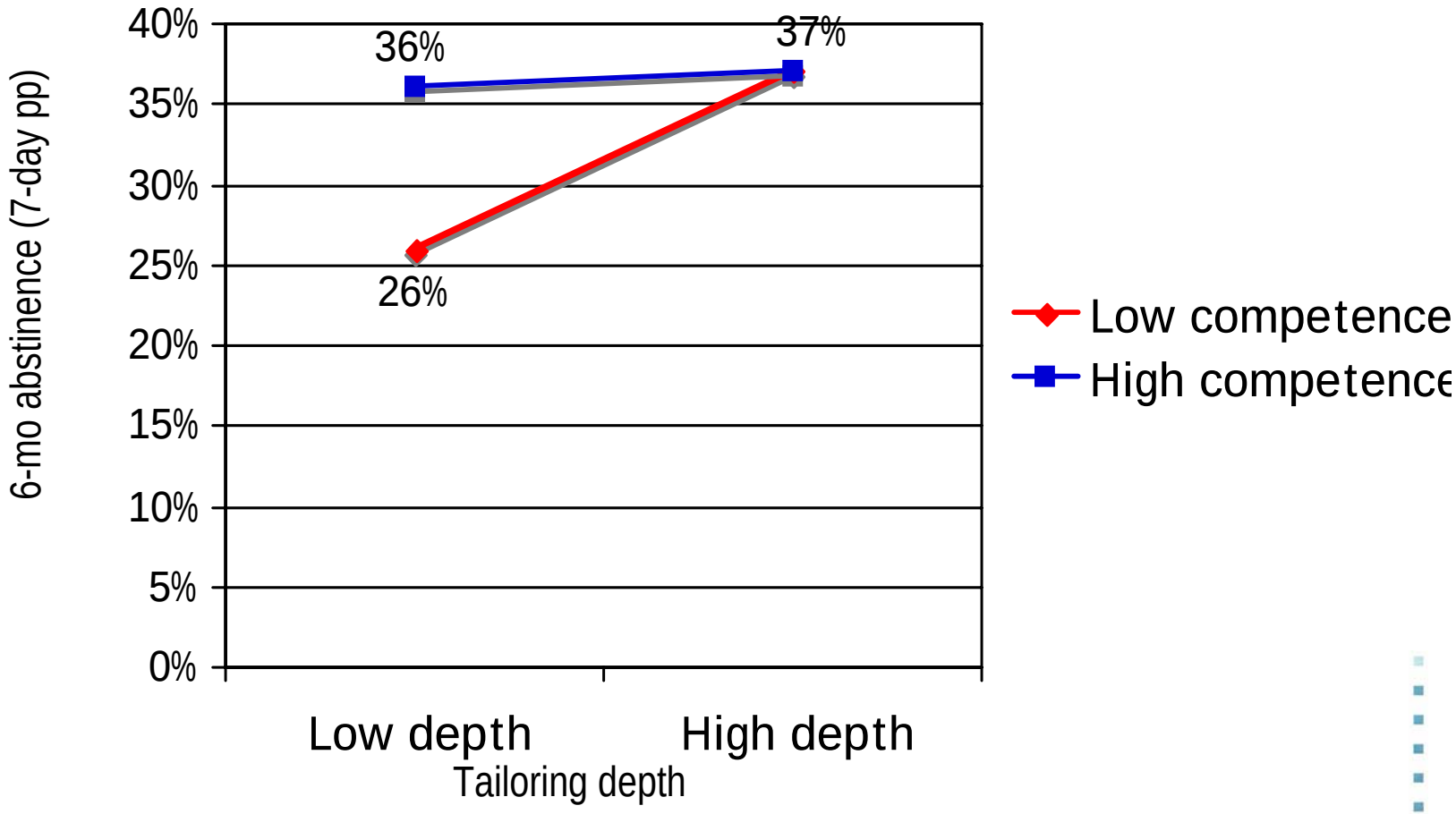
"Learning about differences in response to treatment is not so easy and requires that we do subset analysis."

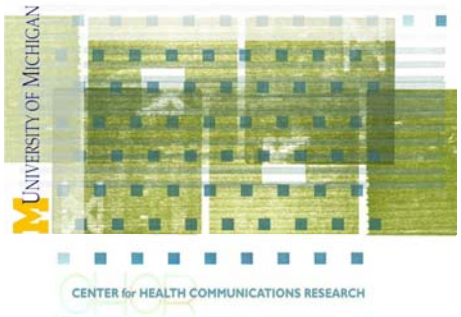
Robert Temple, MD, Center for Drug Evaluation and Research, FDA, at Workshop on PGx and Co-Development, April 11, 2005

Project 1 (Strecher)



Tailoring depth by 6-mo abstinence stratified by perceived competence. (n=958; Wald X^2 of interaction = 3.1; p<.08)





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