

Effects of a Tailored Messaging Intervention on Physical Activity and Fruit and Vegetable Consumption

David K. Ahern, Ph.D.¹

Lucille A. Cardella, Ph.D.¹

George D. Papandonatos, Ph.D.²

Bess Marcus, Ph.D.²

Kim M. Gans, Ph.D., MPH, LDN²

Stefany Palmieri, B.S.¹

Chris Sciamanna, M.D., MPH³

The Abacus Group¹

Brown University Program in Medicine²

Jefferson Medical College³



THE ABACUS GROUP

Introduction

- Improving cancer risk behaviors, such as increasing physical activity and fruit and vegetable (F&V) consumption, is a national health priority
- Given the explosive growth of the internet over the past decade, the internet is an attractive intervention channel
- We set out to examine the impact of computer-tailored messages for three common cancer risk behaviors: physical inactivity, inadequate F&V consumption, and smoking

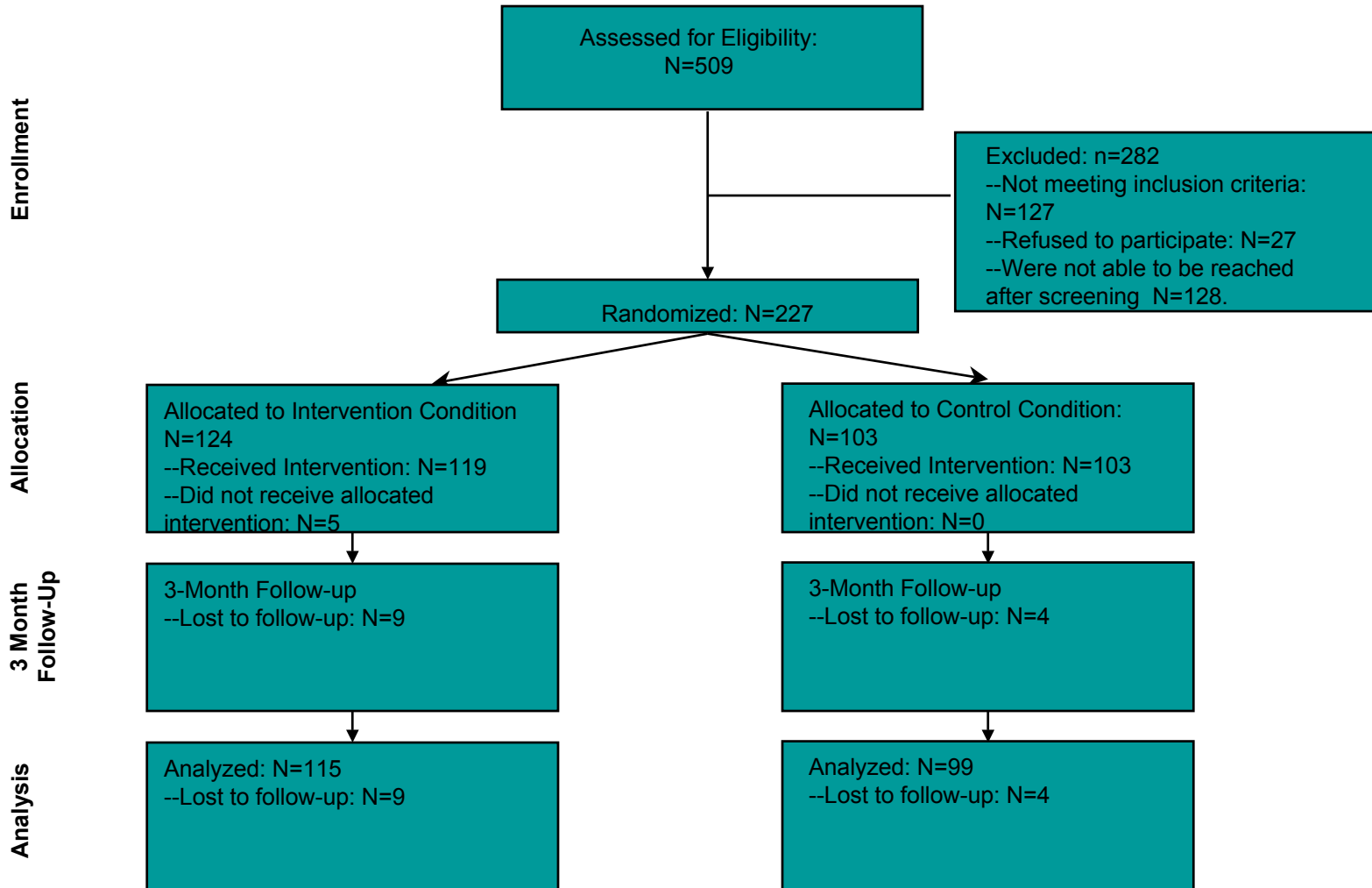
Study Design

- Randomized controlled trial in 2003-2004 with two groups
 - Experimental Group – tailored, web-based tools to improve the primary outcome of physical activity and secondary outcome of F&V consumption
 - Control Group – general written materials on similar content (physical activity, F&V intake, Smoking) mailed to the home

Participants

- Recruited from newspaper ads, printed flyers posted at worksites, and hospital-based, primary care clinic
- Judged medically able to participate via a negative score on the Physical Activity Readiness Questionnaire (PAR-Q) or via active consent of participant's physician
- Exclusionary criteria:
 - Currently exercising at least 90 minutes per week
 - Active cancer treatment
 - Under age 18
 - Relocating out of the state in 12 weeks

Subject Sample



Study Conditions

- **Experimental group:**
 - Access to computerized tailored feedback for 12 weeks (unlimited access)
 - Access to “library” of health information on cancer risk modification via Web
 - Bi-weekly telephone reminders to use the website
 - Raffle incentive for first log-in each week
- **Control Group:**
 - Mailed content-relevant NIH pamphlets (weekly for 12 weeks)
 - Raffle incentive in mailing to home

My Health Maximizer

My Health Maximizer - Welcome - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <https://www.myhealthmaximizer.com/Home.aspx> Go Links

June 10, 2004 ESPAÑOL | CUSTOMIZE | HOME | LOG OUT

MY HEALTH MAXIMIZER SEARCH

HEALTH E-LIFESTYLE CENTERS | PHYSICAL ACTIVITY | HEALTHY EATING | STOPPING SMOKING

HEALTH E-EVALUATORS | HEALTH E-ADVICE | HEALTH E-CALCULATORS | HEALTH E-LOGBOOK | HEALTH E-FORUMS | HEALTH E-FAQ

Welcome, !

Who would think by sitting at a computer that you could become more active, eat healthier, lose weight, or stop smoking?! My Health Maximizer offers a variety of features that work together for good health.

The strength of My Health Maximizer is its **flexibility**. No matter where you are in your thinking about your health, we have features for you.

How do you get started with My Health Maximizer? First, read about our Physical Activity, Healthy Eating, and Stopping Smoking Centers **below**. Choose one by clicking on GO and get more instruction on how to use the features of that Center.

"This web site helped me in ways I didn't think possible. I am eating healthier and I exercise 5 days per week faithfully. There is so much valuable information including the E-log books to assist me in achieving my goals. Thank you Dr. Lucy and Stefany for making this program successful for me."
-- **Agnes, April 12, 2004.**

[Read more feedback from users.](#)

We encourage your feedback on our website. Please take a moment to offer your comments.

"Expect the best; convert problems into opportunities."

-Denis Waitley

My Health Maximizer

- Organized into 3 healthy lifestyle centers which address major risk factors (smoking, physical inactivity, poor nutrition/obesity)
- Utilizes known strategies in prevention of chronic medical conditions (e.g., exercise and diabetes; smoking cessation and benefits to blood pressure)
- Theory and evidence-based content
- Coordinated strategies between risk factors (e.g., exercise when have desire to smoke)
- Research study outcomes included increased physical activity and consumption of fruit and vegetables for participants who used the site.

Content

- Portions of the web site convert to Spanish
- Content is also sensitive to diversity issues (ethnicity, age, gender, income level, disability)
- Addresses barriers specific to groups (e.g., inexpensive ways to exercise, how to exercise given family responsibilities)
- Also, written at lower literacy level and in bulleted or brief paragraphs for enhanced readability

Lifestyle Centers

5 features

February 24, 2005 ESPAÑOL | CUSTOMIZE | HOME | LOG OUT

MY HEALTH MAXIMIZER SEARCH

HEALTH E-LIFESTYLE CENTERS | PHYSICAL ACTIVITY | **HEALTHY EATING** | STOPPING SMOKING


HEALTH E-VALUATORS | HEALTH E-ADVICE | HEALTH E-CALCULATORS | HEALTH E-LOGBOOK | HEALTH E-FAQ | *myMedicationAdvisor*[®]

HEALTHY EATING CENTER


How Do I Best Use the Healthy Eating Center



- 1. The Healthy Eating Center is designed to meet your needs whether you do not have good eating habits, are trying to eat better, or are interested in the latest information.
- 2. Click on the descriptions to the right and read about them to determine which one best describes you.
- 3. Next to the description that you choose, you will see a color-coded "Max" icon. For example, the "Orange Max" is for those of you who are sometimes thinking about improving your eating habits.
- 4. Look for your color-coded "Max" icon next to features and content **below** that is created specifically for where you are in your thinking about eating better. For example, Health eValuators have both a "Red Max" and an "Orange Max" indicating that they are most appropriate for those of you at the first and second levels of thinking.

Physical Activity
Healthy Eating
Stopping Smoking



Click here for the Max Scale



<p>HEALTH E-VALUATORS</p> <p>Use this series of interactive surveys to receive personalized guidance to help you evaluate how ready you are to change your eating habits. Determine specific benefits of healthy eating for you.</p> <p> GO</p>	<p>HEALTH E-CALCULATORS</p> <p>Use these tools to determine important measurements for healthy living.</p> <p> GO</p>	<p><i>myMedicationAdvisor</i>[®]</p> <p>A web-based program that provides educational information and guidance about the safe and appropriate use of medication. The program also provides methods to reduce the cost of selected prescription maintenance medications.</p> <p>Available only to those whose employers participate in this program.</p> <p>GO</p>
HEALTH E-ADVICE	HEALTH E-LOGBOOK	HEALTH E-FAQ

Max Scale

The MAX Scale



Rarely Think About It

"My family, friends, and doctor tell me to get more active. I don't really see the need." Like many people, you may not be aware of all of the benefits of being active. However, you may be experiencing problems sleeping, having energy, or breathing. Be open to learning new information about how physical activity can help you.



Sometimes Think About It

"I would like to get more active. I just can't get motivated." You have a general sense that being more active is important. You need more information about how physical activity specifically will benefit you. We can help you get that personalized information.



Preparing to Get Active

"I am ready to make a change, but I am concerned about failing." You are seriously planning to be more active. Many people have experienced starts and stops when beginning physical activity. We can help you to anticipate barriers to success and to develop ways to overcome them that fit in your lifestyle.



Have Begun to Be Active

"I know what to do and have begun to do it. What if I can't keep it up?" It can be frustrating to go through cycles of being active and inactive or losing and gaining weight. This is a common experience. Don't give up! We can help you to plan for what to do when slips to being inactive occur and to refine your strategies.



Want to Go On Being Active

"I have experienced the benefits of being active. I want to learn more about it." You have focused on your successes. Now, you would like to further refine your strategies and expand your physical activity options. Good for you! You will be more likely to stick with it if you do.

Health e-Valuators

Mi Salud al Máximo - CENTRO DE ACTIVIDAD FÍSICA - e-Valuador de Salud - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address https://www.myhealthmaximizer.com/TailoredMessages.aspx?chunk_id=1 Go Links

E-VALUADOR DE SALUD | E-CONSEJOS SOBRE LA SALUD | E-CALCULADORAS DE LA SALUD | E-DIARIO SANO | E-FORUMS PARA LA SALUD |


E-RECURSOS PARA LA SALUD

CENTRO DE ACTIVIDAD FÍSICA | e-Valuador de Salud

¡BIENVENIDO DE NUEVO!

Estamos encantados de oírle otra vez. Esperamos que estos informes le parezcan interesantes y le sirvan de ayuda. Como siempre, nuestro objetivo consiste en ayudarlo a darse cuenta de qué ventajas tiene el realizar alguna actividad física, así como en ayudarlo para que comience a ser activo físicamente y se mantenga activo durante toda su vida. El hecho de que ahora esté leyendo este informe demuestra que tiene interés en mantenerse sano. ¡Siga así, está haciendo un gran trabajo!

La última vez que tuvimos noticias de usted, estaba dedicando 60 minutos a realizar alguna actividad física cada semana, y ahora está dedicando 0 minutos semanales.



¿HASTA QUÉ PUNTO ESTÁ EN FORMA?

Sus respuestas indican que sigue pensando en cómo volverse más activo. Como aún se limita a pensar en volverse más activo, tal vez no se sienta satisfecho de los progresos que ha realizado hasta el momento. ¡No se desanime! Este es un buen momento para empezar a hacer planes concretos sobre cómo volverse más activo.

Tenemos más información sobre los beneficios de la actividad física. Vaya a [¿Cómo Contribuiré a Mejorar mi Salud y Apariencia, si Aumento mi Actividad Física?](#)

PIENSE EN LOS BENEFICIOS...

SUS respuestas al cuestionario de hoy indican que no piensa a menudo en el lado

Done Internet


Health e-Calculators

My Health Maximizer - HEALTHY EATING CENTER | Can You Correctly Estimate Portion Size and Calor - Microsoft Internet Explo...

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

Address https://www.myhealthmaximizer.com/PortionCalculator.aspx?page_id=20 Go Links



How many ounces of plain candy-coated chocolates are there?

1 oz. 3 oz. 4 oz. 6 oz.

How many calories in this amount of candy-coated chocolates?

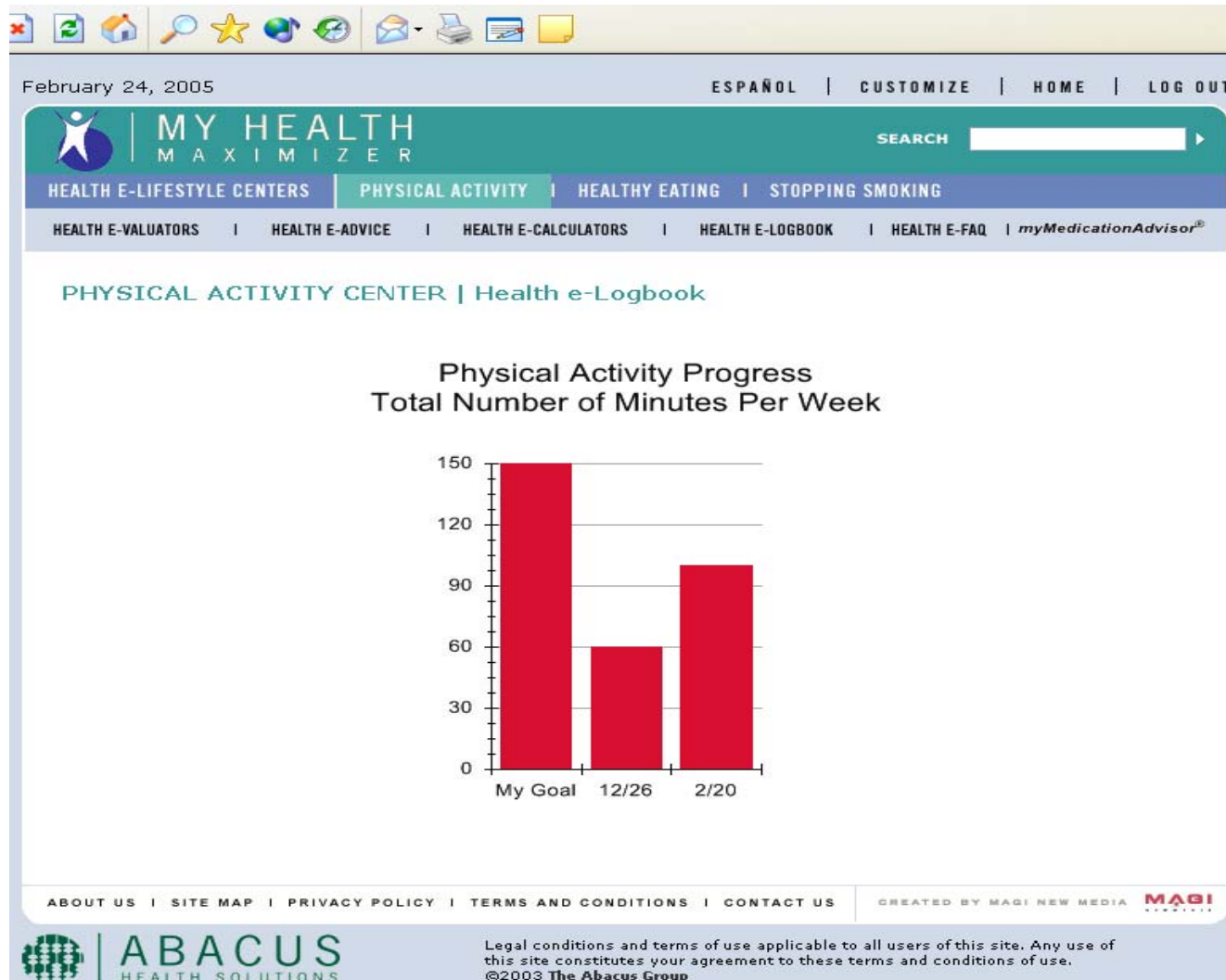
120 200 290 400

No. There are 3 oz. of candy-coated chocolates.

Not quite. There are 400 calories in this amount of candy-coated chocolates.

Done Internet

Health e-Logbook



Health e-Advice

My Health Maximizer - STOPPING SMOKING CENTER | What If I Slip and Have a Cigarette? - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Home Search Favorites

Address https://www.myhealthmaximizer.com/StaticAttractor.aspx?Content_url=what_if_i_slip_and_have_a_cigarette Go Links


June 10, 2004 ESPAÑOL | CUSTOMIZE | HOME | LOG OUT

MY HEALTH MAXIMIZER SEARCH

HEALTH E-LIFESTYLE CENTERS | PHYSICAL ACTIVITY | HEALTHY EATING | **STOPPING SMOKING**

HEALTH E-EVALUATORS | **HEALTH E-ADVICE** | HEALTH E-CALCULATORS | HEALTH E-LOGBOOK | HEALTH E-FORUMS | HEALTH E-FAQ

STOPPING SMOKING CENTER | What If I Slip and Have a Cigarette?



Adapted from National Cancer Institute and Surgeon General

Done Internet

Table 1: Baseline characteristics of study sample

Continuous variables	Overall n=227		Comparison group n=103		Intervention group n=124		p
	Mean	SD	Mean	SD	Mean	SD	
Age (years)	45.11	12.02	44.21	12.78	45.85	11.34	0.31
Education (years)	15.29	3.12	15.46	3.03	15.15	3.20	0.46
Physical Activity (mins)	22.60	28.17	23.43	28.32	21.91	28.15	0.69
PA Stage of Change	2.30	0.53	2.22	0.52	2.36	0.53	0.06
PA Self Efficacy	2.44	0.71	2.42	0.69	2.45	0.73	0.74
PA Decisional Balance	1.21	0.96	1.10	0.89	1.31	1.02	0.12
FV Intake (servings)	5.49	4.02	5.36	3.86	5.60	4.16	0.65
Intention to Change FV Intake	3.35	1.72	3.45	1.80	3.27	1.65	0.45
Categorical variables	n	%	n	%	n	%	
Sex (Female)	171	75.33	76	73.79	95	76.61	0.74
Race (Caucasian)	169	74.45	79	76.70	90	72.58	0.99
Hispanics	33	14.54	14	13.59	19	15.32	0.86
Income <30k	69	30.53	30	29.13	39	31.71	0.92
30k-50k	47	20.80	22	21.36	25	20.33	
50k-70k	44	19.47	19	18.45	25	20.33	
70k+	66	29.20	32	31.07	34	27.64	
Insurance (Yes)	204	89.87	93	90.29	111	89.52	0.83
PCP (Yes)	201	88.55	87	84.47	114	91.94	0.12
Internet access (Yes)	188	82.82	88	85.44	100	80.65	0.44
Email Availability (Yes)	179	78.85	82	79.61	97	78.23	0.93
Smoking (Yes)	55	24.23	27	26.21	28	22.58	0.63

Abbreviations: PA= Physical Activity, FV= Fruits & Vegetables, PCP= Primary Care Provider.

Range: Self Efficacy=1 to 5 (high), Decisional Balance= -5 to 5 (high), Stage of Change=1 to 5 (high).

Table 2: Group differences in residualized changescores

Primary Outcomes	Intervention group n=124			Comparison group n=103			Intervention- comparison		
	Mean	SE	p	Mean	SE	p	Mean	SE	p
Physical Activity (Mins)	110.80	12.36	0.00	91.45	13.56	0.00	19.35	18.36	0.29
PA Self Efficacy	0.21	0.06	0.00	0.22	0.06	0.00	-0.01	0.09	0.90
PA Decisional Balance	0.10	0.07	0.14	0.08	0.08	0.32	0.03	0.11	0.81
PA Stage of Change	1.60	0.37	0.00	1.61	0.35	0.00	-0.01	0.16	0.95
FV Intake (servings)	1.67	0.43	0.00	1.29	0.48	0.01	0.38	0.64	0.56
Intention to change FV intake	0.12	0.13	0.35	0.48	0.15	0.00	-0.36	0.20	0.07

Abbreviations: PA= Physical Activity, FV= Fruits & Vegetables.

Range: Self Efficacy=1 to 5 (high), Decisional Balance= -5 to 5 (high), Stage of Change=1 to 5 (high).

Table 3: Baseline characteristics of intervention sample with internet access

Characteristics	Number of logins < 9 (n=50)		Number of logins ≥ 9 (n=50)		<i>p</i>
	Mean	SD	Mean	SD	
Age	43.3	11.93	47.64	11.38	0.07
	n	%	n	%	
Gender (Female)	37	74	40	80	0.63
Race (Caucasian)	38	76	43	86	0.38
Income <30k	11	22	10	20	0.51
30k-50k	11	22	11	22	
50k-70k	9	18	15	30	
70k+	19	38	14	28	

Discussion

- Results do not support primary hypothesis of statistically greater improvement in participants who had access to computerized tailored feedback
- Actual statistical power was low because of substantial and unexpected improvement in control group
- Observed effect of physical activity improvement from baseline is consistent with other studies of web-based programs

Discussion

- Control group demonstrated a robust effect with weekly mailings of content relevant material and raffle incentive
- Participants who used the website more often reported an increase in both physical activity and FV intake