Building for Dissemination: Efficacy of an Internet Physical Activity Intervention

Lucas J. Carr, Ph.D.
Exercise & Sport Science Department
East Carolina University
The Problem

- Physical inactivity largest public health problem of the 21\textsuperscript{st} century (Blair, 2009)
- Despite known benefits of regular physical activity (PA), less than half of U.S. adults meet PA guidelines (BRFSS, 2007)
- Non face-to-face interventions that encourage home-based, lifestyle PA address many known barriers to PA including transportation needs, time requirements and high cost of delivery (Marcus et al., 2000)
Internet Use in the U.S.

76% of population (230 million users)

Source: Surveys by The Pew Research Center’s Internet & American Life Project and the Pew Research Center for The People & The Press.
Internet Use For Health

- **Age**: 92% of 18 year olds; 72% of 64 year olds
- **Ethnicity**: 76% non-Hispanic whites, 60% African Americans, 56% Hispanics (Pew Research Center, 2009)
- **Health Info**: 8 of 10 Internet users look for health information (Rees, 2005)
- **Exercise Info**: People seeking exercise specific info increased from 36% in 2002 to 52% in 2008 (Pew Research Center, 2009)
Internet as a Delivery Channel

Reach

Interactivity

Available

Customizable

http://www.
Mass Media

STRATEGY 7

Encourage local, state, and federal public health agencies and key stakeholders from the eight sectors to integrate into their physical activity plans and programs Web- and new media-based physical activity interventions that are supported by evidence.

TACTICS

- Test the dissemination of evidence-based media interventions and identify those with the greatest likelihood of population reach and impact.
- Fund and implement these interventions, prioritizing large population groups.
Efficacy of Internet

- Fewer than 27 Internet PA interventions (16 RCT’s)
- Samples have included community adults (7), churches (1), worksite (6), college (1), cardiac rehab patients (1)
- Length varied from 2 months to 16 months with few assessing long term effects
- Wait-list control studies all showed within group increases in PA but no between group differences observed

Ciccolo, Marcus, & Sciamanna, 2009
Step into Motion (HL69866)

- Participants randomly assigned to:
  - Tailored Internet Group
    - Evidence based PA education and motivational materials
    - Regular feedback based on TTM
  - Tailored Print Group
  - Standard Internet Group
    - Six best publicly available websites
  - Primary Outcome: 7-day Physical Activity Recall


Note: There were no significant between-group differences in change scores at 6 or 12 months, $p > 0.05$. 
Rationale for Study

• While significant between group differences were not observed, website use (i.e., logins) was positively associated with greater PA at 12 months (Lewis et al., 2008)

• Constructs from Social Cognitive Theory (SCT) that were measured but not targeted including self monitoring, perceived environment, outcome expectations, social support and enjoyment, were predictive of increased PA at 12 months (Ries et al., 2009)
Step into Motion 2

Specific Aim – Phase 1

- To identify Internet features that: 1) targeted SCT constructs predictive of PA behavior in previous trial; and 2) were rated “most useful” for increasing PA by SIM1 completers
- Three focus groups (N=17)
- Nominal Group Technique used to rank order several Internet tools/features
- Five highest ranked features added to website
Step into Motion 2

Specific Aim - Phase 2

- To test the efficacy of the enhanced intervention (EI) relative to six of the best publicly available PA websites (PAW) in a randomized controlled trial at three and six months
- Delivered completely non face-to-face to participants of three different states
- Primary Outcome: 7 Day Physical Activity Recall by telephone
Study Timeline

October 2009
Focus Groups (N=17)

January 2010
Website Enhancements

February 2010 - November 2010
Enhanced Internet (N=25)
Publicly Available Websites (N=28)
## Focus Group Findings

<table>
<thead>
<tr>
<th>Internet Feature</th>
<th>Targeted Construct</th>
<th>Description of Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA Tracking &amp; Goal Setting Calendar</td>
<td>Self-Monitoring</td>
<td>Set PA goals, receive feedback on progress, track PA</td>
</tr>
<tr>
<td>Regular Peer PA Updates</td>
<td>Outcome Expectations</td>
<td>“Participants have walked an average of 8,000 steps this week.”</td>
</tr>
<tr>
<td>Ask the Expert Forum</td>
<td>Social Support</td>
<td>Post PA questions, receive feedback from trained expert.</td>
</tr>
<tr>
<td>Exercise Videos</td>
<td>Observational Learning</td>
<td>Library of online videos modeling MVPA (yoga, RT, etc.)</td>
</tr>
<tr>
<td>Geographic Mapping Information on PA facilities</td>
<td>Environment &amp; Situation</td>
<td>Create, share, save, print walking paths. Educational materials on local PA facilities (trails, parks, gyms, malls)</td>
</tr>
</tbody>
</table>
Step Into Motion 2 Features Added

Exercise Video Links

Strength and Resistance
- Workout Club: Start Guide 2010 (Ace Fitness)
- Core Stability Ball Exercises (Ace Fitness)
- Summer Total Body Circuit Exercises (Ace Fitness)

Aerobic and Dance
- Hip Hop Fitness, Hop Dance & How to Hula Hoop (Ace Fitness)
- Zumba (Ace Fitness)
- Dance Dance Workout (Paul Eugene)
- Step Aerobics Made Easy (Paul Eugene)

Yoga
- Yoga for Runners (Ace Fitness)
- Beginner Yoga with Nina Frits

Stretching
- GALAM Stretch

Set Your Goals

Use the monthly calendar below to set your weekly goals. Click on any day of the week or in a future week, then fill in the information in the pop-up window. Use the << and >> buttons to change month, and click on days in past weeks to review the goals you set in the past.
<table>
<thead>
<tr>
<th>Publicly Available Websites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The American Heart Association</td>
</tr>
<tr>
<td>2. Shape Up America</td>
</tr>
<tr>
<td>3. The Mayo Clinic</td>
</tr>
<tr>
<td>4. American Academy of Family Physicians</td>
</tr>
<tr>
<td>5. American Council on Exercise (ACE)</td>
</tr>
<tr>
<td>6. American College of Sports Medicine</td>
</tr>
</tbody>
</table>
## Population

<table>
<thead>
<tr>
<th></th>
<th>EI (n = 25)</th>
<th>PAW (n = 28)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%) or $M \pm SD$</td>
<td>No. (%) or $M \pm SD$</td>
<td></td>
</tr>
<tr>
<td>Age, years</td>
<td>38.5(13.1)</td>
<td>36.8(11.1)</td>
<td>0.61</td>
</tr>
<tr>
<td>Percent Female</td>
<td>80.0%</td>
<td>71.4%</td>
<td>0.47</td>
</tr>
<tr>
<td>Body Mass Index (kg/m$^2$)</td>
<td>31.4+1.1</td>
<td>31.0+0.7</td>
<td>0.12</td>
</tr>
<tr>
<td>Non-Hispanic-white</td>
<td>92.0%</td>
<td>82.1%</td>
<td>0.29</td>
</tr>
<tr>
<td>College graduate</td>
<td>52.0%</td>
<td>64.3%</td>
<td>0.36</td>
</tr>
<tr>
<td>Household income &lt; $40,000</td>
<td>56.0%</td>
<td>57.1%</td>
<td>0.93</td>
</tr>
<tr>
<td>Married</td>
<td>36.0%</td>
<td>50.0%</td>
<td>0.30</td>
</tr>
<tr>
<td>Baseline PA (min/week)</td>
<td>18.4(27.0)</td>
<td>20.9(28.6)</td>
<td>0.74</td>
</tr>
</tbody>
</table>
Mean Minutes of MVPA/Week

Note: * Significant between group difference at 3 months only (p>0.05).
# Mean Website Logins by Group

<table>
<thead>
<tr>
<th></th>
<th>Enhanced Internet</th>
<th>Publicly Available Websites</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>($n = 25$)</td>
<td>($n = 28$)</td>
<td></td>
</tr>
<tr>
<td>Over First 3 Months</td>
<td>18.3 (14.5)</td>
<td>5.3 (4.1)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Over First 6 Months</td>
<td>32.3 (29.8)</td>
<td>9.4 (6.1)</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>
## Perceived helpfulness of EI Features at 6 months

<table>
<thead>
<tr>
<th>Likert Scale Rating</th>
<th>Targeted Theoretical Construct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Perceived Environment</td>
</tr>
<tr>
<td>1=Not at all helpful</td>
<td></td>
</tr>
<tr>
<td>2=A little helpful</td>
<td></td>
</tr>
<tr>
<td>3=Moderately helpful</td>
<td></td>
</tr>
<tr>
<td>4=Quite helpful</td>
<td></td>
</tr>
<tr>
<td>5=Extremely helpful</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Feature</th>
<th>Rating</th>
<th>Construct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geographic Mapping Feature</td>
<td>3.67</td>
<td>Perceived Environment</td>
</tr>
<tr>
<td>PA Tracking Calendar</td>
<td>3.52</td>
<td>Self Monitoring/Goal Setting</td>
</tr>
<tr>
<td>Discussion Forum</td>
<td>2.81</td>
<td>Social Support</td>
</tr>
<tr>
<td>Regular Peer PA Updates</td>
<td>2.74</td>
<td>Outcome Expectations</td>
</tr>
<tr>
<td>Exercise Videos</td>
<td>2.53</td>
<td>Observational Modeling</td>
</tr>
</tbody>
</table>
Comparison of SIM1 vs. SIM2

Note: 48% of participants were meeting Federal PA Guidelines at 6 months in SIM2
Conclusions

- Our findings indicate that this completely non face-to-face intervention can increase PA among previously sedentary adults.
- Significantly more EI participants were meeting PA guidelines at 3 months (40% vs. 10%) and nearly half (48% vs. 35%) were meeting guidelines at 6 months.
- EI participants became active more quickly than the PAW participants.
Conclusions

- Formative research was beneficial in identifying useful Internet features.
- Participants reported environment focused and goal setting/tracking features to be “most useful” for increasing physical activity.
- Enhanced website resulted in more MVPA and more people meeting PA guidelines at 6 months compared to Step into Motion.
Future Directions

1. Process evaluation of use of specific Internet features still ongoing (e.g., unique clicks and time spent on each feature)
2. Larger trial to allow for mediator and moderator analyses
3. Explore impact on cardiometabolic risk factors
4. Process evaluation of best PAW features
5. Explore adaptive time varying models
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THANK YOU!