

INDIVIDUAL FITNESS: CREATING A TAILORED FITNESS MESSAGE ASSESSMENT
FOR WOMEN AGES 25-70

by

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DEDICATION

This is dedicated to my patient husband Eric, my wonderful parents, my equally-as-wonderful parents-in-law, my friend since childhood Theodore, the members of the Fairfax Lifetime Fitness Sunday Night Hydrotraining Class, and the brain trust at HealthRx Corporation.

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ABSTRACT

INDIVIDUAL FITNESS: CREATING A TAILORED FITNESS MESSAGE ASSESSMENT FOR WOMEN AGES 25-70

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George Mason University, 2013

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This exploratory research informed the development and refinement of a tailored fitness message assessment system for females ages 25-70 that increases the likelihood of central processing for healthy attitudes and belief change toward fitness through engaging, salient, and actionable messages. Persuasion theory, the health belief model, e-health research, principles of tailored messaging, fitness media message research, and an online survey of the study population form the basis of this assessment and its messages. This research, and the resulting fitness message assessment system, the FMA, present evidence of the viability of a tailored fitness message assessment. This assessment and its messages were based in persuasion theory, the health belief model, e-health research, principles of tailored messaging, and fitness media message research. Though the research was inconclusive regarding whether tailored messages lead to better outcomes than targeted messages, this study did find that engaging, actionable, and salient fitness messages have a positive reception in the 25-70 year old female population.

INTRODUCTION

As “the central process influencing people’s conceptualization of health and well-being,” communication carries great importance in understanding and bettering the public’s health (Kreps & Bonaguro, 2009, p. 973). Health communication research often uses an interdisciplinary approach to influence “health, health care delivery, and health promotion” (Kreps et al., 2007, p. 2). Health promotion research typically focuses on examining “the persuasive uses of messages and media to promote public health...[,] the development and evaluation of communication campaigns” (Kreps et al., 2007, p. 4), and understanding how communication can be used to inform consumers about health issues and present high-quality health information, such as persuasive fitness attitude and belief change messages (Kreps, 2001).

This exploratory research sought to leverage prior work at the intersection of health communication research and public health as well as to build on the body of literature in the areas of health communication, health promotion, exercise physiology, and e-health. This work focused on the development of an assessment of current fitness beliefs, attitudes, goal, interests, and motivations that provides tailored fitness messages promoting attitude and belief change about increasing physical activity for women aged 25-70. The messages were designed to be engaging, salient, actionable, and, therefore, likely to be centrally processed, according to the elaboration likelihood model (Petty & Cacioppo, 1981).

Communication is central to the development of health interventions such as this assessment and its messages, and this focus on communication differentiates this work from other fitness and health assessment and messaging systems. Further, this work uses strategically designed persuasive messages that can be easily accessed and remembered in a manner that promotes attitude and belief change. As convincing, trustworthy messaging is central to the success of this assessment, it was critical to design the messages with the use of thoughtful research and to attempt to eliminate unintended effects and minimize any ethical issues. A way to raise the likelihood of messages having the intended effects is to base them in theory and lessons learned from the literature. Kreps and Bonaguro (2009) note that sophisticated interventions use explanatory theories that identify key factors for design and implementation. Therefore, this physical activity intervention with its assessment and resulting messages draws from persuasion theory (elaboration likelihood model, theory of planned behavior, theory of reasoned action, and cognitive dissonance theory) and the health belief model.

E-health communication is defined as the use of technology, especially the Internet, for health communication activities. One of the major benefits of using e-health for attitude and belief change interventions is the ability to incorporate tailored communication, an assessment-based method for communicating persuasive messages on the individual level. The assessment in this research takes advantage of e-health channels for both the assessment and the delivery of tailored fitness messages. When launching attitude and belief change campaigns through computer-assisted forms and Internet

media, there is great potential for being able to tailor not only the messages but also the communication experience for the individual user.

Statement of the Problem

Fitness messages have a reputation for being prescriptive and sterile at their best and idealized and unattainable at their worst. There is rarely a moderate form of messaging about physical activity that can both inspire and provide adequate direction, both of which are necessary elements to maintain a fitness regimen with the variety and sustainability needed to achieve wellness. Research has shown that tailored messages frequently lead to more engagement, salience, and actionability as a result of increased central processing (Kreuter et al., 2003; Kreuter et al., 2009). At the inception of this research, there was a need to develop an electronic tailored message assessment for fitness messaging that could provide the elements necessary for central processing, and, therefore, the potential to cause lasting positive fitness attitude and belief changes. Many of the current fitness messaging systems focus on health risk assessment, general or targeted messaging, or specific at-risk populations – all of which are helpful, but, yet, are not comprehensive or granular enough to be used on a wider population as a way to influence participants at the individual level like a tailored e-health intervention can. This exploratory research, and the resulting fitness message assessment system presents evidence of the viability and the positive reception of such a tailored fitness message assessment for women aged 25-70 based on persuasion theory and health belief assessment.

Rationale

The first objective of this dissertation was to conduct the exploratory research needed to inform development of an evidence-based prototype of a tailored fitness message assessment program. A second objective was to pilot test the tailored intervention program. The rationale for creating this assessment was to provide an easily-accessible, scalable, electronic assessment that can use the participant's answers to develop tailored messages that are engaging, salient, and actionable, and, therefore, more likely to influence users' exercise attitudes and beliefs. The researcher chose to conduct an electronic assessment as opposed to paper-based or interpersonal one because of the potential for a broader reach and the lower overall cost for those who use it.

This dissertation's work will be used as the foundation for building a tailored fitness promotion and communication product for use in the HealthRx Corporation (www.healthrx.com) enterprise suite. This would allow for use of the medically-based wellness knowledge, health assessment development, and computational medicine history at HealthRx for creating an effective health promotion product. By creating a product that would include both the assessment and messaging system developed in this dissertation and HealthRx's existing medically-based health and wellness elements, this research has the potential to promote wellness and public health across the large public and private HealthRx customer base.

The researcher has chosen to concentrate on fitness messages for women aged 25 to 70 in the first iteration of this assessment because of (1) her professional knowledge about women's fitness as a certified fitness instructor, (2) the extensive social and media

pressure put on adult women, to be fit, healthy, beautiful, and still feminine and motherly (Calogero & Tylka, 2010; Campo & Martin, 2007; Duerksen et al., 2005; Franzoi, 1995; Ferguson, Wingard, & Wingard, 2011; Luff & Gray, 2009; Turner, Vader, & Walters, 2008; Wasyliw et al., 2009), and (3) the many barriers women face when trying to improve fitness (Downes, 2008; Evenson, Moos, Carrier, & Slega-Riz, 2009; Jewson, Spittle, & Casey, 2007; Tavares & Plotnikoff, 2008; Welch, McNaughton, Hunter, Hume, & Crawford, 2008).

LITERATURE REVIEW

Physical Activity Considerations

Physical Activity Guidelines for Adult Women. The U. S. Department of Health and Human Services (2008) published a physical activity guidelines report for adult Americans aged 18-64. This report provides aerobic and muscle-strengthening guidance for healthy adults and adults with special health statuses (e.g., pregnant, disabled) for physical activity beyond ordinary light or sedentary activities of daily living. The HHS defines aerobic activities as “physical activities in which people move their large muscles in a rhythmic manner for a sustained period.” Further, HHS defines muscle-strengthening activities as “activities [that] make muscles do more work than they are accustomed to doing.”

HHS (2008) provides the following key guidelines for adults (without special health states):

- “All adults should avoid inactivity. Some physical activity is better than none, and adults who participate in any amount of physical activity gain some health benefits.
- For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Aerobic

activity should be performed in episodes of at least ten minutes, and preferably, it should be spread throughout the week.

- For additional and more extensive health benefits, adults should increase their aerobic physical activity to 300 minutes (five hours) a week of moderate-intensity, or 150 minutes a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity activity.

Additional health benefits are gained by engaging in physical activity beyond this amount.

- Adults should also do muscle-strengthening activities that are moderate or high intensity and involve all major muscle groups on two or more days a week, as these activities provide additional health benefits” (HHS, 2008).

The guidelines state that inactive adults, or those who do not yet do the recommended 150 minutes of physical activity per week, should work gradually toward this goal, spreading short periods of light-to-moderate intensity exercise throughout the week. Active adults who already meet the minimum guidelines are able to safely increase weekly activity to achieve greater health benefits. Finally, highly-active adults are advised to maintain their current activity level, but to vary their activity types.

Guidelines for pregnant and postpartum women. Women who are pregnant or are in the postpartum period are recommended to be moderately active. HHS provides the following key guidelines for women during pregnancy and the postpartum period:

- “Healthy women who are not already highly active or doing vigorous-intensity activity should get at least 150 minutes (2 hours and 30 minutes) of moderate-

intensity aerobic activity per week during pregnancy and the postpartum period.

Preferably, this activity should be spread throughout the week.

- Pregnant women who habitually engage in vigorous-intensity aerobic activity or are highly active can continue physical activity during pregnancy and the postpartum period, provided that they remain healthy and discuss with their healthcare provider how and when activity should be adjusted over time” (HHS, 2008).

Guidelines for adults with disabilities. Adults with disabilities include “stroke victims, people with spinal cord injury, multiple sclerosis, Parkinson’s disease, muscular dystrophy, cerebral palsy, traumatic brain injury, limb amputations, mental illness, intellectual disability, and dementia” (HHS, 2008). In consultation with their healthcare providers, adults with disabilities can determine the level of activity that is appropriate. Those who are able to do moderate-to-high amounts of physical activity should follow the guidelines for healthy adults. Otherwise, disabled adults are recommended to do the following:

- “Adults with *disabilities, who are able to, should get at least 150 minutes per week (2 hours and 30 minutes) of moderate-intensity, or 75 minutes (1 hour and 15 minutes) per week of vigorous-intensity aerobic activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Aerobic activity should be performed in episodes of at least ten minutes, and preferably, it should be spread throughout the week.*

- Adults with disabilities, who are able to, should also do muscle-strengthening activities of moderate or high intensity that involve all major muscle groups on two or more days per week as these activities provide additional health benefits.
- When adults with disabilities are not able to meet the above Guidelines, they should engage in regular physical activity according to their abilities and should avoid inactivity.
- Adults with disabilities should consult their healthcare providers about the amounts and types of physical activity that are appropriate for their abilities” (HHS, 2008).

Guidelines for adults with chronic medical conditions. Adults with chronic medical conditions should consult their healthcare providers to determine their abilities and the severity of the condition prior to engaging in physical activity. HHS (2008) provides the following information for people with chronic medical conditions:

- “When adults with chronic conditions do activity according to their abilities, physical activity is safe.
- Adults with chronic conditions should be under the care of healthcare providers. People with chronic conditions and symptoms should consult their healthcare providers about the types and amounts of activity appropriate for them.”

Common Barriers to Physical Activity. In multiple studies, women identified health- and non-health-related barriers to physical activity. The most commonly reported barriers were lack of time and pressure from family and social commitments. The following list identifies the most frequently stated barriers across the literature:

- Lack of time
- Long or irregular work hours and pressure to move up in one's profession
- Long or irregular study hours
- Lack of energy
- Commitments to children, family members, and friends
- Environment (resources, safety)
- Housekeeping activities (cleaning, groceries, chores)
- Childcare
- Lack of motivation/discipline
- Dealing with an injury or condition
- Being tired
- Pregnancy (shortness of breath, soreness, being overly tired, fear of premature birth or complications as a result of being active)
- Being unsure of what to do to be active
- Lack of social support
- Lack of financial resources (Downes, 2008; Evenson, Moos, Carrier, & Slegar-Riz, 2009; Jewson, Spittle, & Casey, 2007; Tavares & Plotnikoff, 2008; Welch, McNaughton, Hunter, Hume, & Crawford, 2008).

Theoretical Framework

Persuasion Theory. Persuasion is defined as a successful effort to change the mental states (attitudes, intentions, beliefs) of individuals who have the freedom to make their own choices. The study of persuasion can be viewed from multiple angles, such as (1) functional attitudes, (2) belief modification, (3) dissonance, (4) the connection between behavior and intention, (5) dual processes for cognition, and (6) effects. What all of these approaches have in common is that attitude has a (differing size) role in behavior modification. While all of these approaches to persuasion can be used in health communication, one of the most frequently used approaches to changing mental states - and eventually behavior - regarding fitness involves the application of behavior-intention theories. These theories include the theory of reasoned action (Fishbein & Ajzen, 1975), the theory of planned behavior (Ajzen, 1985), and the dual-process model, the elaboration likelihood model (ELM) (Petty & Cacioppo, 1981).

The theory of reasoned action and the theory of planned behavior. Behavior-intention theories view changing intention as the key to modifying behavior. Though behavior modification is outside the scope of this research, all persuasion in the assessment and messaging system is intended as a path to eventual behavior change. The theory of reasoned action (TRA) (Fishbein & Ajzen, 1975) identifies two elements of intention: (1) attitudinal factors and (2) subjective normative factors. Attitudinal factors are one's evaluation of an attitude object, such as exercise. Subjective normative factors have a social aspect. These factors are influenced by those who are important to the individual - if these others view a behavior as important and positive/negative, the

individual will feel social pressure. Important to the intensity and valence of the subjective normative factors is the individual's motivation to please these others in her life. Fishbein and Ajzen state that persuaders (in the case of this research, message designers) can use two different approaches to intention change: (1) modifying the individual's attitudes toward the object in question and (2) modifying the individual's view of the subjective norms affecting the persuasive object. The system in this research attempts to do both.

TRA's strengths as a guiding theory for the design of interventions. TRA's focus on attitudinal and subjective normative factors captures some of the most important aspects of encouraging individuals to get more physical activity. Attitudes about fitness tend to be conflicting - people know that exercise is good for them, but they may also view exercise as an undesirable chore. This conflict in attitudes about exercise is often mediated by subjective norms coming from those who are not only close to the individual, but also from society. Specifically, adult women are not only held to different social norms than children or men, but they also tend to be those who provide care and nurturing for others. As caregivers, women are expected to be aware of and advocate for healthy behaviors. Their knowledge of the positive effects of exercise is counteracted by their social and personal expectations that they put everyone else first. The attitudinal conflict comes into play when women know about the advantages of a healthy lifestyle, but they see themselves as too busy or not important enough to focus on caring for themselves through exercise. In some cases, women believe that taking time for

themselves to be fit is selfish or vain. Subjective norms tend to reinforce these conflicting attitudes.

For this research, TRA is included in the framework for creating an exercise intervention for adult women. Intervention through the use of this system focuses on changing the attitudes that prevent women from allowing themselves to take part in a healthy lifestyle through engaging, salient, and actionable messaging.

TRA's weaknesses as a guiding theory for the design of interventions. The TRA is limited to simple voluntary behaviors, and while useful, is lacking the complexity needed to fully study health communication issues, such as fitness attitude and belief change. Fitness has a motivational component that is lacking in the TRA. In response to the gaps in TRA, Ajzen developed an extension of the theory - the theory of planned behavior (TPB) (Ajzen, 1985). The TPB adds a motivational element to the attitudinal and subjective normative elements in TRA. The TPB features a component called perceived behavior capability (PBC), which is similar to the concept of self-efficacy, one's belief in her ability to reach a certain outcome. PBC considers the individual's perceived ability to perform the persuasive action. When the individual has a lower PBC, there are barriers in the way of her ability to make the behavior change. The persuader's job it to directly remove the barriers to encourage the individual to make the behavior change. According to the TPB, PBC trumps attitudinal and subjective normative factors in influence over the individual's intentions to perform the behavior.

TPB's strengths as a guiding theory for the design of interventions. The TPB includes the strengths of the TRA - accounting for attitudes' and outside forces' impact

on intention - but it adds the critical element of PBC. Low PBC is often the biggest issue in not only persuading someone to exercise, but in persuading her to move to the next level in fitness. If one believes that she is incapable of running a mile, then she is more likely to fail for reasons beyond physical capability. Persuaders, such as personal trainers and fitness instructors, often focus on convincing clients that they are capable of fitness achievement. In practice, one's PBC is the biggest hurdle in guiding her to exercise or advance her physical fitness.

In addition to messages that encourage women to change their attitudes to ones that are consonant with the importance of exercise and health behaviors, messages should assist with directly removing barriers to getting more physical activity. In this research's messages, barriers to exercise are addressed by providing ways around the barrier through different thinking and/or actions.

The elaboration likelihood model (ELM). This assessment and messaging system is primarily oriented by the central processing proposition in the elaboration likelihood model (ELM) (Petty & Cacioppo, 1981). Essentially, if a message is personally relevant, salient, and actionable, an individual is more likely to process the message critically. This type of processing has the potential to elicit attitude change—which is an important outcome in strategic health communication and the practice of encouraging women to increase their physical activity.

Petty and Cacioppo's (1981) elaboration likelihood model (ELM) posits that there are two manners of internalizing information and processing it—the central route and the peripheral route. Central processing is often required when one seeks attitude change,

such as having the willingness to begin an exercise regimen. Key to central processing are the individual's involvement in the information, her motivation to critically evaluate the information, and the ability to use the information to her benefit (Petty & Cacioppo, 1981; Lane, 2001; University of Twente, 2004; Littlejohn & Foss, 2007). One's involvement, motivation, and ability determine where on the elaboration continuum the individual will fall—ranging from little elaboration to great elaboration (Petty & Cacioppo, 1981; Littlejohn & Foss, 2007; Gass & Seiter, 2007).

Though ELM is traditionally employed as a framework for persuasion and information processing, the application in this research extends the theory to be used in terms of identifying messages that will have personal relevance and salience. This is a useful extension because to create attitude change, individuals must have the involvement, motivation, and ability to use personally relevant messages to achieve a desired attitude change. In this context, one's involvement is synonymous with her engagement with the topic. Pursuing a fitness program is a highly personal action, as one is often anxious about making changes and uncertain of her ability to adhere to a program. This may be from a history of "failure" to adhere to a program, a lack of desire, or self-efficacy issues that stem from her environment, such as childcare responsibilities. "Involvement" implies a connection, but "engagement" more aptly implies a personal connection to the message; therefore, engagement is a more appropriate term than involvement in this extension. One's engagement is inextricably tied to her motivation to receive health messages and evaluate them critically. Like in the traditional use of ELM, the individual's evaluation of the health messages involves a critical analysis of the

information, but in the context of individual engagement, there is an added emotional connection that is well matched to the nature of a fitness program. Finally, one may have the engagement and motivation to absorb and evaluate the health messages she has received, but the individual must also have the self-efficacy to make use of the health messages before being able to apply the information to making an attitude change (Witte et al., 2001). The main difference between the traditional application of ELM and this extension is the personal connection involved in the process.

When engagement, motivation, and self-efficacy come together in message processing, one is using the central route. Those who use the central route have been found to be more thoughtful and critical in message processing, which results in a greater chance for attitude change. Those who use the central route for message processing are also more likely to eventually make stable, lasting behavior changes and are more resistant to opposing messages than those who have used peripheral processing (Petty & Cacioppo, 1981; Petty et al., 2009; Booth-Butterfield & Welbourne, 2002). (Examples of peripheral processing are relying on celebrity diet pill endorsements or being enticed by quick-fix fitness solutions.) Because of its reliance on critical methods and its likelihood of creating an attitude change (Petty et al., 2009), the central route of processing health messages is the most desirable method for health communication professionals developing health messages, and using this mode of processing should be the focus in message creation.

Viewed critically, ELM is often charged with being (1) more descriptive than analytic, (2) unable to explain the psychological reasoning behind why some variables

are processed centrally or peripherally, and (3) difficult to falsify (Cook et al., 2004). Though these criticisms are appropriate for those who are interested in employing the model to explain cognitive processes, they apply less to the use of the theory to create tailored messages that are easily processed. Despite criticisms of ELM, the model is praised for its ability to integrate multiple situational and individual variables, to identify many variables involved in attitude change, and to provide direction in selecting variables that are important to individuals (Cook et al., 2004).

ELM's strengths as a guiding theory for the design of interventions. For message-rich interventions, ELM is a very plausible choice as a framework. Central processing and attitude change have a proven link; however, the challenge is to understand how to create messages that will be centrally processed. Understanding that there are different tactics for getting individuals to process messages is critical to intervention design. Creating a one-size-fits-all intervention with: messages that contain strong and quality arguments; sources with credibility and likability; and calls to action that encourage involvement in the topic means the intervention can essentially be everything to everyone all at once. Those who are likely to use central processing would have quality messages available for analysis, and those who are likely to use peripheral processing would have persuasively-desirable answers to all heuristics they would use to evaluate the messages. All criticisms and endorsements considered, ELM is a useful theoretical base for this research's system because of its focus on the individual and its ability to guide personally salient, compelling, and actionable message creation.

The theory of cognitive dissonance. Festinger's (1957) cognitive dissonance theory attempts to predict and explain dissonant cognitive elements, such as attitudes, behaviors, perceptions, and knowledge. Cognitive dissonance theory is concerned with maintaining cognitive consistency within the bounds of an individual's psychological and social systems. Inconsistencies, or discrepancies, need to be resolved to maintain this cognitive consistency. Cognitive dissonance is relative to one's psychological system, which is built from an individual's cognitive elements, including attitudes, perceptions, knowledge, and behaviors. In addition to one's cognitive elements, an individual derives his personal and social beliefs from what Goethe called the *Zeitgeist*, a snapshot of what one's culture views as truth or the generally accepted social opinion. The *Zeitgeist* may be conscious or unconscious, but either way, there is an impact on an individual's sense of what is discrepant (Boring, 1964). Though there is a societal commonality with the *Zeitgeist*, what is dissonant and the degree to which it is dissonant varies by person.

The two main premises of cognitive dissonance theory are that (1) dissonance produces a psychological imbalance and creates pressure to alleviate it, and (2) when an individual experiences dissonance, she will not only attempt to remove it, but will avoid dissonance producing situations in the future. Festinger specified that magnitude of dissonance necessary to create psychological discomfort is a function of the number of dissonant cognitions and the psychological importance placed on those cognitions. Therefore, the magnitude of dissonance is directly related to the number of dissonant cognitions and their importance (Harmon-Jones, 2002).

Dissonance is a “negative drive state” (Aronson, 1969, p. 2) that occurs when there are inconsistencies between two or more of one’s personal and social cognitions, behavior, or environmental elements (Van Overwalle & Jordens, 2002). The psychological discomfort resulting from cognitive dissonance motivates the individual to change her attitudes or behavior to alleviate the dissonance (Oshikawa, 1968). The root of dissonance creation and reduction is the individual’s attempt at both understanding and justifying the dissonance caused (Van Overwalle & Jordens, 2002).

Dealing with dissonance. Dissonance is likely to manifest in five cognitive situations: (1) decision making, (2) forced compliance, (3) gaining entrance into a group, (4) social support, and (5) effort. The magnitude of one’s dissonance in decision-making is dependent on the following variables: (1) the importance of the decision, (2) the attractiveness of the alternatives, (3) the amount of perceived attractiveness of the alternative that was not chosen, and (4) the degree of similarity between the alternatives (Littlejohn & Foss, 2007). In the case of forced compliance, which is defined as an individual being required to take action contrary to her beliefs or values, the amount of dissonance one experiences is dependent on the degree of unpleasantness the effort creates (Harmon-Jones & Harmon-Jones, 2007).

The theory includes methods for dealing with cognitive dissonance. First, the individual could change at least one of her cognitive elements. Second, she could add new elements to an alternative to make it appear more or less attractive. Third, she could reduce the importance placed on the dissonant elements. Fourth, she could conduct research to find consonant information to cancel out the dissonant information. Lastly,

the individual may consciously choose to distort or misinterpret information in a way that removes dissonance. Regardless of the situation that induces dissonance, the methods diminish dissonance and give the individual a more positive and consistent feeling about the decision, action, or behavior (Littlejohn & Foss, 2007).

Criticism and limitations. Two overarching types of criticism appear frequently in the literature, first that Festinger's original theory has been revised too many times, and second that the theory has been overextended. Lord (1992) argues for both the over-revision and overextension of cognitive dissonance theory. Lord states that the multiple revisions and limitations that cognitive dissonance theorists have imposed on the original theory would have been unnecessary if they had accepted cognitive dissonance theory as an elementary form of learning theory, and that unjustified leaps were made in such extensions as attitude change experiments and attitude polarization experiments.

A combined model of persuasion. Because TRA and TPB consider attitudes, subjective norms, and PBC as components of intention, the intention-creating process is a compliment to the cognitive processing discussed in ELM. When processing, centrally or peripherally, one at least subconsciously accesses her attitudes, subjective views of norms, and notions of whether the attitude change is plausible for her before making a decision about the message. The difference between the two processing routes would be the path through analysis of attitudes, norms, and PBC. It would also be fair to say that intention can have a role in ELM processing. The result of evaluating messages, centrally or peripherally, in terms of attitudes, norms, and PBC is to have an intention to – or not to – perform what is requested. Further, cognitive dissonance theory also fits into this model

of persuasion. Dissonance would be evaluated at the same time as attitudes, norms, and PCB to come up with a decision about the behavior that is "best" for the individual.

Intending to make the change would depend on a balance between matching her attitudes and norms, reducing dissonance, and believing that she can follow through on intentions to do what is requested. This combined model of persuasion works well with the health belief model (Rosenstock, 1974), and these were put together to create this dissertations tailored messaging assessment for fitness.

The Health Belief Model (HBM). The health belief model (HBM) (Rosenstock, 1974) is a framework that is commonly used for guiding the development of health interventions and campaigns and for promoting preventive health behaviors (Witte et al., 2001). The HBM is intended to systematically explain and predict preventative health behavior based on five influencing factors: (1) “perceived barriers to performing the recommended response,” (2) “perceived benefits to performing the recommended response,” (3) “perceived susceptibility to a health threat,” (4) “perceived severity of a health threat,” and (5) “cues to action” (Witte et al., 2001, p. 34). When weighing the costs and benefits of adopting and/or accepting a health message, individuals weigh the five influencing factors to decide whether to perform the recommended behavior. Therefore, when the individual perceives that a health message has strong benefits, she has high susceptibility to the risk, the health threat has high severity, and the barriers to performing the recommended response are low, the individual is more likely to perform the behavior recommended in the health message. In this dissertation’s system, the messages are simply asking a participant to consider making changes. The HBM would

be used as a way to predict the path needed to change attitudes in a way that would put the participant on the way to behavior change.

HBM and ELM. The cues to action identified in the HBM are what prompt an individual to begin to cognitively process or act on a health message. Cues can be internal or external (Witte et al., 2001). Internal cues are those that come from within the individual, such as a pain that causes concern. External cues are those that come from an outside source, such as messages from health campaigns encouraging individuals to think about and act on certain health behaviors. Health communicators' actions to create messaging to trigger cues to action are similar to those efforts to cause central processing. When a message producer develops a message that elicits heightened health issue susceptibility and severity and highlights the benefits of taking action, the message is more likely to be centrally processed and cause an attitude change in the individual. The main goal of the systems developed in this research is to provide messages that will do this in each participant by identifying the individual elements of that person's health attitudes, beliefs, and perceptions that will make a message more salient.

Developing a Tailored Messaging System

Tailored Messaging. The level of individualization of health interventions usually falls somewhere along a continuum that has generic communication and interpersonal communication as end points, with interpersonal communication referring to interaction that is highly individualized. Within this continuum, Kreuter et al. (1999) identify types of communication messages, listed from the broadest to the most specific methods: generic, personalized generic, targeted, tailored, and interpersonal. Messages

that are generic, personalized generic (generic information that directly addresses the participant by name), and targeted are derived from simply using information from public research and often assume homogeneity among a group.

Kreuter et al. (2003) identify tailoring as a preferred method of message creation because it leverages known differences between individuals and focuses on that individual unit rather than a group. The difference between targeted messages and tailored messages is that targeted messages are directed toward groups and tailored messages are solely intended for individuals. Kreuter et al. (1999) argue for tailored communication for health messages intended to change attitudes because this type of messaging considers the details of how individuals vary and the unique effects that those differences can have on a person's health-related behaviors and decisions.

Kreuter et al. (1999) provide a brief description of a five-step approach to tailoring communication:

- Step 1: Analyzing the Problem: Developing the key measurements/determinants, depending on the outcome of interest; searching for relevant theories, literature, and correlates of behavior change; reducing the determinants to as few as possible
- Step 2: Developing an Assessment Tool: Writing research-based, closed-ended questions and corresponding answers that cover as many possible responses in as few questions/answers as possible
- Step 3: Creating Tailored Messages: Compiling a tailored message library of all possible messages that correspond to question responses

- Step 4: Developing a Data Base: Recording participant responses appropriately
- Step 5: Developing Tailoring Algorithms: Creating a system that will automatically match responses and messages as well as provide a solution for missing data

Considering Culture. All people have cultural group affiliations. Culture is lived, consciously and unconsciously, through norms, values, beliefs, and attitudes. Culture, especially aspects such as “religiosity, collectivism, racial pride, and perception of time” (Kreuter et al., 2003, p. 137), has also been known to be a major determinant in one’s health behavior. Because of this connection to health behavior, health intervention developers must “be able to identify and describe cultures and/or subcultures within a given population, understand how each relates to health behavior, and apply this knowledge in planning and development activities” (Kreuter et al., 2003, p. 132).

Kreuter et al. (2003) provide five strategies for using and understanding of culture to enhance the appropriateness of messages. These strategies are (1) peripheral, (2) evidential, (3) linguistics, (4) constituent-involving, and (5) sociocultural in nature. Peripheral strategies are used to give messages and interventions overall “the appearance of cultural appropriateness by packaging them in ways likely to appeal to a given group” (Kreuter et al., 2003, p. 134). This is done by appealing to the colors, aesthetics, and visual elements that are favored by the culture. Evidential strategies enhance the perceived relevance of a health matter by presenting evidence of its impact on the specific group. By tapping into the salient beliefs, attitudes, and values that are culturally

held, message developers can design interventions that the individuals in the public will likely find important. Linguistic strategies increase the accessibility of the intervention messages by using the group's dominant or native language. Taking time to translate information into the individual's language decreases the chances of misunderstanding the messages and unintended message effects. Constituent-involving strategies use direct experience from members of the culture to develop an intervention that will be more likely to be relevant and interesting to the members of the culture. Using this participatory method of intervention message development will not only increase the appropriateness of the messages for members of the group, but will also develop a trusting relationship between the public and the message developers, hopefully reducing the paternalistic nature of health promotion messaging. Finally, sociocultural strategies place the intervention issues in the context of the group's broader social values and couches messages in a way that addresses the unique characteristics of members from that specific culture (Kreuter et al., 2003). The system developed for this dissertation used constituent-involving and sociocultural strategies for assessment and message development.

In creating culturally-sensitive messages, one must note that "individuals within a given culture can have varying levels of certain cultural beliefs" (Kreuter et al., 2003, p. 136). For tailored message intervention developers, this means that understanding an individual's culture is only half the work. In addition to drawing from social and cultural contexts, the message creators must also capture and use personal information that sets the individual apart from others in his or her public.

Health message tailoring: Understanding the individual. Message tailoring for health interventions can motivate individuals to process the information through methods such as: (a) matching messages to an individual's stated needs and interests, (b) framing messages in a meaningful context, (c) capturing attention through aesthetics, and (d) delivering information in a way that the individual prefers (Rimer & Kreuter, 2006). Therefore, when using one or more of these methods, tailoring messages would likely "increase attention, lead to subsequent yielding, and, ultimately, enhance the likelihood of behavior change" (Rimer & Kreuter, 2006, p. S188).

Kreuter, Strecher, & Glassman (1999) state that a "one size fits all approach," such as generic intervention messaging or even simply relying on targeting a certain public, "cannot address the finer details that vary from person to person and uniquely affect each individual's health-related decisions and behaviors" (p. 276). This is because materials that are intended to address more than one person's needs are, by definition, generalized. By creating messages that recognize and play to an individual's characteristics, intervention developers show respect for the highly individual nature of health. To put it simply, the rationale for using tailored communication is that only the necessary, relevant information is used in tailored messaging, so there is less noise, which allows information to be attended to more closely; this attention motivates, trains, and empowers the individual to make the desired behavior changes.

E-Health Systems. As technology has become more prevalent and affordable, e-health systems have gained a prominent place in health communication research, public health policy, and patient preference. The term "e-health" refers to a field that

incorporates health information delivery, communication technology, and medical informatics to deliver health information, improve health outcomes, and enable better care (Eysenbach, 2001; Harris, Kreps, & Dresser, 2007; Neuhauser & Kreps, 2003). More broadly, e-health allows researchers, healthcare providers, patients, and caregivers to think about health in a more global, networked, interactive way (Eysenbach, 2001; Robinson et al., 1998). E-health technologies vary greatly along a continuum of static information-only sources to highly interactive tailored interventions (Lustria et al., 2009). Most e-health technologies fall into one of the following types: (1) information source, (2) decision support tool, (3) computer-assisted education/intervention, (4) support group, and (5) patient-provider communication (Atkinson & Gold, 2002; Neuhauser & Kreps, 2003).

The interactive, multimedia capabilities of e-health technology combine features of traditional communication and media with interactive digital media to create an engaging, user-centered way to communicate health information (Neuhauser & Kreps, 2003). Neuhauser and Kreps (2003) refer to such communication as “hyperpersonal” because of its “highly personalized, interactive,” and “user-driven” design. Neuhauser and Kreps elaborate on this idea of hyperpersonal communication by describing the media and channels used by e-health as hybrids of traditional and emerging technology.

Any discussion of e-health must fully acknowledge the overlapping disciplines that have converged to create e-health technologies—“medical informatics, telehealth, telemedicine, consumer health informatics, public health informatics, among others” (Neuhauser & Kreps, 2003, p. 116). This disciplinary overlap benefits e-health

interventions by allowing for the best of each field to be incorporated into new health technologies, which makes using e-health technologies beneficial in many situations. Unfortunately, many of the challenges associated with these disciplines—especially informatics—affect e-health technologies.

E-health benefits. E-health technologies have contributed significant advances to health information tailoring with automated forms and algorithms, the ability to have multiple instances of the programs running in multiple locations, and their ability to process large amounts of data quickly and easily. Further, the Internet allows for digital interventions to have a broader reach than those using traditional media, making health information and programs more accessible to those with physical or geographic limitations (Lustria et al., 2009). Compared to more traditional health media, such as pamphlets and interpersonal interactions, e-health interventions and communication have the ability to be more customized, interactive, global, and flexible in their channels for message delivery (Neuhauser & Kreps, 2003). When e-health systems are designed well, they are easy-to-use, entertaining, and exciting (Eysenbach, 2001). E-health technologies are especially beneficial because of their: (1) capability for tailoring and customizing messages, (2) range of multimedia and mixed media channels, (3) potential for interactivity, (4) ease of access for most users, (5) efficiency, and (6) low cost.

Tailoring and customization. Rimer and Kreuter (2006) characterize tailored communication as an “assessment-based approach in which data from or about a specific individual and related to a given health outcome are used to determine the most appropriate information or strategies to meet that person’s unique needs” (p. S184). This

type of health communication has been used to enhance the relevance and salience of a message to the individual participant. Tailoring can be used on an intervention's content, context, design and production elements, and/or message delivery channels (Rimer & Kreuter, 2006). In terms of the proposed assessment, the greatest benefit of using e-health technology is this ability to tailor health messages for individual participants through detailed electronic assessment, customized message content, and multimedia message delivery modes (Cousineau et al., 2006; Neuhauser & Kreps, 2003; Portnoy et al., 2008).

Electronic assessments, as opposed to paper-based or interpersonal assessments, easily collect information on factors that influence behaviors, attitudes, and beliefs—such as needs and personal attributes—to produce effective health messages (Neuhauser & Kreps, 2003). Neuhauser and Kreps posit that interventions that introduce an element of learning are more “effective and persuasive when tailored to an individual's beliefs and sensory preferences” (p. 117). By delivering messages through channels that the individual has selected, the system can tailor the actual learning experience to the individual's needs and preferences to create a unique intervention that is able to overcome any linguistic, cultural, or physical barriers (Atkinson & Gold, 2002; Wiljer & Catton, 2003).

Multimedia. Creating interventions and programs with the ability to use multimedia channels for message delivery allows the system to appropriately transmit messages to participants with different learning styles and preferences (Robinson et al., 1998). Multimedia can use text, audio, video, and/or graphics to increase interactivity,

facilitate message understanding, and engage the participant (Jantz, Anderson, & Gould, 2002). Wiljer and Catton (2003) encourage the use of multimedia by noting that e-health users often prefer to experience content through multimedia. Further, Wiljer and Catton discuss instances of multimedia improving learning outcomes, which, when combined with a system's ability to tailor message delivery channels, may lead to both engagement and retention when participants are presented with their tailored messages.

Interactivity. The interactive nature of e-health communication allows it to be more responsive and participatory than traditional health media (Neuhauser & Kreps, 2003) and to “extend the human ability to create and manage interactions in highly structured ways that are not bound by the constraints of time and place” (Harris, Kreps, & Dresser, 2007, p. 330). This interactivity involves the user in a way that allows her shared control in the program, creating an environment where the participant is able to be in an “activated motivated state of readiness to select, interpret, and respond to the message” (Neuhauser & Kreps, 2003, p. 117).

Tailored e-health interventions can use interactivity in an assessment to allow the participant to “tell” the system how she feels about certain health topics and how she would like to receive information. Encouraging the participant to be autonomous, active, and integral to the system's functionality may be persuasive because messages are essentially created by the participant for the participant. The notion that she has a part in the interaction may both empower and encourage the participant to read the messages critically and make attitude and behavior changes.

Access. E-health technologies increase access in four distinct ways: (1) by eliminating time barriers by potentially being available to users 24/7 (Robinson et al., 1998); (2) by eliminating geographic boundaries by potentially being available to users who are geographically, physically, or emotionally incapable of having a face-to-face interaction (Eysenbach, 2001; Portnoy et al., 2008); (3) by providing services to hard-to-reach users, such as the disabled or those with minimal literacy skills (Atkinson & Gold, 2002; Jantz, Anderson, & Gould, 2002); and (4) by democratizing and equalizing the ability to access information and programs that may have beneficial health outcomes (Atkinson & Gold, 2002; Eysenbach, 2001).

Efficiency. Efficiency is one of the strongest arguments for e-health technology adoption (Eysenbach, 2001). Often, computer-based assessments and multimedia message delivery systems are faster and cost less than an in-person facilitator or educator (Jantz, Anderson, & Gould, 2002). Further, e-health technologies often allow the user to use the system on her own schedule, allowing the user to spend time efficiently at a convenient point in her day.

Though most types of e-health systems are efficient, efficiency is best demonstrated in computer-based assessments (as opposed to paper-based or interpersonal). Assessment designers are able to use a variety of tools and functions to make data entry easier and of high quality (Andrews, Nonnecke, & Preece, 2003). Computer functionalities, such as links, drop-down menus, radio buttons and check boxes, and database lookup tables, not only streamline data entry, but they also reduce the likelihood of entering data that is erroneous or that is unrecognizable by the system

when running algorithms. Jantz, Anderson, & Gould (2002) confirm that completing assessments on the computer saves time and they note that doing so may eliminate some of the anxiety associated with entering assessment data.

Low cost. Although developing e-health systems may be time consuming and, therefore, costly, these will be finite up-front costs rather than unpredictable ongoing costs. Designing a system with care would require that thought is put into segmenting the functionality in a way that certain parts could be updated as necessary without complete system redesign or costly downtime. Once a thoughtfully designed system is developed and deployed, it can be used for years with minimal upkeep cost (Dijkstra & De Vries, 1999). In addition to the relatively low cost to run an e-health system, there are other areas of savings. For example, there would be no cost for educator and facilitator salaries or classroom/clinic space rental fees (Cowderly, Suggs, & Parker, 2007).

E-health challenges. E-health is a relatively new domain in health communication; therefore, it has some challenges associated with it. While these challenges should be carefully considered when designing and developing an e-health system, there are certainly surmountable. There are three major types of challenges that affect e-health technologies most frequently: (1) the need for multidisciplinary participation in creating effective systems; (2) usability issues that occur when users have different levels of computer literacy; and (3) privacy matters that are inherent in using a computer-based assessment tool.

Multidisciplinary needs. Often, e-health systems are not as beneficial as they could be because they lack interdisciplinary input. To create an e-health system, there

needs to be a core team of experts in technology (including databases, code, and technical implementation), health content, strategic public research (to understand those who will use the technology), and in any policies that need to be understood to ethically and democratically deploy the system (Atkinson & Gold, 2002). Stakeholders from these differing disciplines and sectors often do not communicate or collaborate with each other, which causes a deficiency in understanding when creating a system (Eng, 2005).

Usability. When creating an e-health system, developers must consider the intervention's "ease of learning, efficiency of use, memorability, error frequency and severity, and subjective satisfaction to the user" (Atkinson & Gold, 2002, p. 90). If the system is not intuitive, easy-to-use, and satisfying, users are unlikely to be interested in the information or the technology. Usability is a great challenge for developers because they must create a system that is usable by all levels of computer literacy skill but also not simplify the technology so much that it loses important functionality. The e-health literature provides multiple examples of how to create a usable, yet useful system. Eakin, Brady, and Lusk (2001) suggest that programs designed to be used without a facilitator should include all explanation needed for a user to proceed without many questions or issues. Sutherland et al. (2001) found in an implementation of their own that users of a lower computer literacy level may not understand how to use features that are often considered standard, such as help buttons or links. The authors also found that users with less education or more remedial reading skills were more likely to understand terms if there were presented through audio rather than simply in text form. Sutherland et al. recommend that designers "eliminate hyperlinks from the low reading-low computer

skills versions of the survey and to provide help on screen with additional text, graphics, and audio” (p. 323). Finally, Gustafson et al. (1999) recommend using color, graphics, and simple user prompts to make information easy to follow.

Privacy. E-health technologies—especially assessments—frequently collect identifying data from participants. When collecting participant health information, especially personally identifying data, there is an obligation to protect confidential information in accordance with privacy laws. In addition to acknowledging and complying with privacy laws, e-health technologies should be tools for building trusting, quality relationships between the participant and the system designer. Andrews, Nonnecke, & Preese (2003) suggest the following for maintaining participant privacy and nurturing trusting relationships: (1) separate consent or registration forms from the assessment and output; (2) offer incentives, such as tailored messages, as a benefit for the cost of intrusion and information provision; and (3) ensure anonymity through pseudonyms or numerical identifiers.

Background on Methods

Perceived Argument Strength Scale. Zhao et al.’s (2011) Perceived Argument Strength Scale is a self-report measure that can be used to assess perceived argument strength in contexts where thought-listing may be less appropriate (p. 48). The researchers argue that thought-listing has limitations, though it is traditionally used in the persuasion literature as the measure of perceived argument strength and, in the context of ELM, one’s cognitive response to an argument. Zhao et al. identify six limitations of thought-listing: (1) participants may not *want* to report their thoughts accurately, (2)

participants may not have the ability to report their thoughts correctly, (3) systematic bias may be introduced because of memory abilities, (4) it is inefficient, (5) messages features may not be captured, and (6) data quality may be affected by “lack of literacy skills, low motivation to complete the task, and heavy demand from multiple messages” (p. 51).

The Perceived Argument Strength Scale is, therefore, presented by the researchers as “an alternative to thought-listing, incorporating both the strengths of the traditional thought-listing procedure and at the same time over coming some of its limitations” (p. 52). The scale this is offered as a viable “pretest of message quality, a check of strength manipulation, or an outcome of message exposure in persuasion research” (p. 49).

Argument strength is defined as “audience members’ perceptions of the quality, strength, and persuasiveness of the arguments employed in a persuasive communication” (p. 50). Zhao et al. posit that argument strength is the most commonly manipulated message feature in the persuasion literature and that there is “relatively consistent evidence that, when processed carefully, strong arguments produce more attitude and belief change than do weak arguments” (p. 49). Put simply, argument strength is important to persuasion research because it may be an indicator of the message recipient’s cognitive responses to the message and a reliable predictor of the message’s persuasion effects.

Using three studies, Zhao et al. assessed the reliability and validity of the scale in “health communication contexts involving anti-drug public service announcements (PSAs) directed at adolescents and anti-smoking PSAs targeting adults.” Zhao et al. also

found “evidence of convergence between this scale and the thought-listing technique” using the “classical comprehensive exam arguments” (p. 48).

The Perceived Argument Strength Scale is an appropriate choice of measures in this project because it also relies on research from within the ELM paradigm. Zhao et al.’s Perceived Argument Strength Scale includes items that allow researchers to study the “full range of argument perceptions that existing theory and research suggest should matter” (p. 54):

- Positive and negative thoughts
- Agreement
- Plausibility
- Importance
- Novelty
- Confidence
- Overall quality

Strengths. The Perceived Argument Strength Scale’s strengths mostly come from its ability to overcome the limitations of the thought-listing technique. Specifically, the scale “lessens the threat of sensitivity and is much less labor-intensive” (Zhao et al., 2011, p. 70). The scale also can measure perceived argument strength in ways beyond simply thought favorability. Finally, the scale is widely applicable to persuasion contexts, especially those in health communication research

Limitations. The greatest limitation of the Perceived Argument Strength Scale is that it relies on self-report measures. This may introduce social desirability biases.

Further, “as a multiple-item instrument, the scale could also fall victim to response set, particularly under circumstances of low motivation or fatigue” (Zhao et al., 2011). Zhao et al. concede that the scale, though a robust and elegant measure of perceived argument strength, cannot replace thought-listing as a way to assess relative amounts of central versus peripheral processing generated by a message.

Use in the FMA Pilot Test. Thought thought-listing is an option for observing participant message processing, the researcher chose the Perceived Argument Strength Scale as a measure of message quality in the pilot test stage of system development. This decision was made because of (1) economy of time, (2) the scale’s easy adaptability to an online format, and (3) the scale’s basis in the ELM paradigm, the primary theoretical underpinning of this research.

Ensuring Positive Effects of the Proposed Research

Unintended Effects. Prior to designing and implementing a health intervention, designers should conduct an audience analysis and choose a relevant framework that is appropriate for the intervention audience and the designer’s goals. Though extensive research and preparation can reduce the likelihood of unintended intervention effects, designers are not always able to anticipate and eliminate certain effects. Further, health messages are transmitted through a communicative process that involves individual perception and interpretation within an (often) uncontrolled social environment.

Cho and Salmon (2007) identify eleven types of unintended effects that can occur through health interventions: (1) obfuscation, (2) dissonance, (3) epidemic of apprehension, (4) culpability, (5) desensitization, (6) opportunity cost, (7) social

reproduction, (8) social norming, (9) enabling, (10) system activation, and (11) boomerang. Obfuscation is confusion and misunderstanding of health risks and actions for risk prevention. This is the most common unintended effect in the literature. Providing clear, simple messages that have limited interpretations can minimize this effect. Dissonance occurs when individuals feel psychological discomfort and distress from the gap between the intervention's recommended special health state and their current state. Dissonance can be mitigated by providing messages with empowering language and actions the individuals can take to reduce the dissonance through behavior change. An epidemic of apprehension occurs when messages make individuals overly sensitive to the health issues presented. They may end up with an eroded sense of well-being as a result of the intervention messages. Complete and straightforward explanation of the health issues in the messages, along with limited use of fear appeals may help prevent an epidemic of apprehension in the target population. Culpability results from interventions when individuals come to the conclusion that the causes of public health problems are within the individual rather than in social conditions. This is a common issue with fitness, nutrition, and weight management interventions. Obesity is seen as a value-laden state that says something about the individual rather than potential causes within society, such as unsafe environments for exercise and play or limited nutritious food sources within the community (Cho & Salmon, 2007).

Desensitization is likely to occur when the public is exposed to too many messages about the health issue over the long term. The repeated exposure may make the population apathetic and present greater challenges in garnering attention for the issue

and promoting behavior change. Use of different messages in the campaign or finding a fresh angle may help with campaigns dealing with known health risks, such as smoking. Opportunity cost is a related issue when trying to get and hold the group's attention. People cannot devote equal attention to all health messages; therefore, interventions compete with each other to stay relevant. As with the issue of desensitization, it is critical that interventions do not rehash known messages, strategies, and tactics (Cho & Salmon, 2007).

Interventions may also activate or perpetuate power issues within a community. Social reproduction reinforces existing (often unequal) social distributions of knowledge, attitudes, and behaviors rather than reforming them. Put simply, either through privilege or continued opportunity, this minority of those with more power tends to be the group with the knowledge. By ensuring that those who are underserved receive the same benefits of information as others in the community, interventions designers and implementers can provide equal opportunity for knowledge. Social norming can occur when individuals compare themselves to others and make a value judgment based on health status. Certain health issues are stigmatized, such as being HIV positive, and identification of an individual as a sufferer may shame, marginalize, or isolate him or her from society. Sensitivity and care in intervention design and implementation can alleviate perpetuation of such social norming. Enabling effects from an intervention enhance power for existing power holders, individual and institutional. Understanding the target population, especially the influencers and power holders, can help designers avoid unfairly promoting any entity. System activation is one of the more difficult

effects to take preventative actions against. In system activation, interventions make changes at one level of a system without anticipating the effects at another level. For example, encouraging a population to reduce meat consumption could be detrimental to the cattle industry. It should be noted that this effect might not always cause negative outcomes (Cho & Salmon, 2007).

Finally, a well-researched effect is the boomerang effect. The boomerang effect, coined by psychologists Hovland, Janis, and Kelly in 1953, refers to an audience reaction that is opposite to the message designer's intended meaning (Cho & Salmon, 2007). This often occurs as a result of exposure to fear appeals. Witte (2004) defines a fear appeal as "a persuasive message that attempts to arouse the emotion of fear by depicting a personally relevant and significant threat and then follows this description of the threat by outlining recommendations presented as feasible and effective in deterring the threat" (p. 114). More specifically, fear is an emotional reaction resulting from one's subjective experience and direct physiological arousal, especially when an issue is a serious and personally relevant threat (Witte, 2004). After exposure to fear appeals, individuals may want to avoid discussion or thought about the risk presented in the message. Often, this avoidance is manifested by acting opposite of the promoted behavior (Cho & Salmon, 2007).

Effective Interventions. Kreps (2008) states that it is "critically important to identify and examine the relevant cultural issues that are likely to influence the ways consumers, particularly members of vulnerable populations, respond to communication about...risks, prevention, detection, and control" (p. 207). Understanding the target

population, including their social and cultural contexts, allows intervention designers to create messages and strategies that meet the audience's unique needs regarding health, information, and communication. Messages must be clear and simple, use accessible language and familiar images, and appeal to the population's key beliefs, attitudes, values, and worldview. Designing messages by putting oneself in the target population's mindset can help with creating an initial message. Eliciting help from members of that community will provide a second check for message relevance and congruity.

Ethical Considerations. When creating a persuasive tailored fitness message assessment such as the one in this study, there are considerable ethical implications. Assessing a person's health beliefs and attitudes and creating tailored health messages becomes an ethical issue because collecting attitudinal and behavioral data is sensitive, and producing individualized risk messages can elicit an emotional response from the participant and may affect her physical and mental health. Therefore, any assessment or message takes on not only a health promotion component, but also an ethical responsibility.

Even if an individual approach to health intervention, such as this dissertation's tailored message assessment, is used, it still relies heavily on principles from public health and health campaign studies. This assessment's questions and bank of potential messages needed to span a large variety of potential participants regarding health attitudes and beliefs, culture, socioeconomic status, and demographics. To address need for the preparation and capacity to reach a large, varied audience of individual

participants, the assessment design included the ethical considerations of both individual and large scale health interventions and addressed the ethical implications involved.

Gortner's (1991) framework for ethical decisions was a good starting point for ensuring that this system's assessment and messages were developed ethically and that there was a plan for evaluating the ethics of the system after deployment. In his framework, Gortner recommends that a researcher address the following ethical aspects that apply to designing such a system: (1) the law, (2) organizational dynamics, (3) professions and professionalism, (4) the philosophical and cultural setting, and (5) personal aspects.

This study's system is unlike any existing health assessment or messaging system because of its unique combination of subject matter, theoretical frameworks, algorithm, and use of tailored messaging. Considering the ethics of this work is important for multiple reasons: (1) health interventions are intrinsically value-laden (Guttman & Salmon, 2004); (2) health risk and behavior change messages, especially those tailored to an individual, have emotional, mental, and social ramifications; and (3) various regulations and professional codes of ethics are of importance in creating a health assessment like this.

The following is a list of standards followed for the creation of this dissertation's system, derived from Gortner's framework and various codes of ethics from relevant professions, that can also be used in both future development and in future evaluations:

- Study/intervention participation is purely voluntary, without coercion or threat

- All participants sign an informed consent prior to beginning the assessment and they are continuously updated on any relevant changes to the consent
- Messages preserve participant autonomy and persuade through suggestion, rather than coercion
- All participants are treated with beneficence throughout the entire assessment process and during any follow-up counsel
- All members of society have an equal opportunity to participate in the study/intervention
- Participant risk is continually minimized
- All participant personal information, if gathered, is kept private and confidential
- Information presented in intervention messaging may be taken on good faith that the researcher has operated with honesty and integrity in assessment development and maintenance
- The intervention exists purely for advancing the cause of creating a common good
- All survey questions and messages will use culturally-sensitive and relevant language
- The messaging development and maintenance are done in accordance with current science and in partnership with health and fitness experts (ADA, 2009; APA, 2010; ASEP, n.d; Bayer, n.d; Bayer & Fairchild, 2004; Callahan & Jennings, 2002; Childress et al., 2002; Department of Health, Education, and Welfare, 1979; Gazmararian et al., 2005; GMU ORSP, 2011; Gortner, 1991; Guttman & Salmon, 2004; Holm, 2007; IDEA Health & Fitness Association, 2003; Kass, 2001;

NAASFP, 2011; NCSF, 2011; NIH, 2008; NIH, 2011; North Carolina Board of Dietetics/Nutrition, 2011; Rich & Evans, 2005; Rippen & Risk, 2000; Sindall, 2002; Telford, n.d.)

After such effort was taken to ethically design the system, it was critical to have an evaluation process in place to ensure that the assessment and its message products remain ethical. The following evaluation criteria provide a thorough assessment of the deployed system (deployment to the public is not within the scope of this dissertation):

- Have all of the standards been upheld?
- Are any of the standards obsolete or irrelevant?
- Is the intervention achieving the goal of improving the common good through individual intervention?
- What are the recorded, known, or potential social, mental, or physical burdens or risks of the system?
- Are there any recorded unintended effects of intervention messaging? (Graham & Abrams, 2005; Kass, 2001)

INTRODUCTION TO THE FITNESS MESSAGE ASSESSMENT (FMA)

At their most primitive level, tailored health interventions are based on demographics, personal characteristics, and an outcome of interest. The intervention then provides a relevant communication for the participant (Atkinson & Gold, 2002). More detailed tailored interventions include a multitude of other demographic, cultural, psychographic, behavioral, experiential, and possibly even biological characteristics to create messaging that is not only appropriate for the individual, but will incite changes in attitudes and behaviors (Atkinson & Gold, 2002). No matter the level of tailoring, these types of interventions are powerful in that they meet an individual's specific needs based on her characteristics (Atkinson & Gold, 2002).

Drawing on aspects of the elaboration likelihood model (ELM) (Petty & Cacioppo, 1986), the theory of reasoned action (Fishbein & Ajzen, 1975), the theory of planned behavior (Ajzen, 1985), cognitive dissonance theory (Festinger, 1957), the health belief model (HBM) (Rosenstock, 1974), e-health research, and tailored messaging to create an assessment and accompanying message delivery system, the Fitness Message Assessment (FMA), addresses the need for a theory-based framework for tailored message prediction in fitness and nutrition programs. The system was designed to support future modules that can be included for specialization, such as a Faith Motivation module for faith-based fitness and nutrition programs.

To meet the needs of participants, the FMA includes close-ended questions about the individual's (1) fitness goals, (2) fitness interests, (3) source of motivation for a healthy lifestyle, and (4) barriers to physical activity to create appropriate tailored messages for the individual. Further, assessment questions are broken into three categories: orienting, core, and modular. Orienting questions gather demographic information, such as age group and special health state. These questions alone would be appropriate for a targeted message system. Core questions collect information on the participant's health beliefs, attitudes, and perceptions through questions regarding their goals, interests, motivation, and barriers. Finally, in future iterations of the FMA that are beyond the scope of this work, modular questions would allow the message creator to understand more specific information, such as the participant's preferred multimedia message delivery mode.

PART 1: SURVEY CREATION, METHODS, AND PROCEDURES

Magazine Study

Prior to developing an online survey to understand relationships between variables used in this research, a content analysis of women's magazines' (1) fitness article topics and (2) fitness/weight loss advertising messages was conducted to determine what fitness messages women are surrounded by in magazine media. Magazines continue to be a popular form of lifestyle and health information for women (Moyer, Vishnu, & Sonnad, 2011), and the magazines chosen cover the 25-70 year old female population under study and have had consistently high circulation numbers (MPA, 2010).

Sample. The magazine titles were selected because of their known popularity with the target age groups. *Glamour* and *Cosmopolitan* have a strong readership of women between 25 and 40 years of age. Similarly, *Good Housekeeping* and *Redbook* also have a strong readership for women over 40 years of age. By examining these titles for both age groups, it was possible to determine the common messages provided for (1) women overall and (2) women in each age group.

Magazines were obtained from the Fairfax County Library's collection. The same sample of magazines was used to identify both fitness articles and fitness/weight loss advertisements. It is important to note that the advertisement data collection was expanded to include messages about weight loss as well as fitness because while

conducting the data collection, it became clear that fitness and weight loss messages were so closely related that they often blurred and covered similar message categories.

For each title, issues from June 2010 to June 2011 were examined. Of the 48 issues reviewed, 34 contained usable fitness articles and 43 contained usable fitness/weight loss advertisements. A complete listing of the issues from this sample that contained usable data can be found in Appendix N.

Data collection. Data were collected by reviewing every page of each magazine in the sample to find fitness articles and fitness/weight loss advertisements. The criteria for fitness articles included: success stories, tips, motivation, how-to, common myths, and ideas for getting more physical activity. The criteria for fitness/weight loss advertisements included: any product that is traditionally associated with fitness or weight loss - such as tennis shoes, weight loss drugs, diet foods, diet plans - and any advertisement with a message geared toward making the product look “healthy” by promoting characteristics such as health benefits, low calorie/low fat solutions, added vitamins and minerals, and wholesomeness.

Each magazine (1) title, (2) issue/volume, and (3) issue date was recorded before review. As the researcher progressed through each magazine, she flagged the relevant articles and advertisements. After finishing reviewing and flagging all magazines in the sample, the following information was recorded for each entry:

- Articles
 - Page(s)
 - Article title

- Author name
- Article topic
- Advertisements
 - Product brand
 - Type of product (e.g., athletic wear, supplement, food/drink)
 - Advertisement text

Analysis. After collecting all of the data, the researcher used an inductive method to create emergent categories. It was clear early in the analysis that the articles and advertisements clustered together in easily-defined categories. The researcher then calculated frequencies to determine the most common messages found across the magazines as well as the most common messages found in magazines by age group (Ages 25-40: *Cosmopolitan* and *Glamour*; Ages 40 and over: *Good Housekeeping* and *Redbook*).

Inter-coder reliability. To determine the reliability of the coding in this content analysis, the researcher recruited a second coder. To truly test the reliability of the code, this coder was neither familiar with the subject matter nor coding as a method prior to training. A representative sampling of the magazines used in the original analysis was gathered for this test of reliability. The sample included five of each magazine: *Cosmopolitan*, *Glamour*, *Good Housekeeping*, and *Redbook*. Prior to training, the researcher reviewed the magazines and identified appropriate articles and advertisements for coding as well as samples for training that were not included in this test of inter-coder

reliability. The researcher coded this selection of articles and advertisements prior to training the coder.

The coder was provided with a codebook to which he could refer during both training and data coding. After discussion of what each code embodied, the researcher and coder reviewed example articles and advertisements together to clarify both the types of articles and advertisements that may be encountered in coding and also to understand why certain codes were appropriate to use in the analysis. The coder then coded the remainder of the examples by himself while the researcher supervised. The coder and researcher reviewed the examples that he had coded together, ensuring that the coder understood the process.

The coder reviewed the magazine sample, assigning codes without supervision. After he finished, the researcher compared the coder's categorization with her own. Of the 58 articles and advertisements coded, 48 of the codes were in agreement. Using the formula $\text{agreements}/(\text{agreements} + \text{disagreements})$, an inter-coder reliability score of 83% was calculated. Scores above 80% are generally accepted in the field as good ratings of reliability.

Article analysis results. As shown in Table 1, the most common fitness article topics across all magazines were instructional (often with pictures and step-by-step instructions) and workout suggestions. The instructional articles were more common in *Cosmopolitan* and *Glamour*, potentially because the younger target audience is more likely to already be fit enough to have interest in the toning and fine-tuning nature of the instructional articles. The workout suggestion articles were most commonly found in the

magazines intended for the older audience, *Good Housekeeping* and *Redbook* (see Table 3). It is likely that the readers would be more interested in suggestions for becoming more active, as the majority of workout suggestion articles provided information on getting active through elementary level workouts.

This information is important to the design of the FMA because it shows (1) what types of fitness information and discussions women are used to being exposed to and (2) the fitness topics that women of different ages are most interested in learning about. It can be assumed that the frequency of the article topics is based on research on and feedback from the magazines' readership.

Table 1

Article Topics

Article Topic	Number in Sample	%
Dramatic loss/Makeover	4	7.69%
Instructional	19	36.54%
Motivational	8	15.38%
Myth dispelling	5	9.62%
Workout suggestion	16	30.77%

Note. N = 52

Table 2

Article Topics by Title

	Dramatic loss/Makeover	Instructional	Motivational	Myth dispelling	Workout suggestion
Cosmopolitan	0	9	0	1	2
Glamour	0	6	1	2	2
Good Housekeeping	2	1	2	0	11
Redbook	2	3	5	2	1

Table 3

Article Topics by Intended Audience Age Group

	Dramatic loss/Makeover	Instructional	Motivational	Myth dispelling	Workout suggestion
Ages 25-40	0	15	1	3	4
Ages 40+	4	4	7	2	12

Advertisement analysis results. Table 4 illustrates that the most common fitness and weight loss advertising message is that it is possible to indulge in the treat you enjoy without guilt. This message is followed in frequency by the messages that (1) products

are “good for” the reader and (2) that fast fixes, such as diet pills, can replace a healthy diet and regular exercise as a weight loss method. Overall, the most common messages perpetuate the false impression that there is an easy way to be well, whether through nutrient-void diet treats, pills, or fortified “ Frankenfoods.”

Table 6 shows that fast fix messages are most common in magazines intended for younger audiences. This may be because there is more of a focus on attractiveness at a younger age, and these advertisements rely heavily on persuading the reader that she can become attractive without having to employ unattractive methods like diet or exercise. Advertisements in magazines for women over 40 have a high number of messages that encourage the reader to indulge without guilt. This may be a more popular message in these magazines because women are starting to be less able to eat what they could when they were younger with a higher metabolism or they are enticed by the treats they buy their children. Both of these circumstances may lead a woman to be interested in enjoying the simulated experience of the advertised diet versions of the products they once preferred.

The implications of these data for the FMA are twofold. First, unhealthy solutions for weight control, such as the fast fixes and “diet” food should be discouraged and healthy exercise behaviors promoted in their place. Selling the FMA participants on the idea of gradual, lasting fitness and weight management progress had to involve careful persuasive tactics. Second, it was important to be aware of the messages competing with the FMA for the participants’ attention and elaboration. Messages in the

FMA had to be especially attractive and actionable to counteract the messages received in magazine media.

Table 4

Advertisement Messages

Ad Message	Number in Sample	%
Be strong and fashionable	14	4.86%
Don't lose weight on your own	7	2.43%
Exercise is fun	5	1.74%
Fast fix	70	24.31%
Indulge without guilt	115	39.93%
It's good for you	77	26.74%

Note. N = 288

Table 5

Advertisement Messages by Title

	Be strong and fashionable	Don't lose weight on your own	Exercise is fun	Fast fix	Indulge without guilt	It's good for you
Cosmopolitan	9	0	1	43	19	14
Glamour	5	0	0	11	24	21
Good Housekeeping	0	4	4	2	48	32
Redbook	0	3	0	14	24	10

Table 6

Advertisement Messages by Intended Audience Age Group

	Be strong and fashionable	Don't lose weight on your own	Exercise is fun	Fast fix	Indulge without guilt
Ages 25-40	14	0	1	54	43
Ages 40+	0	7	4	16	72

From this analysis, it is apparent that the most common messages that women of all ages receive from magazine media are mixed in their helpfulness in reaching overall fitness and wellness. On one hand, articles offer practical, actionable advice on workout suggestions and specific instructions that take the mystery out of fitness. On the other hand, advertisements in the same magazines promote guiltless indulgence in nutritionally-void “diet” foods, false assurance that products are “good” for the consumers, and, worst of all, fast fixes in the form of dangerous diet pills. The questions that arise from this analysis are primarily around how women negotiate the strong juxtaposition and confusion in their magazines in real life to remain motivated to pursue a healthy lifestyle. This analysis provided a strong foundation for developing survey questions to address these inquiries. Questions to ask about barriers to increasing physical activity and sources of motivation for exercise and overall fitness included answer choices gleaned from this magazine analysis.

Survey

Using the results from the content analysis of fitness messages in women’s magazines and knowledge gained from the literature, an online survey was implemented to gather data on the (1) interest in certain fitness topics, (2) fitness goals, (3) barriers to physical activity, and (4) sources of motivation for exercise, and to assess relationships between those variables and (1) age groups, (2) special health statuses, (3) work hours, and (4) the presence of children at home.

Table 7

Study Variables

Independent Variables (characteristics/demographics)	Dependent Variables
Age group	Interest in fitness topics
Special health status	Fitness goals
Work hours	Barriers to physical activity
Children at home	Sources of motivation for exercise

Using information from the persuasive framework described in the literature review, the researcher's personal experience as a certified fitness instructor, and the data from the women's magazine content analysis, this online survey of women ages 25-70 was deployed to better understand the relationship between the women's (1) age groups, (2) special health statuses, (3) work hours, and (4) presence of children at home and their (1) fitness topics of interest, (2) fitness goals, (3) barriers to increasing physical activity, and (4) sources of motivation for exercise. Understanding these relationships was useful in creating the refined assessment for the pilot test, with both targeting and tailoring messages for the pilot test, and increasing confidence in the FMA's predictability.

Sample and recruitment. The survey sample size was 215 participants, and the methods for survey sampling were convenience, snowball, and purposive. Recruitment was done over email and the social network sites Facebook and Twitter. Sources for these

participants spanned the target population, regarding age, special health status, work hours, and the presence of children at home.

Survey distribution. The survey tool used was created by a software developer at the researcher's company, HealthRx Corporation. All calls for participation used the URL wellness.healthrx.com. This URL was only active during the two-week survey period. The survey tool did not track IP addresses, emails, or other personal information, keeping the participants completely anonymous unless they provided an email for participation in the pilot study phase. The pilot test recruitment question did not require a response and did not affect the survey process in any way.

Questions. The survey consisted of dichotomous and multiple selection questions and a final optional question for pilot study recruitment. The survey questions were as follows:

- Are you male or female? [select one]
 - Male
 - Female
- How old are you? [select one]
 - Under 25
 - 25-40
 - 41-50
 - 51-70
 - Over 70
- Do any of the following special health states apply to you? [select all that apply]

- Pregnant/nursing
- Perimenopausal
- Menopausal
- Disabled/In Significant Pain
- Do you have children at home? [select one]
 - Yes
 - No
- Do you work during regular business hours (9-5)? [select one]
 - Yes
 - No, I don't work
 - No, I work hours outside of those times (e.g., shift work, night shift)
- What do you wish you understood better or knew more about when it comes to fitness, exercise, and being active? [select all that apply]
 - What exercises to do
 - How to fit activity into my schedule
 - The specific benefits of exercise
 - How to do the exercises
- If you had all the time and resources you needed to achieve your personal fitness goals, what would those goals be? [select all that apply]
 - Be stronger
 - Improve my cardiovascular performance (including speed and endurance)
 - Increase my flexibility

- Lower my “numbers” (e.g., cholesterol, blood pressure)
- Increase my longevity/quality of life
- Participate in an event (e.g., a race or competition)
- Be more attractive
- What motivates you to be more active? [select all that apply]
 - Support from my friends and family
 - A desire to be healthier and feel better
 - Physical appearance and attractiveness
 - I find it fun
 - It’s expected of me
 - I want to be an example for others
 - A diagnosis or recommendation from my doctor
- What keeps you from exercising or getting in more activity into your schedule?
[select all that apply]
 - Lack of time
 - Lack of motivation
 - Lack of a gym/facility near by
 - Lack of energy
 - Pain or disability
 - Lack of interest
 - Not enough support from friends or family
 - Potential for embarrassment (at gym, in classes, out running, etc.)

- Expense of a gym, classes, equipment, clothing, etc.
- Not understanding how to achieve my goals
- Quick fixes that haven't worked (e.g., diet pills, extreme fitness plans)
- Long/irregular work or study hours
- Overwhelmed by commitments to family members and/or friends
- No safe place to exercise
- Overwhelmed housekeeping responsibilities (e.g., laundry, cleaning, grocery shopping)
- Busy taking care of the kids
- Do you think you would be able to achieve your fitness goals if those barriers were removed? [select one]
 - Yes
 - No
- Thank you very much for participating in this survey! If you are interested in participating in a short online pilot study related to this research in the next few weeks, please enter your email below. Your email will be kept completely private and will only be used for the purposes of this study.
 - [text area for email address entry]

Screen shots of the survey can be found in Appendix G.

SURVEY RESULTS

The independent variables (IVs) in this survey represent target groups that were used in subsequent the pilot test of the FMA. These groups are: (1) 25-40 year olds, (2) 41-50 year olds, (3) 51-70 year olds, (4) participants who are disabled/in significant pain, (5) pregnant participants, (6) perimenopausal participants, (7) menopausal participants, (8) participants with children at home, (9) participants without children at home, (10) participants who do not work, (11) participants who work shifts/outside regular business hours, and (12) participants who work regular business hours.

The only significant correlation in the data was between Business Hours (IV) and Ability to Achieve Fitness Goals (DV). The Pearson correlation for these variables was -.172, which was significant at the .05 level (2-tailed). Reviewing cross tabulations was far more useful in determining (1) the questions that should be included in the FMA pilot test and (2) the possible connection between the orienting questions (those that identified the relevant IVs) and the targeted messages for the pilot test.

Ability to Achieve Goals

In the survey, the participants were asked whether they would be able to achieve their fitness goals if all barriers were removed. The majority of participants stated that they would be able to achieve their goals. Across all IVs, responses indicating that participants did not believe they would be able to achieve their goals were 10% and

under, with those who do not work and those who are pregnant having the highest percentages of negative responses, 10% and 8%, respectively.

Those with disabilities/significant pain and those who work shifts/hours outside of normal work hours were the most confident in their ability to achieve their fitness goals, both with a 100% positive response rate. Participants' confidence in their ability to achieve their fitness goals declined as the groups increased in age, with 51-70 year olds being the least confident at 67%.

This discovery shows the importance of writing motivational, actionable, and salient messages that can allow the participant to view her fitness goals as achievable, thereby increasing their self-efficacy.

Table 8

Ability to Achieve Goals by IV

Achieve				Disabled/		
Goals	25-40	41-50	51-70	Pain	Menopause	Peri-menopause
Yes	92%	85%	67%	100%	91%	89%
No	4%	3%	4%	0%	0%	0%
N/A	5%	12%	29%	0%	9%	11%

Achieve			Kids-	Kids-		
Goals	Pregnant	Yes	No	No Work	Outside Hrs	9 to 5
Yes	92%	94%	88%	77%	100%	94%

No	8%	4%	4%	10%	0%	2%
N/A	0%	2%	7%	13%	0%	4%

Goals, Fitness Interests, Barriers, and Motivations Across Target Groups

The following tables provide an overview of the participant responses for the most common goals, interests, barriers, and motivations by target group (IV).

Table 9

Goals by Target Group

		Disabled			Peri-	
	25-40	41-50	51-70	/In pain	Menopause	menopause
Attractive	79%	71%	53%	50%	64%	56%
Stronger	64%	56%	63%	67%	82%	44%
Cardio	65%	85%	55%	67%	77%	56%
Flexibility	64%	65%	68%	83%	82%	56%
Longevity	64%	59%	55%	50%	68%	67%
Numbers	23%	26%	38%	33%	45%	22%
Event	32%	32%	4%	0%	0%	22%

		Kids- Pregnant	Kids- Yes	Kids- No	Outside No Work	Hrs 9 to 5
Attractive	92%	83%	74%	71%	73%	78%
Stronger	83%	74%	68%	75%	68%	67%
Cardio	75%	74%	71%	60%	73%	75%
Flexibility	42%	66%	74%	73%	68%	72%
Longevity	83%	68%	66%	67%	73%	64%
Numbers	25%	21%	37%	46%	50%	24%
Event	50%	34%	22%	13%	27%	30%

Table 10

Fitness Interests by Target Group

	25-40	41-50	51-70	Disabled/ In Pain	Menopausal	Peri- menopausal
How the do the exercises	22%	15%	26%	33%	41%	11%
Fit in schedule	60%	44%	25%	0%	41%	67%
Specific benefits	7%	9%	15%	0%	9%	0%
What	41%	44%	47%	50%	55%	44%

exercises						
	Pregnant	Kids- Yes	Kids- No	No Work	Outside Hrs.	9-5
How the do the exercises	42%	25%	26%	42%	32%	17%
Fit in schedule	75%	58%	46%	31%	64%	54%
Specific benefits	8%	6%	13%	21%	0%	9%
What exercises	25%	40%	53%	56%	59%	42%

Table 11

Barriers by Target Group

	25-40	41- 50	51-70	Disabled /In Pain	Menopause	Peri- menopause
Kids	20%	32%	5%	17%	9%	44%
Expense	18%	21%	10%	17%	5%	22%
No gym	3%	3%	3%	0%	5%	0%

No Energy	55%	44%	15%	50%	36%	67%
No interest	19%	9%	7%	0%	5%	22%
No Motivation	49%	41%	30%	50%	32%	67%
No Time	74%	59%	38%	17%	64%	56%
Hours	47%	26%	11%	17%	27%	22%
No safe place	2%	0%	0%	0%	0%	0%
No support	5%	12%	3%	17%	0%	22%
Goals	6%	6%	8%	0%	18%	11%
Commitments	15%	24%	21%	0%	27%	11%
Housekeeping	29%	29%	12%	17%	23%	44%
Pain	8%	15%	15%	83%	23%	0%
Embarrassment	11%	6%	3%	17%	9%	0%
Quick Fix	7%	0%	0%	0%	0%	0%

		Kids	Kids-		Outside	
	Pregnant	-Yes	No	No Work	Hrs	9 to 5
Kids	75%	68%	1%	25%	5%	19%
Expense	17%	13%	18%	15%	18%	17%
No gym	0%	6%	2%	0%	0%	6%
No Energy	50%	47%	44%	27%	59%	47%
No interest	0%	9%	17%	13%	9%	16%
No Motivation	25%	34%	49%	48%	50%	44%

No Time	100%	74%	61%	38%	68%	75%
Hours	33%	21%	40%	2%	55%	44%
No safe place	8%	2%	1%	0%	5%	1%
No support	0%	4%	6%	6%	5%	6%
Goals	0%	6%	8%	6%	5%	9%
Commitments	33%	32%	15%	21%	18%	20%
Housekeeping	50%	49%	18%	21%	14%	30%
Pain	0%	9%	14%	19%	18%	10%
Embarrassment	0%	6%	10%	6%	18%	8%
Quick Fix	0%	2%	4%	4%	5%	3%

Table 12

Motivations by Target Group

	Disabled/I			Peri-		
	25-40	41-50	51-70	n Pain	Menopause	menopause
Health	89%	88%	73%	50%	91%	89%
Doctor	7%	15%	22%	50%	27%	11%
Fun	45%	50%	38%	50%	50%	22%
Example	20%	24%	15%	17%	32%	44%
Expected	7%	0%	4%	17%	14%	0%
Attractive	86%	68%	52%	33%	77%	89%
Support	25%	32%	26%	17%	32%	44%

		Kids-	Kids-		Outside	
	Pregnant	Yes	No	No Work	Hrs	9 to 5
Health	83%	91%	91%	83%	86%	95%
Doctor	0%	15%	15%	21%	23%	10%
Fun	58%	49%	47%	46%	36%	50%
Example	33%	42%	12%	8%	9%	27%
Expected	0%	0%	8%	4%	14%	5%
Attractive	83%	83%	76%	71%	77%	82%
Support	17%	32%	29%	35%	36%	26%

Answering the Research Questions

Age: RQ1: What is the relationship between age and (1) fitness topic interests, (2) fitness goals, (3) barriers to getting more physical activity, and (4) sources of motivation?

Goals. The 25-40 year old and 41-50 year old participants had common goals; however, the order of importance of these goals differs. The 25-40 year olds placed the most importance on doing physical activity in order to be attractive (79%), followed by three health-related goals that are nearly equal in importance for this group: bettering cardiovascular fitness (65%), increasing strength (64%), increasing flexibility (64%), and promoting longevity (64%). The 41-50 year olds placed the most importance on

bettering cardiovascular fitness (85%), but, like the 25-40 year olds, were also concerned with being attractive (71%). Increasing flexibility (65%) was the third most important goal for this group.

One can see a clear difference between the 51-70 year olds and the two younger groups. These participants were purely focused on the fitness outcomes of physical activity, with increasing flexibility (68%), increasing strength (63%), and bettering cardiovascular fitness (55%) as their most important goals.

Fitness Interests. The fitness topic of greatest interest to both the 25-40 year olds and 41-50 year olds was understanding how to fit physical activity into their schedules (60% for 25-40 and 44% for 41-50). Of equal importance to 41-50 year olds was learning what exercises to do (44%). Like the 41-50 year olds, the 51-70 year olds were also most interested in learning what exercises to do (47%).

Barriers. The 25-40 year olds and 41-50 year olds showed the same top three barriers to get more physical activity: no time, no energy, and no motivation. For 25-40 year olds, the rankings for these barriers were 74%, 55%, and 49%, respectively. For the 41-50 year olds, they were 59%, 44%, and 41%, respectively.

As with the younger groups, the 51-70 year olds stated that their greatest barriers were no time (38%) and no motivation (30%). However, this group also listed other life commitments (21%) as a barrier.

Motivations. Across all three age groups, the participants were most motivated to get more physical activity because of the health benefits and the promise of being more attractive. All groups ranked health (89% for 25-40, 88% for 41-50, and 73% for 51-70)

as the greatest priority; however, the 25-40 year olds chose being attractive (86%) as a close second. The two older groups had a larger gap between importance of health as an outcome of physical activity and being attractive (68% for 41-50 and 52% for 51-70).

Special Health State: RQ2: What is the relationship between special health state and (1) fitness topic interests, (2) fitness goals, (3) barriers to getting more physical activity, and (4) sources of motivation?

Goals. Participants who are disabled/in significant pain had increasing flexibility (83%), increasing strength (67%), and bettering cardiovascular fitness (67%) as their top goals for doing physical activity.

The majority of pregnant participants use physical activity as a means to be attractive (92%). Increasing strength (83%) and promoting longevity (83%) were also important goals for the pregnant participants.

Like the pregnant participants, the perimenopausal participants are physically active with the goals of promoting longevity (67%) and being attractive (56%); however, the perimenopausal participants also placed importance on bettering cardiovascular fitness (56%) and increasing flexibility through physical activity.

Menopausal participants use physical activity to reach fitness-specific goals, more specifically, increasing strength (82%), increasing flexibility (82%), and bettering cardiovascular fitness (77%).

Fitness Interests. Participants who are disabled/in significant pain and menopausal participants were most interested in learning what exercises to do, with 50%

of disabled/in significant pain participants and 55% of menopausal participants listing this as their top fitness interest.

Pregnant and perimenopausal participants were most interested in understanding how to fit physical activity into their schedules, with 75% of pregnant and 67% of perimenopausal participants responding this way.

Barriers. Predictably, the disabled/in significant pain participants responded that pain (83%) was their most significant barrier to getting more physical activity. In addition to pain, these participants were impeded by not having the energy (50%) and not having the motivation (50%) to be active.

All of the pregnant participants listed a lack of time (100%) as their greatest barrier. The second biggest barrier to physical activity was caring for their children (75%). Not having energy (50%) and being busy with housekeeping (50%) were both the third largest impediment to activity.

Like the pregnant participants, perimenopausal participants also stated that not having energy (67%) or time (56%) were major barriers. Like disabled/in significant pain and menopausal participants, perimenopausal participants also lacked motivation (67%) to add more activity to their schedules.

Menopausal participants responded that their greatest barrier to more activity was time (64%). This barrier is far stronger than their other top responses, no energy (36%) and no motivation (32%).

Motivations. All groups of participants with special health states listed health as their top motivation for physical fitness; however, disabled/in significant pain

participants rated health (50%), doctor's orders (50%), and finding fitness activities fun (50%) equally in terms of their motivation to be active. It is likely that many of the disabled/in significant pain participants who find fitness activities fun and, therefore, motivating were recruited from the researchers water aerobics class. This population tends to be very loyal to and dedicated to their water exercise regimen.

Pregnant, perimenopausal, and menopausal participants all rated health and being attractive as the most motivating aspects of being active. Specifically, health was motivating to 83% of pregnant participants, 89% of perimenopausal, and 91% of menopausal. Being attractive was tied in importance with health for pregnant participants (83%) and perimenopausal participants (89%). Being attractive was of less importance to the menopausal participants (77%).

Work Hours: RQ3: What is the relationship between work hours and (1) fitness topic interests, (2) fitness goals, (3) barriers to getting more physical activity, and (4) sources of motivation?

Goals. Participants who do not work use physical activity to reach their goals of increased strength (75%) and flexibility (73%). In addition to physical fitness goals, the participants in this group were active in order to be more attractive (71%).

Participants who work shifts/outside regular hours were equally interested in using physical activity as a way to be more attractive (73%), better their cardiovascular fitness (73%), and increase their longevity (73%).

Like the participants who work shifts/outside regular hours, participants who work regular business hours used physical activity to be more attractive (78%) and reach

cardiovascular fitness goals (75%). The third most common goal that the participants had was increasing their flexibility (72%).

Fitness Interests. Participants who do not work were most interested in learning what exercises to do (56%). In contrast, those who work shifts/outside of regular business hours as well as those who work during regular business hours were interested in understanding how to fit physical activity into their schedules (shift workers/outside regular hours 64% and regular business hours workers 54%).

Barriers. Participants who do not work were most impeded by a lack of motivation to be active (48%). They showed that lack of time (38%) and lack of energy (27%) were also barriers to their activity.

Both participants who work shifts/outside regular business hours and those who work regular business hours were deterred by not having time (shift workers/outside regular hours 68% and regular business hours workers 44%) and not having energy for more activity (shift workers/outside regular hours 59% and regular business hours workers 47%). Further, both groups were limited by their work hours, with 55% of participants who work shifts/outside business hours and 44% of 9-to-5 workers listing this as a barrier. In addition to these barriers, those who work regular business hours lack motivation (44%) to get more activity.

Motivations. All groups selected health and being attractive as their primary motivations for being physically active. 83% of those who do not work, 86% of shift workers/those who work outside business hours, and 95% of those who work 9-5 jobs responded that their health was a motivator for activity. 71% of those who do not work,

77% of shift workers/those who work outside business hours, and 82% of those who work 9-5 jobs were also motivated by physical activity's outcome of making them more attractive.

Presence of Children at Home: RQ4: What is relationship the between the presence of children at home and (1) fitness topic interests, (2) fitness goals, (3) barriers to getting more physical activity, and (4) sources of motivation?

Goals. Participants with children at home use physical activity to reach goals of being attractive (83%), gaining strength (74%), and reaching cardiovascular fitness goals (74%). Similarly, participants without children at home selected being attractive (74%) and cardiovascular fitness (71%) as goals. In contrast to participants with children at home, those without children at home were concerned with increasing their strength (74%).

Fitness Interests. Fitness interests differ between the two groups, with understanding how to fit physical activity into their schedules (58%) as a top interest for participants with children at home and learning what exercises to do (53%) a priority for those without children at home.

Barriers. The most common barrier for both groups was a lack of time, with 74% of participants with children at home and 61% of those without children at home selecting it. Beyond this, barriers for the two groups differ, with participants with children at home impeded by caring for their kids (68%) and housekeeping (49%) and participants without children at home being deterred by a lack of motivation (49%) and energy (44%).

Motivations. Both groups were motivated by health and becoming more attractive as outcomes of getting physical activity – both groups with 91% of participants motivated by health. 83% of participants with children at home and 76% without children at home selected being attractive (76%) as a motivator.

PART 2: PILOT TEST CREATION, METHODS, AND PROCEDURES

Applying Survey Results to Create the Pilot Test Assessment

Developing Target Messages. Messages for the pilot test were developed by using the survey data to determine the most common goals, interests, barriers, and motivation by target group. Variables were chosen according to most significant breaks in the percentages of responses for each group/topic.

Goals. The top three to five goals from each group were selected for messaging. The most common goals for each group, in order of importance, were as follows:

- **25-40 year olds:** being attractive (79%), bettering cardiovascular fitness (65%), increasing strength (64%), increasing flexibility (64%), and promoting longevity (64%)
- **41-50 year olds:** bettering cardiovascular fitness (85%), being attractive (71%), increasing flexibility (65%)
- **51-70 year olds:** increasing flexibility (68%), increasing strength (63%), and bettering cardiovascular fitness (55%)
- **Disabled/in significant pain:** increasing flexibility (83%), increasing strength (67%), and bettering cardiovascular fitness (67%)
- **Pregnant:** being attractive (92%), increasing strength (83%), and promoting longevity (83%)

- **Perimenopausal:** promoting longevity (67%), being attractive (56%), bettering cardiovascular fitness (56%), and increasing flexibility (56%)
- **Menopausal:** increasing strength (82%), increasing flexibility (82%), and bettering cardiovascular fitness (77%)
- **Children at home:** being attractive (83%), increasing strength (74%), and bettering cardiovascular fitness (74%)
- **Without children at home:** being attractive (74%), increasing flexibility (74%), and bettering cardiovascular fitness (71%)
- **Does not work:** increasing strength (75%), increasing flexibility (73%), and being attractive (71%)
- **Works shifts/outside regular business hours:** being attractive (73%), bettering cardiovascular fitness (73%), and promoting longevity (73%)
- **Works regular business hours:** being attractive (78%), bettering cardiovascular fitness (75%), and increasing flexibility (72%)

Fitness Interests. The top fitness interest from each group was selected for messaging; however, the 41-50 year old group had two top interests. The most common fitness interests for each group were:

- **25-40 year olds:** understanding how to fit physical activity into her schedule (60%)
- **41-50 year olds:** understanding how to fit physical activity into her schedule (44%), learn what exercises to do (44%)
- **51-70 year olds:** learn what exercises to do (47%)

- **Disabled/in significant pain:** learn what exercises to do (50%)
- **Pregnant:** understanding how to fit physical activity into her schedule (75%)
- **Perimenopausal:** understanding how to fit physical activity into her schedule (67%)
- **Menopausal:** learn what exercises to do (55%)
- **Children at home:** understanding how to fit physical activity into her schedule (58%)
- **Without children at home:** learn what exercises to do (53%)
- **Does not work:** learn what exercises to do (56%)
- **Works shifts/outside regular business hours:** understanding how to fit physical activity into her schedule (64%)
- **Works regular business hours:** understanding how to fit physical activity into her schedule (54%)

Barriers. Across all of the groups, time and energy were the most common barriers to getting physical activity. The top three barriers to physical activity from each group were selected for messaging. The most common barriers for each group, in order of importance, were:

- **25-40 year olds:** no time (74%), no energy (55%), and no motivation (49%)
- **41-50 year olds:** no time (59%), no energy (44%), and no motivation (41%)
- **51-70 year olds:** no time (38%), no motivation (30%), and other commitments (21%)

- **Disabled/in significant pain:** pain (83%), no energy (50%), and no motivation (50%)
- **Pregnant:** no time (100%), caring for kids (75%), no energy (50%), and housekeeping (50%)
- **Perimenopausal:** no energy (67%), no motivation (67%), and no time (56%)
- **Menopausal:** no time (64%), no energy (36%), and no motivation (32%)
- **Children at home:** no time (74%), caring for kids (68%), and housekeeping (49%)
- **Without children at home:** no time (61%), no motivation (49%), and no energy (44%)
- **Does not work:** no motivation (48%), no time (38%), and no energy (27%)
- **Works shifts/outside regular business hours:** no time (68%), no energy (59%), and work hours (55%)
- **Works regular business hours:** no time (75%), no energy (47%), no motivation (44%), and work hours (44%)

Motivation. The top two motivational factors (except for those who are disabled/in significant pain where there are three) from each group were selected for messaging. Across all target groups, health was the main motivating factor in getting physical activity. For all groups except those who are disabled/in significant pain, being attractive was the second most important motivator. The most common motivation was:

- **25-40 year olds:** health (89%) and being attractive (86%)
- **41-50 year olds:** health (88%) and being attractive (68%)

- **51-70 year olds:** health (73%) and being attractive (52%)
- **Disabled/in significant pain:** health (50%), doctor's orders (50%), and it's fun to be active (50%)
- **Pregnant:** health (83%) and being attractive (83%)
- **Perimenopausal:** health (89%) and being attractive (89%)
- **Menopausal:** health (91%) and being attractive (77%)
- **Children at home:** health (91%) and being attractive (83%)
- **Without children at home:** health (91%) and being attractive (76%)
- **Does not work:** health (83%) and being attractive (71%)
- **Works shifts/outside regular business hours:** health (86%) and being attractive (77%)
- **Works regular business hours:** health (95%) and being attractive (82%)

Answer Choices Removed from the FMA

Variables that received a low response rate (5% and under) across all target groups were removed as question options from the FMA because of their lack of relevance. In the question, "What keeps you from exercising or getting in more activity into your schedule?" the options (1) No gym, (2) no safe place to work out, and (3) quick fix were removed. All other variables received a significantly higher percentage of responses.

The Pilot Test Questions

Orienting questions. The orienting questions gather data on the participants' age group, special health state, presence of children at home, and work hours. These

questions alone drove the targeted message assignment for the group receiving only these messages in the pilot test. The orienting questions were also used in the tailored message group in the pilot test; however, the tailored assessment also included the core questions referenced below. The orienting questions in the FMA are:

1. Age Group [select one]

- 25-40
- 41-50
- 51-70

2. Do any of the following special health states apply to you? If not, please continue on to the next question. [select all that apply]

- Disabled/In Significant Pain
- Pregnant
- Perimenopausal
- Menopausal

3. Do you have children at home?

- Yes
- No

4. Do you work during regular business hours (9-5)? [select one]

- Yes, I work regular business hours
- No, I work hours outside of those times (e.g., shift work, night shift)
- No, I don't work

Core questions. The core questions are closed-ended questions that address five types of information: (1) fitness interests, (2) fitness goals, (3) sources of motivation for exercise, and (4) barriers to fitness. These questions were only used for the tailored message group in the pilot test. The core questions were:

Fitness Interests

5. What are you hoping to accomplish by getting more active? [select one]

- Weight loss
- Weight gain
- Weight maintenance

6. What do you wish you understood better or knew more about when it comes to fitness, exercise, and being active? [select all that apply]

- How to fit physical activity into my schedule
- What exercises to do
- How to do exercises
- Specific benefits of being more physically active

Goals

7. If you had all the time and resources you needed to achieve your personal fitness goals, what would those goals be? [select all that apply]

- Getting stronger
- Gaining flexibility
- Being more attractive
- Living a longer life

- Getting in better aerobic/cardiovascular shape
- Improving my “numbers” (e.g., cholesterol, blood pressure)
- Preparing for an event (e.g., race, triathlon, competition)

Motivation

8. What motivates you to be more active? [select all that apply]

- Getting healthy
- Being more attractive
- Having fun
- Being an example for others
- Having support from friends and/or family
- My doctor wants me to
- It's expected of me

Barriers

9. What keeps you from exercising or getting in more activity into your schedule? [select all that apply]

- No time
- No motivation
- Too many commitments
- No energy
- Pain
- Housekeeping and chores
- Work/school hours

- The expense
- Not understanding how to achieve my fitness goals
- No interest
- My kids
- No support from friends/family
- I'm embarrassed to have people see me exercising

Messages. In the pilot test, the targeted and tailored groups received different messages. Messages used in the tailored group were those that were under consideration for use in the FMA. These messages were compiled from the literature, the researcher's experience as a fitness professional, and the researcher's medical and fitness professional colleagues. Both targeted and tailored versions of the pilot test used a message bank with a comprehensive listing of all possible messages and their associations with specific question answers. This message bank was designed similar to an answer key or a rubric. (See Appendices D and E for the message banks used in the pilot test).

Pilot Test

After developing and testing a beta version of the FMA, a pilot test of the system was conducted to determine if hypotheses H1 and H2 could be accepted. The purpose of this pilot test was solely to evaluate the message quality/strength and the system's ability to assign appropriate messages.

Sample and recruitment. The pilot study sample size was 89 participants/695 message evaluations. The methods for pilot test sampling were convenience, snowball, and purposive. Recruitment was done within Part 1 of this dissertation - the online

survey - and then followed up with emailing the volunteers. Recruitment for the pilot test originally divided the participants randomly into the control group and the experimental group. Then, separate recruitment emails were sent to each group with a URL corresponding to either the targeted message system or the tailored message system, depending on group assignment. After one week of the pilot test, it became apparent that the method used for recruiting and disseminating the pilot test was not effective enough. By one week into the test period, only 30 pilot tests had been completed.

In consultation with the software developers at HealthRx Corporation, one URL was created for all study participants. After reaching the URL, the system provided the participant with either the targeted test or the tailored test. For each participant, there was a 50% chance of getting either survey. Because of this change, the system automatically alternated the type of test, negating the need for two URLs, the complications that come with using multiple URLs for testing, and the recruitment issue of not being able to mass recruit (because of the need to assign participants to a certain test, therefore URL). After consolidating the test into one programmatically more efficient URL, the researcher emailed a wider group of potential recruits and posted the call on Facebook and Twitter.

Sources for these participants again spanned the target population, regarding age, special health status, work hours, and the presence of children at home. Consent and anonymity practices were the same as in the survey phase.

Participant groups. Participants were randomly assigned to two equal groups: (1) the control group who received targeted messages and (2) the experimental group who received tailored messages.

Control group. Participants in the control group received targeted messages for evaluation. They were given an assessment comprised of only the FMA orienting questions:

1. Age Group [select one]

- 25-40
- 41-50
- 51-70

2. Do any of the following special health states apply to you? [select all that apply]

- Pregnant/nursing
- Perimenopausal
- Menopausal
- Disabled/In Significant Pain

3. Do you have children at home?

- Yes
- No

4. Do you work during regular business hours (9-5)? [select one]

- Yes
- No, I don't work
- No, I work hours outside of those times (e.g., shift work, night shift)

Based on their responses, the participants were provided with text-only targeted fitness messages for their review within the same online session. The participants then

continued to the evaluation portion where they answered questions about each message. After the participants finished the assessment, they progressed to the evaluation portion. The participants were asked to evaluate each message for their perceived argument strength using Zhao et al.'s (2011) Perceived Argument Strength Scale (see Appendix M). After evaluating each message, the participant was asked a final question regarding the message's actionability. (see Appendix F for an example of the message evaluation portion of the pilot test).

Experimental group. Based on their responses, the participants were provided with text-only tailored fitness messages for their review within the same online session. The participants then continued to the evaluation portion where they answered questions about each message. After the participants finished the assessment, they progressed to the evaluation portion. The participants were asked to evaluate each message for their perceived argument strength using Zhao et al.'s (2011) Perceived Argument Strength Scale (see Appendix M). After evaluating each message, the participant was asked a final question regarding the message's actionability. (see Appendix F for an example of the message evaluation portion of the pilot test).

Analysis. The responses from both the control and experimental groups were analyzed for their perceived argument strength and actionability scores.

Perceived Argument Strength Score. The Perceived Argument Strength Scale has nine total items:

1. The statement is a reason for getting more physical activity that is believable.
2. The statement is a reason for getting more physical activity that is convincing.

3. The statement gives a reason for getting more physical activity that is important to me.
4. The statement helped me feel confident about how to best get more physical activity.
5. The statement would help my friends get more physical activity.
6. The statement put thoughts in my mind about wanting to get more physical activity.
7. The statement put thoughts in my mind about not wanting to get more physical activity.
8. Overall, how much do you agree or disagree with the statement?
9. Is the reason the statement gave for getting more physical activity a strong or weak one?

Unfortunately, question 9 was misprinted in the pilot test and, therefore, could not be considered in the analysis.

The items in the scale were scored on a Likert-type scale of 1 to 5, where 1 = strongly disagree and 5 = strongly agree. Zhao et al. (2011) instruct researchers to “subtract item 7 from item 6 to create a single thought favorability item and then convert the new item to a 5-point scale by dividing it by 2 and adding a constant of 3” (p. 75). After resolving items 6 and 7 into a single item, an overall perceived argument strength score was calculated. Following Zhao et al.’s examples, a final perceived argument strength score for each argument was obtained by averaging across the scale items.

Actionability Score. After evaluating each message, the participants in both

groups were asked about the actionability of the message:

10. This statement provides me with enough information to perform the tasks stated.

The participants were asked to score the item on a five-point Likert-type scale, where 1 = strongly disagree and 5 = strongly agree.

PILOT TEST RESULTS

Frequency of Message Occurrence

Message Key

The following table shows the messages that were provided during the pilot test. Not all messages in the targeted and tailored message banks (see Appendices D and E) occurred during this test.

Table 13

Pilot Test Message Key

Survey Type	Message Code	Question	Response	Message
Targeted	Q10101	Age Group	25-40	At your age, you are in your prime! In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you invest in your health and (2) use the advantage you have with your youth to be in top

				<p>condition (cardiovascular, strength, and flexibility) and to stay healthy and beautiful for years to come. You are probably busy, overcommitted, and trying to do it all. Though it may seem that there is no room for exercise in your schedule, you are likely to find stress relief and enjoyment in being active. The reward of being stronger, faster, fitter, and more attractive may be exactly what you need to get and stay motivated and energized to be active.</p>
Targeted	Q10102	Age Group	41-50	<p>As life starts to change – kids are growing up, careers are stable - you may find some new opportunities in your schedule for activity. Whether it is gardening, running, swimming, or a fitness class, there are countless ways to get in your exercise. Also, at your</p>

				<p>age, you have the advantage of still being youthful and vibrant as well as the gift of experience and knowledge. In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you invest in your health and (2) use your resources – like fitness websites, a certified personal trainer, books, fitness classes – to understand how to do specific exercises that will have you in the best condition of your life and will help you to stay healthy and beautiful for years to come. The reward of being stronger, faster, fitter, and more attractive may be exactly what you need to get and stay motivated and energized to be active.</p>
Targeted	Q10103	Age Group	51-70	At your age, you may be

				<p>transitioning into a new way of life regarding health. While you may be finding that your weight is harder to maintain or you have less energy than you did in the past, this is certainly the time to get your body into great condition and to fully use the gift of experience and knowledge you've gained over the years. In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you invest in your health and commit to your wellness as much as you commit to others and (2) use your resources – like fitness websites, a personal trainer, books, fitness classes – to understand how to do specific exercises that will have you feeling healthy and beautiful for</p>
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				<p>years to come. The reward of being stronger, more flexible, fitter, and glowing from the inside out may be exactly what you need to get and stay motivated and energized to be active.</p>
Targeted	Q10204	Special Health States	Menopausal	<p>Many women feel tired during menopause. It may seem counterintuitive, but a bit of activity may be what you need to reenergize. If you're feeling bothered by hot flashes, outsmart your body by jumping in the pool for some laps or a water aerobics class. You will get the same cardiovascular benefit as using a treadmill or elliptical, but you won't feel the heat. There is no time like the present to start good fitness behaviors and find a place in your busy schedule for activity. As women age, their physical</p>

				<p>make up changes as well, leading to more fat storage, brittle bones, and muscle loss. Getting active now can offset these common effects of aging, potentially extend your life, and keep your skin bright and healthy.</p>
Targeted	Q10301	Children at home	Yes	<p>Any mom knows that chasing the little ones around, cleaning up after the family, and getting everyone ready and where they need to go counts as exercise. Even better, playtime can be family AND fitness time! For those with older children, consider using the time between piano lessons and soccer practice as bonus "you" time to take a walk or stretch or hit the gym with some friends. Making your health a priority is often difficult for women – especially those who are</p>

				<p>busy caring for others. Take time to care for your own wellness so you can keep up with the kids.</p>
Targeted	Q10401	Business Hours	9 to 5	<p>If you have a job where you are seated for most of the day, it is especially important that you make sure you are getting up every 30 minutes for a quick stretch or a walk around the office. Many companies have gyms in the building or nearby - yours may even offer a discount or incentive for joining the gym. You can also gather coworkers and create a fitness challenge where you are accountable to each other and can provide support and encouragement. In order to put your health first, choose a time of day to exercise that works best in your schedule. Maybe giving yourself an extra half hour in the</p>

				<p>morning to take a walk or run will make all the difference. Or, you may benefit from keeping a gym bag in your car and hitting the gym on the way home from work.</p>
Targeted	Q10402	Business Hours	Shift	<p>With the availability of 24-hour gyms, DVDs, and simple at-home fitness activities, you schedule does not need to be a hindrance to getting more activity. Take advantage of your schedule and get in some time at the park, the gym, or the mall when they are less crowded. Any activity, whether it's cleaning, grocery shopping, or dancing in Zumba class can get you stronger, healthier, and happier! However, if you have a job where you are on your feet, you're entitled to some relaxation after work. Instead of sitting in front of TV, wind down</p>

				with some quiet yoga or stretching.
Targeted	Q10403	Business Hours	No work	No work, huh? Well, the world is your oyster! Take advantage of your schedule and get in some time at the park, the gym, or the mall when they are less crowded. Any activity, whether it's cleaning, grocery shopping, or dancing in Zumba class can get you stronger, healthier, and happier!
Tailored	Q20101	Age Group	25-40	Women your age tend to be busy, overcommitted, and trying to do it all. Though it may seem that there is no room for exercise in your schedule, you are likely to find stress relief and enjoyment in being active. Try different activities until you find what works for you.
Tailored	Q20102	Age Group	41-50	As life starts to change - kids are

				growing up, careers are stable - you may find some new opportunities in your schedule for activity. Whether it is gardening, running, swimming, or a fitness class, there are countless ways to get in your exercise.
Tailored	Q20103	Age Group	51-70	Whether it is gardening, swimming, water aerobics, or a fitness class, there are countless ways to get in your exercise. Getting active is an excellent way to keep your body strong and vibrant and prevent the negative effects of aging.
Tailored	Q20201	Special Health States	Disabled/In Significant Pain	Women with disabilities or chronic pain benefit from including as much activity as they are able to, spread across the week. Be sure to consult your healthcare provider about the types and amounts of activity that are

				<p>appropriate for you. If you are able to, you should get at least 150 minutes per week (2 hours and 30 minutes) of moderate-intensity aerobic activity performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week. You should also do muscle-strengthening activities of moderate or high intensity that involve all major muscle groups on 2 or more days per week as these activities provide additional health benefits.</p>
Tailored	Q20203	Special Health States	Peri-menopausal	<p>Many women start to feel tired as menopause approaches. It may seem counterintuitive, but a bit of activity may be what you need to reenergize.</p>
Tailored	Q20204	Special Health States	Menopausal	<p>Many women feel tired during menopause. It may seem counterintuitive, but a bit of</p>

				<p>activity may be what you need to reenergize. If hot flashes are a problem for you, consider going to the pool for a water aerobics class or a swim. That way, you can stay cool and get in an excellent workout!</p>
Tailored	Q20301	Children at home	Yes	<p>Any mom knows that chasing the little ones around, cleaning up after the family, and getting everyone ready and where they need to go counts as exercise. Even better, playtime can be family AND fitness time! For those with older children, consider using the time between piano lessons and soccer practice as bonus “you” time to take a walk or stretch or hit the gym with some friends. Making your health a priority is often difficult for women – especially those who are</p>

				<p>busy caring for others. Take time to care for your own wellness so you can keep up with the kids.</p>
Tailored	Q20401	Business Hours	9 to 5	<p>If you have a job where you are seated for most of the day, it is especially important that you make sure you are getting up every 30 minutes for a quick stretch or a walk around the office. Many companies have gyms in the building or nearby - yours may even offer a discount or incentive for joining the gym. You can also gather coworkers and create a fitness challenge where you are accountable to each other and can provide support and encouragement In order to put your health first, choose a time of day to exercise that works best in your schedule. Maybe giving yourself an extra half hour in the</p>

				<p>morning to take a walk or run will make all the difference. Or, you may benefit from keeping a gym bag in your car and hitting the gym on the way home from work.</p>
Tailored	Q20402	Business Hours	Shift	<p>With the availability of 24-hour gyms, DVDs, and simple at-home fitness activities, your schedule does not need to be a hindrance to getting more activity. Take advantage of your schedule and get in some time at the park, the gym, or the mall when they are less crowded. Any activity, whether it's cleaning, grocery shopping, or dancing in Zumba class can get you stronger, healthier, and happier! However, if you have a job where you are on your feet, you're entitled to some relaxation after work. Instead of sitting in front of TV, wind down</p>

				with some quiet yoga or stretching.
Tailored	Q20403	Business Hours	No work	No work, huh? Well, the world is your oyster! Take advantage of your schedule and get in some time at the park, the gym, or the mall when they are less crowded. Any activity, whether it's cleaning, grocery shopping, or dancing in Zumba class can get you stronger, healthier, and happier!
Tailored	Q20501	What are you hoping to accomplish	Weight loss	Always consult your physician before beginning a weight loss program. Healthy weight loss is 1-2 lbs/week, but you may lose more during your first few weeks on a new program.
Tailored	Q20503	What are you hoping to accomplish	Weight maintenance	Often, weight management is just as difficult as weight loss. Remember that an overage or deficit of 3,500 calories/week will

				cause 1 lb. of weight gain or loss, respectively.
Tailored	Q20601	Fitness Interests	How to fit physical activity into my schedule	<p>Sometimes what's standing in the way of you and your workout isn't lack of motivation — rather, it's simply finding the time.</p> <p>Committing to a fitness class, working out with a friend, or getting fit with a certified personal trainer can keep you accountable.</p> <p>Scheduling exercise can also be helpful if you tend to run out of time. But, you won't always have an extra hour for the gym.</p> <p>Scheduling exercise may not as difficult as you think if you get creative by parking farther away, taking the stairs, walking at lunch time, or taking little fitness breaks throughout the day to get your heart pumping for a short amount of time.</p>

Tailored	Q20602	Fitness Interests	What exercises to do	Step aerobics, interval training, cardio kickboxing, oh my! There are so many ways to be fit and active these days that it can get confusing when all you want is to know how to get great legs or how to run a mile. For advice on the perfect exercises for you and for your goals, set up a consultation with a certified personal trainer, look through fitness websites and magazines, or go with a tried-and-true method - exercise videos. In addition to ones you can buy, there are endless how-to videos on YouTube and there may even be a selection at your public library.
Tailored	Q20603	Fitness Interests	How to do exercises	It can be a waste of time - and potentially harmful - if you try to do exercises without understanding technique. Be sure to clarify how to do movements

				with a certified personal trainer or fitness instructor. They can also teach you how to modify exercises to better suit your needs or fit your skill level.
Tailored	Q20604	Fitness Interests	Specific benefits of being more physically active	According to the Mayo Clinic, there are 7 important benefits you'll get from increasing your physical activity: (1) exercise controls weight, (2) exercise combats health conditions and diseases, (3) exercise improves mood, (4) exercise boosts energy, (5) exercise promotes better sleep, (6) exercise puts the spark back into your sex life, and (7) exercise can be fun.
Tailored	Q20701	Fitness Goals	Getting stronger	Strength training isn't just for beefcakes and strongwomen. Whether you like machines, free weights, or working with your own body weight, there is a

				<p>strength-training regimen that fits your needs. Be sure that you speak with a certified personal trainer or consult an expert before using new machines or heavier weights than usual. In general, training with high repetitions will allow you to build muscle and get an aerobic workout at the same time. Time saver!</p>
Tailored	Q20702	Fitness Goals	Gaining Flexibility	<p>Flexibility is gained through persistence and continuity. Stretching after workouts and throughout the day will improve your flexibility. Activities such as yoga, Pilates, and dance are fun ways to increase total-body flexibility.</p>
Tailored	Q20703	Fitness Goals	Being more attractive	<p>There is a direct connection between exercise and healthy, gorgeous skin and hair. Regular physical activity will give you: (1)</p>

				<p>better collagen production, which leads to smoother, firmer skin, (2) reduced acne, and (3) healthier hair. You can get these benefits from all types of activity!</p>
Tailored	Q20704	Fitness Goals	Living a longer life	<p>According to a 2012 Canadian study, participants who got at least 150 minutes (2 hours and 30 minutes) of moderate activity a week were anticipated to live nearly 6 extra years. There are no rules for what activity you have to do to reap those benefits – just that you’re moving during that time.</p>
Tailored	Q20705	Fitness Goals	Getting in better aerobic/cardio vascular shape	<p>Training to improve aerobic and cardiovascular performance should include work at all intensities. To be truly aerobically fit, dedicate training time to low, moderate, and high intensity zones. An excellent method for achieving this is to include interval training in your</p>

				workout where you will raise and lower the intensity, working at a high rate in short bursts.
Tailored	Q20706	Fitness Goals	Improving my "numbers"	Getting more physical activity can have a profound effect on your “numbers” like blood pressure, cholesterol, and waist size. All of these are indicators of heart health and overall wellness. Even better, changes in these numbers are measurable, concrete ways to track your efforts.
Tailored	Q20707	Fitness Goals	Preparing for an event	If you're training for an event, such as a race, fun run, marathon, or even dance marathon, get some support and motivation from others. See if there is a training program for your event, such as Team in Training, or an online group of people you can train with. Having that event date in mind is great motivation and can help you

				figure out a training schedule to get you to where you need to be by event day.
Tailored	Q20801	Motivation	Getting healthy	No matter what you are striving to be healthy for, increasing your physical activity arm your body against disease, strengthen your immune system, and increase your energy.
Tailored	Q20802	Motivation	Being more attractive	All that work and sweat will pay off when it comes to beauty. To enhance the beautiful skin benefits that a regular work out give you, make sure you are drinking enough water. An easy guideline for how much you should drink is $(\text{your weight in pounds})/2 = \text{the number of ounces of water you should consume daily}$. On days that you work out, add another 16-24 ounces to that number.
Tailored	Q20803	Motivation	Having fun	Being active isn't about torture. If

				you're having fun, you're far more likely to keep up with the activity and benefit from it. If you're taking a fun fitness class or have discovered your love for long power walks, enlist some friends to join you so you can share the fun.
Tailored	Q20804	Motivation	Being an example	Be a model for your friends and loved ones by showing them that it's possible and fun to add physical activity to a daily routine. When you are at your best physically and mentally, you are the best help to others.
Tailored	Q20805	Motivation	Having support from friends and/or family	Gather together some friends, a parent, a child - just about anybody - to foster fun and encouragement while getting active.
Tailored	Q20806	Motivation	My doctor wants me to	So your doctor says your need more physical activity. That's

				likely true of most women in America. Use your doctor as a partner and supporter in you exercise. Find out if there are specific suggestions he or she has that will maximize the benefits of being active.
Tailored	Q20807	Motivation	It's expected of me	Exercise is a gift you give yourself for your health, longevity, wellness, and happiness. Even if you're expected by others in your life to be fit, ultimately, you're taking care of yourself and other people's opinions and expectations should take a smaller role in your life.
Tailored	Q20901	Barriers	No time	Exercise does not have to be done in 30-60 minute sessions. Simply adding 10 minutes when you can to get in some light to moderate exercise will refresh and energize you to get through your day.

Tailored	Q20902	Barriers	No motivation	Each day, engage in at least one activity that gets your body moving. Even activities that don't seem like exercise - such as vacuuming or dancing at a club - can be beneficial.
Tailored	Q20903	Barriers	Too many commitments	Try to make some of your family and social time active. Play outside with the kids, go on a walk or shopping trip with your friends, or even just park a little farther away when you're running your errands.
Tailored	Q20904	Barriers	No energy	Working out alone can be relaxing and therapeutic. Use your time on a walk or at the gym as your own slice of “me” time.
Tailored	Q20905	Barriers	Pain	Everything can seem like a challenge when you're in pain, but it doesn't have to stop you from living your life and being active. Your doctor, physical therapist, or

				<p>a certified personal trainer can help you find activities that give you all of the health benefits but none of the stress and pain of traditional exercise. Yoga, water aerobics, and the recumbent bike are just a few of the many exercise options for those in pain.</p>
Tailored	Q20906	Barriers	Housekeeping and chores	<p>Make your chores and errands into a fitness experience by picking up the pace in your cleaning with some lively music or by parking a little farther from the grocery store or cleaners. Housework and regular errands can be a great way to move around.</p>
Tailored	Q20907	Barriers	Work/school hours	<p>Find some time in your work or study schedule to take breaks.</p> <p>Your body needs the opportunity to refresh and reenergize in order for you to be at your best mentally.</p> <p>Get up and walk or do a few</p>

				stretches. It is very important for you to schedule in times when you can devote 20 minutes or more to moderate exercise. Consider this a necessary step toward your success at work or school.
Tailored	Q20908	Barriers	The expense	Being active does not mean having a \$100 per month gym membership - unless you want it to! There are many free and low-cost options that will have just as many benefits as a gym membership. Local universities and community centers often have free or low cost fitness classes and access to gym equipment and pools. You can also go low-tech and walk your neighborhood or high school track. For strength training, your own body weight is all you need to shape up. Movements like push-ups, sit-ups,

				leg lifts, and the like sculpt beautiful muscles for free.
Tailored	Q20909	Barriers	Not understanding how to achieve my fitness goals	The hardest part of exercise is setting goals, but all that work is for nothing if you don't know how to achieve those goals. Once you have your fitness goals set, consult a certified personal trainer, a fitness instructor, or your doctor for ways to achieve those goals.
Tailored	Q20910	Barriers	No interest	“Physical activity” can happen outside of the gym and outside of your assumptions about what exactly it constitutes. What do you love to do that doesn't involve sitting in a chair? Gardening? Shopping? Dancing? Any activity where you're moving is, by definition, physical activity. You may not break a sweat, but if you're in motion, you're on the right track.

Tailored	Q20911	Barriers	My kids	Children are built-in workout partners. Whether you're chasing them around the yard, cleaning up after them, or corralling them, you're in constant motion. Get into a child's mindset and think about opportunities to play.
Tailored	Q20912	Barriers	No support from friends/family	Online support groups, message boards, and social network sites provide a wide world of people just like you who want to talk and support each other.
Tailored	Q20913	Barriers	I'm embarrassed to have people see me exercising	Everyone is too focused on themselves to watch you at the gym. Promise! However, there is plenty that can be done in the privacy of your own home. Run stairs, do a workout DVD, try a few YouTube exercise videos. Being active is only as public as you want it to be.

Messages in the pilot test of both the targeted and tailored messages occurred as a direct result of the participants' responses in the assessment. Some of the messages in the system occurred more frequently than others because of overall relevance. Of the 695 message evaluations collected, the following table shows the frequency of each message's occurrence.

Table 14

Pilot Test Message Occurrence Frequency

Survey Type	Message	Occurrences
Tailored	Q20801	33
Tailored	Q20701	31
Tailored	Q20704	29
Tailored	Q20702	28
Tailored	Q20705	26
Targeted	Q10101	24
Targeted	Q10401	24
Tailored	Q20501	22
Tailored	Q20602	22
Tailored	Q20101	21
Tailored	Q20802	21
Tailored	Q20902	21

Tailored	Q20401	20
Tailored	Q20601	20
Tailored	Q20803	20
Tailored	Q20103	19
Tailored	Q20503	19
Tailored	Q20403	18
Tailored	Q20706	18
Tailored	Q20901	18
Tailored	Q20903	17
Tailored	Q20703	15
Tailored	Q20907	15
Targeted	Q10301	14
Targeted	Q10103	13
Tailored	Q20204	12
Tailored	Q20301	12
Tailored	Q20904	12
Targeted	Q10403	11
Tailored	Q20603	11
Targeted	Q10102	10
Tailored	Q20905	10
Tailored	Q20707	9

Tailored	Q20604	8
Targeted	Q10402	7
Tailored	Q20102	7
Tailored	Q20804	7
Tailored	Q20805	7
Tailored	Q20906	6
Targeted	Q10204	5
Tailored	Q20402	5
Tailored	Q20909	5
Tailored	Q20806	4
Tailored	Q20807	4
Tailored	Q20908	4
Tailored	Q20201	3
Tailored	Q20203	2
Tailored	Q20912	2
Tailored	Q20913	2
Tailored	Q20910	1
Tailored	Q20911	1

The messages that occurred the most frequently in the pilot test were:

- **Tailored, Motivation, “Getting Healthy”:** No matter what you are striving to be healthy for, increasing your physical activity arms your body against disease,

strengthen your immune system, and increase your energy.

- **Tailored, Goals, “Getting Stronger”:** Strength training isn't just for beefcakes and strongwomen. Whether you like machines, free weights, or working with your own body weight, there is a strength-training regimen that fits your needs. Be sure that you speak with a certified personal trainer or consult an expert before using new machines or heavier weights than usual. In general, training with high repetitions will allow you to build muscle and get an aerobic workout at the same time. Time saver!
- **Tailored, Goals, “Living a Longer Life”:** According to a 2012 Canadian study, participants who got at least 150 minutes (2 hours and 30 minutes) of moderate activity a week were anticipated to live nearly 6 extra years. There are no rules for what activity you have to do to reap those benefits – just that you’re moving during that time.
- **Tailored, Goals, “Gaining Flexibility”:** Flexibility is gained through persistence and continuity. Stretching after workouts and throughout the day will improve your flexibility. Activities such as yoga, Pilates, and dance are fun ways to increase total-body flexibility.

Perceived Argument Strength

Targeted Messages. The perceived argument strength scores for the targeted messages ranged from 4.19-3.44. The perceived argument strength was measured on a scale of 1-5, where 1=very weak, 2=weak, 3=neither strong nor weak, 4=strong, and 5=very strong. The following shows the perceived argument strength scores for all

targeted messages.

Table 15

Perceived Argument Strength Scores for Targeted Messages

Message	Perceived Argument Strength Score
Q10103	4.19
Q10402	4.01
Q10401	3.87
Q10101	3.71
Q10301	3.68
Q10204	3.66
Q10403	3.62
Q10102	3.44

The strongest targeted message was Age Group, “51-70”:

At your age, you may be transitioning into a new way of life regarding health.

While you may be finding that your weight is harder to maintain or you have less energy than you did in the past, this is certainly the time to get your body into great condition and to fully use the gift of experience and knowledge you’ve gained over the years. In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you

invest in your health and commit to your wellness as much as you commit to others and (2) use your resources – like fitness websites, a personal trainer, books, fitness classes – to understand how to do specific exercises that will have you feeling healthy and beautiful for years to come. The reward of being stronger, more flexible, fitter, and glowing from the inside out may be exactly what you need to get and stay motivated and energized to be active (4.19).

The weakest targeted message was Age Group, “41-50”:

As life starts to change – kids are growing up, careers are stable - you may find some new opportunities in your schedule for activity. Whether it is gardening, running, swimming, or a fitness class, there are countless ways to get in your exercise. Also, at your age, you have the advantage of still being youthful and vibrant as well as the gift of experience and knowledge. In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you invest in your health and (2) use your resources – like fitness websites, a certified personal trainer, books, fitness classes – to understand how to do specific exercises that will have you in the best condition of your life and will help you to stay healthy and beautiful for years to come. The reward of being stronger, faster, fitter, and more attractive may be exactly what you need to get and stay motivated and energized to be active (3.44).

Tailored Messages. The perceived argument strength scores for the tailored messages ranged from 4.26-2.96. As with the targeted messages, the perceived argument strength was measured on a scale of 1-5, where 1=very weak, 2=weak, 3=neither strong

nor weak, 4=strong, and 5=very strong. The following shows the perceived argument strength scores for all tailored messages.

Table 16

Perceived Argument Strength Scores for Tailored Messages

Message	Perceived Argument Strength Score
Q20706	4.26
Q20903	4.13
Q20201	4.07
Q20704	4.07
Q20707	4.04
Q20806	4.04
Q20906	4.04
Q20604	4.04
Q20103	4.04
Q20807	4
Q20910	4
Q20703	3.995
Q20601	3.96
Q20904	3.93
Q20801	3.91

Q20702	3.91
Q20705	3.90
Q20905	3.83
Q20901	3.82
Q20803	3.82
Q20402	3.77
Q20902	3.75
Q20701	3.73
Q20503	3.72
Q20908	3.70
Q20907	3.69
Q20401	3.67
Q20501	3.67
Q20301	3.66
Q20802	3.62
Q20602	3.58
Q20204	3.56
Q20102	3.54
Q20805	3.54
Q20101	3.52
Q20913	3.50

Q20403	3.41
Q20804	3.37
Q20603	3.36
Q20203	3
Q20911	3
Q20912	3
Q20909	2.96

The strongest tailored message was Goals, “Improving my ‘numbers’”:

Getting more physical activity can have a profound effect on your “numbers” like blood pressure, cholesterol, and waist size. All of these are indicators of heart health and overall wellness. Even better, changes in these numbers are measurable, concrete ways to track your efforts (4.26).

The weakest tailored message was Barriers, “Not understanding how to achieve my fitness goals”:

The hardest part of exercise is setting goals, but all that work is for nothing if you don't know how to achieve those goals. Once you have your fitness goals set, consult a certified personal trainer, a fitness instructor, or your doctor for ways to achieve those goals (2.96).

Strongest Arguments Overall. The strongest arguments overall, considering both targeted and tailored message tests were:

- **Tailored, Goals, “Improving my "numbers"”:** Getting more physical

activity can have a profound effect on your “numbers” like blood pressure, cholesterol, and waist size. All of these are indicators of heart health and overall wellness. Even better, changes in these numbers are measurable, concrete ways to track your efforts (4.26).

- **Targeted, Age Group, “51-70”:** At your age, you may be transitioning into a new way of life regarding health. While you may be finding that your weight is harder to maintain or you have less energy than you did in the past, this is certainly the time to get your body into great condition and to fully use the gift of experience and knowledge you’ve gained over the years. In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you invest in your health and commit to your wellness as much as you commit to others and (2) use your resources – like fitness websites, a personal trainer, books, fitness classes – to understand how to do specific exercises that will have you feeling healthy and beautiful for years to come. The reward of being stronger, more flexible, fitter, and glowing from the inside out may be exactly what you need to get and stay motivated and energized to be active (4.19).
- **Tailored, Barriers, “Too Many Commitments”:** Try to make some of your family and social time active. Play outside with the kids, go on a walk or shopping trip with your friends, or even just park a little farther away when you're running your errands (4.13).

Weakest Arguments Overall. The weakest arguments overall, considering both targeted and tailored message tests were:

- **Tailored, Barriers, “Not understanding how to achieve my fitness goals”:** The hardest part of exercise is setting goals, but all that work is for nothing if you don't know how to achieve those goals. Once you have your fitness goals set, consult a certified personal trainer, a fitness instructor, or your doctor for ways to achieve those goals (2.96).
- **Tailored, Special Health States, “Perimenopausal”:** Many women start to feel tired as menopause approaches. It may seem counterintuitive, but a bit of activity may be what you need to reenergize (3).
- **Tailored, Barriers, “My kids”:** Children are built-in workout partners. Whether you're chasing them around the yard, cleaning up after them, or corralling them, you're in constant motion. Get into a child's mindset and think about opportunities to play (3).
- **Tailored, Barriers, “No support from friends/family”:** Online support groups, message boards, and social network sites provide a wide world of people just like you who want to talk and support each other (3).

Actionability

Targeted Messages. In this pilot test, actionability was measured through the question, “This statement provides me with enough information to perform the tasks stated.” The participants were asked to score the item on a five-point Likert-type scale, where 1 = strongly disagree and 5 = strongly agree. The actionability scores for targeted

messages ranged from 3.67-2.92.

Table 17

Actionability Scores for Targeted Messages

Message	Actionability Score
Q10401	3.67
Q10204	3.6
Q10403	3.55
Q10402	3.29
Q10103	3.23
Q10301	3.21
Q10102	3
Q10101	2.92

The most actionable targeted message was Business Hours, “9-5”:

If you have a job where you are seated for most of the day, it is especially important that you make sure you are getting up every 30 minutes for a quick stretch or a walk around the office. Many companies have gyms in the building or nearby - yours may even offer a discount or incentive for joining the gym. You can also gather coworkers and create a fitness challenge where you are accountable to each other and can provide support and encouragement. In order to put your health first, choose a time of day to exercise that works best in your

schedule. Maybe giving yourself an extra half hour in the morning to take a walk or run will make all the difference. Or, you may benefit from keeping a gym bag in your car and hitting the gym on the way home from work (3.67).

The least actionable targeted message was Age Group, “25-40”:

At your age, you are in your prime! In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you invest in your health and (2) use the advantage you have with your youth to be in top condition (cardiovascular, strength, and flexibility) and to stay healthy and beautiful for years to come. You are probably busy, overcommitted, and trying to do it all. Though it may seem that there is no room for exercise in your schedule, you are likely to find stress relief and enjoyment in being active. The reward of being stronger, faster, fitter, and more attractive may be exactly what you need to get and stay motivated and energized to be active (2.92).

Tailored Messages. As in the targeted message pilot test, actionability was measured through the question, “This statement provides me with enough information to perform the tasks stated.” The participants were asked to score the item on a five-point Likert-type scale, where 1 = strongly disagree and 5 = strongly agree. The actionability scores for tailored messages ranged from 4.11-2.5.

Table 18
Actionability Scores for Tailored Messages

Message	Actionability Score
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Q20707	4.11
Q20201	4
Q20806	4
Q20903	4
Q20906	4
Q20601	3.8
Q20602	3.77
Q20802	3.76
Q20908	3.75
Q20704	3.72
Q20102	3.71
Q20805	3.71
Q20401	3.7
Q20803	3.7
Q20905	3.7
Q20706	3.67
Q20902	3.67
Q20904	3.67
Q20907	3.67
Q20702	3.64
Q20705	3.62

Q20402	3.6
Q20301	3.58
Q20701	3.58
Q20703	3.53
Q20204	3.5
Q20807	3.5
Q20913	3.5
Q20603	3.45
Q20901	3.39
Q20103	3.37
Q20501	3.36
Q20801	3.27
Q20403	3.22
Q20503	3.11
Q20604	3
Q20804	3
Q20910	3
Q20911	3
Q20909	2.8
Q20101	2.57
Q20203	2.5

Q20912	2.5
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The most actionable tailored message was Goals, “Preparing for an event”:

If you're training for an event, such as a race, fun run, marathon, or even dance marathon, get some support and motivation from others. See if there is a training program for your event, such as Team in Training, or an online group of people you can train with. Having that event date in mind is great motivation and can help you figure out a training schedule to get you to where you need to be by event day (4.11).

The least actionable tailored message were:

Special Health States, “Perimenopausal”:

Many women start to feel tired as menopause approaches. It may seem counterintuitive, but a bit of activity may be what you need to reenergize (2.5).

Barriers, “No support from friends/family”:

Online support groups, message boards, and social network sites provide a wide world of people just like you who want to talk and support each other (2.5).

Highest Actionability Overall. The most actionable messages overall, considering both targeted and tailored message tests were:

- **Tailored, Goals, “Preparing for an event”:** If you're training for an event, such as a race, fun run, marathon, or even dance marathon, get some support and motivation from others. See if there is a training program for your event, such as Team in Training, or an online group of people you can train with. Having that

event date in mind is great motivation and can help you figure out a training schedule to get you to where you need to be by event day (4.11).

- **Tailored, Motivation, “My doctor wants me to”:** So your doctor says you need more physical activity. That's likely true of most women in America. Use your doctor as a partner and supporter in you exercise. Find out if there are specific suggestions he or she has that will maximize the benefits of being active (4).
- **Tailored, Barriers, “Housekeeping”:** Make your chores and errands into a fitness experience by picking up the pace in your cleaning with some lively music or by parking a little farther from the grocery store or cleaners. Housework and regular errands can be a great way to move around (4).
- **Tailored, Special Health States, “Disabled/In Significant Pain”:** Women with disabilities or chronic pain benefit from including as much activity as they are able to, spread across the week. Be sure to consult your healthcare provider about the types and amounts of activity that are appropriate for you. If you are able to, you should get at least 150 minutes per week (2 hours and 30 minutes) of moderate-intensity aerobic activity performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week. You should also do muscle-strengthening activities of moderate or high intensity that involve all major muscle groups on 2 or more days per week as these activities provide additional health benefits (4).
- **Tailored, Barriers, “Too many commitments”:** Try to make some of your family and social time active. Play outside with the kids, go on a walk or

shopping trip with your friends, or even just park a little farther away when you're running your errands (4).

Lowest Actionability Overall. The least actionable messages overall, considering both targeted and tailored message tests were:

- **Tailored, Special Health States, “Perimenopausal”:** Many women start to feel tired as menopause approaches. It may seem counterintuitive, but a bit of activity may be what you need to reenergize (2.5).
- **Tailored, Barriers, “No support from friends/family”:** Online support groups, message boards, and social network sites provide a wide world of people just like you who want to talk and support each other (2.5).
- **Tailored, Age Group, “25-40”:** Women your age tend to be busy, overcommitted, and trying to do it all. Though it may seem that there is no room for exercise in your schedule, you are likely to find stress relief and enjoyment in being active. Try different activities until you find what works for you (2.6).

Unsolicited Comments

The following comments were received by email following pilot test completion:

- “This was seriously interesting and you're a fantastic writer!”
- “I completed it, and just to let you know, just reading about fitness messages etc. motivated me to get back on the fitness track! You are definitely on to something with these fitness messages.”

Determining the Hypotheses

H1: The FMA’s tailored messages will have greater perceived argument strength,

and therefore, will be more salient and engaging for the individual than targeted messages

Results from this pilot test did not show a significant difference in perceived argument strength between the targeted and tailored messages. Overall, targeted messages had an average perceived argument strength score of 3.77 and tailored messages had an average perceived argument strength score of 3.72. H1 can neither be accepted nor rejected.

H2: The FMA's tailored messages will be more actionable for the individual than targeted messages.

Results from this pilot test did not show a significant difference in actionability between the targeted and tailored messages. Overall, targeted messages had an average actionability score of 3.31 and tailored messages had an average actionability score of 3.48. H2 can neither be accepted nor rejected.

DISCUSSION

The 25-70 Year Old Female Population

This research collected information beyond expectation on the attitudes, barriers, interests, and the media surrounding women between 25-70 years of age. The data collection and analysis of fitness and weight loss messages in popular women's magazines was originally meant to provide a bit of background for survey creation. The researcher intended to gather most of this study's data on attitudes, barriers, and interests regarding physical activity from the survey portion; however, the women's magazines provided valuable information that endured throughout each stage of data gathering and analysis. The messages that women are surrounded by in the media – especially from magazines that women often began reading at a young age – shape the salient issues around fitness, weight loss, and body image. In addition to shaping the issues, the media also contributes greatly to women's attitudes and beliefs about themselves physically and as active beings.

Salient Message Types. The magazine content analysis portion of this study allowed for an informed survey of the population's fitness interests, goals, motivations, and barriers. In the survey, the participants were asked whether they would be able to achieve their fitness goals if all barriers were removed. The majority of participants stated that they would be able to achieve their goals. Regardless, it was important to understand that though the group of participants who did not believe they would be able

to achieve their goals was fewer than 10% of those surveyed, they were still a represented minority in this population. This discovery of participants who did not feel they could achieve their goals – even under ideal conditions - showed the importance of writing motivational, actionable, and salient messages that can allow the participant to view her fitness goals as achievable, thereby increasing self-efficacy. The ultimate goal of this area of research and a system like the FMA is to reach those who are more difficult to convert to healthy behaviors.

Age groups. In the survey portion of the research, the 25-40 year old and 41-50 year old participants had common goals; however, the order of importance of these goals differs. These two age groups were most interested in being active to attain goals of being attractive and being in shape. Regarding participant goals for getting more exercise, one could see a clear difference between the 51-70 year olds and the two younger groups. The 51-70 year old participants were purely focused on the fitness outcomes of physical activity.

The fitness topic of greatest interest to both the 25-40 year olds and 41-50 year olds was understanding how to fit physical activity into their schedules. This is likely because many of these participants work full-time jobs and/or are in school. Again, there is a difference between the two younger age groups and the 51-70 year old group. The 51-70 year old group was most interested in learning what exercises to do. This may be because as women age, they are less likely to do the same exercises and activities they did in their youth and are familiar with, such as running, organized sports, or dance fitness classes like Zumba.

All age groups identified a lack of time as a major barrier to being more active. The 25-40 year olds and 41-50 year olds also lacked the energy and motivation to be active. The 51-70 year olds also indicated a lack of motivation, but identified other life commitments as a barrier to their activity. Women in all of these age groups - especially from the Washington, D.C. metro area where most of the study recruiting was done – are busy and overcommitted, which makes them have to prioritize daily activities. Many women view exercise as something that is necessary, but not exactly fun. Those who are more excited by exercise, such as those who work out with friends or have a group fitness class they would not want to miss, are more likely to make physical activity a priority. Those women are not the main audience for the FMA. This system is for women who need motivation and help with reducing barriers in order to be more active. The FMA's messages in this study's tests and in future iterations are intended to change attitudes about physical activity to put it in a more exciting and desirable light.

Across all three age groups, the participants were most motivated to get more physical activity because of the health benefits and the promise of being more attractive. This is a helpful discovery for message creation. Knowing that being healthy and attractive is a priority for most women in this population is useful in finding the correct message and way to entice these women to be more active.

Special health states. The special health states used in the FMA are temporary conditions, with the exception of disability/significant pain. Messages intended for pregnant, perimenopausal, and menopausal participants are stop-gap types of messages that are intended to get the women over the proverbial hump in order to be active.

Interests, goals, barriers, and motivations for women who are pregnant, for example, are likely to change when the woman no longer is in that health state. But, in the case of disabled/in significant pain women, they need ways to make life changes to accommodate the disability or pain and to find lifetime solutions.

In the survey, participants who are disabled/in significant pain had increasing flexibility, increasing strength, and bettering cardiovascular fitness as their top goals for doing physical activity. These goals are all beneficial in reducing pain and accommodating disability. To achieve these goals, messages need to be specific, well-informed, and appropriate for disabled/in significant pain women.

Pregnant and perimenopausal participants use physical activity as a means to be attractive, fit, and to increase longevity. Pregnancy gives women a new worldview where they are no longer simply caring for themselves and making their own decisions. The interest in longevity in this health state is likely a result of wanting to be around to provide for a family. Further, women who have reached the perimenopausal state are likely to have just begun to “feel their age.” Concerns about fitness and longevity are important to both of these groups as attitudes and outlooks change.

Menopausal participants use physical activity to reach fitness-specific goals, unlike the pregnant and perimenopausal participants. This time of a woman’s life is transitional. Their bodies are physically transitioning, and there may be changes to their lives like children leaving home and retirement that refocus their goals and priorities. This group may also find that they have more time to devote to physical activity.

Participants who are disabled/in significant pain and menopausal participants were most interested in learning what exercises to do. This is a predictable outcome because women who are disabled/in significant pain need specialized activities. Menopausal women also may need to adjust their activity for changes in ability and interest that come with not only menopause, but also age.

Pregnant and perimenopausal participants were most interested in understanding how to fit physical activity into their schedules. This was also an expected finding, as many women in these two health states are often working full-time and have many life commitments.

Survey results for barriers for each special health state were logical and explanatory. The disabled/in significant pain participants responded that pain was their greatest barrier to getting more physical activity. In addition to pain, these participants were impeded by not having the energy or the motivation to be active. Pregnant, perimenopausal, and menopausal participants identified lack of time and energy as their primary barriers to being more active.

All groups of participants with special health states listed health as their top motivation for physical fitness; however, disabled/in significant pain participants rated health, doctor's orders, and finding fitness activities fun equally in terms of their motivation to be active. It is likely that many of the disabled/in significant pain participants who find fitness activities fun and, therefore, motivating were recruited from the researcher's water aerobics class. This population tends to be very loyal to and dedicated to their water exercise regimen.

Pregnant, perimenopausal, and menopausal participants all rated health and being attractive as the most motivating aspects of being active. Being attractive was tied in importance with health for pregnant participants and perimenopausal participants, but being attractive was of less importance to the menopausal participants. This is likely due to aging, maturity, and prioritizing other aspects of self.

Work hours. Participants within all variations of work schedules were active with the goals of being more attractive and being healthier. Work schedule did not appear to be a factor in the participants' goals.

Participants who do not work were most interested in learning what exercises to do. In contrast, those who work shifts/outside of regular business hours as well as those who work during regular business hours were interested in understanding how to fit physical activity into their schedules. This is likely because of time constraints that are avoided by participants who do not work but are experienced by the 9-5 and shift workers. Scheduling becomes a priority when much of a woman's week is taken up with work. It is possible that if work were removed as a barrier for these participants, they would also be most interested in learning what exercises to do rather than how to adjust their schedules.

Participants who do not work were most impeded by a lack of motivation to be active. Both participants who work shifts/outside regular business hours and those who work regular business hours were deterred by not having time. Unsurprisingly, both groups were limited by their work hours. Specifically, those who work regular business

hours lack motivation to get more activity. When time is limited, activity that is less desirable, like exercise, is likely to become a lower priority.

All groups selected health and being attractive as their primary motivations for being physically active.

Presence of children at home. Participants with and without children at home were interested in using physical activity to be attractive and healthy. Though their goals were the same, fitness interests differed between the two groups, with understanding how to fit physical activity into their schedules as a top interest for participants with children at home and learning what exercises to do a priority for those without children at home. This was a similar finding to those who work versus participants who do not. Time is limited for all of the participants, but those with commitments such as work and childcare taking up the majority of their time focus on finding a way to fit in fitness.

In contrast to the two groups' interests, both participants with and without children at home are impeded by a lack of time for physical activity. Beyond this, barriers for the two groups differ, with participants with children at home impeded by caring for their kids and housekeeping and participants without children at home being deterred by a lack of motivation and energy. Despite any difference, both groups were motivated by health and becoming more attractive as outcomes of getting physical activity.

The Messages

Frequency of message occurrence. Messages in the pilot test of both the targeted and tailored messages occurred as a direct result of the participants' responses in

the assessment. Some of the messages in the system occurred more frequently than others because of overall relevance. The messages that occurred the most frequently in the pilot test were reflective of the most common interests, goals, motivations, and barriers.

Perceived argument strength. The strongest arguments overall, considering both targeted and tailored message tests, were those that tended to apply to and be chosen by the 51-70 year old participant group:

- **Tailored, Goals, “Improving my "numbers"”:** Getting more physical activity can have a profound effect on your “numbers” like blood pressure, cholesterol, and waist size. All of these are indicators of heart health and overall wellness. Even better, changes in these numbers are measurable, concrete ways to track your efforts.
- **Targeted, Age Group, “51-70”:** At your age, you may be transitioning into a new way of life regarding health. While you may be finding that your weight is harder to maintain or you have less energy than you did in the past, this is certainly the time to get your body into great condition and to fully use the gift of experience and knowledge you’ve gained over the years. In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you invest in your health and commit to your wellness as much as you commit to others and (2) use your resources – like fitness websites, a personal trainer, books, fitness classes – to understand how to do specific exercises

that will have you feeling healthy and beautiful for years to come. The reward of being stronger, more flexible, fitter, and glowing from the inside out may be exactly what you need to get and stay motivated and energized to be active.

- **Tailored, Barriers, “Too Many Commitments”:** Try to make some of your family and social time active. Play outside with the kids, go on a walk or shopping trip with your friends, or even just park a little farther away when you're running your errands.

Two explanations for this phenomenon are possible. First, this older group of participants is not constantly inundated with fitness information from blogs, websites, tweets, and TV like the two younger groups would likely be. This may have made the messages more novel and interesting to this population. An alternate explanation is what the researcher would refer to as The Mother Hen Effect. Many of the women participating in this pilot test from this age group are likely to have children the researcher's age that may also have been through graduate school. The desire to see the researcher succeed may have affected their responses. Similarly, many participants in this age group were recruited from the group fitness class the researcher teaches. These participants may have also had a more sympathetic attitude toward the messages.

The weakest arguments overall, considering both targeted and tailored message tests, did not have the group commonality that the strongest arguments had. These messages, upon review, lack innovation and engaging information. The messages that tested weak all need to be rewritten and given care to provide new information beyond

what the women hear from the media and their doctors over and over again.

- **Tailored, Barriers, “Not understanding how to achieve my fitness goals”:** The hardest part of exercise is setting goals, but all that work is for nothing if you don't know how to achieve those goals. Once you have your fitness goals set, consult a certified personal trainer, a fitness instructor, or your doctor for ways to achieve those goals.
- **Tailored, Special Health States, “Perimenopausal”:** Many women start to feel tired as menopause approaches. It may seem counterintuitive, but a bit of activity may be what you need to reenergize.
- **Tailored, Barriers, “My kids”:** Children are built-in workout partners. Whether you're chasing them around the yard, cleaning up after them, or corralling them, you're in constant motion. Get into a child's mindset and think about opportunities to play.
- **Tailored, Barriers, “No support from friends/family”:** Online support groups, message boards, and social network sites provide a wide world of people just like you who want to talk and support each other.

Actionability. The most actionable messages overall, considering both targeted and tailored message tests, all have one critical characteristic – they are specific. There is a clear connection between specificity and actionability in this test.

- **Tailored, Goals, “Preparing for an event”:** If you're training for an event, such as a race, fun run, marathon, or even dance marathon, get some support and motivation from others. See if there is a training program for your event, such as

Team in Training, or an online group of people you can train with. Having that event date in mind is great motivation and can help you figure out a training schedule to get you to where you need to be by event day.

- **Tailored, Motivation, “My doctor wants me to”:** So your doctor says your need more physical activity. That's likely true of most women in America. Use your doctor as a partner and supporter in you exercise. Find out if there are specific suggestions he or she has that will maximize the benefits of being active.
- **Tailored, Barriers, “Housekeeping”:** Make your chores and errands into a fitness experience by picking up the pace in your cleaning with some lively music or by parking a little farther from the grocery store or cleaners. Housework and regular errands can be a great way to move around.
- **Tailored, Special Health States, “Disabled/In Significant Pain”:** Women with disabilities or chronic pain benefit from including as much activity as they are able to, spread across the week. Be sure to consult your healthcare provider about the types and amounts of activity that are appropriate for you. If you are able to, you should get at least 150 minutes per week (2 hours and 30 minutes) of moderate-intensity aerobic activity performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week. You should also do muscle-strengthening activities of moderate or high intensity that involve all major muscle groups on 2 or more days per week as these activities provide additional health benefits.
- **Tailored, Barriers, “Too many commitments”:** Try to make some of your

family and social time active. Play outside with the kids, go on a walk or shopping trip with your friends, or even just park a little farther away when you're running your errands.

Unlike the most actionable messages, the least actionable messages overall lack detail and specificity. It is apparent why these messages would test low for actionability – they are general statements that do not give directions. All messages in the FMA will need to be reviewed and edited for specificity, clarity, and the use of directions to achieve the desired outcome.

- **Tailored, Special Health States, “Perimenopausal”:** Many women start to feel tired as menopause approaches. It may seem counterintuitive, but a bit of activity may be what you need to reenergize.
- **Tailored, Barriers, “No support from friends/family”:** Online support groups, message boards, and social network sites provide a wide world of people just like you who want to talk and support each other.
- **Tailored, Age Group, “25-40”:** Women your age tend to be busy, overcommitted, and trying to do it all. Though it may seem that there is no room for exercise in your schedule, you are likely to find stress relief and enjoyment in being active. Try different activities until you find what works for you.

Targeted versus Tailored Messages

Contrary to the literature comparing the effectiveness of targeted and tailored messages for health interventions, this study did not show a significant difference between the two. With such a large body of literature supporting the use of tailored

messages over targeted messages, the researcher believes that there are other factors involved in the pilot test's results. First, it is possible that the tailored messages were not using the most effective subject variables. While it was still effective to tailor based on interests, goals, motivations, and barriers, there may be demographic variables that would be better suited for tailoring. Some such variables that are supported in tailored message health intervention literature are education, socioeconomic status, geographic region, race/ethnicity, and cultural affiliation. In addition to these demographic variables, it may also be helpful to tailor messages according to fitness level and available time during the day for physical activity.

In addition to fitness messages, the FMA would be enhanced by including diet and nutrition components, especially for participants who are interested in losing weight. By including questions and messages about the participant's diet, the FMA could use known algorithms to calculate the participant's resting metabolic rate (calories burned when the body is at rest), average caloric intake, and average caloric burn (through exercise or other physical activity). Using these data would enhance the tailorability of the system as well as provide more detailed, actionable messages.

The Necessity of Tailoring

The findings in this study suggest that targeted and tailored messages had essentially the same effects on the participants, considering perceived argument strength and actionability scores. The messages that were the most detailed and specific were also those that had higher perceived argument strength and actionability scores. While targeted messages would certainly be effective in communicating general fitness

information, they are best for the women who already have the motivation and the knowledge to be physically active on their own. Targeted messages would serve more as a “nudge” to encourage and remind the women to be active.

Tailored messages, when they are based on the most effective and salient variables, are able to provide participants with information beyond what can be found in a magazine, on a daytime talk show, or in a physician’s pamphlet. Tailoring has the ability to be especially actionable and compelling, as it speaks directly to the participant. Direct, relevant information that is specific and actionable is more helpful for the participant because it calls them to action rather than passively suggesting “women like them” should have certain attitudes and perform certain behaviors. Targeted messages could never serve the purpose of being direct and specific enough to captivate women and, hopefully, convert them to a healthier, more active lifestyle.

Implications

Results from this pilot test did not show a significant difference in perceived argument strength or actionability between the targeted and tailored messages. The hypotheses made in this dissertation can neither be accepted nor rejected from this study alone. The most that can be said about targeted versus tailored messaging in this context is that well-written, clear, specific, salient, engaging messages are beneficial, whether they are targeted or tailored to the individual participant. The implications of this research on the fitness/wellness industry are significant. The ability to create theory-based, medically-sound messages for clients could enhance the work of health clubs, medically-based weight loss centers, and even general practitioners’ offices. Further, this

research contributes to the growing body of knowledge about health interventions using e-health technologies and targeted and tailored messaging. It is possible that the expense incurred when health promoters research, develop, and deploy tailored health message interventions could be spared in favor of carefully-constructed targeted messages.

LIMITATIONS

Sample Representativeness

Though efforts were taken to recruit participants from channels that encourage diversity, the nature of the test may reduce the generalizability of the results. Women with the access to an Internet connection required for participation are more likely to be of a higher socioeconomic status; therefore, the study result should only be applied to women who have access to an Internet connection. Further, recruitment for the study may lead to more participants who are from the Washington, D.C. metropolitan area because of (1) the University's location and (2) the researcher's network.

Elimination of Question 9

In the pilot test evaluation, question 9: Is the reason the statement gave for getting more physical activity a strong or weak one? was misprinted in the pilot test and, therefore, could not be considered in the analysis. Though elimination of this question did not have a significant impact on the data analysis, it was regrettable that it had to be eliminated.

Messages Tested

Both the pilot test for the targeted messages and the test for the tailored messages relied on participant responses to determine which messages were displayed. This resulted in messages in the bank never being tested. With a far larger sample size that

would be more likely to receive and evaluate all possible messages, testing would be more effective.

FUTURE DIRECTIONS

Completing the FMA for Women

The immediate next step after testing and ensuring that this basic version of the FMA is stable and accurately delivers appropriate tailored messages is to create and conduct a pilot test of the multimedia message delivery module, in which participants select their desired medium for message delivery. Such a test would be designed similarly to the message quality/strength pilot test in this project; however, the participants would be asked to evaluate the message media exclusively.

After assessing the message delivery media, it would be appropriate to add questions about key publics, such as cultural groups and religious affiliations to the assessment. Information from key publics questions will allow for the researcher to supplement the orienting questions and further tailor messages and message delivery to the participant's social context.

Thought-Listing. Once the above research and development is complete for the women's version of the FMA, it may be beneficial to conduct a test of the messages using thought-listing. Zhao et al. (2011) indicated that there are limitations to eliminating thought-listing completely in favor of the Perceived Argument Strength Scale. Zhao et al. stated that thought-listing is beneficial for assessing relative amounts of central versus peripheral processing generated by a message.

FMA for Men and for Young Adults

The proposed research methods and procedures in this proposal and those noted in the above future directions discussion will be used again in future FMA research to create assessments and messages for men aged 25 and over, for men and women aged 18-24.

User-Based Tailoring

Once research and development have been done to create the full FMA system as described above, it would make sense to make the move to a more user-based tailoring system. Though employing user-based tailoring is beyond the scope of this current project, the researcher sees the benefit of following the current trend in message tailoring to make the experience fully interactive and user-driven. A user-based tailoring assessment would potentially increase the likelihood of the information being salient, and, in turn, may increase the likelihood of the messages being centrally processed. This format change will be a necessary development for the productization of the FMA.

Productizing the FMA

HealthRx's early 1990s product for medically-based wellness and computerized health assessment would be a beneficial compliment to the FMA. The ultimate goal of this dissertation research and future research is to grow this legacy HealthRx product into a tool for nutrition and wellness messages with a medically-based health risk analysis connection. This tool would be marketed to medically-based weight loss clinics, health and fitness clubs, and occupational medical clinics.

CONCLUSION

At the inception of this research, there was a need to develop an electronic tailored message assessment for fitness messaging that could provide the elements necessary to cause lasting positive fitness attitude and belief changes. The goal of creating such a system was to approach fitness messaging from a comprehensive, granular, and individual perspective that could apply to a wider population as a way to influence participants at the individual level. This exploratory research, and the resulting fitness message assessment system, the FMA, presented evidence of the viability of such a tailored fitness message assessment based on persuasion theory and health belief assessment for women aged 25-70. Though the research was inconclusive regarding whether tailored messages lead to better outcomes than targeted messages, this study did find that engaging, actionable, and salient fitness messages have a positive reception in the 25-70 year old female population.

Further research will explore better ways for capturing differences between targeted and tailored messages for fitness use as well as way to increase the perceived argument strength and the actionability of fitness messages.

APPENDICIES

APPENDIX A: SURVEY QUESTIONS

1. Age Group [select one]

- 25-40
- 41-50
- 51-70

2. Do any of the following special health states apply to you? If not, please continue on to the next question. [select all that apply]

- Disabled/In Significant Pain
- Pregnant
- Perimenopausal
- Menopausal

3. Do you have children at home?

- Yes
- No

4. Do you work during regular business hours (9-5)? [select one]

- Yes, I work regular business hour
- No, I work hours outside of those times (e.g., shift work, night shift)
- No, I don't work

5. What do you wish you understood better or knew more about when it comes to fitness, exercise, and being active? [select all that apply]

- How to fit physical activity into my schedule
- What exercises to do
- How to do exercises
- Specific benefits of being more physically active

6. If you had all the time and resources you needed to achieve your personal fitness goals, what would those goals be? [select all that apply]

- Getting stronger
- Gaining flexibility
- Being more attractive
- Living a longer life
- Getting in better aerobic/cardiovascular shape
- Improving my “numbers” (e.g., cholesterol, blood pressure)
- Preparing for an event (e.g., race, triathlon, competition)

7. What motivates you to be more active? [select all that apply]

- Getting healthy
- Being more attractive
- Having fun
- Being an example for others
- Having support from friends and/or family
- My doctor wants me to

- It's expected of me

8. What keeps you from exercising or getting in more activity into your schedule? [select all that apply]

- No time
- No motivation
- Too many commitments
- No energy
- Pain
- Housekeeping and chores
- Work/school hours
- The expense
- Not understanding how to achieve my fitness goals
- No interest
- My kids
- No support from friends/family
- I'm embarrassed to have people see me exercising
- Lack of a gym/facility near by
- Quick fixes that haven't worked (e.g., diet pills, extreme fitness plans)
- No safe place to exercise

9. Do you think you would be able to achieve your fitness goals if those barriers were removed? [one choice]

- Yes
- No

APPENDIX B: PILOT TEST QUESTIONS: TARGETED

1. Age Group [select one]

- 25-40
- 41-50
- 51-70

2. Do any of the following special health states apply to you? If not, please continue on to the next question. [select all that apply]

- Disabled/In Significant Pain
- Pregnant
- Perimenopausal
- Menopausal

3. Do you have children at home?

- Yes
- No

4. Do you work during regular business hours (9-5)? [select one]

- Yes, I work regular business hour
- No, I work hours outside of those times (e.g., shift work, night shift)
- No, I don't work

APPENDIX C: PILOT TEST QUESTIONS: TAILORED

1. Age Group [select one]

- 25-40
- 41-50
- 51-70

2. Do any of the following special health states apply to you? If not, please continue on to the next question. [select all that apply]

- Disabled/In Significant Pain
- Pregnant
- Perimenopausal
- Menopausal

3. Do you have children at home?

- Yes
- No

4. Do you work during regular business hours (9-5)? [select one]

- Yes, I work regular business hours
- No, I work hours outside of those times (e.g., shift work, night shift)
- No, I don't work

5. What are you hoping to accomplish by getting more active? [select one]

- Weight loss
- Weight gain
- Weight maintenance

6. What do you wish you understood better or knew more about when it comes to fitness, exercise, and being active? [select all that apply]

- How to fit physical activity into my schedule
- What exercises to do
- How to do exercises
- Specific benefits of being more physically active

7. If you had all the time and resources you needed to achieve your personal fitness goals, what would those goals be? [select all that apply]

- Getting stronger
- Gaining flexibility
- Being more attractive
- Living a longer life
- Getting in better aerobic/cardiovascular shape
- Improving my “numbers” (e.g., cholesterol, blood pressure)
- Preparing for an event (e.g., race, triathlon, competition)

8. What motivates you to be more active? [select all that apply]

- Getting healthy
- Being more attractive
- Having fun

- Being an example for others
- Having support from friends and/or family
- My doctor wants me to
- It's expected of me

9. What keeps you from exercising or getting in more activity into your schedule? [select all that apply]

- No time
- No motivation
- Too many commitments
- No energy
- Pain
- Housekeeping and chores
- Work/school hours
- The expense
- Not understanding how to achieve my fitness goals
- No interest
- My kids
- No support from friends/family
- I'm embarrassed to have people see me exercising

APPENDIX D: PILOT TEST TARGETED MESSAGES BANK

Table 19

Pilot Test Targeted Messages Bank

Question	Possible Answers	Messages
1. Age Group	25-40	<p>At your age, you are in your prime! In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you invest in your health and (2) use the advantage you have with your youth to be in top condition (cardiovascular, strength, and flexibility) and to stay healthy and beautiful for years to come.</p> <p>You are probably busy, overcommitted, and trying to do it all. Though it may seem that there is no room for exercise in your schedule, you are likely to find stress relief and enjoyment in being active. The reward of being stronger, faster, fitter, and more attractive may be exactly what you need to get and stay motivated and energized to be active.</p>

	41-50	<p>As life starts to change – kids are growing up, careers are stable - you may find some new opportunities in your schedule for activity. Whether it is gardening, running, swimming, or a fitness class, there are countless ways to get in your exercise. Also, at your age, you have the advantage of still being youthful and vibrant as well as the gift of experience and knowledge. In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you invest in your health and (2) use your resources – like fitness websites, a certified personal trainer, books, fitness classes – to understand how to do specific exercises that will have you in the best condition of your life and will help you to stay healthy and beautiful for years to come. The reward of being stronger, faster, fitter, and more attractive may be exactly what you need to get and stay motivated and energized to be active.</p>
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	51-70	<p>At your age, you may be transitioning into a new way of life regarding health. While you may be finding that your weight is harder to maintain or you have less energy than you did in the past, this is certainly the time to get your body into great condition and to fully use the gift of experience and knowledge you've gained over the years. In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you invest in your health and commit to your wellness as much as you commit to others and (2) use your resources – like fitness websites, a personal trainer, books, fitness classes – to understand how to do specific exercises that will have you feeling healthy and beautiful for years to come. The reward of being stronger, more flexible, fitter, and glowing from the inside out may be exactly what you need to get and stay motivated and energized to be active.</p>
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2. Do any of the following special health states apply to you? If not, please continue on to the next question.	Disabled/In Significant Pain	<p>Women with disabilities or chronic pain benefit from including as much activity as they are able to, spread across the week. A disability or chronic pain may seem like a big roadblock when you think of being active; however, you may just need to think outside of the fitness box to find the right exercises for your body. Your doctor, a personal trainer, a fitness instructor, or online resources can help you first identify what you should do to be fit and what to avoid. One idea you may try is water aerobics - it isn't just for pensioners! The water's resistance makes exercise in this environment ideal for increasing flexibility, strength, and cardiovascular fitness, and it's appropriate for all ages, sizes, and abilities. An instructor will lead you through the class and make sure that all movements are beneficial and safe. Yoga is also a great way to build strength and flexibility without aggravating pain. Different types of yoga practice can be used to condition just about anyone, and an instructor will guide you through the poses.</p>
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	Pregnant	<p>Pregnant women who continued to be highly active before and after becoming pregnant can continue physical activity during pregnancy and the postpartum period, provided that they remain healthy and discuss with their health-care provider how and when activity should be adjusted over time.</p> <p>Even if you were not already highly active before your pregnancy, you should still get at least 150 minutes per week of moderate-intensity aerobic activity during pregnancy.</p> <p>Being active at the appropriate level will likely keep you and your baby healthy throughout your pregnancy. Even better, it will make it much easier to drop your baby weight after delivery!</p> <p>Whether it's with a mother's group, time you set aside for yourself, cleaning and errands, or your favorite group fitness class, making it a priority to be active will help you be a strong, beautiful mommy, as well as show your family that being active is a priority.</p>
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	Perimenopausal	<p>Your body will soon be going through a transition into menopause that could make achieving fitness more difficult. Many women start to feel tired as menopause approaches. It may seem counterintuitive, but a bit of activity may be what you need to reenergize. There is no time like the present to start good fitness behaviors and find a place in your busy schedule for activity. Being physically active will, in most cases, make your body's transition easier when menopause sets in. As women age, their physical make up changes as well, leading to more fat storage, brittle bones, and muscle loss. Getting active now can offset these common effects of aging, potentially extend your life, and keep your skin bright and healthy.</p>
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	Menopausal	<p>Many women feel tired during menopause. It may seem counterintuitive, but a bit of activity may be what you need to reenergize. If you're feeling bothered by hot flashes, outsmart your body by jumping in the pool for some laps or a water aerobics class. You will get the same cardiovascular benefit as using a treadmill or elliptical, but you won't feel the heat.</p> <p>There is no time like the present to start good fitness behaviors and find a place in your busy schedule for activity. As women age, their physical make up changes as well, leading to more fat storage, brittle bones, and muscle loss. Getting active now can offset these common effects of aging, potentially extend your life, and keep your skin bright and healthy.</p>
3. Do you have children at home?	Yes	<p>Any mom knows that chasing the little ones around, cleaning up after the family, and getting everyone ready and where they need to go counts as exercise. Even better, playtime can be family AND fitness time! For those with older children, consider using the time between piano lessons and soccer practice as</p>

		<p>bonus "you" time to take a walk or stretch or hit the gym with some friends.</p> <p>Making your health a priority is often difficult for women – especially those who are busy caring for others. Take time to care for your own wellness so you can keep up with the kids.</p>
	No	N/A
4. Do you work during regular business hours (9-5)?	Yes, I work regular business hours	<p>If you have a job where you are seated for most of the day, it is especially important that you make sure you are getting up every 30 minutes for a quick stretch or a walk around the office. Many companies have gyms in the building or nearby - yours may even offer a discount or incentive for joining the gym. You can also gather coworkers and create a fitness challenge where you are accountable to each other and can provide support and encouragement.</p> <p>In order to put your health first, choose a time of day to exercise that works best in your schedule. Maybe giving yourself an extra half hour in the morning to take a walk or run will make all the difference. Or, you may benefit from keeping a gym bag in your car and hitting the gym on the way home from work</p>

	No, I work shifts/outside of regular business hours (e.g., shift work, night shift)	<p>With the availability of 24-hour gyms, DVDs, and simple at-home fitness activities, your schedule does not need to be a hindrance to getting more activity.</p> <p>Take advantage of your schedule and get in some time at the park, the gym, or the mall when they are less crowded. Any activity, whether it's cleaning, grocery shopping, or dancing in Zumba class can get you stronger, healthier, and happier! However, if you have a job where you are on your feet, you're entitled to some relaxation after work. Instead of sitting in front of TV, wind down with some quiet yoga or stretching.</p>
	No, I don't work	<p>No work, huh? Well, the world is your oyster! Take advantage of your schedule and get in some time at the park, the gym, or the mall when they are less crowded. Any activity, whether it's cleaning, grocery shopping, or dancing in Zumba class can get you stronger, healthier, and happier!</p>

APPENDIX E: PILOT TEST TAILORED MESSAGES BANK

Table 20

Pilot Test Tailored Messages Bank

Question	Possible Answers	Message
1. Age Group	25-40	Women your age tend to be busy, overcommitted, and trying to do it all. Though it may seem that there is no room for exercise in your schedule, you are likely to find stress relief and enjoyment in being active. Try different activities until you find what works for you.
	41-50	As life starts to change - kids are growing up, careers are stable - you may find some new opportunities in your schedule for activity. Whether it is gardening, running, swimming, or a fitness class, there are countless ways to get in your exercise.

	51-70	Whether it is gardening, swimming, water aerobics, or a fitness class, there are countless ways to get in your exercise. Getting active is an excellent way to keep your body strong and vibrant and prevent the negative effects of aging.
2. Do any of the following special health states apply to you? If not, please continue on to the next question.	Disabled/In Significant Pain	Women with disabilities or chronic pain benefit from including as much activity as they are able to, spread across the week. Be sure to consult your healthcare provider about the types and amounts of activity that are appropriate for you. If you are able to, you should get at least 150 minutes per week (2 hours and 30 minutes) of moderate-intensity aerobic activity performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week. You should also do muscle-strengthening activities of moderate or high intensity

		that involve all major muscle groups on 2 or more days per week as these activities provide additional health benefits.
	Pregnant	Healthy women who are not already highly active or doing vigorous-intensity activity should get at least 150 minutes (2 hours and 30 minutes) of moderate-intensity aerobic activity per week during pregnancy and the postpartum period. Preferably, this activity should be spread throughout the week. If you who habitually engage in vigorous-intensity aerobic activity or are highly active, you can continue this physical activity during your pregnancy and the postpartum

		<p>period, provided that you remain healthy and discuss with your healthcare provider how and when activity should be adjusted over time.</p>
	Perimenopausal	<p>Many women start to feel tired as menopause approaches. It may seem counterintuitive, but a bit of activity may be what you need to reenergize.</p>
	Menopausal	<p>Many women feel tired during menopause. It may seem counterintuitive, but a bit of activity may be what you need to reenergize.</p> <p>If hot flashes are a problem for you, consider going to the pool for a water aerobics class or a swim. That way, you can stay cool and get in an excellent workout!</p>

3. Do you have children at home?	Yes	<p>Any mom knows that chasing the little ones around, cleaning up after the family, and getting everyone ready and where they need to go counts as exercise. Even better, playtime can be family AND fitness time! For those with older children, consider using the time between piano lessons and soccer practice as bonus "you" time to take a walk or stretch or hit the gym with some friends.</p> <p>Making your health a priority is often difficult for women – especially those who are busy caring for others. Take time to care for your own wellness so you can keep up with the kids.</p>
	No	N/A

Do you work during regular business hours (9-5)?	Yes, I work regular business hours	<p>If you have a job where you are seated for most of the day, it is especially important that you make sure you are getting up every 30 minutes for a quick stretch or a walk around the office. Many companies have gyms in the building or nearby - yours may even offer a discount or incentive for joining the gym. You can also gather coworkers and create a fitness challenge where you are accountable to each other and can provide support and encouragement.</p> <p>In order to put your health first, choose a time of day to exercise that works best in your schedule. Maybe giving yourself an extra half hour in the morning to take a walk or run will make all the difference. Or, you may benefit from keeping a gym bag in your car and hitting the gym on the way home from work.</p>
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	No, I work shifts/outside of regular business hours (e.g., shift work, night shift)	With the availability of 24-hour gyms, DVDs, and simple at-home fitness activities, your schedule does not need to be a hindrance to getting more activity. Take advantage of your schedule and get in some time at the park, the gym, or the mall when they are less crowded. Any activity, whether it's cleaning, grocery shopping, or dancing in Zumba class can get you stronger, healthier, and happier! However, if you have a job where you are on your feet, you're entitled to some relaxation after work. Instead of sitting in front of TV, wind down with some quiet yoga or stretching.
	No, I don't work	No work, huh? Well, the world is your oyster! Take advantage of your schedule and get in some time at the park, the gym, or the mall when they are less crowded. Any activity,

		<p>whether it's cleaning, grocery shopping, or dancing in Zumba class can get you stronger, healthier, and happier!</p>
<p>5. What are you hoping to accomplish by getting more active?</p>	Weight loss	<p>Always consult your physician before beginning a weight loss program.</p> <p>Healthy weight loss is 1-2 lbs/week, but you may lose more during your first few weeks on a new program.</p> <p>Remember that an overage of 3,500 calories/week will cause 1 lb of weight gain.</p>
	Weight gain	<p>Always consult your physician before beginning a weight gain program. An overage of 3,500 calories/week will cause 1 lb of weight gain, but be sure that the gain is through healthful measures, like increasing muscle mass and a healthy diet.</p>
	Weight maintenance	<p>Often, weight management is just as difficult as weight loss. Remember that an overage or deficit of 3,500</p>

		calories/week will cause 1 lb. of weight gain or loss, respectively.
6. What do you wish you understood better or knew more about when it comes to fitness, exercise, and being active?	How to fit physical activity into my schedule	Sometimes what's standing in the way of you and your workout isn't lack of motivation — rather, it's simply finding the time. Committing to a fitness class, working out with a friend, or getting fit with a certified personal trainer can keep you accountable. Scheduling exercise can also be helpful if you tend to run out of time. But, you won't always have an extra hour for the gym. Scheduling exercise may not be as difficult as you think if you get creative by parking farther away, taking the stairs, walking at lunch time, or taking little fitness breaks throughout the day to get your heart pumping for a short amount of time.

	What exercises to do	<p>Step aerobics, interval training, cardio kickboxing, oh my! There are so many ways to be fit and active these days that it can get confusing when all you want is to know how to get great legs or how to run a mile. For advice on the perfect exercises for you and for your goals, set up a consultation with a certified personal trainer, look through fitness websites and magazines, or go with a tried-and-true method - exercise videos. In addition to ones you can buy, there are endless how-to videos on YouTube and there may even be a selection at your public library.</p>
	How to do exercises	<p>It can be a waste of time - and potentially harmful - if you try to do exercises without understanding technique. Be sure to clarify how to do movements with a certified personal trainer or fitness instructor.</p>

		They can also teach you how to modify exercises to better suit your needs or fit your skill level.
	Specific benefits of being more physically active	According to the Mayo Clinic, there are 7 important benefits you'll get from increasing your physical activity: (1) exercise controls weight, (2) exercise combats health conditions and diseases, (3) exercise improves mood, (4) exercise boosts energy, (5) exercise promotes better sleep, (6) exercise puts the spark back into your sex life, and (7) exercise can be fun.
7. If you had all the time and resources you needed to achieve your personal fitness goals, what would those	Getting stronger	Strength training isn't just for beefcakes and strongwomen. Whether you like machines, free weights, or working with your own body weight, there is a strength-training regimen that fits your needs. Be sure that you speak with a certified personal trainer or consult an expert before using new

goals be?		<p>machines or heavier weights than usual. In general, training with high repetitions will allow you to build muscle and get an aerobic workout at the same time. Time saver!</p>
	Gaining flexibility	<p>Flexibility is gained through persistence and continuity. Stretching after workouts and throughout the day will improve your flexibility.</p> <p>Activities such as yoga, Pilates, and dance are fun ways to increase total-body flexibility.</p>
	Being more attractive	<p>There is a direct connection between exercise and healthy, gorgeous skin and hair. Regular physical activity will give you: (1) better collagen production, which leads to smoother, firmer skin, (2) reduced acne, and (3) healthier hair. You can get these benefits from all types of activity!</p>

	Living a longer life	<p>According to a 2012 Canadian study, participants who got at least 150 minutes (2 hours and 30 minutes) of moderate activity a week were anticipated to live nearly 6 extra years.</p> <p>There are no rules for what activity you have to do to reap those benefits – just that you’re moving during that time.</p>
	Getting in better aerobic/cardiovascular shape	<p>Training to improve aerobic and cardiovascular performance should include work at all intensities. To be truly aerobically fit, dedicate training time to low, moderate, and high intensity zones. An excellent method for achieving this is to include interval training in your workout where you will raise and lower the intensity, working at a high rate in short bursts.</p>

	Improving my "numbers" (e.g., cholesterol, blood pressure)	Getting more physical activity can have a profound effect on your "numbers," like blood pressure, cholesterol, and waist size. All of these are indicators of heart health and overall wellness. Even better, changes in these numbers are measurable, concrete ways to track your efforts.
	Preparing for an event (e.g., race, triathlon, competition)	If you're training for an event, such as a race, fun run, marathon, or even dance marathon, get some support and motivation from others. See if there is a training program for your event, such as Team in Training, or an online group of people you can train with. Having that event date in mind is great motivation and can help you figure out a training schedule to get you to where you need to be by event day.
8. What motivates you to be more	Getting healthy	No matter what you are striving to be healthy for, increasing your physical activity arm your body against

active?		disease, strengthen your immune system, and increase your energy.
	Being more attractive	All that work and sweat will pay off when it comes to beauty. To enhance the beautiful skin benefits that a regular work out give you, make sure you are drinking enough water. An easy guideline for how much you should drink is $(\text{your weight in pounds})/2 = \text{the number of ounces of water you should consume daily}$. On days that you work out, add another 16-24 ounces to that number.
	Having fun	Being active isn't about torture. If you're having fun, you're far more likely to keep up with the activity and benefit from it. If you're taking a fun fitness class or have discovered your love for long power walks, enlist some friends to join you so you can share the fun.

	Being an example for others	Be a model for your friends and loved ones by showing them that it's possible and fun to add physical activity to a daily routine. When you are at your best physically and mentally, you are the best help to others.
	Having support from friends and/or family	Gather together some friends, a parent, a child - just about anybody - to foster fun and encouragement while getting active.
	My doctor wants me to	So your doctor says you need more physical activity. That's likely true of most women in America. Use your doctor as a partner and supporter in you exercise. Find out if there are specific suggestions he or she has that will maximize the benefits of being active.

	It's expected of me	Exercise is a gift you give yourself for your health, longevity, wellness, and happiness. Even if you're expected by others in your life to be fit, ultimately, you're taking care of yourself and other people's opinions and expectations should take a smaller role in your life.
9. What keeps you from exercising or getting in more activity into your schedule?	No time	Exercise does not have to be done in 30-60 minute sessions. Simply adding 10 minutes when you can to get in some light to moderate exercise will refresh and energize you to get through your day.
	No motivation	Each day, engage in at least one activity that gets your body moving. Even activities that don't seem like exercise - such as vacuuming or dancing at a club - can be beneficial.
	Too many commitments	Try to make some of your family and social time active. Play outside with the kids, go on a walk or shopping trip

		with your friends, or even just park a little farther away when you're running your errands.
	No energy	Working out alone can be relaxing and therapeutic. Use your time on a walk or at the gym as your own slice of "me" time.
	Pain	Everything can seem like a challenge when you're in pain, but it doesn't have to stop you from living your life and being active. Your doctor, physical therapist, or a certified personal trainer can help you find activities that give you all of the health benefits but none of the stress and pain of traditional exercise. Yoga, water aerobics, and the recumbent bike are just a few of the many exercise options for those in pain.

	Housekeeping and chores	<p>Make your chores and errands into a fitness experience by picking up the pace in your cleaning with some lively music or by parking a little farther from the grocery store or cleaners.</p> <p>Housework and regular errands can be a great way to move around.</p>
	Work/school hours	<p>Find some time in your work or study schedule to take breaks. Your body needs the opportunity to refresh and reenergize in order for you to be at your best mentally. Get up and walk or do a few stretches. It is very important for you to schedule in times when you can devote 20 minutes or more to moderate exercise. Consider this a necessary step toward your success at work or school.</p>

	The expense	<p>Being active does not mean having a \$100 per month gym membership - unless you want it to! There are many free and low-cost options that will have just as many benefits as a gym membership. Local universities and community centers often have free or low cost fitness classes and access to gym equipment and pools. You can also go low-tech and walk your neighborhood or high school track. For strength training, your own body weight is all you need to shape up. Movements like push-ups, sit-ups, leg lifts, and the like sculpt beautiful muscles for free.</p>
	Not understanding how to achieve my fitness goals	<p>The hardest part of exercise is setting goals, but all that work is for nothing if you don't know how to achieve those goals. Once you have your fitness goals set, consult a certified personal trainer, a fitness instructor, or</p>

		your doctor for ways to achieve those goals.
	No interest	"Physical activity" can happen outside of the gym and outside of your assumptions about what exactly it constitutes. What do you love to do that doesn't involve sitting in a chair? Gardening? Shopping? Dancing? Any activity where you're moving is, by definition, physical activity. You may not break a sweat, but if you're in motion, you're on the right track.
	My kids	Children are built-in workout partners. Whether you're chasing them around the yard, cleaning up after them, or corralling them, you're in constant motion. Get into a child's mindset and think about opportunities to play.
	No support from friends/family	Online support groups, message boards, and social network sites

		<p>provide a wide world of people just like you who want to talk and support each other.</p>
	<p>I'm embarrassed to have people see me exercising</p>	<p>Everyone is too focused on themselves to watch you at the gym. Promise!</p> <p>However, there is plenty that can be done in the privacy of your own home. Run stairs, do a workout DVD, try a few YouTube exercise videos. Being active is only as public as you want it to be.</p>

APPENDIX F: PILOT TEST EVALUATION EXAMPLE

Please review these messages carefully and consider each question that follows the statement.

MESSAGE #1

1. The statement is a reason for getting more physical activity that is believable.
1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree
2. The statement is a reason for getting more physical activity that is convincing.
1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree
3. The statement gives a reason for getting more physical activity that is important to me.
1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree
4. The statement helped me feel confident about how to best get more physical activity.
1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree
5. The statement would help my friends get more physical activity.

1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree

6. The statement put thoughts in my mind about wanting to get more physical activity.

1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree

7. The statement put thoughts in my mind about not wanting to get more physical activity.

1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree

8. Overall, how much do you agree or disagree with the statement?

1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree

9. The statement provides me with enough information to perform the tasks stated.

1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree

10. I feel confident that I could perform the tasks stated if I really wanted to.

1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree, 5-strongly agree

[The evaluation repeated for each message assigned to the participant.]

APPENDIX G: SURVEY SCREEN SHOTS

Questions

Gender

Are you male or female?

Details

Select One:

☐ Male

☐ Female

Age

How old are you?

Details

Select One:

☐ Under 25

☐ 25-40

☐ 41-50

☐ 51-70

☐ Over 70

Special Health States

Do any of the following special health states apply to you? If not, please continue on to the next question.

Details

Select All That Apply:

☐ Pregnant/nursing

☐ Perimenopausal

☐ Menopausal

☐ Disabled/suffering from significant pain

Children

Do you have children at home?

Details

Select One:

☐ Yes

☐ No

Work Hours

Do you work during regular business hours (9-5)?

Details

Select One:

☐ Yes

☐ No, I don't work

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Submit

Figure 1. Survey.

Questions

Work Hours

Do you work during regular business hours (9-5)?

Details

Select One:

☐ Yes

☐ No, I don't work

☐ No, I work hours outside of those times (e.g., shift work, night shift)

Understanding Fitness

What do you wish you understood better or knew more about when it comes to fitness, exercise, and being active?

Details

Select All That Apply:

☐ What exercises to do

☐ How to fit activity into my schedule

☐ The specific benefits of exercise

☐ How to do the exercises

Fitness Goals

If you had all the time and resources you needed to achieve your personal fitness goals, what would those goals be?

Details

Select All That Apply:

☐ Be stronger

☐ Improve my cardiovascular performance (including speed and endurance)

☐ Increase my flexibility

☐ Lower my "numbers" (e.g., cholesterol, blood pressure)

☐ Increase my longevity/quality of life

☐ Participate in an event (e.g., a race or competition)

☐ Be more attractive (e.g., weight loss, toning)

Motivation

What motivates you to be more active?

Details

Select All That Apply:

☐ Support from my friends and family

☐ A desire to be healthier and feel better

☐ Physical appearance and attractiveness

☐ I find it fun

☐ It's expected of me

☐ I want to be an example for others

☐ A diagnosis or recommendation from my doctor

<< < > >> Submit

Figure 2. Survey.

Questions

☐ I find it fun
 ☐ It's expected of me
 ☐ I want to be an example for others
 ☐ A diagnosis or recommendation from my doctor

Barriers

What keeps you from exercising or getting in more activity into your schedule?

Details

Select All That Apply:
 ☐ Lack of time
 ☐ Lack of motivation
 ☐ Lack of a gym/facility near by
 ☐ Lack of energy
 ☐ Pain or disability
 ☐ Lack of interest
 ☐ Not enough support from friends or family
 ☐ Potential for embarrassment (at gym, in classes, out running, etc.)
 ☐ Expense of a gym, classes, equipment, clothing, etc.
 ☐ Not understanding how to achieve my goals
 ☐ Quick fixes that haven't worked (e.g., diet pills, extreme fitness plans)
 ☐ Long/irregular work or study hours
 ☐ No safe place to exercise
 ☐ Overwhelmed housekeeping responsibilities (e.g., laundry, cleaning, grocery shopping)
 ☐ Busy taking care of the kids
 ☐ Overwhelmed by commitments to family members and/or friends

Removing Barriers

Do you think you would be able to achieve your fitness goals if those barriers were removed?

Details

Select One:
 ☐ Yes
 ☐ No

Thank You

Thank you very much for participating in this survey! If you are interested in participating in a short online pilot study related to this research in the next few weeks, please enter your email below. *Your email will be kept completely private and will only be used for the purposes of this study.* Those who participate in the pilot study are eligible to win one of our \$25 Amazon gift cards!

Details

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Submit

Figure 3. Survey.

APPENDIX H: PILOT TEST SCREEN SHOTS

Pilot Test for a Tailored Fitness Message Assessment for Women Ages 25-70

Instructions: Please complete the questions below to the best of your ability. Click the submit button to continue on to (1) get your fitness messages and (2) complete a brief evaluation about the messages. [Be sure to click the Submit button at the end to receive your feedback!](#)

What is your age group?

☐ 25-40

☐ 41-50

☐ 51-70

Check any of the following special health states that apply to you.

☐ Disabled/suffering significant pain

☐ Pregnant

☐ Perimenopausal

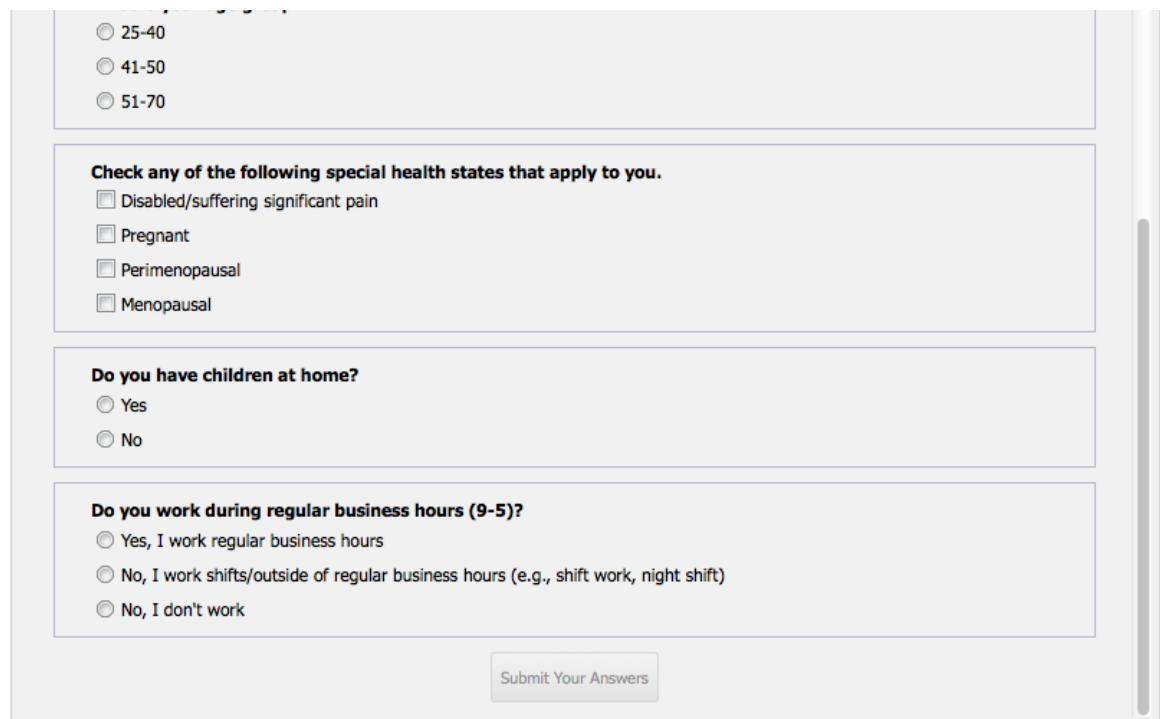
☐ Menopausal

Do you have children at home?

☐ Yes

☐ No

Figure 4. Targeted group assessment.



☐ 25-40
☐ 41-50
☐ 51-70

Check any of the following special health states that apply to you.

☐ Disabled/suffering significant pain
☐ Pregnant
☐ Perimenopausal
☐ Menopausal

Do you have children at home?

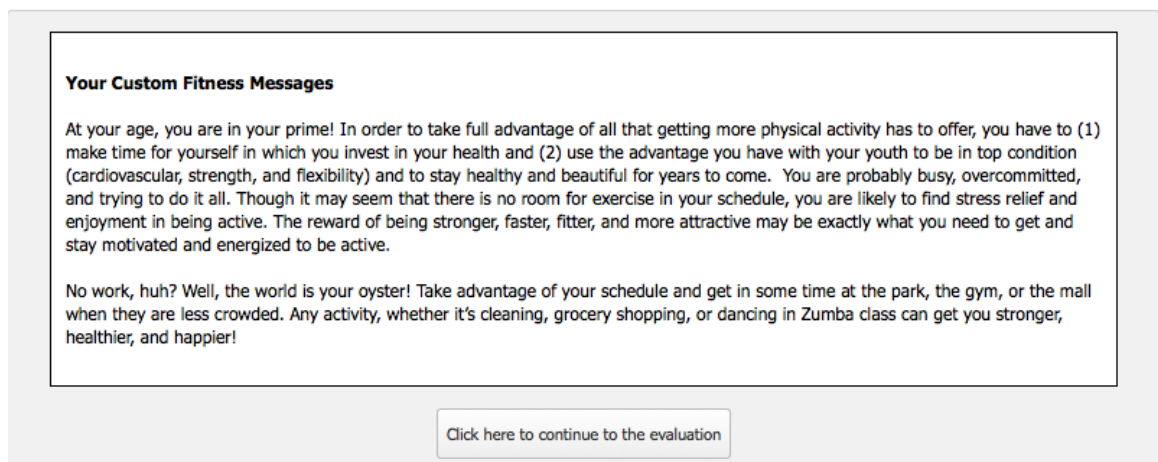
☐ Yes
☐ No

Do you work during regular business hours (9-5)?

☐ Yes, I work regular business hours
☐ No, I work shifts/outside of regular business hours (e.g., shift work, night shift)
☐ No, I don't work

Submit Your Answers

Figure 5. Targeted group assessment.



Your Custom Fitness Messages

At your age, you are in your prime! In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you invest in your health and (2) use the advantage you have with your youth to be in top condition (cardiovascular, strength, and flexibility) and to stay healthy and beautiful for years to come. You are probably busy, overcommitted, and trying to do it all. Though it may seem that there is no room for exercise in your schedule, you are likely to find stress relief and enjoyment in being active. The reward of being stronger, faster, fitter, and more attractive may be exactly what you need to get and stay motivated and energized to be active.

No work, huh? Well, the world is your oyster! Take advantage of your schedule and get in some time at the park, the gym, or the mall when they are less crowded. Any activity, whether it's cleaning, grocery shopping, or dancing in Zumba class can get you stronger, healthier, and happier!

Click here to continue to the evaluation


Figure 6. Targeted group custom fitness message review screen.

Pilot Test Evaluation

Read the message carefully. For each measure, slide the button left or right to indicate your response.


Message: At your age, you are in your prime! In order to take full advantage of all that getting more physical activity has to offer, you have to (1) make time for yourself in which you invest in your health and (2) use the advantage you have with your youth to be in top condition (cardiovascular, strength, and flexibility) and to stay healthy and beautiful for years to come. You are probably busy, overcommitted, and trying to do it all. Though it may seem that there is no room for exercise in your schedule, you are likely to find stress relief and enjoyment in being active. The reward of being stronger, faster, fitter, and more attractive may be exactly what you need to get and stay motivated and energized to be active.

1. The statement is a reason for getting more physical activity that is believable.



Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
-------------------	----------	----------------------------	-------	----------------

2. The statement is a reason for getting more physical activity that is convincing.



Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
-------------------	----------	----------------------------	-------	----------------

Figure 7. Targeted group Message 1 evaluation.

3. The statement gives a reason for getting more physical activity that is important to me.

Strongly disagree

Disagree

Neither agree nor disagree

Agree

Strongly agree

4. The statement helped me feel confident about how to best get more physical activity.

Strongly disagree

Disagree

Neither agree nor disagree

Agree

Strongly agree

5. The statement would help my friends get more physical activity.

Strongly disagree

Disagree

Neither agree nor disagree

Agree

Strongly agree

6. The statement put thoughts in my mind about wanting to get more physical activity.

Strongly disagree

Disagree

Neither agree nor disagree

Agree

Strongly agree

7. The statement put thoughts in my mind about not wanting to get more physical activity.

Figure 8. Targeted group Message 1 evaluation.

7. The statement put thoughts in my mind about not wanting to get more physical activity.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
-------------------	----------	----------------------------	-------	----------------

8. Overall, how much do you agree or disagree with the statement?

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
-------------------	----------	----------------------------	-------	----------------

9. Is the reason the statement gave for getting more physical activity a strong or weak one?

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
-------------------	----------	----------------------------	-------	----------------

10. The statement provides me with enough information to perform the tasks stated.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
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Next Message

Figure 9. Targeted group Message 1 evaluation.

Pilot Test for a Tailored Fitness Message Assessment for Women Ages 25-70

Instructions: Please complete the questions below to the best of your ability. Click the submit button to continue on to (1) get your fitness messages and (2) complete a brief evaluation about the messages. [Be sure to click the Submit button at the end to receive your feedback!](#)

What is your age group?

☐ 25-40

☐ 41-50

☐ 51-70

Check any of the following special health states that apply to you.

☐ Disabled/suffering significant pain

☐ Pregnant

☐ Perimenopausal

☐ Menopausal

Do you have children at home?

☐ Yes

☐ No

Figure 10. Tailored group assessment.

Do you work during regular business hours (9-5)?

- ☐ Yes, I work regular business hours
- ☐ No, I work shifts/outside of regular business hours (e.g., shift work, night shift)
- ☐ No, I don't work

What are you hoping to accomplish by getting more active?

- ☐ Weight loss
- ☐ Weight gain
- ☐ Weight maintenance

What do you wish you understood better or knew more about when it comes to fitness, exercise, and being active?

- ☐ How to fit physical activity into my schedule
- ☐ What exercises to do
- ☐ How to do exercises
- ☐ Specific benefits of being more physically active

If you had all the time and resources you needed to achieve your personal fitness goals, what would those goals be?

- ☐ Getting stronger
- ☐ Gaining Flexibility

Figure 11. Tailored group assessment.

If you had all the time and resources you needed to achieve your personal fitness goals, what would those goals be?

- ☐ Getting stronger
- ☐ Gaining Flexibility
- ☐ Being more attractive
- ☐ Living a longer life
- ☐ Getting in better aerobic/cardiovascular shape
- ☐ Improving my numbers (e.g., cholesterol, blood pressure)
- ☐ Preparing for an event (e.g., race, triathlon, competition)

What motivates you to be more active?

- ☐ Getting healthy
- ☐ Being more attractive
- ☐ Having fun
- ☐ Being an example
- ☐ Having support from friends and/or family
- ☐ My doctor wants me to
- ☐ It's expected of me

What keeps you from exercising or getting in more activity into your schedule?

- ☐ No time

Figure 12. Tailored group assessment.

☐ Having support from friends and/or family

☐ My doctor wants me to

☐ It's expected of me

What keeps you from exercising or getting in more activity into your schedule?

☐ No time

☐ No motivation

☐ Too many commitments

☐ No energy

☐ Pain

☐ Housekeeping and chores

☐ Work/school hours

☐ The expense

☐ Not understanding how to achieve my fitness goals

☐ No interest

☐ My kids

☐ No support from friends/family

☐ I'm embarrassed to have people see me exercising

Submit Your Answers

Figure 13. Tailored group assessment.

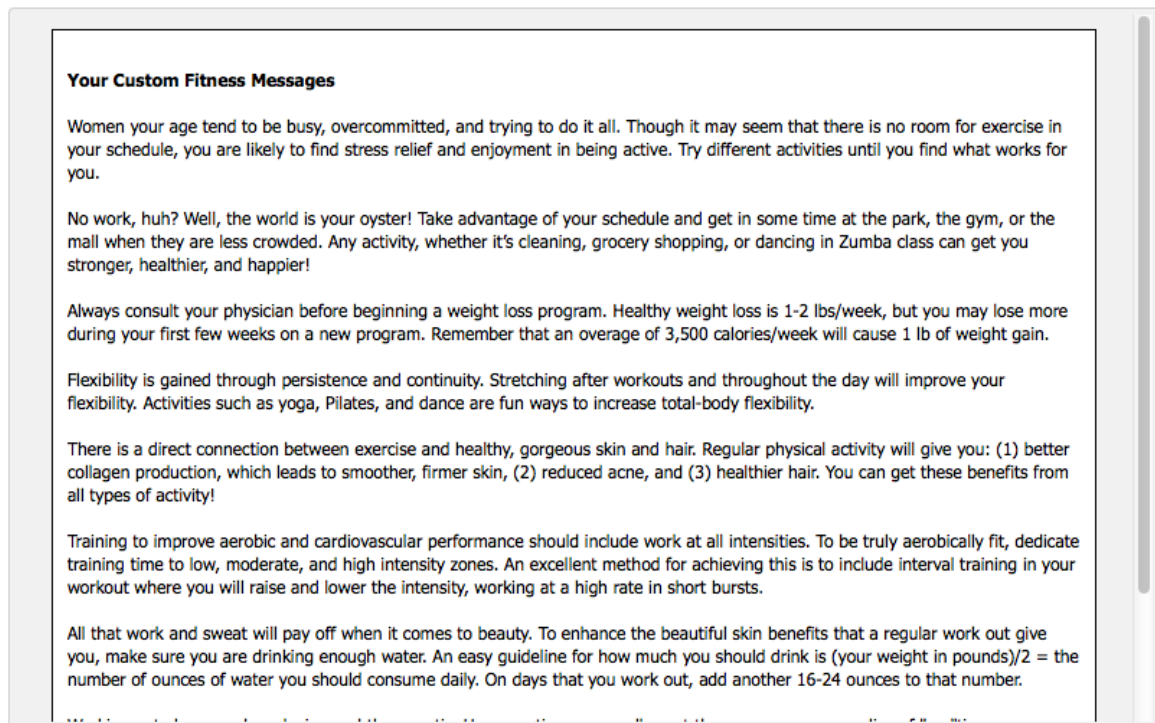


Figure 14. Tailored group custom fitness message review screen.

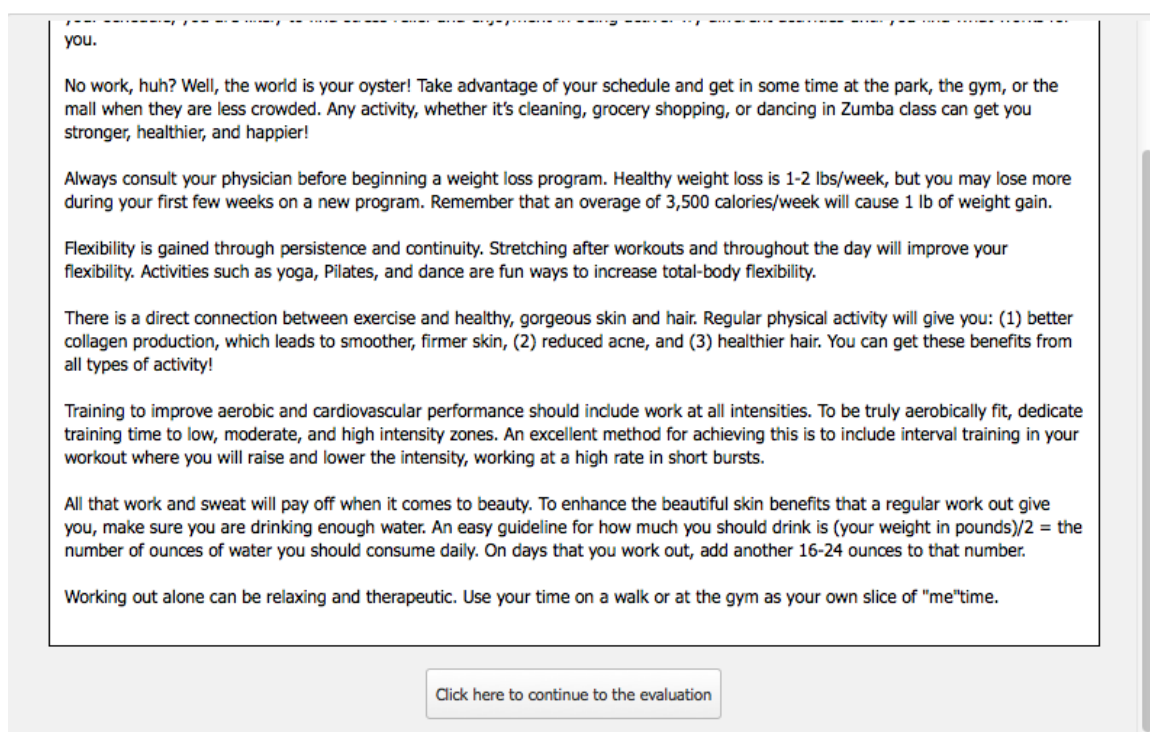



Figure 15. Tailored group custom fitness message review screen.

Pilot Test Evaluation

Read the message carefully. For each measure, slide the button left or right to indicate your response.


Message: Women your age tend to be busy, overcommitted, and trying to do it all. Though it may seem that there is no room for exercise in your schedule, you are likely to find stress relief and enjoyment in being active. Try different activities until you find what works for you.

1. The statement is a reason for getting more physical activity that is believable.



Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
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2. The statement is a reason for getting more physical activity that is convincing.



Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
-------------------	----------	----------------------------	-------	----------------

3. The statement gives a reason for getting more physical activity that is important to me.

Figure 16. Tailored group Message 1 evaluation.

3. The statement gives a reason for getting more physical activity that is important to me.

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

4. The statement helped me feel confident about how to best get more physical activity.

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

5. The statement would help my friends get more physical activity.

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

6. The statement put thoughts in my mind about wanting to get more physical activity.

Strongly disagree Disagree Neither agree nor disagree Agree Strongly agree

7. The statement put thoughts in my mind about not wanting to get more physical activity.

Figure 17. Tailored group Message 1 evaluation.

7. The statement put thoughts in my mind about not wanting to get more physical activity.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
-------------------	----------	----------------------------	-------	----------------

8. Overall, how much do you agree or disagree with the statement?

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
-------------------	----------	----------------------------	-------	----------------

9. Is the reason the statement gave for getting more physical activity a strong or weak one?

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
-------------------	----------	----------------------------	-------	----------------

10. The statement provides me with enough information to perform the tasks stated.

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
-------------------	----------	----------------------------	-------	----------------

Next Message

Figure 18. Tailored group Message 1 evaluation.

APPENDIX I: CALLS FOR SURVEY PARTICIPATION

Participants were recruited using the following email:

Dear friends and colleagues,

I am seeking females between the ages of 25-70 to participate in a very short online survey on fitness attitudes and interests for my dissertation research on fitness messaging for women. The survey is open to women of all fitness levels, degrees of interest in fitness, and backgrounds. The purpose of the survey is to identify the (1) topics of interest for fitness messages, (2) the barriers to getting adequate physical activity, and (3) attitudes about fitness topics.

*If you are interested in participating in this short survey, click on this link: <http://wellness.healthrx.com>. This survey will take **no more than 10 minutes** of your time.*

I would appreciate it if you would forward this survey to female friends, family members, and/or colleagues between the ages of 25 and 70 who may be interested in participating in this short survey.

Thank you for your consideration,

Kelly

In addition, the following calls were posted on the researcher's personal Facebook and Twitter profiles, respectively:

Friends, I'm seeking females between the ages of 25-70 to participate in a very short online survey on fitness attitudes. Click on this link to access the survey: <http://wellness.healthrx.com> Please pass this survey along to any qualified friends.

Attn: women 25-70. Please take a short survey on fitness attitudes for my dissertation research. <http://wellness.healthrx.com> Please RT!

APPENDIX J: SURVEY INFORMED CONSENT

Individual Fitness: Creating a Tailored Fitness Message Assessment for Women

Ages 25-70 – Part 1: Survey

INFORMED CONSENT FORM

RESEARCH PROCEDURES

This research is being conducted to inform the development and refinement of a tailored fitness message assessment system (Fitness Message Assessment (FMA)) that will increase the likelihood engaging, relevant, and actionable messages will be considered more thoroughly, leading to a positive change in one's mindset about fitness. If you agree to participate, you will be asked to complete questions about your fitness beliefs, current fitness behaviors, and lifestyle. Your part in this study will take no longer than 10 minutes to complete.

RISKS

There are no foreseeable risks for participating in this research.

BENEFITS

There are no benefits to you as a participant other than to further research in tailored fitness messaging for women ages 25-70.

CONFIDENTIALITY

The data in this study will be confidential. Any emails used for recruiting purposes (this

survey of for Part 2: Pilot Test) will be only be used for recruiting. While it is understood that no computer transmission can be perfectly secure, reasonable efforts will be made to protect the confidentiality of your transmission.

PARTICIPATION

Your participation is voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party.

CONTACT

This research is being conducted by Kelly Vandersluis Morgan from the Communication department at George Mason University. She may be reached at kvanders@gmu.edu or 703-585-3373 for questions or to report a research-related problem. Ms. Morgan's faculty advisor, Dr. Gary Kreps may also be contacted at gkreps@gmu.edu or 703-993-1094.

You may contact the George Mason University Office of Research Integrity & Assurance at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your participation in this research.

CONSENT

I have read this form and agree to participate in this study.

The George Mason University Human Subjects Review Board has waived the requirement for a signature on this consent form.

APPENDIX K: CALLS FOR PILOT TEST PARTICIPANTS

Participants were first recruited through a question in the survey portion of this research. In order to reconnect with these volunteers, the following email was sent:

Hello!

Thank you for being kind enough to volunteer to help with this second round of my dissertation research. It really means a lot to me! I'm in the final stretch of this program and am looking forward to graduation.

*To refresh your memory about my research, I am seeking females ages 25-70 to participate in an online pilot test of a fitness message system that I've developed. **The pilot test will take no longer than 30 minutes to complete.***

Data from this pilot test will be used to further refine an assessment and accompanying messages intended to encourage women to increase their physical activity.

If you are still interested in participating in this online pilot test, please click on this link: <http://dev.healthrx.com/wellnesssurvey>

I would appreciate it if you would forward this email to female friends, family members, and/or colleagues between the ages of 25 and 70 who may be interested in participating.

*Thank you for your consideration,
Kelly Morgan*

After determining that the pilot study volunteers were not responding quickly enough, a slightly modified call for participants was sent through email to friends:

Hello, everyone!

I'm begging, pleading, and groveling at your pretty feet hoping you'll help me by

taking my final dissertation survey. It's a quick pilot test of a fitness messaging system I've created, and the test is open to any women aged 25-70. Some of you may have already received an email about this survey last Sunday (if you've done it - THANKS!), but if not, please consider helping me out.

Here is the link to the survey: <http://dev.healthrx.com/wellnesssurvey/>. It will take you about 10 minutes to do the whole thing, and it'll mean the world to me.

If you have some nice ladies who would be willing to help out a panicked Ph.D. candidate, please pass this along! In the immortal words of The Temptations, I ain't too proud to beg.

Kelly

and the following were posted on the researcher's personal Facebook and Twitter accounts:

Women 25-70: Please take 10 minutes to fill out my final dissertation survey that tests my system. <http://dev.healthrx.com/wellnesssurvey/>

APPENDIX L: PILOT TEST INFORMED CONSENT

Individual Fitness: Creating a Tailored Fitness Message Assessment for Women

Ages 25-70 – Part 2: Pilot Test

INFORMED CONSENT FORM

RESEARCH PROCEDURES

This research is being conducted to inform the development and refinement of a tailored fitness message assessment system (Fitness Message Assessment (FMA)) that will increase the likelihood engaging, relevant, and actionable messages will be considered more thoroughly, leading to a positive change in one's mindset about fitness. If you agree to participate, you will be asked to (1) complete questions about your fitness beliefs, current fitness behaviors, and lifestyle, (2) review fitness messages provided from your responses, and (3) evaluate the messages. You will be able to download a copy of your fitness messages to keep. Your part in this study will take no longer than 30 minutes to complete.

RISKS

There are no foreseeable risks for participating in this research.

BENEFITS

There are no benefits to you as a participant; however, you will receive either tailored or

targeted fitness messages that will likely help you in a pursuit to better health. You will also further research in tailored fitness messaging for women ages 25-70.

CONFIDENTIALITY

The data in this study will be confidential. Any emails used for recruiting purposes will be only be used for recruiting. While it is understood that no computer transmission can be perfectly secure, reasonable efforts will be made to protect the confidentiality of your transmission.

PARTICIPATION

Your participation is voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party.

CONTACT

This research is being conducted by Kelly Vandersluis Morgan from the Communication department at George Mason University. She may be reached at kvanders@gmu.edu or 703-585-3373 for questions or to report a research-related problem. Ms. Morgan's faculty advisor, Dr. Gary Kreps may also be contacted at gkreps@gmu.edu & 703-993-1094.

You may contact the GMU Office of Research Integrity & Assurance at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your participation in this research.

CONSENT

I have read this form and agree to participate in this study.

The George Mason University Human Subjects Review Board has waived the requirement for a signature on this consent form.

APPENDIX M: ZHAO ET AL.'S (2011) PERCEIVED ARGUMENT STRENGTH
SCALE

“PERCEIVED ARGUMENT STRENGTH SCALE

1. The statement is a reason for ____ that is believable.
2. The statement is a reason for ____ that is convincing.
3. The statement gives a reason for ____ that is important to me.
4. The statement helped me feel confident about how best to ____.
5. The statement would help my friends ____.
6. The statement put thoughts in my mind about wanting to ____.
7. The statement put thoughts in my mind about not wanting to ____.
8. Overall, how much do you agree or disagree with the statement?
9. Is the reason the statement gave for ____ a strong or weak reason?

Instructions: Fill in the blanks with the target behavior for the persuasive argument.

Use a 5-point Likert scale (*strongly disagree* to *strongly agree*) to score items 1–8. Use a 5-point Likert type scale (*very weak* to *very strong*) to score item 9. Subtract item 7) from item 6) to create a single thought favorability item and then convert the new item to a 5-point scale by dividing it by 2 and then adding a constant of 3” (Zhao et al., 2011).

APPENDIX N: LIST OF USABLE MAGAZINES FROM CONTENT ANALYSIS

Table 20

Issues with Fitness Articles

Magazine	Iss/vol	Issue
Cosmopolitan	248(6)	Jun-10
Cosmopolitan	249(1)	Jul-10
Cosmopolitan	249(2)	Aug-10
Cosmopolitan	249(3)	Sep-10
Cosmopolitan	249(4)	Oct-10
Cosmopolitan	249(5)	Nov-10
Cosmopolitan	250(1)	Jan-11
Cosmopolitan	250(3)	Mar-11
Cosmopolitan	250(5)	May-11
Cosmopolitan	250(6)	Jun-11
Glamour	108(7)	Jul-10
Glamour	108(9)	Sep-10
Glamour	108(10)	Oct-10
Glamour	109(1)	Jan-11

Glamour	109(3)	Mar-11
Glamour	109(4)	Apr-11
Glamour	109(5)	May-11
Glamour	109(6)	Jun-11
Good Housekeeping	250(1)	Jan-10
Good Housekeeping	250(2)	Feb-10
Good Housekeeping	250(3)	Mar-10
Good Housekeeping	250(4)	Apr-10
Good Housekeeping	250(6)	Jun-10
Good Housekeeping	251(1)	Jul-10
Good Housekeeping	251(3)	Sep-10
Good Housekeeping	251(5)	Nov-10
Good Housekeeping	251(6)	Dec-10
Good Housekeeping	252(1)	Jan-11
Redbook	214(1)	Jan-10
Redbook	214 (2)	Feb-10
Redbook	214(3)	Mar-10
Redbook	214(4)	Apr-10
Redbook	214(6)	Jun-10

Table 21

Issues with Fitness/Weight Loss Advertisements

Magazine	Iss/Vol	Issue
Cosmopolitan	248(6)	Jun-10
Cosmopolitan	249(1)	Jul-10
Cosmopolitan	249(2)	Aug-10
Cosmopolitan	249(3)	Sep-10
Cosmopolitan	249(4)	Oct-10
Cosmopolitan	249(5)	Nov-10
Cosmopolitan	250(1)	Jan-11
Cosmopolitan	250(2)	Feb-11
Cosmopolitan	250(3)	Mar-11
Cosmopolitan	250(4)	Apr-11
Cosmopolitan	250(5)	May-11
Cosmopolitan	250(6)	Jun-11
Glamour	108(6)	Jun-10
Glamour	108(7)	Jul-10
Glamour	108(8)	Aug-10
Glamour	108(9)	Sep-10
Glamour	108(10)	Oct-10
Glamour	108(12)	Dec-10
Glamour	109(1)	Jan-11

Glamour	109(2)	Feb-11
Glamour	109(3)	Mar-11
Glamour	109(3)	Apr-11
Glamour	109(5)	May-11
Glamour	109(6)	Jun-11
Glamour	250(1)	Jan-10
Good Housekeeping	250(1)	Jan-10
Good Housekeeping	250(2)	Feb-10
Good Housekeeping	250(3)	Mar-10
Good Housekeeping	250(4)	Apr-10
Good Housekeeping	250(5)	May-10
Good Housekeeping	250(6)	Jun-10
Good Housekeeping	251(1)	Jul-10
Good Housekeeping	251(3)	Sep-10
Good Housekeeping	251(5)	Nov-10
Good Housekeeping	251(6)	Dec-10
Good Housekeeping	252(1)	Jan-11
Redbook	214(1)	Jan-10
Redbook	214 (2)	Feb-10
Redbook	214(3)	Mar-10
Redbook	214(4)	Apr-10

Redbook	214(6)	Jun-10
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