

Research Article

In their Own Language: Communicating Health to Boost Compliance for Weight Loss and Diabetes

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Abstract

101 older female respondents evaluated different sets of messages (vignettes) dealing with diabetes, obesity, and how to deal with them. Regression analysis related the ratings to the presence/absence of the messages. Most messages were perceived as appropriate to the respondent, suggesting a positive blandness and ineffectiveness of messaging. Clustering the respondents by the pattern of coefficients revealed three different mind-sets of approximately equal size, respectively; Focus on medical indicators, Focus on lifestyle, and Focus on drinking water. A mind-set assigner comprising six questions was developed to identify new people, who can then be messaged more convincingly based upon the mind-set to which they are assigned.

Introduction

It is clear that the rampant increase in the obesity followed by diabetes is becoming the most threatening problem to world health. Our lifestyle, the foods that we eat, the reduction in exercise, and the more sedentary behavior has changed affected our health. Overweight is rampant world-wide, and diabetes is not far behind. Both the popular press and the scientific literature abound with material on the spread of obesity [1-3].

There are drugs on the market which reduce intake [4], and a whole industry of dieticians who, for fee, can personally monitor a person, suggesting what to do in order for the person to be healthier. For those who can afford it, both financially and physically, there are retreats [5], dietetic coaches [6], new ways of reducing weight such as the buddy system for dieting [7], and of course bariatric surgery [8]. It may be possible to reduce the deleterious effects of being overweight through the judicious application of the arsenal of tools.

The issue addressed by this paper is whether it might be possible to enhance the messaging to those who are diabetic using the newly emerging technology of AI, artificial intelligence, coupled with a traditional research approach, conjoint measurement. The objective of the effort is to see what can be done in the space of 24 hours, using available technologies, with the goal of creating a systematized, industrial-sale system which teaches how to communicate health issues with people.

The origins of this paper come from three different sources.

1. The use of personal computers and the internet to make consumer research fast, easy, and inexpensive. The approach used here, Mind Genomics, traces its history over a 30+ year period from the early 1990's. The goal was to take a well-

accepted research techniques in consumer science, conjoint measurement, and port it over to a DIY, do-it-yourself system. Summarizing Mind Genomics, one can think of presenting combinations of messages, elements, to a person, getting the person to react to these combinations, and then determining what specific feature or element drives the rating. The objective here is to simulate nature, which presents people with combinations, scenarios, to which the person reacts. Responding to mixtures is more nature, more 'ecologically valid' than responding to single ideas.

2. The desire to create better messaging for the world of medicine. Messaging is the way that people can be encouraged to comply. Messaging is the way that the doctor can tell the patient what the problem is, and what may need to be done, as well as the specific words to say it. One might think that with the advances of medicine the messaging will take care of itself, but the reality is that often messaging is the 'last mile,' and fails the patient. The messaging may be relevant but motivating to the respondent. Or, the messaging may be incorrect, or even both. Years of experience can fine tune the messaging, but what happens when the person is a new graduate, and dozen have years.
3. The ongoing effort to create a 'wiki of the mind,' a systematized database of how people respond to the different aspects of everyday life. The idea is to explore the world of the everyday in a systematized manner, almost in the manner of a cartographer of the mind. The approach, called grounded research theory (REF), stands in contrast to the more popular method of hypothetical deductive reasoning, which posits how the world works, sets up a study to confirm or disconfirm, and then proceeds to implementing the experiment. The

systematized exploration of the everyday experience does not lend itself to an explanation of how the world works; but rather just ‘what’s actually going on.’

Beyond Simple Questionnaires to Probing the Mind with Mind Genomics

The conventional way of understanding people’s thinking is through simple questionnaires. We are inundated with questionnaires, the modern era suffused with the desire to gain feedback on every interaction with a person and a service provider. Whereas previously questionnaires were often long documents with the respondent asked to score different facets of life, or an experience, today’s questionnaires are short, limited to a topic of one’s experience. Whether one works with a short questionnaire after an interaction, or with a long A&U (attitude and usage) questionnaire, the objective is the same, namely understand at an intellectual level how a person feels about a topic. These questionnaires parse the experience or topic into different, cleanly and surgically divided sections, instructing the respondent to think of each topic or each question, one topic at a time, and in isolated thought rate aspects of that topic. Along with the effort to administer these questionnaires there is an accompanying cadre of analytics, mainly summarizations of the data, data reduction principal component factor analysis [9], and clustering [10], to paint a picture.

The Evolution and Contribution of Mind Genomics to the Issue of Understanding and Messaging

The emerging science of Mind Genomics can be summarized as an experimenting science which understands how people respond to the ordinary world, such understanding promoted by the evaluation of systematically created vignettes of daily life, and the deconstruction of responses to those vignettes into the ‘driving power’ of the components of the vignettes, the ‘elements’. The description of Mind Genomics in this way hints at Mind Genomics as an experimenting science, rather than an observational science. It is the experimentation with features of the ‘ordinary’ which enables the Mind Genomics researcher to craft a new understanding of how people think when they are exposed to the world of ordinary life. In a Mind Genomics study there is no need to alter reality to establish a principle. Rather, the altered realities are simply combinations of features of the everyday, recombined into simple combinations that are evaluated, the pattern of responses showing how ‘nature is working.’

Mind Genomics plays a role in understanding the messaging about weight and diabetes because the messages are relevant to the topic. As will be shown below, the different combinations of messages end up judged in different ways by a person. The carefully created set of combinations of messages, the vignettes, put together through experimental design, present slightly different ‘realities’ to the respondent. It is the pattern of response to these different realities which allows for an immediate understanding of how people react to the messaging. A key benefit of the Mind Genomics approach is its ability to prevent a respondent from ‘gaming’ the system. Thus, Mind Genomics avoids biases which plague many survey methods, especially those dealing with sensitive topics [11,12].

The original work of Mind Genomics dealt with commercial products [13]. These studies were inspired by the pioneering work of the late Professor Paul Green of the Wharton School, University of Pennsylvania [14]. It was Green and his colleagues, especially Yoram Wind, who took the rather esoteric method of conjoint measurement, and, simplifying the notion of understanding ideas by studies of mixtures, brought conjoint measurement into common use. Mind Genomics made the system even simpler and more robust by having the respondents each evaluate different sets of combinations of ideas, each set created to allow for subsequent statistical analysis at the level of the individual [15]. The approach evolved to a DIY (do it yourself) system, with automated analysis and reporting [16,17]. The approach presented here is an example of that latest evolution. A history of Mind Genomics can be found in a variety of published papers [13,18].

Applying Mind Genomics to the Study of How to Communicate Weight Control

The remainder of this paper is devoted to an explication of the Mind Genomics approach to uncovering what to say to people to encourage weight control. The Mind Genomics approach follows a series of templated steps, so that the discoveries presented in this paper end up being simply empirically ‘fleshed out’ data tables and figures. That is, standardized approach to Mind Genomics studies provides the researcher with a tool that can be applied quickly and usually productively to a problem.

Step 1 – Create a name for the study, or really for the experiment. This first step may seem obvious, but the reality of research is that the novice researcher often fails to crystallize the reason for the study, and the topic. Rather, the novice attempts to put into the title the entire research project, rather than separating out the general topic from the specific method. The study here was simply called Diabetes Weight, a name which allowed the researchers to focus on different ways to think about the topic.

Step 2 – Develop four questions pertaining to the topic. The actual test stimuli for Mind Genomics comprise four sets of four phrases each. In turn, each set of four phrases represent four alternative ‘ideas’, or messages about the topic. The structure of four questions allows the researcher to answer each question. It will be the answers to the questions which constitute the test material that the respondent will evaluate. Thus, the structure of the question/answer is a way to focus the mind of the researcher, with the questions serving as an aid to thinking, and as a bookkeeping device.

It is at the stage of creating four questions that many prospective researcher find the task to be difficult. Our education does not teach people to think critically, focusing as it does on answering questions rather than developing them. It should come as no surprise that at this early stage in the Mind Genomics process many prospective researchers become frustrated and give up. It is a tribute to grade school and high students that they find this challenge to be fun, rather than frustrating, and proceed to come up with questions far more readily than do older people, and even far more readily than professionals.

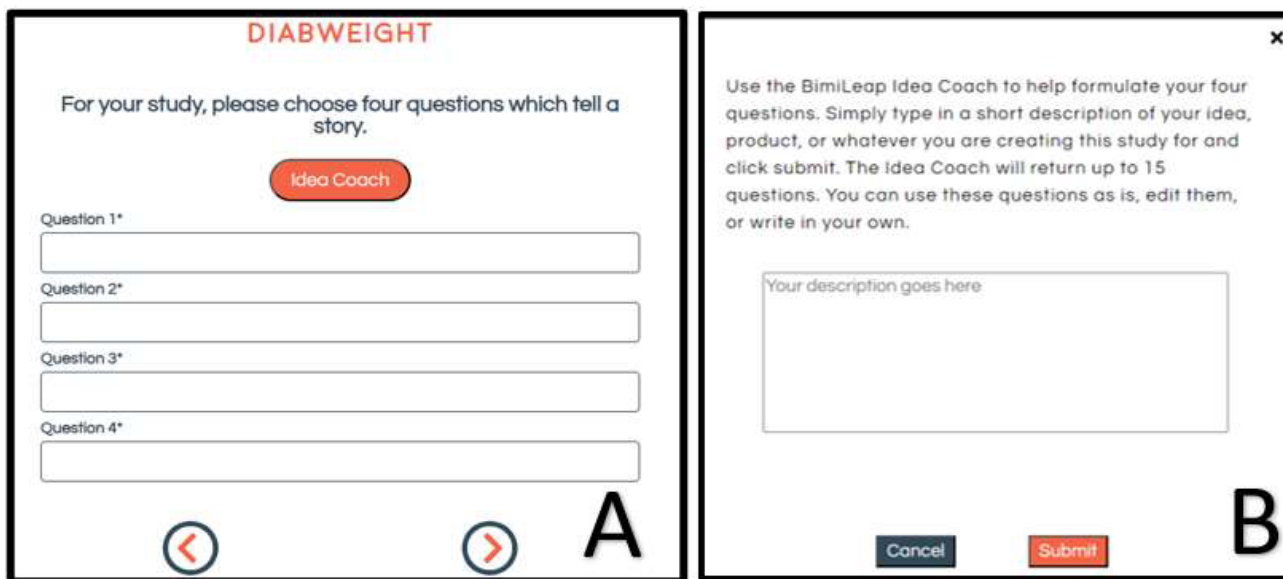


Figure 1: Screen shots for the set-up phase for a Mind Genomics study. Panel A shows the template, panel B shows the template for the Idea Coach.

In order to address the long-standing issue of ‘creating the raw material’, viz., questions but also answers, recent versions of the Mind Genomics platform have incorporated artificial intelligence, AI, as a TACT, Technical Aide to Creative Thought. That term was first used almost 60 years ago by the late Professors Anthony Gervin Oettinger at Harvard University, but it is appropriate here. The researcher need not come up with the actual questions, but instead must come up with a ‘squib’ or short paragraph about the topic. It is that ‘squib’ which will become the prompt for embedded AI, GPT3.5 [19].

Figure 1 shows screenshots which allow the researcher either to put in her or his questions, or to request that the AI embedded in “Idea Coach” suggest questions. Not surprising is the observation that having a ‘coach’ to help with the questions changes the set-up, so that it becomes intriguing and fun, rather than frightening. Panel A shows the set of four placeholders in which the researcher is to type a question. Panel A is stark, forbidding, a tabula rasa, a blank sheet, with little to support the researcher. The researcher who wants to use AI need only press the Idea Coach button, and be quickly guided away to a safer place, the box in Panel B. Of course, the researcher must talk about the project, but as we will see, the Idea Coach is forgiving, letting the researcher iterate.

Once the researcher has composed the squib and put it into Figure 1, Panel B, the Idea Coach returns with a proposed set of questions. Each iteration of the Idea Coach generates 15 different questions. The researcher can iterate as many times as desired, changing the squib or keeping the squib the same. The AI will return a number of new questions each time, and occasionally repeat a question. At the end of the iteration the research will have developed four questions and can edit them. Figure 2 shows the completed set of four questions after they have been developed by Idea Coach, and ‘edited’ in preparation for the answers.

After the squib is constructed and put into Figure 1, Panel B, Idea Coach creates a set of 15 questions from a squib in approximately 10-20 seconds. The researcher can select a question or several questions,

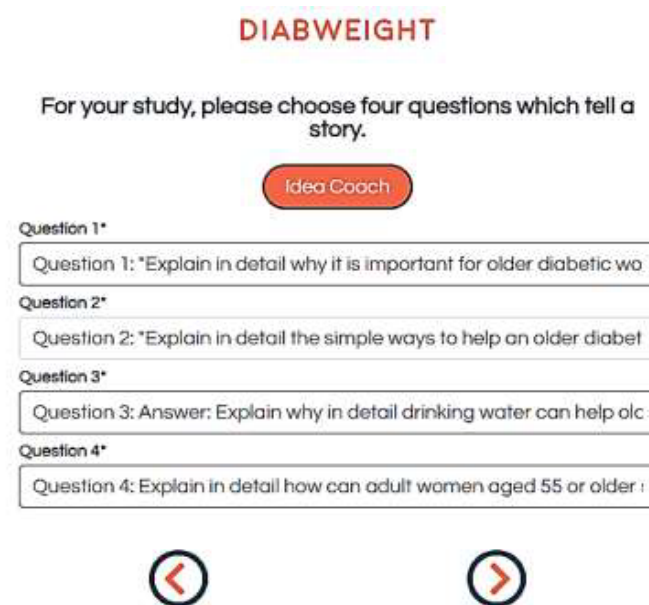


Figure 2: The completed set of four questions, after being edited and polished by the researcher.

dropping them into the study, and editing them. When the researcher does not find a question to drop into the study it is easy to re-run the Idea Coach, either with the same squib or with a revised squib. The process can go on several times, until the researcher has uncovered four questions, using Idea Coach and/or developing the question(s) oneself. Idea Coach truly becomes a coaching tool after the researcher gains experience.

At the end of the development of questions, and later of answers, the Mind Genomics platform stores each of the iterations of 15 questions (and 15 answers) on a separate Excel tabulation. As the study is being closed, the platform subjects each set of 15 questions (or answers) to an extensive summarization, using AI, with specific prompts. Table 1 presents the AI summarization of the first set of 15 questions.

Table 1: First results from the AI-powered Idea Coach, attempting to develop questions from the squib.

Questions - Results 1

Topic (Squib written by the researcher): Explain in detail how I should talk to older diabetic patients about losing weight for their health. Focus on actual things that are easy to do for an adult woman 55 years or older. Make the question no longer than 15 words. Make the answer understandable to a 12-year-old girl. Focus on what to do specifically.

Topic Questions:

Question 1: How can adult women over 55 years old easily start losing weight for their health?

Answer: Encourage these women to make small, gradual changes to their lifestyle and eating habits.

Question 2: What are some simple ways for them to become more active?

Answer: They can start by taking short walks, doing light exercises, or engaging in activities they enjoy, like gardening or swimming.

Question 3: Are there any specific foods they should try to avoid?

Answer: Suggest reducing their intake of sugary snacks, sodas, and processed foods which can contribute to weight gain.

Question 4: What healthier food options can they incorporate into their diet?

Answer: They can focus on adding more fruits, vegetables, whole grains, lean proteins, and low-fat dairy products to their meals.

Question 5: How should they portion their meals?

Answer: Encourage them to use smaller plates to control portion sizes and to eat slowly, paying attention to their feelings of fullness.

Question 6: Is it important for them to drink enough water?

Answer: Yes, staying hydrated is crucial. Suggest drinking water instead of sugary drinks and having a glass of water with every meal.

Question 7: Should they try any specific diets?

Answer: Mention that instead of diets, they should aim for balanced and nutritious eating habits that they can maintain in the long term.

Question 8: Can they involve their family or friends in their weight loss journey?

Answer: Yes, suggest they invite loved ones for walks, cook healthy meals together, or join group fitness classes for support and motivation.

Question 9: Are there any specific exercises they can do at home?

Answer: They can try gentle stretching exercises, yoga, or follow exercise videos specifically designed for older adults.

Question 10: How can they keep track of their progress?

Answer: Encourage them to maintain a journal to record their daily activities, food intake, and any weight loss, making it easier to stay motivated.

Question 11: Is it important for them to get enough sleep?

Answer: Yes, remind them that getting adequate sleep helps regulate hormones that affect metabolism and appetite, making weight loss easier.

Question 12: What should they do if they feel discouraged or lose motivation?

Answer: Suggest finding a weight loss buddy or joining support groups to share experiences, seek advice, and cheer each other on.

Question 13: Should they consult a doctor before starting any weight loss efforts?

Answer: Absolutely! It's important to talk to a healthcare professional who can guide them based on their specific health conditions and needs.

Question 14: How can they make healthy eating enjoyable?

Answer: Encourage them to try new recipes, add herbs and spices to their dishes for flavor, and explore different cooking methods like grilling or baking.

Question 15: What should they do if they experience any health concerns during their weight loss journey?

Answer: Advise them to consult a healthcare professional immediately if they notice any unusual symptoms or have concerns about their health.

Key Ideas

1. Gradual lifestyle and eating habit changes are important for weight loss in adult women over 55.
2. Becoming more active can start with small exercises like walking or engaging in enjoyable activities.
3. Sugary snacks, sodas, and processed foods should be reduced to promote weight loss.
4. Fruits, vegetables, whole grains, lean proteins, and low-fat dairy products should be incorporated into their diet.
5. Using smaller plates and eating slowly can help control portion sizes.
6. Drinking enough water is important for hydration and weight loss.
7. Balanced and nutritious eating habits are more important than specific diets.
8. Involving family and friends can provide support and motivation.
9. Gentle stretching exercises, yoga, and exercise videos for older adults can be done at home.
10. Keeping track of progress through journaling can help with motivation.
11. Adequate sleep helps regulate hormones that impact weight loss.
12. Finding a weight loss buddy or support groups can help with motivation and discouragement.
13. Consultation with a healthcare professional is crucial before starting any weight loss efforts.
14. Healthy eating can be enjoyable through trying new recipes, adding flavor with herbs and spices, and exploring different cooking methods.
15. Seeking immediate medical assistance is necessary if any health concerns arise during the weight loss journey.

Themes

1. Lifestyle Changes:

- Gradual lifestyle and eating habit changes are important for weight loss in adult women over 55.
- Becoming more active can start with small exercises like walking or engaging in enjoyable activities.
- Using smaller plates and eating slowly can help control portion sizes.
- Adequate sleep helps regulate hormones that impact weight loss.
- Healthy eating can be enjoyable through trying new recipes, adding flavor with herbs and spices, and exploring different cooking methods.

2. Dietary Changes:

- Sugary snacks, sodas, and processed foods should be reduced to promote weight loss.
- Fruits, vegetables, whole grains, lean proteins, and low-fat dairy products should be incorporated into their diet.
- Balanced and nutritious eating habits are more important than specific diets.

3. Support and Motivation:

- Involving family and friends can provide support and motivation.
- Keeping track of progress through journaling can help with motivation.
- Finding a weight loss buddy or support groups can help with motivation and discouragement.
- Consultation with a healthcare professional is crucial before starting any weight loss efforts.
- Seeking immediate medical assistance is necessary if any health concerns arise during the weight loss journey.

4. Exercise and Physical Activity:

- Gentle stretching exercises, yoga, and exercise videos for older adults can be done at home.

5. Hydration:

- Drinking enough water is important for hydration and weight loss.

Perspectives

Theme 1: Lifestyle Changes

- Plus: Gradual changes make it easier to adapt to new habits and are more sustainable. Exploring different cooking methods and trying new recipes can make healthy eating more enjoyable.
- Minus: Lifestyle changes require discipline and consistency, which can be challenging for some individuals. Adequate sleep may be difficult to achieve for some people.
- Interesting: Lifestyle changes can have a significant impact on weight loss and overall health, and they can be personalized to fit individual preferences and needs.

Theme 2: Dietary Changes

- Plus: Incorporating fruits, vegetables, whole grains, lean proteins, and low-fat dairy products promotes a balanced and nutritious diet. Avoiding sugary snacks and processed foods is beneficial for weight loss.
- Minus: Restricting certain food groups or following specific diets may be difficult for some individuals to adhere to.
- Interesting: Balanced and nutritious eating habits are more important than specific diets, emphasizing the importance of overall health rather than short-term weight loss.

Theme 3: Support and Motivation

- Plus: Involving family and friends provides a strong support system. Journaling progress and finding a weight loss buddy or support group can provide accountability and encouragement.
- Minus: Not everyone may have access to a strong support system. It can be challenging to find motivation and stay motivated throughout the weight loss journey.
- Interesting: Consulting with a healthcare professional before starting weight loss efforts is crucial to ensure safety and appropriateness of chosen methods.

Theme 4: Exercise and Physical Activity

- Plus: Gentle stretching exercises, yoga, and exercise videos for older adults provide accessible options for physical activity. Incorporating exercise into daily routines can contribute to weight loss and overall health.
- Minus: Physical limitations or health conditions may restrict certain types of exercise or make it challenging to engage in physical activity.
- Interesting: Age-appropriate exercises and activities can be effective for weight loss and can be done from the comfort of one's home.

Theme 5: Hydration

- Plus: Drinking enough water is essential for hydration and overall health. It can also aid in weight loss by promoting feelings of fullness.
- Minus: Some individuals may struggle to drink enough water or may prefer other beverages.
- Interesting: Hydration is often overlooked in weight loss discussions, highlighting its importance in overall well-being.

What is missing

Some additional questions that can complete an understanding of the topic are:

- How can they overcome emotional eating or cravings?
- What types of exercises are suitable for women with certain health conditions or physical limitations?
- Are there any specific supplements or vitamins they should consider taking?
- How long should they expect to see results and what is a realistic weight loss goal?
- How can they maintain their weight loss once they reach their goal?
- Are there any specific medical conditions that may require a different approach to weight loss?
- What are some strategies for managing stress, which can impact weight loss efforts?
- How can they navigate social situations or dining out while trying to lose weight?
- Are there any warning signs they should watch out for that may indicate they are losing weight too quickly or in an unhealthy manner?
- Can they incorporate intermittent fasting or other alternative eating patterns into their weight loss plan?
- Is it necessary for them to track their calorie intake or can they focus on other factors such as portion control and mindful eating?
- Can they incorporate strength training exercises into their fitness routine to preserve muscle mass and improve overall body composition?
- How can they maintain a positive body image and focus on health rather than just weight loss?
- Are there any specific strategies for managing menopause-related weight gain?
- Is it normal to experience weight fluctuations during the weight loss process, and how can they stay motivated during plateaus?

Alternative Viewpoints

Question 1: Alternative viewpoint: Adult women over 55 years old should focus on other aspects of their health, such as mental well-being and maintaining a healthy body composition, rather than solely focusing on losing weight.

Question 2: Alternative viewpoint: Becoming more active is not necessary for older women to maintain their health. They can focus on other activities that bring them joy and improve their overall quality of life.

Question 3: Alternative viewpoint: There are no specific foods that women over 55 should avoid. Instead, they should focus on intuitive eating and listening to their bodies' needs.

Question 4: Alternative viewpoint: Older women should not make drastic changes to their diet. They should continue eating in a way that is familiar and enjoyable to them.

Question 5: Alternative viewpoint: Portion control is not necessary for older women. They should focus on eating until they feel satisfied, rather than restricting their intake based on external measurements.

Question 6: Alternative viewpoint: Drinking enough water is not crucial for weight loss in older women. They should focus on getting fluids from a variety of sources and listening to their body's thirst signals.

Question 7: Alternative viewpoint: Older women should try popular diets, such as keto or intermittent fasting, to jumpstart their weight loss and see quicker results.

Question 8: Alternative viewpoint: Involving family or friends in their weight loss journey may not be beneficial. Older women should focus on self-motivation and self-accountability for their health goals.

Question 9: Alternative viewpoint: Older women should prioritize rest and relaxation over exercise. Gentle movements and physical activities can be detrimental to their overall well-being.

Question 10: Alternative viewpoint: Tracking progress is unnecessary and can lead to obsessive behaviors. Older women should focus on how they feel rather than relying on external measurements.

Question 11: Alternative viewpoint: Adequate sleep is not necessary for weight loss in older women. They should focus on other lifestyle factors that may contribute to their overall health.
Question 12: Alternative viewpoint: Feeling discouraged or losing motivation is a natural part of any weight loss journey. Older women should embrace these feelings and not force themselves to stay motivated.
Question 13: Alternative viewpoint: Consultations with doctors are unnecessary as older women can rely on their own intuition and personal experiences to guide their weight loss efforts.
Question 14: Alternative viewpoint: Making healthy eating enjoyable is unnecessary. Older women should focus on eating out of necessity rather than seeking enjoyment from their food.
Question 15: Alternative viewpoint: Older women should not be overly concerned about health concerns that arise during their weight loss journey. They should trust their bodies to heal and regulate themselves.

Interested Audiences

1. Adult women over 55 years old: This audience would be the most interested as these questions directly relate to their age group and specific health concerns, providing them with guidance on how to start losing weight in a healthy and sustainable way.
2. Family members and friends of adult women over 55 years old: They might be interested as they may want to support their loved ones in their weight loss journey, and these questions can provide them with ideas on how to assist and encourage them.
3. Healthcare professionals: Doctors, nutritionists, and dietitians would be interested in these questions as they can use them as a framework to provide advice and guidance when working with adult women in this age group who are looking to lose weight for health reasons.
4. Fitness instructors and trainers: They may be interested in these questions to gain an understanding of the specific needs and challenges faced by adult women over 55 when it comes to losing weight and becoming more physically active, allowing them to tailor their programs and advice accordingly.
5. Support groups and weight loss communities: These groups would be interested in these questions as they provide a valuable resource for members looking for tips, advice, and motivation from their peers who are also on a weight loss journey.
6. Individuals interested in healthy aging: People who are generally interested in maintaining their health and well-being as they age may find these questions informative and helpful, even if they are not specifically targeting weight loss.

Opposing Audiences

1. People who believe in promoting body positivity and accepting all body sizes could oppose the topic of weight loss for older women. They may argue that focusing on weight loss perpetuates harmful beauty standards and can lead to unhealthy relationships with food and body image.
2. Individuals who advocate for intuitive eating and listening to one's body cues might oppose the topic of weight loss. They may argue that prioritizing weight loss can overshadow the importance of honoring the body's natural hunger and fullness cues, leading to disordered eating habits.
3. Some feminist groups may oppose the topic of weight loss for older women, arguing that society puts too much pressure on women to conform to certain beauty standards, including being thin. They might advocate for embracing body diversity and challenging societal norms instead.
4. Certain medical professionals might have concerns about older women engaging in weight loss efforts without proper supervision. They may argue that weight loss can be more complicated for older individuals, who may have underlying health conditions or require personalized dietary and exercise plans.
5. There may be individuals who believe that weight-focused discussions contribute to fat-shaming and discrimination against people with larger bodies. They might argue that focusing on health-promoting behaviors, regardless of weight, is a more inclusive and compassionate approach.

It is important to acknowledge and respect these opposing views while considering the individual needs and goals of older women who may be interested in pursuing weight loss for their health.

Innovations

New or innovative products, services, experiences, or policies that the themes suggest include:

1. Weight loss apps or trackers: These can help individuals track their progress, set goals, and receive support and motivation through virtual communities.
2. Meal delivery services: These services can provide pre-portioned, nutritious meals that align with the recommended dietary changes for weight loss. This can make healthy eating more convenient for individuals.
3. Fitness classes or programs tailored for older adults: These can offer gentle exercises, such as low-impact aerobics, strength training, and flexibility exercises, specifically designed for older adults.
4. Health coaching services: These services can provide personalized guidance and support to individuals in making lifestyle and dietary changes for weight loss.
5. Workplace wellness programs: Companies can implement wellness programs that include weight management initiatives, such as nutrition education, fitness challenges, and access to on-site exercise facilities. This can promote healthy lifestyles for employees of all ages.
6. Health insurance coverage for weight loss programs: Health insurance companies can offer coverage for weight loss programs, consultations with dietitians or nutritionists, and gym memberships, making it more accessible for individuals to seek professional help in their weight loss journey.
7. Educational campaigns: Governments and health organizations can launch campaigns to educate the public, particularly older women, about the importance of lifestyle changes, balanced nutrition, and regular exercise for weight loss and overall health. These campaigns can provide practical tips and resources for implementing these changes.
8. Community initiatives: Local communities can organize walking groups, fitness classes, or support groups specifically tailored for older women looking to lose weight. These initiatives can foster a sense of community, support, and accountability in the weight loss journey.
9. Telehealth services: Virtual consultations with healthcare professionals, dietitians, or personal trainers can be offered, allowing individuals to seek guidance and support remotely.
10. Research on tailored weight loss strategies: Continued research can focus on developing tailored weight loss strategies specifically for adult women over 55, considering their unique needs, preferences, and challenges. This can help refine and improve existing approaches to weight loss for this demographic.

Once the researcher has completed the set-up of the questions, the next step is to set up the four answers to each question. In this case the researcher must edit the questions in order to ensure that the answers are short and understandable. Such editing occurs as the researcher completes the creation of the four questions. It becomes a simple matter to add a phrase to the question as part of the prompt to the AI-driven Idea Coach, that prompt guiding the style of the answer provided. Table 2 shows the first set of 15 answers to Question #1 after the question has been edited by the researcher.

As we finish this section of the set-up it is well to keep in mind that the incorporation of the AI into the creation of questions and answers ends up producing an 'Idea Book.' This Excel file becomes a rich source of information about the topic, summarized by key issues and questions. The Idea Book moves from the list of questions, itself valuable for the researcher, onto issues of points of view, suggestions of what's missing, and even suggestions about innovations. As noted above, the entire process of creating each logical page should be no more than a minute, with the creation of a 20-page book on the topic requiring less than 20 minutes.

Table 2: First results from the AI-powered Idea Coach, attempting to develop 15 answers from the first question, that question edited to direct the style and comprehension level of the answers.

Answers - Results 1
<p>Question 1: "Explain in detail why it is important for older diabetic women to lose weight for their health?" Make the answer 15 words or fewer and make the answer understandable to a 12-year-old girl.</p> <p>Topic Statements:</p> <p>Losing weight helps older diabetic women manage their condition, reduce health complications, and live healthier lives.</p> <p>Key Ideas</p> <ol style="list-style-type: none"> 1. Losing weight: This key idea suggests that weight loss is a crucial factor for older diabetic women to effectively manage their condition. It implies that reducing excess body weight can positively impact various aspects of their health. 2. Older diabetic women: This key idea focuses on a specific demographic group, suggesting that the topic statements specifically address the needs, challenges, and health concerns of older women who have diabetes. It implies that weight loss may have different implications and benefits for this particular group. 3. Managing their condition: This key idea highlights the importance of actively controlling and monitoring their diabetes. It suggests that losing weight can be an effective strategy to regulate blood sugar levels, manage insulin resistance, and alleviate symptoms commonly associated with diabetes. 4. Reduce health complications: This key idea indicates that weight loss can potentially help lower the risk and severity of various health complications related to diabetes. It implies that shedding excess weight may contribute to a decrease in cardiovascular diseases, hypertension, nerve damage, kidney problems, and other diabetes-associated conditions. 5. Live healthier lives: This key idea emphasizes the overall improvement in the quality of life that older diabetic women may experience due to weight loss. It suggests that managing their weight can enhance their physical, mental, and emotional well-being, increase energy levels, improve mobility, and potentially alleviate diabetes-related discomfort or limitations. <p>Perspectives</p> <p>Plus factors:</p> <ol style="list-style-type: none"> 1. Improved condition management: Losing weight can help older diabetic women better manage their condition by improving blood sugar control and reducing the need for medication. 2. Reduced health complications: Weight loss can help in reducing the risk of cardiovascular diseases, stroke, kidney problems, and other complications commonly associated with diabetes. 3. Improved overall health: Losing weight can lead to better overall health, including increased energy levels, improved mobility, and a lower risk of developing other chronic conditions. <p>Minus factors:</p> <ol style="list-style-type: none"> 1. Challenges in weight loss: Losing weight can be a difficult process, especially for older individuals, as it may involve lifestyle changes, dietary modifications, and physical activity, which can be more challenging to implement. 2. Potential need for medication adjustment: As weight loss occurs, medication dosages may need to be adjusted to prevent hypoglycemia. This adjustment process may require careful monitoring and consultation with healthcare professionals to ensure proper medication management. <p>Interesting factors:</p> <ol style="list-style-type: none"> 1. Impact on quality of life: Weight loss has the potential to improve the quality of life for older diabetic women, providing them with a sense of accomplishment and increased confidence in managing their condition. 2. Individualized approach: The effectiveness and benefits of weight loss may vary from person to person. It is essential to consider individual health needs, preferences, and potential limitations when determining weight loss strategies for older diabetic women. <p>Additional information</p> <ol style="list-style-type: none"> 1. The importance of regular exercise in addition to losing weight for older diabetic women. 2. The recommended dietary changes to support weight loss and manage diabetes in older women. 3. The potential risks or challenges associated with losing weight for older diabetic women. 4. The role of medication or insulin management in conjunction with weight loss for older women with diabetes. 5. The potential impact of weight loss on other diabetes-related complications, such as cardiovascular health or neuropathy. 6. The recommended rate of weight loss and strategies for maintaining weight loss in older diabetic women. 7. The potential benefits or improvements in quality of life that older diabetic women may experience as a result of weight loss. 8. The importance of regular monitoring and medical check-ups for older diabetic women who are actively losing weight. 9. The role of psychological support or counseling in helping older diabetic women navigate weight loss and diabetes management. 10. The potential impact of weight loss on other co-existing conditions or comorbidities among older diabetic women. <p>Alternative Viewpoints</p> <ol style="list-style-type: none"> 1. Losing weight may not be the most effective method for older diabetic women to manage their condition, as other factors such as medication and lifestyle changes could have a greater impact. 2. Losing weight could be detrimental for older diabetic women, as it may lead to muscle loss and weakened bone density, increasing the risk of falls and fractures. 3. Older diabetic women should focus on overall fitness and healthy habits rather than solely focusing on weight loss, as maintaining a balanced diet and being physically active can have numerous health benefits regardless of weight. 4. Weight loss may not be as significant for older diabetic women, as their priority should be maintaining stable blood sugar levels and managing their medications effectively. 5. The emphasis on weight loss could lead to negative body image issues and potential eating disorders among older diabetic women, which could have a detrimental impact on their mental health.

Interested Audiences

1. Older diabetic women: This audience would be highly interested in the topic statements as they directly relate to their own health and well-being. Older diabetic women who are struggling with weight management would be particularly interested in learning how losing weight can help them better manage their condition, reduce health complications, and lead healthier lives.
 2. Healthcare professionals specializing in diabetes: Endocrinologists, dietitians, and general practitioners who work with older diabetic women would be interested in the topic statements. They would likely want to stay updated on the latest research and information regarding weight management and its impact on diabetes management in older women. This knowledge would help them guide their patients towards effective treatment strategies.
 3. Researchers and academics in the field of diabetes and obesity: This audience would be interested in the topic statements as they contribute to the growing body of research on diabetes management and weight loss. They may be conducting studies or examining the effectiveness of weight loss programs for older diabetic women. The topic statements would provide them with valuable insights and potential avenues for further research.
 4. Family members and caregivers of older diabetic women: The family members and caregivers of older diabetic women would likely be interested in understanding how weight loss can positively impact their loved one's condition. They may be seeking information to support and encourage weight loss efforts while providing additional care and assistance in managing their diabetes.
 5. Insurance companies and healthcare policy-makers: These stakeholders may have an interest in understanding the potential benefits of weight loss for older diabetic women. This information could influence insurance coverage policies for weight management programs and interventions, ultimately improving access to necessary services and supporting healthier lifestyle choices for older diabetic women.
 6. Fitness and wellness industries targeting older adults: Companies and professionals offering fitness programs, nutrition plans, or wellness products aimed at older adults might find the topic statements beneficial. It can help them market their services as a way to support weight loss, diabetes management, and overall health improvement among this specific demographic.
- Overall, the topic statements would be of interest to a wide range of audiences, including older diabetic women themselves, healthcare professionals, researchers, family members/caregivers, insurance companies, and fitness/wellness industries targeting older adults. Each of these groups has a vested interest in understanding the significance of weight loss for managing diabetes in older women and its potential benefits.

Opposing Audiences

1. The weight loss industry: Some individuals or organizations within the weight loss industry might oppose the statement that losing weight helps older diabetic women manage their condition. This could be because they argue that other approaches, such as medication or specialized diets, are more effective in controlling diabetes. They might also be concerned that promoting weight loss as the primary solution could impact their business model.
2. Body positivity activists: Some advocates of body positivity might oppose the statement because they believe that promoting weight loss as a primary solution perpetuates harmful stigmas and unrealistic beauty ideals. They argue that focusing on health at every size and on self-acceptance is more important than weight loss.
3. Eating disorder recovery groups: Some individuals or organizations that work with individuals recovering from eating disorders might oppose the statement because they are concerned that promoting weight loss as beneficial could trigger negative behaviors or relapses. They argue that emphasis should be placed on overall well-being, self-acceptance, and a healthy relationship with food, rather than weight loss.
4. Medical professionals emphasizing other intervention methods: Some medical professionals might oppose the statement if they believe that factors other than weight loss (e.g., medication, regular exercise, or dietary modifications) lead to better management of diabetes in older women. They may argue that weight loss should not be the primary focus in managing diabetes.

Innovations

Table 3 shows the final set of questions and answers. The answers have been edited by the researcher in order to be more readable when they are presented to the respondents in various combinations of answers. Henceforth, the answers will be referred to as 'elements.' The questions themselves will not play any role in the actual evaluation by respondents, nor in the analysis of the results. Rather, the questions are simply used to allow the researcher or Idea Coach to create a set of related but different 'elements,' viz., different answers.

Setting Up the Mind Genomics Study

Mind Genomics studies comprise several parts, all templated. Table 4 shows these parts. Table 4 is provided as a standard output of every Mind Genomics project:

1. Key words selected by the researcher in order to make searching for the study results easier in the database of Mind Genomics studies.
2. Respondent orientation
3. Self-profiling questions. Gender and age are standard questions in every study, and so are not shown in Table 4.
4. The rating question and the different answers.

The Respondent Experience in the Mind Genomics Study

Once the study set up has been completed it is the task of the researcher to provide respondents. With the advent of the Internet, it has become increasingly easy to obtain respondents, although

at a slight cost to the researcher. It is the business of companies in the market research 'space' to provide motivated respondents for the many hundreds of thousands, perhaps millions or dozens of millions of studies on the internet. Across the entire world there have emerged companies which, for a fee, offer their members the chance to participate in on-line studies. It is from one of these companies, Luc.id Inc., in Louisiana, that the respondents are obtained, with the respondents satisfying specific criteria: Age 45 or older, Lives in one of three states: New York, New Jersey or Connecticut.

Luc.id Inc. is set up to provide these individuals, doing so with the actual experience taking approximately five minutes for a respondent. The respondents are recompensed by Luc.id, and are totally anonymized. The respondent opts in to participate in the particular study. In turn, the research guarantees not to accept any specific identifying information during the course of the study. In situations where the researcher wants specific information, that information is requested in the 'open ended' questions, with a disclaimer that the information offered is entirely optional and left to the respondent.

Luc.id sent out email invitations to the prospective respondents, doing so in 'waves' until the quota of 101 respondents was filled. The quota comprised females, ages 45-70, living in New York, New Jersey or Connecticut, respectively. For easy to find respondents, such as those participating in this Mind Genomics study, the quota of 101 individuals is typically filled within 90 minutes. The Mind Genomics platform orients the respondents, presents the test materials, acquires the ratings, creates a database, performs the relevant analysis, and then

Table 3: The final questions and elements (answers to the question), after editing by the researcher.

	Question A: Question 1: "Explain in detail why it is important for older diabetic women to lose weight for their health?" Make the answer 15 words or fewer and make the answer understandable to a 12-year-old girl.
A1	Losing weight is important for older diabetic women because it helps control blood sugar and reduces health risks.
A2	Losing weight reduces the risk of developing high blood pressure.
A3	Losing weight can prevent or manage diabetes complications.
A4	Losing weight helps to maintain stable blood sugar levels.
	Question B: Question 2: "Explain in detail the simple ways to help an older diabetic woman lose weight?" "Make the answer 15 words or fewer and make the answer understandable to a 12-year-old girl.
B1	What to do: Limit sugary drinks.
B2	What to do: Exercise regularly.
B3	What to do: Control portion sizes.
B4	What to do: Drink more water.
	Question C: Answer: Explain why in detail drinking water can help older women feel fuller and reduce calorie intake, while also improving overall health and hydration. Make the answer 15 words or fewer and make the answer understandable to a 12-year-old girl.
C1	Fact: Water makes you feel full, so you eat less food.
C2	Fact: Water keeps your skin healthy and hydrated.
C3	Fact: Drinking water helps your organs, like kidneys, work properly.
C4	Fact: Drinking water boosts your energy levels.
	Question D: Question 2: Explain in detail how can adult women aged 55 or older start losing weight in an easy way? Make the answer 15 words or fewer and make the answer understandable to a 12-year-old girl.
D1	Advice: Get enough sleep each night to give your body rest.
D2	Advice: Limit eating out and cook more meals at home using healthy ingredients.
D3	Advice: Avoid skipping meals, especially breakfast.
D4	Advice: Start exercising or being more active (walking, dancing, or biking).

Table 4: Study information.

<p>Keywords: diabetes</p> <p>Study info: Here are some thoughts about diabetes and you. Please read the sentences together and give you feelings on the ratings scale.</p> <p>Preliminary question: What do you know about diabetes?</p> <p>1=Very little 2=Somewhat 3=I have a friend who suffers from it 4=A close family member suffers from it 5=I suffer from it</p> <p>Preliminary question: Tell us your feelings about being overweight.</p> <p>1=I am normal weight 2=I am overweight and try to lose weight 3=I am puzzled by what to do and have given up</p> <p>Preliminary question: How afraid of you of diabetes?</p> <p>1=Not afraid 2=A little concerned 3=Very concerned</p> <p>Preliminary question: How do you and your doctor deal with diabetes?</p> <p>1=It never comes up in conversation 2=My doctor insist I lose weight 3=My doctor intimidates me by talking about what diabetes can do to people.</p> <p>Rating question: Please select the answer below which expresses how you feel.</p> <p>1=Not for me...and... hard to do 2=Not for me...but...easy to do 3=Can't answer 4=For me...but...hard to do 5=For me...and...easy to do</p>

creates the report along with AI summarization, generally within 15-30 minutes after the completion of the field work.

The actual Mind Genomics experiment begins with a short ‘hello,’ and proceeds to the self-profiling classification shown in Figure 3, Panel A. The self-profiling classification presents a clean screen to the respondent. The alternative answers to each question appear when the respondent reaches that question. The happy consequence of this pull-down screen is that the respondent is made to feel comfortable, rather than being confronted by a wall of words.

Afterwards, the respondent is exposed to 24 different vignettes, similar to that shown in Figure 3, Panel B. The vignettes are shown one vignette after another. The respondent is told simply to rate the combination. Exit interviews with respondents over the years as well as observations of colleagues participating in the Mind Genomics interview

continue to point to the fact that professionals try to ‘outsmart’ the system, whereas ordinary respondents simply fall into a relaxed mode, and end up saying that they ‘guess.’ The results below will show that the respondents are performing quite well, and that despite their statement that they feel they are ‘guessing,’ the opposite is true. The typical respondent, the non-professional, ends up realizing that it is impossible to ‘game the system,’ and settle for a relaxed experience. This relaxed, almost non-involved evaluation is felt to more validly represent the real judgment of the respondent, the judgment made when no one seems to be looking.

Creating the Database and Transforming the Ratings for Subsequent Statistical Analyses

The Mind Genomics study presents vignettes to the respondent, and acquires both the rating on the two-sided scale, as well as the response time. The response time is defined as the elapsed time

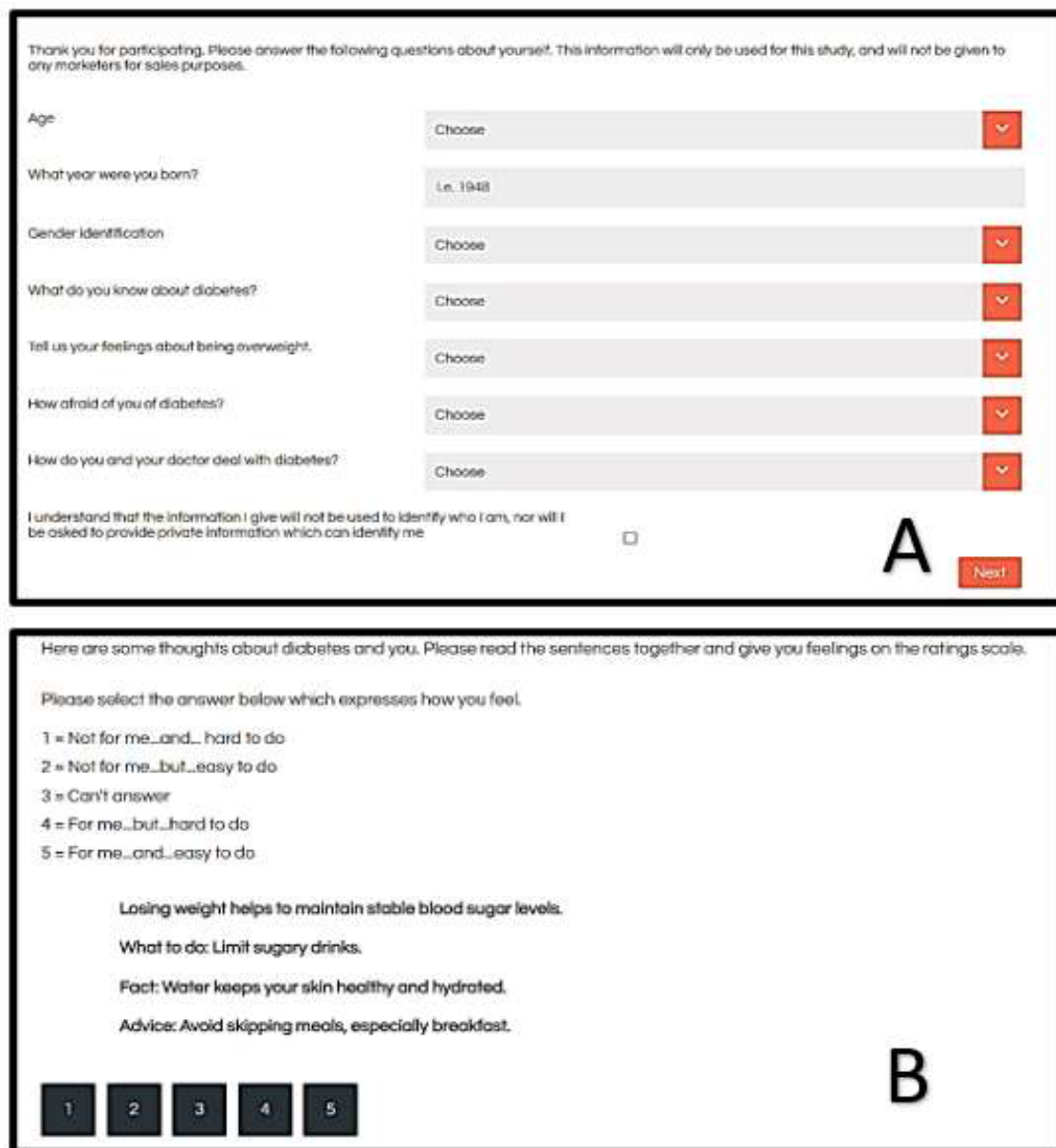


Figure 3: The respondent experience in the Mind Genomics experiment. Panel A shows the pull-down menu for the self-profiling classification. Panel B shows an example of a vignette, accompanied by a short introduction and the rating scale, both at the top.

between the presentation of the vignette and the respondent's selection of the rating, Figure 4 shows the three vignettes from respondent (participant) #27. As one might surmise, there are 2424 vignettes in total, each vignette different in composition from every other vignette, accompanied by the rating and the response time. When the response time was longer than 9 seconds, BimiLeap automatically made the response time 9 seconds. The reason for this seemingly arbitrary rule is that the respondents were unsupervised and might have been doing other things. Thus, it is important to truncate the range of response times in order to avoid accepting response times of say 36 seconds. Clearly that response time reflects other behaviors besides the respondent participation in the study.

Relating the Presence/Absence of the Elements

The essence of Mind Genomics is relating the presence/absence of the elements in the vignettes to the ratings. The vignettes themselves vary from respondent to respondent, and in actuality are only vehicles in which to embed the 16 elements. It is the elements which convey the actual information. In turn, the rating scale is the device by which the respondent can communicate feelings. Both the vignettes and the rating scale, however, need to be translated into a set of variables that can be analyzed by statistics.

Figure 5 shows the part of the database prepared for the subsequent statistical analysis. Figure 5 divides into three distinct panels.

Panel A shows the row number of the database, and then information about the respondent, as provided by the respondent.

Panel B shows the order of testing (1-24) for the specific vignette, and then the deconstruction of the composition of the vignette into a series of 1' and 0's. Recall that the vignettes comprise combinations of elements, done so according to an experimental design. The particular design used here, the permuted experimental design, uses one basic structure, but changes the specific combinations through a permutation scheme [15]. The benefit is that each respondent's data can be analyzed as either part of a group, or analyzed separately, one respondent at a time. The transformation of the experimental design is done by so-called 'dummy variable' coding [20]. The coding creates 16 columns, one for each element. When the element is present in the vignette the cell has the value '1'. When the cell is absent from the vignette the cell has the value '0'. The 1's and 0's are called dummy variables because nothing is known about these variables other than presence or absence. Any analysis with these dummy variables simply shows the contribution to a criterion variable which occurs when the element is placed into the vignette. The 'why' is unknown.

Participant 22	Losing weight is important for older diabetic women because it helps control blood sugar and reduces health risks.	5	8.04
Participant 23			
Participant 24			
Participant 25			
Participant 26			
Participant 27	What to do: Limit sugary drinks. Fact: Water keeps your skin healthy and hydrated. Advice: Limit eating out and cook more meals at home using healthy ingredients.	1	11.334
Participant 28			
Participant 29			
Participant 30			
Participant 31	Losing weight is important for older diabetic women because it helps control blood sugar and reduces health risks.	5	10.974
Participant 32			
Participant 33	Fact: Water keeps your skin healthy and hydrated.		
Participant 34	Advice: Limit eating out and cook more meals at home using healthy ingredients.		
Participant 35			

Figure 4: Example of input information to the database showing the respondent, the text of the vignette, the rating assigned to the vignette, and the number of seconds elapsing between the presentation of the vignette and the assignment of a rating.

Figure 5: The database for vignettes 1-11 presented to and rated by Panelist (respondent) #1.

Row	The respondent					Order of testing and the binary transformation of the vignette components																Rating and transformation to new variables													
	Panelist	Gender	Age	Quest1	Quest2	TestOrder	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4	RTSeconds	Rating	R5x	R4x	R3x	R2x	R1x	R54	R52				
1	1	2	61	5	2	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.0	5	100	0	0	0	0	100	100			
2	1	2	61	5	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7.0	5	100	0	0	0	0	100	100			
3	1	2	61	5	2	3	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5.6	4	0	0	0	0	0	100	0			
4	1	2	61	5	2	4	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	8.1	4	0	0	0	0	0	0	100	0		
5	1	2	61	5	2	5	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	1	3.6	5	100	0	0	0	0	100	100		
6	1	2	61	5	2	6	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.0	4	0	0	0	0	0	100	0		
7	1	2	61	5	2	7	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4.1	5	100	0	0	0	0	100	100		
8	1	2	61	5	2	8	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	9.0	4	0	0	0	0	0	0	100	0	
9	1	2	61	5	2	9	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	5.9	5	100	0	0	0	0	0	100	100	
10	1	2	61	5	2	10	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	4.7	4	0	0	0	0	0	0	100	0	
11	1	2	61	5	2	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.0	5	100	0	0	0	0	0	0	100	100

Only the ‘what’ is known Panel C shows the response time (time elapsed between the appearance of the vignette on the screen and the response), as well as the five-point rating assigned to the vignette. The remaining columns show the transformations of the ratings into the five single responses, the key being R5x (For me, Easy to do), and then two ‘combined’ responses R54 (For me), R52 (Easy to do).

R54x=100 when the rating is either 5 or 4, R54=0 when the rating is 3, 2 or 1

R52x=100 when the rating is either 5 or 2, R52=0 when the rating is 5,3 or 1

Once the database has been constructed, the Mind Genomics platform creates a set of simple linear equations, viz., linear models, first for the total panel, and then for each self-defined subgroup, self-defined age grouping, and finally gender. The analysis is called linear regression [21], with the variables taking on only one of two levels, 0 for absent, 1 for present, so-called dummy variables.

The equation for each binary variable is expressed schematically as: Binary Dependent variable= $k_1(A1) + k_2(A2) \dots k_{16}(D4)$. The equation just presented shows how each of the 16 elements ‘drives’ the binary rating. Typically, the standard error is about 7-8 for these studies, suggesting that coefficients around 16 or higher should be significant in a statistical sense.

The Mind Genomics platform ends up providing a great deal of data, almost a ‘wall of numbers.’ In order to identify underlying patterns, the convention is to shade the so-called ‘strong performer.’ ‘Strong’ means meaningful, based upon insights gleaned from previous Mind Genomics experiments. We move beyond the conventional criterion of ‘statistically significant’ to the following:

For the binary transformed variable, R54, typically the key ‘evaluative variable, such as ‘for me’ or ‘I will buy’, we shade coefficients of 21 or higher.

For all other binary transformed variables, e.g., R52, R5, etc., we shade coefficients of 16 or higher.

For RT, response time, we shade coefficients of 1.5 or higher, the foregoing criteria are not ‘fixed in stone.’ Rather, they reflect simple heuristics which allow the researcher to identify emergent themes. Indeed, the search for themes is so important in Mind Genomics that an alternative heuristic might be considered, namely deleting all coefficients which are lower than the cut-off criterion. That alternative ends up typically creating a sparse table, since in conventional Mind Genomics the coefficients are usually far lower than what we see here.

Table 5 shows the coefficients for the linear equations relating the presence/absence of the 16 elements to the binary transformed variables of R5x, R54x, and R52x, respectively, along with the coefficients for the RT (response time) equation. Ordinarily, R5x (For me and Easy) would not appear in the table. Rather, R54 (For Me) would become the focus of the analysis. Table 5 shows the surprising finding that for this study on obesity and diabetes virtually all of the elements (15 of 16) are strong performers, with coefficients of 21 or higher. In light of this remarkably strong performance of virtually all elements we move the key evaluative variable to R5x, (For me and Easy), which shows the more typical pattern observed in the results for other topics, not medical ones but rather products and services.

Despite the strong performance of many elements, Table 5 does not give up secrets about the underlying patterns of strong performing elements. For example, three of the four strongest performing elements for R5x deal with water and drinking, but drinking water must be

Table 5: Coefficients for important transformed binary variables, and for response time. The elements are sorted in descending order by the coefficient for R5x.

	For Me	Y	Y		
	Easy	Y		Y	
	Total Panel	R5X	R54X	R52X	RT
C3	Fact: Drinking water helps your organs, like kidneys, work properly.	19	28	21	1.6
C4	Fact: Drinking water boosts your energy levels.	18	27	19	1.3
A1	Losing weight is important for older diabetic women because it helps control blood sugar and reduces health risks.	17	22	21	1.5
C2	Fact: Water keeps your skin healthy and hydrated.	16	25	17	1.4
C1	Fact: Water makes you feel full, so you eat less food.	15	27	17	1.3
A2	Losing weight reduces the risk of developing high blood pressure.	15	20	18	1.1
D3	Advice: Avoid skipping meals, especially breakfast.	15	23	17	1.1
A4	Losing weight helps to maintain stable blood sugar levels.	14	24	15	1.6
D4	Advice: Start exercising or being more active (walking, dancing, or biking).	14	23	16	1.3
A3	Losing weight can prevent or manage diabetes complications.	14	21	17	1.3
D2	Advice: Limit eating out and cook more meals at home using healthy ingredients.	12	20	13	1.1
B4	What to do: Drink more water.	11	25	15	1.5
B1	What to do: Limit sugary drinks.	11	25	16	1.7
D1	Advice: Get enough sleep each night to give your body rest.	10	21	12	1.3
B2	What to do: Exercise regularly.	10	24	14	1.6
B3	What to do: Control portion sizes.	10	23	14	1.5

associated with a reason, not just be present by itself. When present by itself, without any outcome, however, drinking water performs poorly.

Fact: Drinking water helps your organs, like kidneys, work properly.

Fact: Drinking water boosts your energy levels.

Losing weight is important for older diabetic women because it helps control blood sugar and reduces health risks.

Fact: Water keeps your skin healthy and hydrated.

In a similar fashion patterns for R52X (Easy to do) and RT (response time) are elusive. No clear pattern emerges. We see differences in two variables when we deal with respondents who declare themselves normal weight versus those who declare themselves as overweight. Table 6 shows the dramatic differences between these groups, attributable to the rating of ‘easy’. Those who declare themselves overweight find most of the elements to refer to themselves (high coefficients for ME) but harder to do (lower coefficients for R52X, corresponding to easy). These results suggest the promising use of ‘Easy’ as a key variable to consider.

Mind-Sets: Uncovering Deep Differences among People in Order to Drive Effective Messages

A continuing theme in Mind Genomics is the emergence of mind-sets, clusters of people who perceived the world in clearly different ways, in ways which make sense and point to divergence what these clusters to feel to be important. Table 6 gives us a sense that when it

comes to ‘Hard vs Easy’, those who declare themselves to be overweight find many statements to be not quite as easy as those who declare themselves to be normal weight. This difference in people makes sense but does not satisfy. The differences are there, but do not strike us as a compelling story.

One way to identify these possibly more profound differences is by statistics alone, by considering the pattern of the 16 coefficients and searching for different patterns. The search is not based on the self- definition of the respondent, nor based on the meaning of the elements. Rather, the search is based purely on the mathematical structure of the 16 coefficients. If the mathematics reveals clearly different, easy to interpret mind-sets, the research will have provided a powerful tool to identify what to communicate, and to whom.

The method used to create these clusters is called k-means clustering [22]. The objective is to put the different objects, our 101 respondents, into groups based upon an objective criterion. The criterion is that the ‘distance’ between pairs of people in a cluster should be ‘small’, but the distances between the centroid (average) of the 16 coefficients should be large. The k-means clustering is not exact but tries to satisfy these conditions.

The study uses the coefficient for R5X (ME and Easy to do) as the variable on which to do the clustering exercise. We can imagine 101 rows of coefficients, one row for each respondent, and in turn 16 columns of coefficients. Table 7 shows the strongest performing elements for each mind-set or cluster, respectively Mind-Set 1 (focus

Table 6: Coefficients for important transformed binary variables, and for response time, shown for two self-defined groups, Normal Weight versus Overweight.

		R5X		R54x		R52x		RT	
ME		Y		Y					
Easy		Y				Y		RT	
Self-Classified Weight		Normal	Overweight	Normal	Overweight	Normal	Overweight	Normal	Overweight
C4	Fact: Drinking water boosts your energy levels.	24	14	28	25	21	18	1.3	1.3
A1	Losing weight is important for older diabetic women because it helps control blood sugar and reduces health risks.	22	15	21	22	30	14	1.6	1.4
A3	Losing weight can prevent or manage diabetes complications.	22	6	21	23	28	6	1.2	1.3
C3	Fact: Drinking water helps your organs, like kidneys, work properly.	22	19	30	27	23	21	1.4	1.7
A2	Losing weight reduces the risk of developing high blood pressure.	20	9	19	20	26	10	1.0	1.1
C2	Fact: Water keeps your skin healthy and hydrated.	20	12	29	22	19	15	1.5	1.2
D3	Advice: Avoid skipping meals, especially breakfast.	20	10	21	27	24	10	1.2	1.1
A4	Losing weight helps to maintain stable blood sugar levels	19	11	23	25	23	11	1.4	1.6
C1	Fact: Water makes you feel full, so you eat less food.	19	13	29	26	17	16	1.3	1.1
D2	Advice: Limit eating out and cook more meals at home using healthy ingredients.	17	9	21	22	19	9	1.3	1.0
D4	Advice: Start exercising or being more active (walking, dancing, or biking).	13	13	22	25	19	11	1.6	1.0
D1	Advice: Get enough sleep each night to give your body rest.	12	9	21	23	17	9	1.5	1.0
B1	What to do: Limit sugary drinks.	11	10	23	27	16	13	1.9	1.5
B3	What to do: Control portion sizes.	10	9	19	28	18	9	1.5	1.5
B4	What to do: Drink more water.	10	12	21	28	15	11	1.5	1.5
B2	What to do: Exercise regularly.	9	8	21	27	13	9	1.8	1.6

Table 7: Coefficients for important transformed binary variables, and for response time. The elements are sorted in descending order by the coefficient for R5x, for each of the three emergent mind-sets.

	For Me	Y	Y		
	Easy	Y		Y	
	Mind Set 1 - Focus on medical indicators	R5X	R54X	R52X	RT
A1	Losing weight is important for older diabetic women because it helps control blood sugar and reduces health risks.	28	25	34	1.3
A2	Losing weight reduces the risk of developing high blood pressure.	25	20	28	0.9
A4	Losing weight helps to maintain stable blood sugar levels.	23	28	26	1.4
C3	Fact: Drinking water helps your organs, like kidneys, work properly.	21	26	20	1.7
A3	Losing weight can prevent or manage diabetes complications.	21	23	28	0.9
C2	Fact: Water keeps your skin healthy and hydrated.	20	28	16	1.2
C4	Fact: Drinking water boosts your energy levels.	18	26	15	1.7
C1	Fact: Water makes you feel full, so you eat less food.	16	27	10	1.2
B4	What to do: Drink more water.	13	21	18	1.5
B3	What to do: Control portion sizes.	9	19	16	1.7
B2	What to do: Exercise regularly.	8	18	16	1.5
B1	What to do: Limit sugary drinks.	8	21	16	1.9
D4	Advice: Start exercising or being more active (walking, dancing, or biking).	5	23	8	1.6
D3	Advice: Avoid skipping meals, especially breakfast.	4	23	6	1.4
D2	Advice: Limit eating out and cook more meals at home using healthy ingredients.	x	14		1.7
D1	Advice: Get enough sleep each night to give your body rest.	x	15		1.7
	For Me	Y	Y		
	Easy	Y		Y	
	Mind-Set 2 - Focus on lifestyle	R5X	R54X	R52X	RT
D3	Advice: Avoid skipping meals, especially breakfast.	23	21	25	1.0
D2	Advice: Limit eating out and cook more meals at home using healthy ingredients.	23	25	24	0.7
D1	Advice: Get enough sleep each night to give your body rest.	23	23	22	1.2
D4	Advice: Start exercising or being more active (walking, dancing, or biking).	20	24	21	1.3
A1	Losing weight is important for older diabetic women because it helps control blood sugar and reduces health risks.	16	22	17	1.5
C3	Fact: Drinking water helps your organs, like kidneys, work properly.	15	28	22	1.6
A4	Losing weight helps to maintain stable blood sugar levels.	15	24	13	1.8
A2	Losing weight reduces the risk of developing high blood pressure.	13	24	17	1.4
A3	Losing weight can prevent or manage diabetes complications.	13	22	14	1.6
C4	Fact: Drinking water boosts your energy levels.	11	24	15	0.8
B1	What to do: Limit sugary drinks.	9	23	15	1.8
B3	What to do: Control portion sizes.	9	22	12	1.9
B4	What to do: Drink more water.	7	22	13	1.6
C2	Fact: Water keeps your skin healthy and hydrated.	7	23	13	1.4
C1	Fact: Water makes you feel full, so you eat less food.	6	23	13	1.2
B2	What to do: Exercise regularly.	3	23	7	2.0
	For Me	Y	Y		
	Easy	Y		Y	
	Mind Set 3 - Focus on drinking water	R5X	R54X	R52X	RT
C1	Fact: Water makes you feel full, so you eat less food.	24	30	27	1.5
C4	Fact: Drinking water boosts your energy levels.	23	29	25	1.6
C3	Fact: Drinking water helps your organs, like kidneys, work properly.	22	29	23	1.4
D3	Advice: Avoid skipping meals, especially breakfast.	20	27	22	0.9
C2	Fact: Water keeps your skin healthy and hydrated.	19	23	21	1.5
D4	Advice: Start exercising or being more active (walking, dancing, or biking).	19	23	18	0.9
B2	What to do: Exercise regularly.	18	30	17	1.5
B1	What to do: Limit sugary drinks.	17	33	17	1.3
D2	Advice: Limit eating out and cook more meals at home using healthy ingredients.	15	23	17	1.0
B4	What to do: Drink more water.	13	32	13	1.3
D1	Advice: Get enough sleep each night to give your body rest.	13	25	16	1.0
B3	What to do: Control portion sizes.	12	29	13	0.9
A1	Losing weight is important for older diabetic women because it helps control blood sugar and reduces health risks.	8	17	11	1.8
A3	Losing weight can prevent or manage diabetes complications.	6	19	7	1.4
A2	Losing weight reduces the risk of developing high blood pressure.	5	15	8	1.0
A4	Losing weight helps to maintain stable blood sugar levels.	3	20	6	1.5

on medical indicators), Mind-Set 2 (Focus on Lifestyle), and Mind-Set 3 (Focus on drinking water). Each table is sorted by the coefficients for R5X (For ME and Easy). Each mind-set is clearly different, and interpretable, remarkable in view of the actual ‘difficulty’ of doing the study on the part of the respondent. Recall that each respondent had evaluated 24 different vignettes, with 2-4 elements, seemingly randomly put together. Despite what one might think, the respondents actually perform quite well.

In Their Own Words

Our three mind-sets suggest radically different words to which they are sensitive. Do these mind-sets transcend the simple statistical analyses which brought them to our attention? In other words, beyond statistics which tell a ‘nice story’ can we find anything else. One way is to look at how they describe their experience with diabetes, whether their own, their family experience, or just their knowledge.

Each respondent was instructed to write about diabetes from their own point of view, doing this exercise AFTER having done the evaluation of the 24 unique vignettes. An AI ‘summarizer’, QuillBot [23], took the open-ended answers, and summarized them. Table 8 shows three rather different summaries, suggesting that these mind-sets do actually think about diabetes in different ways. The objective of showing the summarizations is to give a sense of the different ‘morphologies’ or structures in the way people of mind-sets write about their experience, what they say, how they say it.

Identifying the Mind-sets in the Population

An important outcome of dividing people into mind-sets is the ability to tailor the proper message to each person. By understanding the different messages to which people are sensitive, there is the possibility of increasing the overall health of a population. Proper messaging has been shown to substantially reduce the number of within-30-day hospital readmissions after discharge for patients with congestive heart failure [24], as well as double the number of colorectal cancer screenings in an underserved area in the Philadelphia area [25].

How then do we assign a given person to one of the mind-sets? Once the person is properly assigned to a mind-set it becomes much simpler to identify the set of messages likely to communicate properly and effect the appropriate behavior response. The traditional approach has been to look at easy-to-measure factors, such as gender, age, and superficial cultural cues. The experienced physician may attend to more cues, as would an experienced salesperson. But what about the situation wherein one cannot involve an experienced professional. Is there any way that the staff at the ‘front desk’ might be able to assign a patient to a mind-set in a perhaps a minute or less, and attach that information to the patient chart, along with the relevant material to communicate, as well as well as what to avoid.

During the past decade author Moskowitz and colleagues have worked on an identification system, a mind-type assigner or personal viewpoint identifier [16,17]. The objective is to create a short set of questions such as that shown in Figure 6. With such a tool, it becomes possible to have a patient fill out the form in a minute or two. Panel A shows the background information that the patient fills out. Panel B shows the six questions, taken from the study, and answered with a two-point scale. The pattern of responses to the six questions ends up assigning the patient to the most appropriate mind-set.

Table 9 shows set-up for the ‘assigner’ tool, including the name of the mind-set, and the feedback given either to the patient and/or to the medical professional. The mind-set assigner further provides the ability to send the respondent to a website with a video.

The final feature of the mind-set assigner is the ability to ask a set of 16 different questions, each with 2-4 answers. Table 10 shows the set of 16 questions for this study. The mind-set assigner with its set of 16 questions enables the researcher to work with many new respondents, both assigning each respondent to a mind-set, and obtaining more data about the respondent. In this way the research into mind-sets moves beyond simply understanding the person in terms of the particular situation, but actually allows the researcher to deepen knowledge of the person and the covariation of that knowledge with mind-type membership.

Table 8: AI summarization of open-ended answers about experience with diabetes from the three emergent mind-sets.

<p>In Their Own Words – How the three mind-sets describe their experience with diabetes (Open Ends)</p> <p>Mind Set 1 – summarized - Focus on medical indicators (From Clustering R5 coefficients)</p> <p>Diabetes is a concern in the maternal side of the family, affecting the author’s family members. Despite not being overweight, the author keeps track of their blood sugar levels. Their youngest son’s father had type 1 diabetes and died at age 42. The author’s family is thin, and they exercise and watch their food intake. The author’s husband and sister have been diagnosed with diabetes, and they have changed their eating habits and lifestyle.</p> <p>The author’s father had type 1 diabetes and passed away, which is concerning as several people in their extended family are overweight and have developed diabetes later in life. The author’s friend has diabetes and controls it well, but it rules his life. The author’s wife has type 2 diabetes and is pre-diabetic, which is concerning for their household.</p> <p>The author’s family does not have a lot of experience with diabetes, making it difficult for them to come to terms with the diagnosis. They also have relatives who have or had diabetes but none in the immediate family. The author’s sister has had diabetes for 40 years and is encouraged to monitor her weight and get good rest.</p> <p>Mind Set 2 – summarized - Focus on lifestyle (From Clustering R5 coefficients)</p> <p>Diabetes is a serious health issue that affects individuals and families worldwide. It is a serious concern that requires a coordinated effort from the entire family, including the individual, their family, and their friends and family. The individual is a pre-diabetic and has to monitor their glucose levels daily. They have no family history of diabetes, but their A1c is slightly higher than their family members suggest. They are advised to lose weight, exercise more, and be healthier. They have experienced the effects of diabetes on their family, including their mother, who is diabetic and overweight. They believe that if children start eating healthier at an early age, it is easier to manage the disease. They have no personal experience with diabetes, but they have seen many patients with eye problems associated with diabetes. They believe that limiting sugar and carb intake in the household is crucial. They have a relative with diabetes who is also cautious about his diet and drinks.</p> <p>Mind-Set 3 Summarized – Focus on drinking water (From clustering R5 coefficients)</p>

Diabetes is a terrible disease that can lead to limb loss and death. It is not a common issue in the family, but it is a serious concern that should be addressed by children. The author believes that children should be more proactive in preventing and helping others who are aware of the disease. They also mention that their family is concerned about obesity and is aware of sugar complications. The author believes that children can learn from their grandparents’ experiences and be more proactive in preventing diabetes. They also mention their own family members who have had diabetes and have lost limbs. They all try to maintain healthy lifestyles and avoid complications. Despite not having children, the author believes that everyone should prevent diabetes and help others.

Please give your first impression. Thank you.

The information I am giving you is about my attitudes towards a specific topic(s). As part of the exercise, I am giving you information about myself. This information will be used to provide better choices in products and services, based on your answers.

I Agree to Participate I Do Not Agree to Participate

Follow Up for Research and Marketing Purposes *Required
 Allow Not Allow

Day Of Week Taken *Required
 DAY

Approximate Time Taken *Required
 SELECT RANGE

If you were given an Admin code enter it below
 Enter Admin Code if you were given one

If you were given a Respondent code enter it below
 Enter Respondent Code if you were given one

Email address *Required
 Enter Email

Year of Birth *Required
 YEAR

Country *Required
 United States

Gender *Required
 GENDER

WEIGHT PVI 11.01.2023.1

LOSING WEIGHT REDUCES THE RISK OF DEVELOPING HIGH BLOOD PRESSURE.
 I CAN DO IT EASILY
 I CAN'T DO IT EASILY

WHAT TO DO: EXERCISE REGULARLY.
 I CAN DO IT EASILY
 I CAN'T DO IT EASILY

LOSING WEIGHT IS IMPORTANT FOR OLDER DIABETIC WOMEN BECAUSE IT HELPS CONTROL BLOOD SUGAR AND REDUCES HEALTH RISKS.
 I CAN DO IT EASILY
 I CAN'T DO IT EASILY

FACT: WATER MAKES YOU FEEL FULL, SO YOU EAT LESS FOOD.
 I CAN DO IT EASILY
 I CAN'T DO IT EASILY

ADVICE: GET ENOUGH SLEEP EACH NIGHT TO GIVE YOUR BODY REST.
 I CAN DO IT EASILY
 I CAN'T DO IT EASILY

ADVICE: LIMIT EATING OUT AND COOK MORE MEALS AT HOME USING HEALTHY INGREDIENTS.
 I CAN DO IT EASILY
 I CAN'T DO IT EASILY

Figure 6: The first two portion of the mind-set assigner. Panel A shows the background information. Panel B shows the six questions, which are presented in randomized order for each respondent.

Table 9: Set up information for the mind-set assigner.

ID	Question Code	Question Text	Mind-Set1	Mind-Set2	Mind-Set3
1	xxx0	Weight			
2	xxx1	MindSet Name	Focus on indicators	Focus on lifestyle	Focus on drinking water as control
3	xxx2	MindSet Feedback	Losing weight is important for older diabetic women because it helps control blood sugar and reduces health risks. Losing weight reduces the risk of developing high blood pressure.	Advice: Avoid skipping meals, especially breakfast. Limit eating out and cook more meals at home using healthy ingredients. Get enough sleep each night to give your body rest.	Fact: Water makes you feel full, so you eat less food. Fact: Drinking water boosts your energy levels. Fact: Drinking water helps your organs, like kidneys, work properly. Advice: Avoid skipping meals, especially breakfast.
4	xxx3	Mindset Video			
5	xxx4	Mindset Link			
6	xxx5	Additive Constant	0	0	0
7	xxx6	In the PVI there are two Answers: Anchor for Answer on Left - Anchor for Answer on Right	I can do it easily	I can't do it easily	

Table 10: The 16 questions and their associated answers. The Questions and Answers constitute the third 'leg' of the mind-set assigner.

ID	Question Text	Option A	Option B	Option C	Option D
1	How do you feel about your health	Healthy not worried	Concerned but no specifics	Concerned about specifics	Actively monitoring a condition
2	How do you feel about your lifestyle	Very positive	It's ok	I'm struggling but coping	I'm really struggling and it's very hard
3	What defines a good doctor visit	Get what I need	Doctor understands me	Doctor guides me	Don't really know
4	How long in time should a doctor visit take when it is a checkup	About 10- 15 minutes with doc	About 15-20 minutes with doc	About 20-30 minutes with doc	I don't know but something is wrong with the time length of the visit. Not working for me
5	How do you like to be contacted by your doctor	Like personal call from Doc	Like message left on answering machine	Like the computer portal	Like to call Doc on my schedule
6	Have you heard of telehealth	No	Heard about it but not sure	Heard about it. Will try it some day	I'm using it and am a big fan
7	Do you worry about paying medical bills	No	Somewhat	Yes	Very concerned
8	How long ago was your last doctor visit	Within a week	Within a month	Within a year	Can't remember
9	What is your experience when you check in	I don't like the front desk	It's ok but impersonal	It's efficient	It's very warm and welcoming
10	Do you feel isolated right now in life	Yes very much	Somewhat	Not really	I'm not isolated at all
11	What feelings do you have most often when you visit your doctor	Nervousness	Relief	Curiosity	Fear I'll hear something bad
12	How do you feel right now about your weight	Happy	Sort of ok	A bit nervous	Nervous and unhappy
13	How do you feel about your control over your daily life	Happy	Sort of ok	A bit nervous	Nervous and unhappy
14	How are you feeling about your job or school	Happy	Sort of ok	A bit nervous	Nervous and unhappy
15	How are you feeling about the world around you	Happy	Sort of ok	A bit nervous	Nervous and unhappy
16	How are you feeling about your family	Happy	Sort of ok	A bit nervous	Nervous and unhappy

Discussion and Conclusions

The study on diabetes and obesity presented here constitutes the second of a planned series of studies on the communication between the doctor and the patient, using the emerging science of Mind Genomics. Several searches through the published literature and a discussion with young medical professionals revealed again and again that there is a well-established clinical literature on many medical topics, but very little on the words that doctors should say to patients, and the meanings of what patients say to doctors. The oft-given reason, perhaps excuse, is that this sensitivity to the patient can come only with experience, and that the doctor must learn to listen [26].

As the medical world becomes increasingly subject to the financial structures of capitalism, the time that a doctor spends with a patient necessarily decreases. It is the doctor's time which 'costs', and the goal of a business such as the business of health care is to reduce these topline costs. It may be possible to optimize the throughput of diagnostics, and increase the efficiencies in hospital stays, especially surgery, but what about the ability of the doctor or other medical professional to communicate with the patient. If it takes years to educate someone to become an actor as well as years to become a doctor. Where then is the time to become a listener, and an empathic conveyor of news, often bad news. It is the attention to this topic, empathic information exchange, to which this new effort of Mind Genomics is dedicated, and in which spirit this early experiment and paper in that effort have been done and written. The discovery that there are really three mind-sets, not just one general mind-set with the 'most right messaging' becomes the important discovery here, one which, if not addressed, can become an

ongoing issue in mammography, perhaps getting worse as the medical system becomes increasingly driven to efficiency by driving out the human component.

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