

Review Article

AI Simulations of What a Doctor Might Want to Hear from a Patient: Mind Genomics, Synthetic Respondents, and New Vistas for Personalizing Medicine

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Abstract

The study reported here deals with the creation of questions about what a doctor wants to hear when interacting with a patient, and the evaluation of that question to those questions. The questions, answers and respondents (survey takers) were all generated through artificial intelligence. The results revealed the possibility of AI support in all three areas, and revealed meaningful results when the study was run using the procedure of Mind Genomics. Systematic combinations of messages (elements) according to an experimental design revealed clearly different patterns of responses to the messages based upon who the response personas were designated to be. Three clearly different mind-sets emerged, groups of synthesized respondents whose pattern of coefficients were similar to each other within a mind-set, with the centroids of the mind-sets differing in a way which made intuitive sense.

Introduction

The introduction of artificial intelligence (AI) has created a level of interest perhaps unrivalled in the history of technology, but also spilling over into all areas of human endeavor as well as issues of philosophy [1]. As the use of AI has become easier, more widespread, various uses have emerged, almost beyond counting.

At the same time that technology and society has focused on AI, the author and colleagues have been working with a different, somewhat new way of fathering data about the world of the everyday. The science is called Mind Genomics. The notion is that everyday experience is worth studying for the way it allows us to understand people. Furthermore, rather than studying people by asking them about topics using questionnaires, or by talking directly to them as do qualitative researchers, an intermediate way is to present people with different descriptions, or vignettes, really combinations of phrases to paint a word picture, and then ask the people to rate the vignettes on a scale. The results generate a database of impressions of these vignettes, with the impressions able to be deconstructed into the driving power of each of the element or phrases. The respondent, or survey taker doing this task, cannot 'game the system' because the combinations change from person to person, based upon an underlying set of planned combinations, the so-called experimental design [2].

Up to now the test takers in these Mind Genomics studies have been real people, whether of school age or older. The extensive data

which has emerged from these studies range from evaluation of descriptions of foods [3,4] and onto education [5] the law [6], social issues [7], and beyond. The Mind Genomics approach has proved fruitful in its ability to allow different ideas to emerge from these studies, as well as uncover new to the world groups of people who think of the world differently. These groups are called mind-sets.

The Mind Genomics Platform and AI as a Generator of Ideas

In the Mind Genomics platform AI has already been used to create questions, and from those questions create sets of answers. It is these 'answer's or elements, that Mind Genomics combines into small, easy to read combinations called vignettes. These vignettes, comprise a maximum of four elements and a minimum of two elements, created by an underlying experimental design. The vignettes are created in a rigorous fashion, so that:

1. Each vignette has at most one element or answer from a question, never two or more answers from a question, but occasionally no answer from a question. It is this property of incompleteness that will allow the researcher to use statistical (regression analysis) to show how the elements or answers 'drive' ratings
2. Each vignette is different from every other vignette. The vignettes a systematically changed by a permutation program [8].

3. Each respondent evaluates a specific set of 24 vignettes, with each element appearing four times. Each set of 24 vignettes is reserved for a specific respondent

During the early part of 2023 the Mind Genomics platform was enhanced by AI, first to provide questions, and then to provide answer to the questions. The enhancement used ChatGPT3.5 [9,10]. The researcher was presented with a screen which requested four questions, and afterwards four screens, each of which requested four separate answers to each question that the research would provide. Though one might not think that the request to provide four questions is particularly daunting, the reality is that it is quite daunting. As a consequence, many nascent uses of Mind Genomics simply abandoned the task. The reality began to become apparent, viz., that people may be good at answering questions, but they are not good at formulating a story in terms of a set of questions to ask which will get at the answer(s). Some may call this a deficit in so-called critical thinking, but for the purposes of this paper it is simply a stumbling block in usability of Mind Genomics.

The creation of a series of built in prompts, provided to the researcher in a non-threatening, rather easy way, ended up producing Idea Coach. We will show the use of Idea Coach in this paper, as part of the specific treatment of the topic, 'what doctors want in patients'. We will use Idea Coach to show how the questions are generated, and how data from synthetic respondents are created and analyzed. This paper shows the method, and the nature of the answers that one might get.

The underlying motivation is to see what might emerge from these initial trials with AI acting as a synthetic respondent. The important issue is do the data 'make sense' to the reader. The issue about whether the data matches external results must be addressed later, when the approach of creating synthetic respondent has been well worked out. This study is only the first step in that process, not the external validation step. To summarize, the validity considered here is the simplest one of all, namely 'face validity.' Do the data generated by AI 'make sense'?

Running the Mind Genomics AI Experiment from Start to Finish

The Mind Genomics process is templated from start to finish. The study presented here deals with what a doctor wants from a patient. The synthesized respondents are going to be medical professionals. The actual study can be found in the website. Much of the set-up of the study has been taken from the senior author's previous Mind Genomics website, www.BimiLeap.com. The synthetic respondents are created within a new website, Socrates as a Service™, which uses many of the feature of the Mind Genomics platform, but adds the ability to synthesize respondents simply by describing the way they think, what they do, etc.

Step 1

Give the study a name, select a language for the prompts, and accept the terms for privacy.

Step 2: Create Four Questions Which 'Tell a Story'

As noted above, it is at this point in the process that many researchers are stymied, and where the researcher can use AI to help formulate questions. The instructions to 'tell a story' are simply meant as a help to the research. The underlying idea is that the questions should deal with different aspects of the topic.

Figure 1 shows the screen requesting the four questions, and the next screen invoked when the request is made to use AI in the form of Idea Coach. The 'box' in Panel B of Figure 1 is filled out by the researcher. Typically, the request should comprise an introduction (e.g., explain in detail), the issue (the specific request), and then prompts asking the Idea Coach to produce a question of no more than 15 words, and a question understandable to a person of younger age. For this project the age was '12' years, but in other projects the age has been higher (e.g., around 21 years old). Finally, Panel C shows the return of a subset of the 15 questions produced by AI, with the remaining questions requiring the researcher to scroll down. Panel D shows the final set of questions, edited, and in preparation for the next step in AI empower Idea Coach.

The researcher can repeat the request to Idea Coach as many times as desired, with each return by Idea Coach comprising 15 questions, some new, some repeats. At the end of the process, the researcher will have selected four questions, and inserted them into the template, and, if necessary, editing these questions to ensure the proper format of answers to be produced by Idea Coach in the next step. Table 1 presents one set of questions, along with an AI based 'summarization' of the questions as well as further extension of the questions into new opportunities. Note that Table 1 is created for every set of 15 questions developed through Idea Coach, as well as for every set of 15 answers to a question produced by Idea Coach (see below). Excel booklet from which Table 1 is extracted is called the project 'Idea Book.' Each separate iteration, either to generate questions or answers, generates 15 results. The full Idea Book is available after the project passes the stage of creating questions and answers.

Step 3: Create the Answers

Once the questions have been created and edited (polished to increase the quality of the AI output), it is time to create answers. The same process occurs, with the researcher presented Idea Coach with the edited question, and then 15 answers returned. Again, the researcher has the task of selecting up to four answers and re-running the Idea Coach again for new answers to address the now polished/edited question. During the process it is always possible to revise the question. Figure 2 shows the different steps for the creation of answers. Once again, the Idea Coach can be invoked as many times as desired. Table 2 shows an example of the 15 answers to the first question.

Step 4: Select the Final Set of Questions and Answers

Table 3 shows this selection. All text comes from Idea Coach, but with edits at each step of the way to make sure that the elements can be understood in a meaningful way by people, and presumably in that case by AI as well.

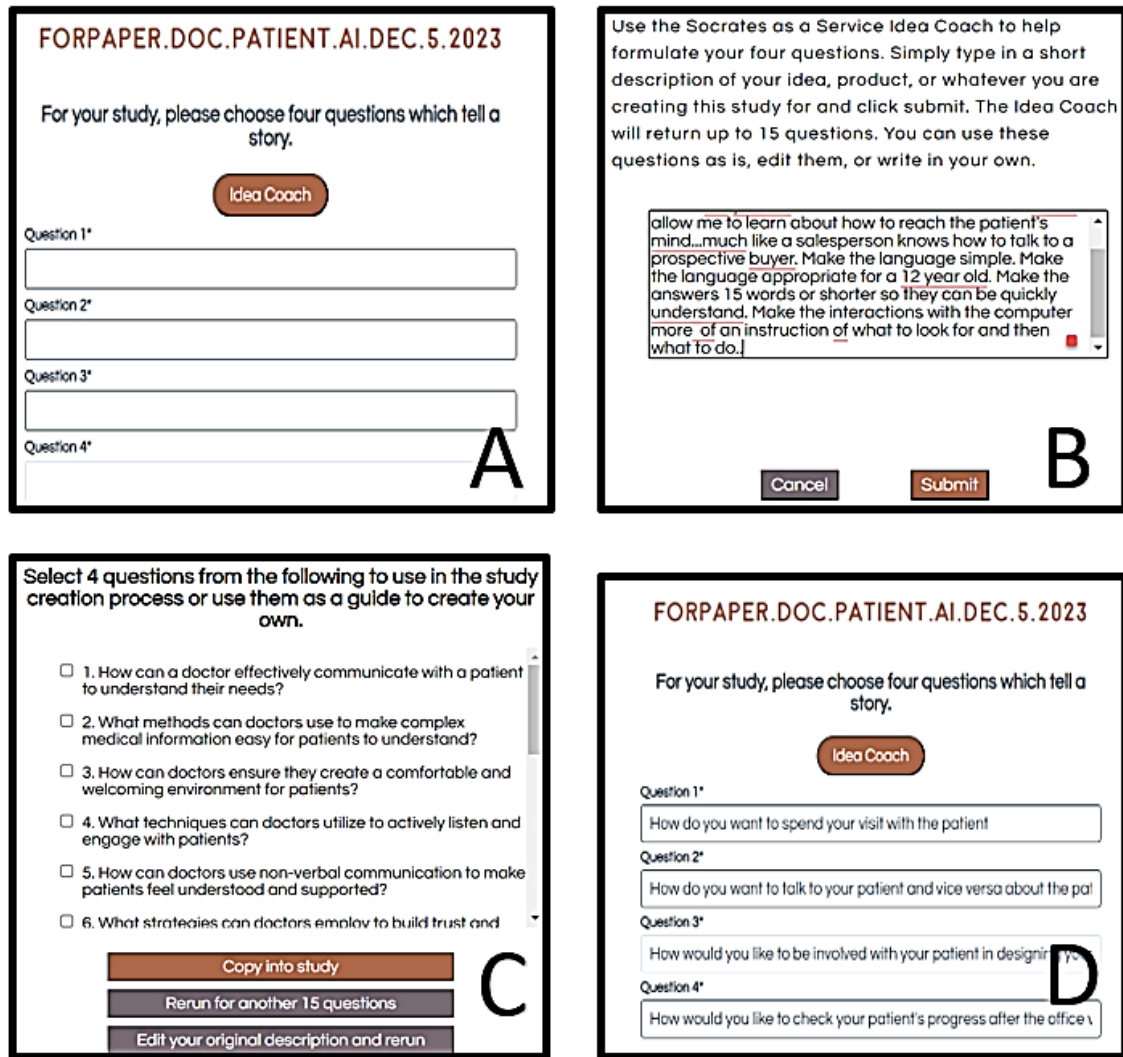


Figure 1: Four questions and Idea Coach.

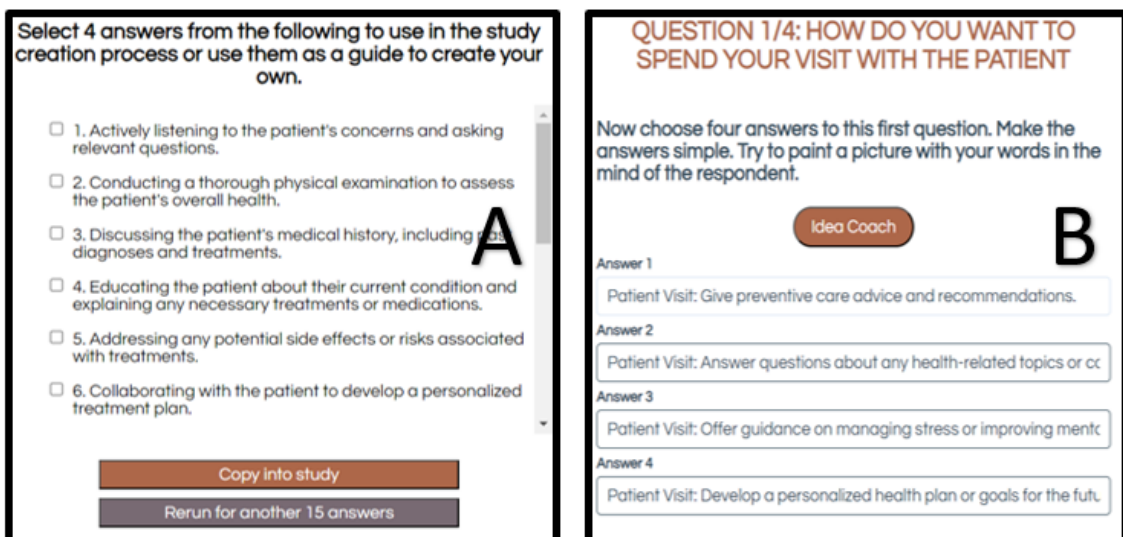


Figure 2: Screenshots showing the process for creating the four answers to a question. Panel A shows the partial output from Idea Coach. Panel 2 shows the four answers actually selected, and then slightly edited for use in the study.

Table 1: The Idea Coach prompt, the first set of 15 questions, and the AI elaboration of those 15.

Questions-Results 1

Topic: How do I discover the different ways that a doctor can talk to the patient. Is there a set of test methods which allow me to learn about how to reach the patient's mind...much like a salesperson knows how to talk to a prospective buyer. Make the language simple. Make the language appropriate for a 12-year-old. Make the answers 15 words or shorter so they can be quickly understood. Make the interactions with the computer more of an instruction of what to look for and then what to do..

Topic Questions:

- What are some effective ways doctors can communicate with their patients?
- How can doctors make sure they understand their patients' needs and concerns?
- What are the benefits of using simple language when communicating with patients?
- How can doctors create a comfortable and open environment for patients to talk in?
- Why is active listening important in a doctor-patient conversation?
- How can doctors ask questions that encourage patients to share important information?
- What role does non-verbal communication play in doctor-patient interactions?
- Why is it important for doctors to use empathy when speaking with patients?
- How can doctors adapt their communication style to different patients' ages and backgrounds?
- What can doctors do to ensure patients understand their treatment options and medical advice?
- How can doctors explain complex medical information in a simple and understandable way?
- What techniques can doctors use to build trust and rapport with their patients?
- How can doctors address patients' fears or anxieties during consultations?
- What should doctors do if they notice a patient is having difficulty expressing themselves?
- How can doctors ensure effective follow-up communication with their patients after visits or procedures?

Key Ideas

1. Effective communication methods for doctors to interact with patients.
2. Understanding patients' needs and concerns.
3. Benefits of using simple language in doctor-patient communication.
4. Creating a comfortable and open environment for patients to talk.
5. Importance of active listening in doctor-patient conversations.
6. Asking questions that encourage patients to share important information.
7. Role of non-verbal communication in doctor-patient interactions.
8. Importance of empathy in doctor-patient conversations.
9. Adapting communication style to different patients' ages and backgrounds.
10. Ensuring patient understanding of treatment options and medical advice.
11. Explaining complex medical information in a simple and understandable way.
12. Building trust and rapport with patients.
13. Addressing patient fears and anxieties during consultations.
14. Responding to difficulty in patient expression.
15. Ensuring effective follow-up communication with patients.

Themes

Theme 1: Effective Communication Methods for Doctors

- Effective communication methods for doctors to interact with patients.
- Benefits of using simple language in doctor-patient communication.
- Role of non-verbal communication in doctor-patient interactions.
- Importance of empathy in doctor-patient conversations.
- Adapting communication style to different patients' ages and backgrounds.

Theme 2: Understanding Patients' Needs and Concerns

- Understanding patients' needs and concerns.
- Creating a comfortable and open environment for patients to talk.
- Importance of active listening in doctor-patient conversations.
- Asking questions that encourage patients to share important information.
- Building trust and rapport with patients.

Theme 3: Patient Education and Information Sharing

- Ensuring patient understanding of treatment options and medical advice.
- Explaining complex medical information in a simple and understandable way.
- Addressing patient fears and anxieties during consultations.
- Responding to difficulty in patient expression.

Theme 4: Follow-Up and Continuity of Care

- Ensuring effective follow-up communication with patients.

Perspectives

Theme 1:

- Plus: Effective communication can lead to better patient compliance and understanding.
- Minus: Doctors may struggle with time constraints and lack of training in communication skills.
- Interesting: Non-verbal communication can often convey more information than verbal communication.

Theme 2:

- Plus: Understanding patients' needs and concerns can lead to more personalized and effective care.
- Minus: Doctors may face challenges in balancing time constraints with the need to listen and address patients' concerns.
- Interesting: Active listening can help doctors uncover important information that patients may not initially disclose.

Theme 3:

- Plus: Educating patients empowers them to make informed decisions about their healthcare.
- Minus: Explaining complex medical information in a simple way can be challenging for some doctors.
- Interesting: Addressing patient fears and anxieties can improve patient satisfaction and overall well-being.

Theme 4:

- Plus: Effective follow-up communication can improve patient outcomes and prevent complications.
- Minus: Doctors may face barriers in maintaining continuity of care due to limited resources or system constraints.
- Interesting: Continuous communication can help build strong doctor-patient relationships and promote trust.

What is missing

Some possible missing topics could include:

- The importance of non-verbal communication in doctor-patient interactions
- Strategies for building trust and rapport with patients
- Addressing patients' fears and anxieties during consultations
- Ensuring effective follow-up communication with patients
- Adapting communication styles to patients' ages and backgrounds
- Explaining complex medical information in a simple and understandable way
- Techniques for encouraging patients to share important information
- Using empathy when speaking with patients
- Ensuring patient understanding of treatment options and medical advice
- Helping patients who have difficulty expressing themselves

Alternative Viewpoints

1. Alternative viewpoint: Some may argue that doctors should focus more on using medical terminology and technical language when communicating with patients. They could argue that this shows expertise and can help patients better understand their condition and treatment options.
2. Alternative viewpoint: There may be a belief that doctors should prioritize efficiency and time management over creating a comfortable and open environment for patients to talk in. This viewpoint may argue that doctors need to spend less time on conversation and more time on diagnosis and treatment.
3. Alternative viewpoint: Some people may argue that non-verbal communication is not as important in doctor-patient interactions since the focus should primarily be on the verbal exchange of information. They may believe that non-verbal cues can be easily misinterpreted or misunderstood.
4. Alternative viewpoint: There may be a belief that doctors should be more authoritative and less empathetic in order to maintain a professional distance and avoid getting emotionally involved with patients. This viewpoint may argue that empathy could lead to bias or clouded judgment in the doctor's decision-making process.
5. Alternative viewpoint: Some individuals may argue that doctors should not adapt their communication style based on patients' ages and backgrounds. They may believe that medical information should be presented the same way to everyone, regardless of their background or demographic.
6. Alternative viewpoint: There may be a belief that doctors should solely focus on providing information and treatment options, and it is the patients' responsibility to ensure they understand and ask questions if needed. This viewpoint may argue that it is not the doctor's responsibility to ensure understanding, but rather the patient's responsibility to seek clarification if necessary.

Interested Audiences

1. Medical professionals and healthcare providers: Doctors and healthcare providers are most interested in these topic questions as they directly relate to their profession and the interactions they have with patients. By exploring effective communication strategies, doctors can enhance patient satisfaction, improve healthcare outcomes, and strengthen their relationships with patients.
2. Medical students and residents: Medical students and residents who are still in the process of learning and gaining experience in patient care can benefit from these topic questions. Understanding the importance of effective communication and learning practical techniques to communicate with patients will help them become better healthcare providers in the future.
3. Patient advocacy groups: Patient advocacy groups are interested in ensuring that patients receive the best possible care and have a positive experience during their interactions with healthcare professionals. These groups may be interested in exploring ways to improve doctor-patient communication and advocating for better communication practices within healthcare systems.
4. Patients and their families: Patients and their families have a vested interest in effective doctor-patient communication. They want to be understood, feel comfortable expressing their concerns, and have confidence in their doctors' ability to communicate important information clearly. Exploring these topic questions can help patients and their families understand how they can actively participate in their healthcare and navigate doctor-patient interactions more effectively.
5. Healthcare administrators and policymakers: Healthcare administrators and policymakers play a crucial role in shaping healthcare systems and policies. By understanding the benefits of effective communication between doctors and patients, they can advocate for the implementation of strategies and tools that facilitate better communication practices. This can ultimately improve patient satisfaction, healthcare outcomes, and reduce healthcare costs.

Opposing Audiences

1. Some audiences that might oppose doctors using simple language when communicating with patients could be medical professionals who believe that using technical terms and complex language is necessary for accuracy and precision in conveying medical information.
2. Another audience that might oppose doctors using empathy when speaking with patients could be those who believe that doctors should maintain a more detached and objective approach to patient care, prioritizing scientific knowledge and medical expertise over emotional connection.
3. Audiences that might oppose doctors adapting their communication style to different patients' ages and backgrounds could include those who believe that medical professionals should have a standard approach to communication, regardless of individual patient characteristics, in order to maintain consistency and uniformity in care.
4. Some audiences that might oppose doctors addressing patients' fears or anxieties during consultations could be individuals who believe that focusing on emotional concerns detracts from the medical aspects of the consultation and could lead to unnecessary worry or anxiety.
5. Lastly, audiences that might oppose doctors ensuring effective follow-up communication with patients after visits or procedures could include those who argue that doctors' time would be better spent focusing on new patients and cases, rather than allocating additional resources to maintain communication with already treated patients.

Innovations

- Online platforms or apps that allow patients to communicate with their doctors and access medical information easily.
- Telemedicine services that provide virtual consultations and follow-ups.
- Patient portals or electronic health records systems that allow patients to access their medical information and communicate with their doctors.
- Collaborative care models that involve a team of healthcare professionals working together to provide comprehensive care and ensure continuity across different healthcare settings.
- Patient feedback and satisfaction surveys to gather feedback on communication and improve the patient experience.
- Use of technology, such as virtual reality or interactive educational tools, to enhance patient education and information sharing.
- Training programs for healthcare professionals to improve their communication skills and knowledge of cultural diversity.
- Policies that promote patient-centered care and prioritize effective communication between doctors and patients.

Table 2: First set of answers to question #1.

Answers-Results 1

How do you want to spend your visit with the doctor

Topic Statements:

- I want to discuss any health concerns I have been experiencing.
- I want to understand the results of any medical tests or screenings.
- I want to review my current medication and discuss potential alternatives or adjustments.
- I want to ask questions about any symptoms I have been struggling with.
- I want to discuss any changes in my lifestyle or habits that may affect my health.
- I want to receive advice or guidance on maintaining a healthy diet and exercise routine.
- I want to discuss any mental or emotional health concerns I may have.
- I want to talk about preventive measures to avoid certain illnesses or diseases.
- I want to discuss any potential side effects or concerns regarding my current medications.
- I want to address any sleep-related issues or concerns I may have.
- I want to discuss any family medical history and understand its potential impact on my health.
- I want to learn about new medical advancements or treatments that may be relevant to my health.
- I want to receive necessary vaccinations or immunizations.
- I want to discuss any potential allergies or intolerances I may have recently developed.
- I want to establish a long-term health plan and schedule regular check-ups and screenings.

Key Ideas

1. Health concerns-This topic involves discussing any physical or mental health issues the individual has been experiencing and seeking advice or treatment for them.
2. Understanding medical test results-This topic focuses on comprehending the results of medical tests or screenings and gaining insight into their implications for the individual's health.
3. Reviewing medication-This topic involves evaluating the effectiveness and potential alternatives or adjustments for current medications to ensure optimal treatment.
4. Symptoms inquiry-This topic entails asking questions and seeking professional guidance regarding any troubling symptoms that the individual may be experiencing.
5. Lifestyle changes-This topic encompasses discussing any modifications in habits or routines that may impact the individual's health and seeking advice on how to manage them.
6. Healthy diet and exercise-This topic involves receiving advice or guidance on maintaining a nutritious diet and exercise routine to promote overall well-being.
7. Mental and emotional health concerns-This topic focuses on discussing any psychological or emotional issues and seeking support or treatment for them.
8. Preventive measures-This topic centers around discussing strategies to prevent specific illnesses or diseases through vaccinations, screenings, or lifestyle modifications.
9. Medication concerns-This topic entails addressing any potential side effects or worries about current medications and finding suitable solutions.
10. Sleep-related issues-This topic involves discussing any sleep-related problems or concerns and seeking advice on how to improve sleep quality and quantity.
11. Family medical history-This topic encompasses understanding and discussing any hereditary conditions or diseases that may influence the individual's health.
12. Medical advancements and treatments-This topic involves learning about new medical advancements or treatments that may be relevant to the individual's health and exploring their options.
13. Vaccinations or immunizations-This topic entails receiving necessary vaccinations or immunizations to prevent certain diseases or infections.
14. Allergies or intolerances-This topic involves discussing and addressing any newly developed allergies or intolerances and finding suitable approaches to manage them.
15. Establishing a health plan-This topic centers around creating a long-term health plan, including scheduling regular check-ups and screenings to monitor and maintain good health.

Perspectives

Topic: Health concerns

Plus: Provides an opportunity to address any health issues and seek necessary medical attention.

Minus: May require discussing potentially unpleasant symptoms or diagnoses.

Interesting: Allows for a proactive approach to maintaining one's health and addressing any potential problems early on.

Topic: Understanding medical test results

Plus: Provides insight into one's overall health and any potential issues that may need further attention.

Minus: May involve technical or complex information that can be difficult to understand.

Interesting: Offers a chance to learn about one's own body and gain a better understanding of medical terminology and procedures.

Topic: Reviewing current medication

Plus: Allows for potential adjustments or alternatives that may better suit one's needs.

Minus: May involve experiencing side effects or potential concerns with current medications.

Interesting: Provides an opportunity to learn about different treatment options and how they interact with one's body.

Topic: Asking about symptoms

Plus: Helps address any concerns and seek medical advice for symptom management.

Minus: May require discussing unpleasant or uncomfortable symptoms.

Interesting: Provides an opportunity to learn about potential causes and treatments for symptoms.

Topic: Lifestyle changes affecting health

Plus: Offers guidance and advice on maintaining a healthy lifestyle.

Minus: May require making difficult changes or adjustments to one's habits or routines.

Interesting: Provides insight into how certain lifestyle choices can impact overall health and well-being.

Topic: Advice on diet and exercise routine

Plus: Offers guidance on maintaining a healthy lifestyle and improving overall well-being.

Minus: May involve making changes to one's current diet or exercise routine.

Interesting: Provides an opportunity to learn about the benefits of different foods and exercise regimens.

Topic: Mental or emotional health concerns

Plus: Allows for seeking professional guidance and support for mental well-being.

Minus: May involve discussing personal and sensitive topics.

Interesting: Offers an opportunity to learn about different strategies and treatments for mental health issues.

Topic: Preventive measures

Plus: Provides insight into ways to avoid potential illnesses and diseases.

Minus: May require making lifestyle changes or adopting new habits to prevent specific conditions.

Interesting: Offers knowledge about the body's immune system and ways to strengthen it.

Topic: Medication side effects

Plus: Allows for addressing potential concerns or finding alternatives to reduce side effects.

Minus: May involve experiencing unpleasant or unwanted side effects from medications.

Interesting: Provides an opportunity to learn about how medications interact with the body and why side effects occur.

Topic: Sleep-related issues

Plus: Offers an opportunity to seek advice and solutions to improve sleep quality.

Minus: May involve discussing potential sleep disorders or disturbances.

Interesting: Provides knowledge about the importance of sleep and the impact it has on overall health.

Topic: Family medical history

Plus: Allows for understanding potential health risks or genetic predispositions.

Minus: May involve discussing sensitive or uncomfortable topics related to family medical history.

Interesting: Offers insight into the impact of genetics on one's health and potential preventive measures.

Topic: New medical advancements or treatments

Plus: Provides knowledge about innovative treatments or therapies that may improve health outcomes.

Minus: May involve complex medical information that can be challenging to understand.

Interesting: Offers insight into the ever-evolving field of medicine and potential breakthroughs in healthcare.

Topic: Vaccinations or immunizations

Plus: Protects against preventable diseases and infections.

Minus: May involve temporary discomfort or mild side effects.

Interesting: Offers an opportunity to learn about the importance of immunization and the science behind vaccines.

Topic: Allergies or intolerances

Plus: Allows for understanding and managing potential health risks and finding alternatives.

Minus: May involve avoiding certain foods or substances that one previously enjoyed.

Interesting: Provides insight into the body's immune response and the potential causes of allergies or intolerances.

Topic: Establishing long-term health plan

Plus: Ensures regular check-ups and screenings for early detection and prevention.

Minus: May require committing to regular medical appointments and potential lifestyle changes.

Interesting: Provides a sense of control and empowerment in managing one's health and well

Additional information

List what is missing from the topic statements above that can complete an understanding of the topic:

- I want to discuss any chronic conditions or diseases I have and their management.
- I want to address any concerns about sexual health or reproductive issues.
- I want to talk about any injuries or physical discomfort I have been experiencing.
- I want to discuss any alternative or complementary therapies I have been considering.
- I want to understand the potential risks and benefits of any medical procedures or surgeries.
- I want to address any issues related to substance abuse or addiction.
- I want to discuss any concerns about aging and age-related health problems.
- I want to talk about any environmental or occupational health hazards that may affect me.
- I want to understand the potential effects of stress or mental health on my overall well-being.
- I want to discuss any concerns regarding sexual or gender identity and its impact on my health.

Alternative Viewpoints

Alternative viewpoints on the topic statements may include:

1. Some may believe that health concerns or symptoms are not significant and can be ignored or treated at home without consulting a healthcare professional.
2. Others may disregard the importance of understanding medical test results, believing that they are too complicated or unnecessary to comprehend.
3. Some people may prefer to stick with their current medication without considering alternatives or adjustments, believing that it is effective enough.
4. Certain individuals may underestimate the seriousness of their symptoms or may not believe they require medical attention.
5. There may be individuals who do not believe in the importance of making changes to their lifestyle or habits for the sake of their health.
6. Some may believe that diet and exercise are not significant factors in maintaining overall health and therefore do not seek advice or guidance on these topics.
7. Others may overlook mental or emotional health concerns, believing that they can be managed without professional help.
8. Certain individuals may not see the value in discussing and implementing preventive measures to avoid illnesses, feeling that they are unlikely to be affected.
9. Some may not have concerns or experience side effects with their current medications, and therefore may not think it necessary to address potential concerns.
10. There may be individuals who do not prioritize addressing sleep-related issues or concerns, believing that they are not significant enough to warrant attention.
11. Some individuals may not be aware of their family medical history or may not believe it to be relevant or impactful on their own health.
12. Certain individuals may not have an interest in learning about new medical advancements or treatments, feeling that they will not benefit from them.
13. Some may have personal beliefs or reservations regarding vaccinations or immunizations and may choose not to receive them.
14. Others may not recognize the importance of identifying and addressing potential allergies or intolerances.
15. Certain individuals may not prioritize establishing a long-term health plan or scheduling regular check-ups and screenings, believing that they are unnecessary or too time-consuming.

Interested Audiences

1. Individuals looking for medical advice or seeking answers to their health concerns would be interested in all of the topic statements. These individuals may be experiencing symptoms or have questions about their health and want to discuss their concerns with a medical professional.
2. Patients who have recently undergone medical tests or screenings would be interested in understanding the results. They may want clarification on any abnormalities found or recommendations for further action.
3. Individuals who are currently taking medication and are interested in exploring alternative options or adjusting their current medication regimen would be interested in discussing potential alternatives or adjustments. They may be experiencing side effects or feel that their current medication is not effective.
4. Individuals who are experiencing specific symptoms and want to understand their causes or potential treatments would be interested in asking questions about their symptoms. They may be worried about their health and want clarification or advice.
5. Individuals who are making lifestyle changes that could affect their health, such as starting a new exercise routine or changing their diet, would be interested in discussing these changes. They may want advice on how to make these changes in a healthy and sustainable way.
6. Individuals who want guidance on maintaining a healthy diet and exercise routine would be interested in receiving advice or guidance on this topic. They may be looking for tips or recommendations on how to improve their overall health.
7. Individuals who are experiencing mental or emotional health concerns would be interested in discussing these concerns. They may be looking for support or treatment options for conditions such as depression, anxiety, or stress.
8. Individuals who are interested in preventive measures to avoid certain illnesses or diseases would be interested in discussing preventive measures. They may want information on vaccinations, screenings, or lifestyle changes that can help reduce their risk.
9. Individuals who are taking medications and want to understand potential side effects or concerns would be interested in discussing any potential side effects or concerns regarding their medications. They may want to be informed about the risks and benefits of their current medications.
10. Individuals who are experiencing sleep-related issues or concerns would be interested in addressing these issues. They may be experiencing insomnia, sleep apnea, or other sleep disorders and want to explore treatment options.
11. Individuals who want to understand the impact of their family medical history on their health would be interested in discussing their family medical history. They may want to know if they are at increased risk for certain conditions or diseases.
12. Individuals who are interested in staying updated on new medical advancements or treatments would be interested in learning about new medical advancements or treatments. They may want to explore potential options for their own health.
13. Individuals who are due for necessary vaccinations or immunizations would be interested in receiving necessary vaccinations or immunizations. They may want to protect themselves from certain diseases or comply with travel or work requirements.
14. Individuals who suspect they have developed allergies or intolerances would be interested in discussing any potential allergies or intolerances they may have recently developed. They may want to identify the cause of their symptoms or need guidance on managing these allergies or intolerances.
15. Individuals who want to establish a long-term health plan and schedule regular check-ups and screenings would be interested in establishing a long-term health plan. They may want to take a proactive approach to their health and ensure they are receiving appropriate care and monitoring.

Opposing Audiences

1. Anti-vaccine groups may oppose the topic statement about receiving necessary vaccinations or immunizations due to their beliefs that vaccines are harmful or unnecessary.
2. Individuals who are skeptical of medications or traditional medicine may oppose the topic statement about reviewing current medication and discussing alternatives, as they may prefer alternative or natural remedies.
3. Some individuals may oppose the topic statement about discussing mental or emotional health concerns due to stigmas surrounding mental health or a belief that it is not important compared to physical health.
4. Individuals who are against conventional medical treatments or prefer holistic approaches may oppose the topic statement about discussing potential side effects or concerns regarding current medications, as they may believe in alternative treatments with minimal side effects.
5. People who believe that diet and exercise are not important in maintaining health or who have different dietary beliefs (e.g., fad diets or extreme eating habits) may oppose the topic statement about receiving advice or guidance on maintaining a healthy diet and exercise routine.
6. Some individuals may oppose the topic statement about discussing family medical history and its impact on health due to concerns about privacy or not wanting to acknowledge potential risks or genetic predispositions.
7. People who may be opposed to seeking medical help or addressing health concerns may oppose the topic statement about establishing a long-term health plan and scheduling regular check-ups and screenings. They may have a fear of medical procedures, distrust in the healthcare system, or a preference for self-diagnosis and self-care.

Innovations

1. Telemedicine services that allow patients to discuss their health concerns remotely with healthcare professionals.
2. Personalized medicine approaches that use genetic testing to tailor medication and treatment plans to individual patients.
3. Alternative therapies or natural remedies that can be considered as potential alternatives or adjustments to current medications.
4. Mobile health apps or wearable devices that can help track and monitor symptoms for discussion with healthcare professionals.
5. Health coaching services that provide guidance and support for making lifestyle changes to improve overall health.
6. Nutritional counseling services that provide personalized advice on maintaining a healthy diet and exercise routine.
7. Mental health apps or online therapy platforms that provide resources and support for addressing mental and emotional health concerns.
8. Preventive health programs or screenings that target specific illnesses or diseases based on individual risk factors.
9. Pharmacogenomics testing to identify potential medication side effects or concerns based on individual genetic profiles.
10. Sleep clinics or sleep studies that can help diagnose and address sleep-related issues or concerns.
11. Genetic testing services that can provide insight into potential inherited health risks based on family medical history.
12. Health newsletters or online portals that provide information on new medical advancements or treatments.
13. Vaccination clinics or immunization programs that offer convenient access to necessary vaccines.
14. Allergy testing services or dietary counseling to address potential allergies or intolerances.
15. Healthcare providers that prioritize preventive care and offer regular check-ups and screenings as part of a long-term health plan.

Table 3: The final set of questions and answers.

	Question A: How do you want to spend your visit with the patient
A1	Patient Visit: Give preventive care advice and recommendations.
A2	Patient Visit: Answer questions about any health-related topics or conditions asked by patient
A3	Patient Visit: Offer guidance on managing stress or improving mental well-being.
A4	Patient Visit: Develop a personalized health plan or goals for the future.
	Question B: How do you want to talk to your patient and vice versa about the patient's situation
B1	My Patient: Requests simple and easy-to-understand language.
B2	My Patient: Requests understandable medical terminology when discussing my condition.
B3	My Patient: Requests visual aids or diagrams to help explain my condition if applicable.
B4	My Patient: Wants my time (even extra time) to listen to concerns ... answers any questions patient may have.
	Question C: How would you like to be involved with your patient in designing your own health care involve you in the decision-making process when it comes to your treatment plan?
C1	My Patient: Expects the pros and cons of different treatment options and involve me in the decision-making process.
C2	My Patient: Clearly articulates preferences and values when discussing a treatment plan.
C3	My Patient: Requests and honors regular follow-up appointments to discuss progress and make necessary adjustments to treatment plan.
C4	My Patient: Offers honest feedback and satisfaction with treatment plan.
	Question D: How would you like to check your patient's progress after the office visit
D1	Visit Follow up: I provide an e-mail with a link to an online progress survey.
D2	Visit Follow up: I provide a text message asking about any changes or improvements.
D3	Visit Follow up: I provide a mobile health tracking app to monitor my progress.
D4	Visit Follow up: My nurse calls patient to discuss any updates on patient progress.

Figure 3 consists of two panels, A and B, illustrating a self-profiling classification question. Both panels contain the same introductory text: "Along with being asked for age and gender, you can ask your respondents an additional question before they begin the study. You can ask up to 8 classification questions and offer up to 8 answers for each (only 1 answer is required.) Please utilize complete sentences for your question and answers." Below the text is a large empty text box for the question. Panel A, labeled 'A', shows eight empty text boxes for answers, labeled 'Answer 1' through 'Answer 8'. Panel B, labeled 'B', shows the same form filled out. The question is "How many years have you been a medical professional". The answers are: "I'm a student, planning to start my career", "I'm in school", "I've graduated, just starting a job (less than 6 months)", "I have been a medical professional 6 months to 2 years", "I have been a medical professional 3 years - 5 years", "I have been a medical professional 6 years or longer", and two empty boxes for 'Answer 7' and 'Answer 8'. Both panels have an "Add Classification Question" button at the bottom.

Figure 3: Example of one question filled out for the self-profiling classification. Panel A shows the empty placeholder. Panel B shows the first self-profiling classification as filled out by the research. There are up to eight of these questions, each with a possible 2-8 alternative answers.

Step 5: Create the Self-profiling Questions

The personas of the synthetic respondents are created from combinations of the self-profiling questions. The underlying process is systematically one randomly selected answer from each question to create the persona. The personas were created by “Socrates as a Service™,” the

next generation of program in the Mind Genomics platform. Figure 3 shows an example of a classification question, with Panel A having no information, and Panel B showing the same template, but filled out to define the respondent. Note that the self-profiling classification allows the researcher to specify anything desired about the to-be-synthesized respondent. Table 4 shows the actual set of self-profiling questions.

Table 4: The set of self-profiling questions and answers. The personas were created from combinations of the answers.

<p>Q1: How many years have you been a medical professional 1=I'm a student, planning to start my career 2= I'm in school 3= I've graduated, just starting a job (less than 6 months) 4=I have been a medical professional 6 months to 2 years 5=I have been a medical professional 3 years-5 years 6=I have been a medical professional 6 years or longer</p> <p>Q2: What makes you dislike a patient 1=I dislike a patient who has 'attitude' 2=I dislike patient who probably won't follow orders 3=I dislike a patient when i can't help the patient .. I'm not sure why 4=I dislike patient because I may have gotten up on the wrong side of the bed when we met 5=I dislike patient because my colleagues told me some not nice things about the patient</p> <p>Q3: How long is a reasonable time with a patient 1=A reasonable time with the patient is 5 minutes 2=A reasonable time with the patient is10 minutes 3=A reasonable time with the patient is 15 minutes 4=A reasonable time with the patient is 20 minutes 5=A reasonable time with the patient is 25 minute 6=A reasonable time with the patient is 30 minutes</p> <p>Q4: What is your feeling about telehealth 1=I think telehealth destroys the closeness of the relationship with the patient 2=I think telehealth provides health care to the underserved 3=I'm thinking about using telehealth in my practice .. not sure yet</p> <p>Q5: How do you feel about the insurance companies and the medical holding companies 1=The insurance companies and the medical holding companies are simply part of the economic world-gotta get used to it 2=The insurance companies and the medical holding companies has its downsides, but the medical care is going to end up the same for patients 3=Regarding insurance companies and the medical holding companies, doctors are just ending up being 'factory workers'. To see more patients 4=Regarding insurance companies and the medical holding companies, in the end it's going to really create needed efficiencies which are not here</p> <p>Q6: How do you feel when you start the day 1=I like my job 2=I'm hoping to help a patient 3=I recognize i am doing good work, but feel run off my feet 4=I'm getting too old to do this work as well as when i was young 5=I'm dreading a day which will bring with it a tough problem ... too many of those recently</p>
--

Step 5: Create an Open-ended Question

As part of the Mind Genomics effort, the platform allows the respondent to complete two open ended questions, one before doing the evaluation of the vignettes the other after doing the evaluation of the vignette. Figure 4 shows the request for the open-ended question to be done after the synthetic respondent has 'evaluated' the 24 vignettes comprising combinations of elements or 'messages'. The normal human respondent generally has a lackadaisical attitude towards filling out these open-ended questions, unless the topic is deeply emotional, such as breast cancer. The inclusion of the open-ended question was done to explore what might emerge from AI. Those results are discussed below.

Step 6: Create the Respondent Orientation and Rating Scale

Figure 5, Panel A shows the very short respondent orientation. The Mind Genomics process has been set up with the guiding vision that the information needed to rate the vignette would be presented in the

combinations of the elements or test messages, as well as influenced by who the respondent 'IS' and how the respondent 'THINKS'. Consequently, the very short introduction simply instructs the respondent to read the vignette. Figure 5, Panel B shows the two-sided scale as presented to the researcher during the set-up. Table 5 shows the actual text of the scale, emphasizing the two sides or dimensions embedded in each scale point.

Step 7: Select the Source of Respondents

The new Mind Genomics platform, now named SaaS (Socrates as a Service™) has expanded the options to include synthetic respondents using AI. Figure 6 shows the choices. The newest choice is at the bottom, 'I want to use simulated respondents.' By making the synthetic respondent simply become another choice, the new Mind Genomics platform has created the opportunity for SaaS to become a simple, affordable teaching tool. The researcher can set up the study in the manner previously done, but 'explore' the response using AI, in order

OPEN ENDED QUESTION

You have the option to add a question for participants to answer at the end of the survey.

Normal ↕ B I 🔗

Now that you have had a chance to think about medical practioner, describe how a really good interaction with your patient would sound like.

Write three sentences please. Give us a sense of YOU. This

RESPONDENT ORIENTATION A

Use this space to tell your study respondents what the study is about. We recommend 2-3 complete sentences. Be general, not too specific.

Normal ↕ B I 🔗

Please read each vignette and tell us how you feel

⏪
⏩

RATING SCALE B

Please type the question that you would like your respondents to answer.

How do you feel about this patient interaction with you

All fields are required.

What does 1 mean on the scale?	This interaction with the pat
What does 2 mean on the scale?	This interaction with the patie
What does 3 mean on the scale?	Can't decide
What does 4 mean on the scale?	This interaction with the patie
What does 5 mean on the scale?	This interaction with the patie

Figure 5: The respondent orientation (Panel 5A), and the rating scale (Panel 5B).

Table 5: The text of the 5-point binary scale used by the synthetic respondent to rate the vignette.

Rating question:	How do you feel about this patient interaction with you
1=	This interaction with the patient is not my style AND I have negative gut feel about it
2=	This interaction with the patient is not my style... Even though I have a positive gut feel about it
3=	Can't decide
4=	This interaction with the patient is my style .. Even though I have a negative gut feel about it
5=	This interaction with the patient is my style... AND I have a positive gut feel about it

to learn. Research now becomes a tool to learn both through the combination of Idea Coach + Question Book at the start of the project, and through iterative explorations using AI in the middle or end of the project.

Step 8: Define Respondent

For studies run with people the first step in the actual evaluation consists of a very short 'hello' followed by the pull-down menu for the self-profiling classification. Figure 7 shows this pull-down menu, showing the three answers for the question 'How do you feel about the insurance companies and the medical health holding companies?'

Human respondents find this way of answering the self-profiling questions to be easy and not intimidating. When it comes to the synthetic respondents, there is no need for Step 8. The program automatically creates the personas, the synthesized combinations of the different answers, with each question contributing exactly one answer to the persona being developed.

Step 9: Create Test Vignettes by Experimental Design

A hallmark of Mind Genomics is the creation of combinations of messages, these creations being called vignettes. Rather than instructing a respondent to evaluate each of the 16 elements, the Mind

Table 6: Distribution of the five rating scale points for each selection in the self-profiling classification questionnaire.

Self-profiling questions and answers		Numbers of responses on the five-point rating scale for each answer to each self-profiling question					Percent of time each five-point rating was selected.					
My Style		No	No	?	Yes	Yes		No	No	?	Yes	Yes
Gut Feel		Neg	Pos		Neg	Pos		Neg	Pos	?	Neg	Pos
	ANS	R1x	R2x	R3x	R4x	R5x		R1x	R12x	R3x	R4x	R5x
QUEST 1	1	108	408	886	517	145		5%	20%	43%	25%	7%
	2	84	373	816	474	149		4%	20%	43%	25%	8%
	3	111	409	944	511	161		5%	19%	44%	24%	8%
	4	124	455	1029	554	190		5%	19%	44%	24%	8%
	5	114	471	1056	546	213		5%	20%	44%	23%	9%
	6	141	507	1229	721	234		5%	18%	43%	25%	8%
	7	163	555	1258	652	204		6%	20%	44%	23%	7%
	8	146	531	1169	660	206		5%	20%	43%	24%	8%
QUEST2	1	185	678	1589	875	273		5%	19%	44%	24%	8%
	2	163	696	1608	901	280		4%	19%	44%	25%	8%
	3	193	706	1663	878	304		5%	19%	44%	23%	8%
	4	197	721	1576	893	285		5%	20%	43%	24%	8%
	5	253	908	1951	1088	360		6%	20%	43%	24%	8%
QUEST3	1	174	589	1337	758	238		6%	19%	43%	24%	8%
	2	145	609	1411	772	255		5%	19%	44%	24%	8%
	3	155	612	1288	760	233		5%	20%	42%	25%	8%
	4	183	597	1413	764	235		6%	19%	44%	24%	7%
	5	187	660	1492	754	267		6%	20%	44%	22%	8%
	6	147	642	1446	827	274		4%	19%	43%	25%	8%
QUEST4	1	314	1282	2885	1620	547		5%	19%	43%	24%	8%
	2	315	1160	2610	1435	456		5%	19%	44%	24%	8%
	3	362	1267	2892	1580	499		5%	19%	44%	24%	8%
QUEST5	1	258	934	2073	1187	372		5%	19%	43%	25%	8%
	2	259	907	2026	1160	376		5%	19%	43%	25%	8%
	3	249	995	2221	1172	379		5%	20%	44%	23%	8%
	4	225	873	2067	1116	375		5%	19%	44%	24%	8%
QUEST6	1	187	786	1712	916	311		5%	20%	44%	23%	8%
	2	227	750	1733	969	329		6%	19%	43%	24%	8%
	3	207	821	1818	1009	321		5%	20%	44%	24%	8%
	4	202	769	1784	941	312		5%	19%	45%	23%	8%
	5	168	583	1340	800	229		5%	19%	43%	26%	7%
TWO MS	1	484	1827	4057	2326	738		5%	19%	43%	25%	8%
	2	507	1882	4330	2309	764		5%	19%	44%	24%	8%
THREE MS	1	362	1352	2872	1694	536		5%	20%	42%	25%	8%
	2	315	1037	2535	1370	431		6%	18%	45%	24%	8%
	3	314	1320	2980	1571	535		5%	20%	44%	23%	8%

Now that you have published your study, you need respondents! You can choose to find respondents yourself, or you could use our sourcing services or a custom service to provide respondents for your study.

Remember, studies made through the Socrates as a Service platform are FREE. You pay only the per respondent processing fee. If you want your study privatized, there is an additional fee for that. Other costs may be incurred when you require the translation and programming of the standard respondent instruction pages into a new language, as well as handling fees for non-credit billing, or specialized recruiting of respondents.

The screenshot shows five buttons for sourcing respondents, each with a question mark icon to its right:

- I want Socrates as a Service to provide respondents (general population)
- I want a custom sample of respondents from Socrates as a Service
- I want to use a third-party service or explore more custom sampling options
- I will source myself
- I want to use simulated respondents

Figure 6: Screen shot showing how the researcher can source 'respondents'.

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Thank you for participating. Please answer the following questions about yourself. This information will only be used for this study, and will not be given to any marketers for sales purposes.

Age	Choose	▼
What year were you born?	I.e. 1948	
Gender identification	Choose	▼
How many years have you been a medical professional	Choose	▼
What makes you dislike a patient	Choose	▼
How long is a reasonable time with a patient	Choose	▼
What is your feeling about telehealth	Choose	▼
How do you feel about The insurance companies and the medical holding companies	Choose	▼
How do you feel when you start the day	The insurance companies and the medical holding companies are simply part of the economic world - gotta get used to it	
I understand that the information I give will not be used to identify me and I will not be asked to provide private information which can identify me	The insurance companies and the medical holding companies has its downsides but the medical care is going to end up the same for patients	
	Regarding insurance companies and the medical holding companies, doctors are just ending up being 'factory workers'..to see more patients	
	Regarding insurance companies and the medical holding companies, in the end it's going to really create needed efficiencies which are not here	

Figure 7: The pull-down menu for self-profiling classification, used for human respondents, but not for synthetic respondents.

Genomics strategy is to combine these elements into small, easy-to-read combinations. There is no effort to link the elements together, an effort which would backfire because the ensuing paragraph of linked elements would contain too much connective material, verbal plaque, as it were.

The actual vignettes are created by an underlying experiment design which ensures that the 16 elements appear equally often (5x in a set of 24 vignettes). Furthermore, no vignette ever has more than one element or answer from a question, but many vignettes have only two or three answers, with other questions failing to contribute to the vignette. Finally, each respondent evaluates a mathematically equivalent set of vignettes by the permutation process, but the actual combinations evaluated by the individual respondents differ from one respondent to another [8].

The foregoing strategy lies at the basis of Mind Genomics. It becomes virtually impossible to game the system because the combinations are overwhelming. The real focus is on the performance of the individual elements. The vignettes are only the way to get the elements in front of the respondent in a way which resembles the seemingly discordant nature of everyday experience. Quite often exit interviews with respondents as well as discussions with professionals end up with the ‘complaint’ that it was simply impossible to figure out the; right answer’, an effect which mildly irritates people, but all too often infuriates academics.

Step 10: Present the 24 Vignettes for a Respondent to the AI and Obtain a Rating on the Five-point Scale

The AI system proceeds by creating a prompt for each vignette. The first part of the prompt defines WHO the respondent is. The respondent is some randomized combinations of answers from the six self-profiling classifications, with each answer appearing approximately equally often across the 801 respondents. This first part of Step 10 will produce a constant persona across the 24 vignettes.

The second part of Step 10 presents the rating question and scale to the AI. This second part of step 10 will produce a constant rating question and set of answers across the 24 vignettes for the synthesized persona.

The third part of Step 10 presents the AI with the vignette. The AI is instructed to assume the persona, to read the scale, and then to rate the vignette on the scale by choosing one of the five answers.

The actual study is now run, the total time for 801 respondents lasting 15-30 minutes. The time may be substantially shorter, but there is extensive back and forth with the AI modules and provider.

Step 11: Uncover the Distribution of the Five-point Scale Ratings across the Set of All Self-profiling Scales

At the end of the process, we can look at the distribution of the ratings across the groups synthetic respondents, these groups defined by the how the synthetic respondent ‘identifies itself’. Table 6 shows a remarkable consistency across the different self-profiling groups. If we were to stop here, we would conclude that there is no discernible difference across the different self-profiling groups, and thus the effort

to create synthetic respondents at this stage of AI development has failed. We would, however, be quite wrong in that conclusion, as the further tables will show.

Step 12: Transform the Ratings into Binary Variables

A now-standard practice in Mind Genomics is to transform the rating scale. The rating scale created here provides two dimensions. Our focus here is on simulating the positive response ‘My style’, corresponding to the combination or union of ratings 5 and 4, respectively. The transformation makes ratings of 5 or 4 equal to 100, and in turn ratings of 1,2 or 3 equal to 0. To each newly transformed variable, now called R54x, is added a vanishingly small number (<10⁻⁴). This prophylactic step ensures some minimum level of variation in R54x, which will become a dependent variable in OLS (ordinary least-squares regression), discussed in Step 11. For other analyses, the system or the researcher can create different binary variables, such as R52X, a positive gut feel.

Step 13: Relate the Presence/Absence of the 16 Elements to the Newly Developed Binary Variables

Table 7 shows the coefficients for the equations relating the presence/absence of each element to the following dependent variables, which have been coded 0 or 100.

- R1x-Rating of 1 coded 100, ratings of 2, 3, 4 or 5 coded 0
- R2x-Rating of 2 coded 100, ratings of 1, 3, 4 or 5 coded 0
- R3x-Rating of 3 coded 100, ratings of 1, 2, 4 or 5 coded 0
- R4x-Rating of 4 coded 100, ratings of 1, 2, 3, or 5 coded 0
- R5x-Rating of 5 coded 100, rating of 1, 2, 3 or 4 coded 0

Table 7: Coefficients for the Total Panel (801 respondents x 24 vignettes each).

	Dependent variable generated by AI									
	R1X	R2X	R3X	R4X	R5X	R54X	R52X	R41X	R21X	RT
A1	1	6	13	7	2	9	7	8	7	0.6
A2	1	5	13	8	1	9	6	9	6	0.6
A3	1	6	12	8	1	9	7	8	6	0.6
A4	1	5	13	8	2	9	7	9	6	0.6
B1	2	6	12	8	2	10	9	10	8	0.7
B2	2	6	12	7	3	10	9	9	8	0.7
B3	2	6	12	8	3	10	9	9	8	0.7
B4	2	7	11	8	3	10	10	10	9	0.7
C1	1	6	13	6	4	10	10	7	7	0.7
C2	1	5	14	7	3	9	8	8	7	0.7
C3	2	5	15	6	2	8	7	8	7	0.7
C4	2	6	13	7	3	10	9	9	8	0.7
D1	2	6	12	6	3	9	8	8	8	0.6
D2	2	5	13	6	2	8	7	8	7	0.6
D3	2	4	13	6	2	8	6	8	6	0.6
D4	2	4	13	7	3	10	7	9	6	0.6

R54x-Ratings of 5 or 4 coded 100, ratings of 1, 2 or 3 coded 0

R52x-Ratings of 5 or 2 coded 100, ratings of 4, 3 or 1 coded 0

R21z-Ratings of 2 or 1 coded 100, ratings of 5, 4 or 3 coded 0

R41x-Ratings of 4 or 1 coded 100, ratings of 5, 3, or 2 coded 0

RT-Response time-with human being defined as the number of seconds elapsing between the presentation of the vignette and the response. Not definable for AI, although measurable.

It is clear from Table 7 that the coefficients within a column are quite similar to each other. There are some variations, but remarkably little. Furthermore, the answers seem to make intuitive sense. It does not pay to analyze each set of numbers, however, because within a column the numbers are simply too close. Finally, there is a response time emerging, although it is not clear what that means. The RT, response time, is measured in terms of seconds between the presentation of the vignette and the respondent's rating. All response times are low, around 0.6, but do not know what is occurring.

Step 14: Show the Linkage between Elements and R54 for Different Levels of Each Persona Variable

A slightly more nuanced picture emerges when the total panel results are broken up into separate persona 'levels.' Table 4 shows the six different self-profiling questions, and the answers to each. Tables 8A-8F show the strong performing elements for each persona 'level.' Each table, Tables 8A-Table 8F, corresponds to one of the six self-profiling questions. The columns correspond to the answers. The coefficients are strong performing values for element, with 'strong performing' operationally defined as a coefficient of +14 or higher.

The development of Tables 8A-8F is straightforward, consisting of the isolation of the vignettes showing the specified persona option, and then running the OLS (ordinary least-squares) regression for all the cases having the appropriate self-profiling answer. Each table has a base size, referring to the number of respondents in the simulated set of 801 who are assigned the particular answer. Thus, in Table 8A, for example, 86 respondents were assigned to the answer 1 of question 1,

Table 8A: Strong performing elements for persona Q1: How many years have you been a medical professional.

	Base Size	86	79	89	98	100	118
B1	My Patient: Requests simple and easy-to-understand language.			14			
C4	My Patient: Offers honest feedback and satisfaction with treatment plan.		14				

Table 8B: Strong performing elements for persona Q2: What makes you dislike a patient?

	Q2: What makes you dislike a patient? 1=I dislike a patient who has 'attitude' 2=I dislike patient who probably won't follow orders 3=I dislike a patient when i can't help the patient .. I'm not sure why 4=I dislike patient because I may have gotten up on the wrong side of the bed when we met 5=I dislike patient because my colleagues told me some not nice things about the patient	I dislike a patient who has 'attitude'	I dislike patient who probably won't follow orders	I dislike a patient whom i can't help the patient .. I'm not sure why	I dislike patient because I may have gotten up on the wrong side of the bed when we met	I dislike patient because my colleagues told me some not nice things about the patient
	Base Size	150	152	156	153	190
A4	Patient Visit: Develop a personalized health plan or goals for the future.		15			
B4	My Patient: Wants my time (even extra time) to listen to concerns ... answers any questions patient may have.				15	

Table 8C: Strong performing elements for persona Q3: How long is a reasonable time with a patient?

	Q3: How long is a reasonable time with a patient? 1=A reasonable time with the patient is 5 minutes 2=A reasonable time with the patient is 10 minutes 3=A reasonable time with the patient is 15 minutes 4=A reasonable time with the patient is 20 minutes 5=A reasonable time with the patient is 25 minute 6=A reasonable time with the patient is 30 minutes	A reasonable time with the patient is minutes	A reasonable time with the patient is 10 minutes	A reasonable time with the patient is 15 minutes	A reasonable time with the patient is 20 minutes	A reasonable time with the patient is 25 minutes	A reasonable time with the patient is 30 minutes
	Base Size	129	133	127	133	140	139
A2	Patient Visit: Answer questions about any health-related topics or conditions Asked by patient				14		
B1	My Patient: Requests simple and easy-to-understand language.			14	14		
B2	My Patient: Requests understandable medical terminology when discussing my condition.		14				
C2	My Patient: Clearly articulates preferences and values when discussing a treatment plan.	14					

Table 8D: Strong performing elements for persona Q4: What is your feeling about telehealth. No strong performing elements emerged.

	Q4: What is your feeling about telehealth? 1=I think telehealth destroys the closeness of the relationship with the patient 2=I think telehealth provides health care to the underserved 3=I'm thinking about using telehealth in my practice.. not sure yet	I think telehealth destroys the closeness of the relationship with the patient	I think telehealth provides health care to the underserved	I'm thinking about using telehealth in my practice.. not sure yet
Base Size		277	249	275

Table 8E: Strong performing elements for persona Q5: How do you feel about the insurance companies and the medical holding companies.

	Q5: How do you feel about the insurance companies and the medical holding companies? 1=The insurance companies and the medical holding companies are simply part of the economic world-gotta get used to it 2=The insurance companies and the medical holding companies has its downsides, but the medical care is going to end up the same for patients 3=Regarding insurance companies and the medical holding companies, doctors are just ending up being 'factory workers'. To see more patients 4=Regarding insurance companies and the medical holding companies, in the end it's going to really create needed efficiencies which are not here	The insurance companies and the medical holding companies are simply part of the economic world-gotta get used to it	The insurance companies and the medical holding companies has its downsides, but the medical care is going to end up the same for patients	Regarding insurance companies and the medical holding companies, doctors are just ending up being 'factory workers'. To see more patients	Regarding insurance companies and the medical holding companies, in the end it's going to really create needed efficiencies which are not here
Base Size		201	197	209	194
A3	Patient Visit: Offer guidance on managing stress or improving mental well-being.	15			
A4	Patient Visit: Develop a personalized health plan or goals for the future.	16			
C1	My Patient: Expects the pros and cons of different treatment options and involve me in the decision-making process.				14

Table 8F: Strong performing elements for persona Q6: How do you feel when you start the day.

	Q6: How do you feel when you start the day 1=I like my job 2=I'm hoping to help a patient 3=I recognize i am doing good work, but feel run off my feet 4=I'm getting too old to do this work as well as when i was young 5=I'm dreading a day which will bring with it a tough problem ... too many of those recently	I like my job	I'm hoping to help a patient	I recognize i am doing good works, but feel run off my feet	I'm getting too old to do this work as well as when i was young	I'm dreading a day which will bring with it a tough problem ... too many of those recently
Base Size		163	167	174	167	130
B1	My Patient: Requests simple and easy-to-understand language.		14			14
B3	My Patient: Requests visual aids or diagrams to help explain my condition if applicable.					15
C4	My Patient: Offers honest feedback and satisfaction with treatment plan.				15	

namely: How many years have you been a medical professional, with the answer 1, 'I'm a student, planning to start my career.'

The OLS regression [9] returns return with coefficients for each cell, based upon the rating: $R54 = k_1A1 k_2A2 \dots k_{16}A16$. The result is a wall of numbers. Table 7 suggests that the highest coefficient for R54 for the total panel is 10. Therefore, Tables 8A-AF shows only those coefficients of 14 or higher. Furthermore, Tables 8A-8F shows only those elements which have at least one coefficient of 14 in a row. This stringent criterion substantially reduces the number of data points that need to be considered.

Our initial results here suggest that there are coefficients higher than others, although not many of them. Nor is the underlying story particularly clear. Finally, the highest coefficient is 17, hardly as strong

as the results obtained with human beings, but yet suggesting that AI can differentiate among elements based upon the persona created.

Step 15: Create Mind-sets from Synthesized Respondent Data

Our final analysis for this study considers the existence of mind-sets, different ways of looking at the data. When Mind Genomics is executed with human respondents there is an almost universal emergence of mind-sets, with perhaps the exception of 'murder' [6].

When Mind Genomics data are clustered together on the basis of the coefficients, generally the meaning of the mind-sets becomes exceptionally clear, even though the process of creating mind-sets does not use any interpretation of the data. Rather, the process to create mind-sets is clustering, with the process easy to do with conventional

data, and now just as easy to do with synthesized data. The process uses k-means clusters [11,12], and a measure of 'distance' between two objects (e.g., between two synthesized persons) defined as (1-Pearson R). The Pearson R, the correlation coefficient, shows the degree to which two sets of numbers co-vary. When the 16 coefficients of the two synthesized people co-vary perfectly, they are considered to be in the same mind-set, the Pearson R is 1.00, and the distance is 0. When they 16 coefficients vary perfectly inversely with each other, they are considered to be in different mind-sets, the Pearson R is -1, and the distance is 2.0.

Moving now to the results from the k-means clustering at the top of Table 9, we see coefficients around 9-11 for the total panel, coefficients 0-22 for two clusters or mindsets but not many high coefficients of 21+, and three mind-sets emerging from three clusters, two of the mind-sets being strong, with a number of coefficients 21 or higher. The value 21 has been chosen for simplicity, based upon observations over a two-year period working with human respondents in different topics.

When we apply the criterion of 21 or higher we end up with three mind-sets, two of which show the requisite value of coefficients 21 or higher (Mind-Sets 2 of 3 and 3 of 3, respectively).

Mind-Set 1 of 3-Focus on the process of the visit (but no truly strong elements)

Mind-Set 2 of 3-"Intervention-focused Patients"

Mind-Set 3 of 3-Engaged and collaborative patients.

The three mind-sets can be interpreted more deeply through AI, using the same set of prompts as we used to summarize the ideas on each page of questions (see Table 1) and each page of answers (see Table 2). Table 10 shows the summarization for Mind-Sets 2 of 3 and 3 of 3, respectively. The summarization is based on the commonalities of all elements with coefficients of 21 or higher. Mind-Set 1 of 3 fails to meet that minimum level, and therefore the Idea Coach Summarizer was not applied.

Step 16: How well does the AI Perform When Synthesizing Respondents?

A continuing effort in Mind Genomics is the attempt to increase critical thinking. How does one measure critical thinking, however, and more importantly, how can one set up criteria to assess the development of critical thinking. One way to assess such thinking is by looking at the set of positive coefficients for the total panel, for the two mind-set solutions, and for the three mind-set solutions. The objective is to create elements with high coefficients, but also elements which are very high in one mind-set, but low in the in other mind-sets. Thus, higher may not be better because the elements do not score differently

Table 9: Coefficients for the total panel, and for the two and three mind-set groupings. Strong performing coefficients (21 or higher) are shown in shaded cells. Coefficients with negative or 0 values are not shown.

	Total	Mindset 1 of 2	Mindset 2 of 2	Mindset 1 of 3	Mindset 2 of 3	Mindset 3 of 3
Base (number of respondents in this group)	801	393	408	284	237	280
Mind-Set 1 of 3 - Focus on the process of the visit						
Visit Follow up: My nurse calls patient to discuss any updates on patient progress.	10	18	3	19	9	2
My Patient: Wants my time (even extra time) to listen to concerns ... answers any questions patient may have.	10	15	6	18	17	
My Patient: Requests simple and easy-to-understand language.	11	16	5	18	16	
My Patient: Requests understandable medical terminology when discussing my condition.	10	15	5	18	15	
Mind-Set 2 of 3 - "Intervention-focused Patients"						
Patient Visit: Offer guidance on managing stress or improving mental well-being.	9		22		22	15
Patient Visit: Develop a personalized health plan or goals for the future.	10		22		21	17
Mind-Set 3 of 3 - Engaged and collaborative patients						
My Patient: Offers honest feedback and satisfaction with treatment plan.	10	12	8	11		23
My Patient: Clearly articulates preferences and values when discussing a treatment plan.	10	11	8	12		22
My Patient: Expects the pros and cons of different treatment options and involve me in the decision-making process.	10	14	6	13		21
My Patient: Requests and honors regular follow-up appointments to discuss progress and make necessary adjustments to treatment plan.	8	10	7	11		21
Not strong for any of the three mind-sets						
Patient Visit: Give preventive care advice and recommendations.	9		21		20	16
Patient Visit: Answer questions about any health-related topics or conditions Asked by patient	9		20		18	15
Visit Follow up: I provide an e-mail with a link to an online progress survey.	9	15	3	16	9	2
Visit Follow up: I provide a text message asking about any changes or improvements.	8	14	2	14	8	1
My Patient: Requests visual aids or diagrams to help explain my condition if applicable.	11	15	6	16	17	
Visit Follow up: I provide am mobile health tracking app to monitor my progress.	8	14	2	14	11	

Table 10: Summarization by Idea Coach (AI) of the strong performing elements for Mind-Sets 2 of 3 and 3 of 3. The names of the mind-sets were also suggested by AI.

<p>Mindset 1 of 3 - Top -No elements generate coefficients of 21 or higher, and so no interpretation</p> <p>Mindset 2 of 3-Top</p> <p>The following is a description of attributes from the total sample of a research study. Interested in: Patient Visit: Offer guidance on managing stress or improving mental well-being.; Patient Visit: Develop a personalized health plan or goals for the future.</p> <p>Create a label for this segment: "Intervention-focused Patients"</p> <p>Describe this segment: This segment of the total sample of the research study is focused on patients who have indicated a need for guidance on managing stress or improving their mental well-being during their patient visits. They are seeking support and assistance in coping with stress or enhancing their overall mental wellness. Furthermore, these patients also desire to have a personalized health plan or goals developed for their future healthcare needs during their visits. They believe in the importance of individualized care and want to work towards customized health objectives for themselves.</p> <p>Describe the attractiveness of this segment as a target audience: The segment of patients who are interested in receiving guidance on managing stress or improving mental well-being, as well as developing personalized health plans or goals for the future, can be considered an attractive target audience.</p> <p>This segment indicates a proactive approach towards their health and well-being, showing a willingness to actively participate in their healthcare. They may be seeking support and guidance to address and manage stress, indicating an awareness of the importance of mental well-being.</p> <p>Moreover, their interest in developing personalized health plans or goals demonstrates a desire for individualized and tailored approaches to healthcare. This indicates a higher level of engagement with their healthcare providers and an openness to long-term planning and commitment towards their health.</p> <p>This segment's focus on both mental well-being and personalized health planning suggests a holistic approach to healthcare. They may be more receptive to interventions that address both physical and mental aspects of their well-being.</p> <p>Considering these characteristics, this segment may be more likely to engage in proactive health behaviors, adhere to treatment plans, and actively seek resources and support to improve their overall health and well-being. Their receptiveness to guidance and goal setting also suggests that they may be more open to behavior changes and interventions suggested by healthcare providers.</p> <p>Overall, the attractiveness of this segment lies in their proactive mindset, openness to personalized health planning, and priorities towards mental well-being. These attributes indicate a potential receptiveness to healthcare interventions and a higher likelihood of engaging in behaviors that promote long-term health and well-being.</p> <p>Explain why this segment might not be attractive as a target audience: There are a few reasons why this segment might not be attractive as a target audience:</p> <ol style="list-style-type: none">1) Lack of interest or motivation: This segment may not be interested in actively managing their stress or improving their mental well-being. They may not prioritize their mental health or see it as a key concern.2) Limited willingness to invest time and effort: Developing a personalized health plan or setting goals for the future requires a certain level of commitment and effort. This segment may not be motivated to invest time or energy into these activities.3) Low perceived value: This segment may not see the value in guidance for managing stress or developing a health plan. They may not believe that it will significantly impact their well-being or overall health outcomes.4) Pre-existing coping mechanisms: This segment may already have effective coping mechanisms in place to manage their stress or mental well-being. They may feel that they do not need additional guidance or support in these areas.5) Medical focus: This segment may prioritize medical treatments or solutions rather than focusing on holistic approaches to health and well-being. They may be more interested in addressing physical health concerns rather than mental well-being. <p>Overall, these factors indicate that this segment may not be receptive to or prioritize the interventions offered, making them less attractive as a target audience for the specific services mentioned.</p> <p>List what is missing or should be known about this segment, in question form:</p> <ol style="list-style-type: none">1. Are there specific demographics or patient characteristics that are more likely to seek guidance on managing stress or improving mental well-being during a patient visit?2. What are the main sources of stress that patients in this segment typically experience?3. How effective are the guidance or interventions offered during the patient visit in improving patients' mental well-being?4. What are the most common mental health issues or conditions experienced by patients seeking guidance in managing stress or improving mental well-being?5. Are there any specific methods or techniques used during the patient visit to help patients manage stress or improve mental well-being?6. What are the factors influencing patients' willingness to engage in the development of a personalized health plan or goals for the future during a patient visit?7. How successful are the personalized health plans or goals developed during the patient visit in improving patients' overall health outcomes?8. Are there any specific resources or tools provided to patients to support the achievement of their personalized health plans or goals?9. How frequently should patients revisit or follow up on their personalized health plans or goals?10. Are there any differences in the response to personalized health plans or goal development based on the severity of patients' existing health conditions? <p>List and briefly describe attractive new or innovative products, services, experiences, or policies for this segment:</p> <ol style="list-style-type: none">1. Mobile Mental Health Apps: With the increasing use of smartphones, mobile mental health apps can offer convenient and accessible guidance in managing stress and improving mental well-being. These apps can provide self-help techniques, meditation exercises, stress management tools, and personalized mental health plans.2. Telemedicine Services: Telemedicine allows patients to connect with healthcare professionals remotely and seek guidance on managing stress or improving mental well-being from the comfort of their own homes. This approach eliminates the need for in-person visits and provides convenience and accessibility to patients.
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3. **Virtual Reality Therapies:** Virtual reality therapies are an innovative approach to managing stress and improving mental well-being. These therapies involve immersive experiences that offer guided relaxation, exposure therapy, or stress-reducing activities in virtual environments, providing a unique and engaging way to address mental health concerns.
4. **Personalized Health Apps:** These apps can assist in developing personalized health plans or setting goals for the future. By incorporating data from wearable devices, such as fitness trackers, these apps can provide personalized recommendations for exercise, nutrition, and wellness activities, giving patients a sense of empowerment and ownership over their health.
5. **Workplace Wellness Programs:** Innovative workplace wellness programs can focus on stress management and mental well-being. These programs can include mindfulness workshops, meditation sessions, mental health awareness campaigns, and employee assistance programs, promoting a positive and supportive work environment.
6. **Community Support Programs:** Creating community-based support programs that focus on mental well-being and stress management can provide a supportive network for individuals facing mental health challenges. These programs can offer group therapy sessions, peer support groups, and educational workshops, fostering a sense of belonging and reducing stigma.
7. **Online Mental Health Platforms:** Online mental health platforms can provide individuals with access to licensed mental health professionals through video consultations or chat services. These platforms can offer personalized counseling, therapy sessions, and mental health resources, ensuring individuals receive the support they need, regardless of geographical location.
8. **Mindfulness-Based Stress Reduction Programs:** Mindfulness-based stress reduction programs combine meditation, yoga, and cognitive therapy techniques to help individuals manage stress and improve mental well-being. These programs can be offered through workshops, classes, or online platforms, providing individuals with practical tools to cope with stressors in their daily lives.

Which messages will interest this segment?

The following messages may interest this segment:

1. "Discover effective stress management techniques and improve your mental well-being with our expert guidance during your patient visit."
2. "Enhance your overall health and well-being with a personalized health plan or future goals developed specifically for you during your patient visit."
3. "Take control of your stress levels and achieve a healthier mind and body with our assistance during your patient visit."
4. "Empower yourself with a personalized health plan that will help you set and achieve realistic goals for a brighter future during your patient visit."
5. "Prioritize your mental well-being and receive support in developing a customized health plan that aligns with your goals during your patient visit."

These messages highlight the benefits and outcomes that this segment can expect during their patient visit, emphasizing stress management, improved mental well-being, personalized health plans, and goal setting for a healthier future.

Mindset 3 of 3-Top

The following is a description of attributes from the total sample of a research study. Interested in:

My Patient: Expects the pros and cons of different treatment options and involve me in the decision-making process.; My Patient: Clearly articulates preferences and values when discussing a treatment plan.; My Patient: Requests and honors regular follow-up appointments to discuss progress and make necessary adjustments to treatment plan.; My Patient: Offers honest feedback and satisfaction with treatment plan..

Create a label for this segment:

Engaged and Collaborative Patients

Describe this segment:

This segment of patients can be described as proactive and engaged in their healthcare. They are actively involved in the decision-making process and value being informed about the potential benefits and drawbacks of different treatment options. They effectively communicate their preferences and values when discussing treatment plans, indicating a strong desire for personalized care. They also recognize the importance of regular follow-up appointments to assess progress and make necessary adjustments to the treatment plan. Moreover, they provide honest feedback and express satisfaction with the treatment plan, showing their commitment to their own well-being.

Describe the attractiveness of this segment as a target audience:

This segment, consisting of patients who expect the pros and cons of different treatment options to be discussed and want to be involved in the decision-making process, is highly attractive as a target audience. Their focus on being well-informed and actively participating in their treatment plan indicates a high level of engagement and motivation in managing their health.

Patients who clearly articulate their preferences and values during treatment plan discussions are more likely to have a strong sense of ownership and investment in their healthcare decisions. This suggests a higher likelihood of adherence to treatment recommendations and better overall outcomes.

The segment's request for regular follow-up appointments to discuss progress and make necessary adjustments to the treatment plan further highlights their commitment to ongoing monitoring and optimization of their health. This level of proactive involvement is indicative of a segment that is invested in achieving the best possible outcomes.

Lastly, their willingness to provide honest feedback and express satisfaction with the treatment plan demonstrates a desire for open communication and a collaborative relationship with healthcare providers. This segment is likely to be responsive to feedback and open to making necessary adjustments to improve their treatment experience.

Overall, this segment's proactive and engaged approach towards their healthcare, along with their emphasis on collaborative decision-making and regular communication, makes them an attractive target audience for healthcare providers.

Explain why this segment might not be attractive as a target audience:

This segment might not be attractive as a target audience because they have high expectations, are actively involved in the decision-making process, and regularly request follow-up appointments for adjustments to the treatment plan. These characteristics indicate that they require significant time and attention from healthcare providers. From a business perspective, targeting this segment may result in higher costs due to the increased communication and interactions needed to meet their expectations. Additionally, their high level of involvement and expectation for customization might also make it challenging to provide a standardized and efficient treatment approach.

List what is missing or should be known about this segment, in question form:

1. Does the patient have any specific treatment options in mind that they are interested in exploring?
2. How involved does the patient want to be in the decision-making process? Do they want to actively contribute to the decision or prefer to be guided by the healthcare provider?
3. Are there any particular preferences or values that the patient has mentioned when discussing their treatment plan?
4. How often does the patient prefer to have follow-up appointments to discuss progress and adjust? Is there a specific timeframe that they prefer?
5. Are there any specific factors or criteria that the patient considers when providing feedback and evaluating their satisfaction with the treatment plan?

List and briefly describe attractive new or innovative products, services, experiences, or policies for this segment:

1. Decision-making support tools: Development of interactive software or mobile applications that provide comprehensive information on different treatment options, including their pros and cons. These tools could also help patients in discussing their preferences and values with their healthcare providers, facilitating shared decision-making.
2. Personalized treatment plans: Implementing personalized medicine approaches that consider patients' preferences and values when designing treatment plans. This could involve tailoring medication dosages, treatment schedules, or therapies to meet individual needs and goals.
3. Telehealth services: Offering telehealth platforms that allow patients to have regular follow-up appointments with their healthcare providers via video calls or messaging. This enables continuous communication and adjustments to the treatment plan, promoting convenience and adherence.
4. Patient satisfaction survey tools: Developing user-friendly tools or surveys that measure patient satisfaction and gather honest feedback regarding their treatment plans. This information can help healthcare providers identify areas for improvement and make necessary adjustments to enhance patient experience.
5. Collaborative decision-making platforms: Creating online platforms or forums where patients can access information, share experiences, and engage in discussions with other patients and healthcare professionals. This can provide a supportive community and empower patients to participate actively in decision-making processes.
6. Personal health trackers: Integrating wearable devices or mobile applications that enable patients to track their progress, monitor treatment outcomes, and provide valuable data to healthcare providers. This way, patients can be actively involved in their treatment plans and have a better understanding of how their decisions impact their health.
7. Patient education resources: Developing easily accessible and understandable educational materials, such as videos, brochures, or online courses, which provide patients with comprehensive information about their conditions, treatment options, and potential outcomes. This empowers patients to make informed decisions and actively engage in their treatment plans.

These attractive new products, services, experiences, or policies aim to enhance patient involvement, satisfaction, and communication in the treatment decision-making process. By providing patients with the necessary tools, support, and information, healthcare providers can create a more patient-centered approach, improving treatment outcomes and overall patient experience.

Table 11: Computation specifics of the IDT, Index of Divergent Thought. A value between 68 and 72 may be optimal.

	Total	Mindset 1 of 2	Mindset 2 of 2	Mindset 1 of 3	Mindset 2 of 3	Mindset 3 of 3
Calculation of the IDT - Index of Divergent Thought						
Sum Total of Squares of All Positive Coefficients	1458	2433	2170	2792	3055	2899
Average of All Positive Coefficients (sum coefficients/base)	2	6	5	10	13	10
Number of respondents in the column (in the subgroup)	801	393	408	284	237	280
Weight = Proportion of the respondents in the subgroup	0.33	0.16	0.17	0.12	0.10	0.12
Weighted Total (Weight x Sum Total of Squares of All Positive Coefficients)	481	389	369	335	306	348
Final Score = sum of weighted total	2228					
IDT	47					

across the mind-sets. Some preliminary simulation suggest that strong performance occurs with an IDT value of 68-72. The IDT is the Index of Divergent Thought, shown in Table 11. The table shows the relevant parameters to compute the IDT.

The results from this study and from several other parallel studies of the same type (doctor-patient) suggest that the IDT values for synthesized data are lower than what are obtained from people. That is, the synthetic respondents do generate easy-to-interpret mind-sets, but the inner structure is not as strong, based upon the IDT of 47 rather than the IDT's of 70 often observed in the simplest of these Mind Genomics studies. In other words, synthetic respondents give answers, but the 'deep structure' is somehow not quite 'human'.

Discussion and Conclusions

The appetite for AI as synthetic 'people' is increasing daily. Whether the topic be social issues [1], health [13], or politics [14] there appears to be a one-way push towards more sophistication in the application. We no longer question the utility or even the 'validity' of synthetic people. Rather, the focus is on the improvement of the application. Towards that goal of improvement, the study reported here suggests a new application, namely the use of AI to explore medical issues involving stated specifics of the doctor-patient interaction. The potential for Mind Genomics in this area is as yet unknown, but one might imagine doctors using Mind Genomics with synthetic patients to learn how to interact with patients. It may well be that the years

of experience of a doctor in the so-called 'bedside manner' might be quickly learned with AI. Only time will tell, but fortunately the use of Socrates as a Service™ may well shorten that time for learning.

References

1. Bryson JJ, Diamantis ME, Grant TD (2017) Of, for, and by the people: the legal lacuna of synthetic persons. *Artificial Intelligence and Law* 273-291.
2. Kirk RE (2009) Experimental design. Sage handbook of quantitative methods in psychology, pp. 23-45.
3. Moskowitz HR (2012) 'Mind genomics': The experimental, inductive science of the ordinary, and its application to aspects of food and feeding. *Physiology & Behavior* 107: 606-613. [[crossref](#)]
4. Moskowitz HR, Gofman A, Beckley J, Ashman H (2006) Founding a new science: Mind genomics. *Journal of Sensory Studies* 21: 266-307.
5. Moskowitz H, Sciacca A, Lester A (2018) I'd like to teach the world to think: Mind Genomics, big mind, and encouraging youth. In: *Harnessing Human Capital Analytics for Competitive Advantage, IGI Global*, pp. 55-90.
6. Moskowitz HR, Wren J, Papajorgji P (2020) *Mind Genomics and the Law. LAP LAMBERT Academic Publishing.*
7. Moskowitz H, Kover A, Papajorgji P (eds.) (2022) *Applying Mind Genomics to Social Sciences. IGI Global.*
8. Gofman A, Moskowitz H (2010) Isomorphic permuted experimental designs and their application in conjoint analysis. *Journal of Sensory Studies* 25: 127-145.
9. Abdullah M, Madain A, Jararweh Y (2022) ChatGPT: Fundamentals, applications and social impacts. In 2022 Ninth International Conference on Social Networks Analysis, Management and Security (SNAMS) (1-8) IEEE. November
10. Spitale G, Biller-Andorno N, Germani F (2023) AI model GPT-3 (dis) informs us better than humans. arXiv preprint arXiv: 2301.11924. *sci adv* [[crossref](#)]
11. Burton AL (2021) OLS (Linear) regression. *The encyclopedia of research methods in criminology and Criminal Justice* 2: 509-514.
12. Likas A, Vlassis N, Verbeek JJ (2003) The global k-means clustering algorithm. *Pattern Recognition* 36: 451-461.
13. Loong B, Zaslavsky AM, He Y, Harrington DP (2013) Disclosure control using partially synthetic data for large-scale health surveys, with applications to CanCORS. *Statistics in Medicine* 32: 4139-4161. [[crossref](#)]
14. Sanders NE, Ulinich A, Schneier B (2023) Demonstrations of the potential of AI-based political issue polling. arXiv preprint arXiv: 2307.04781.

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