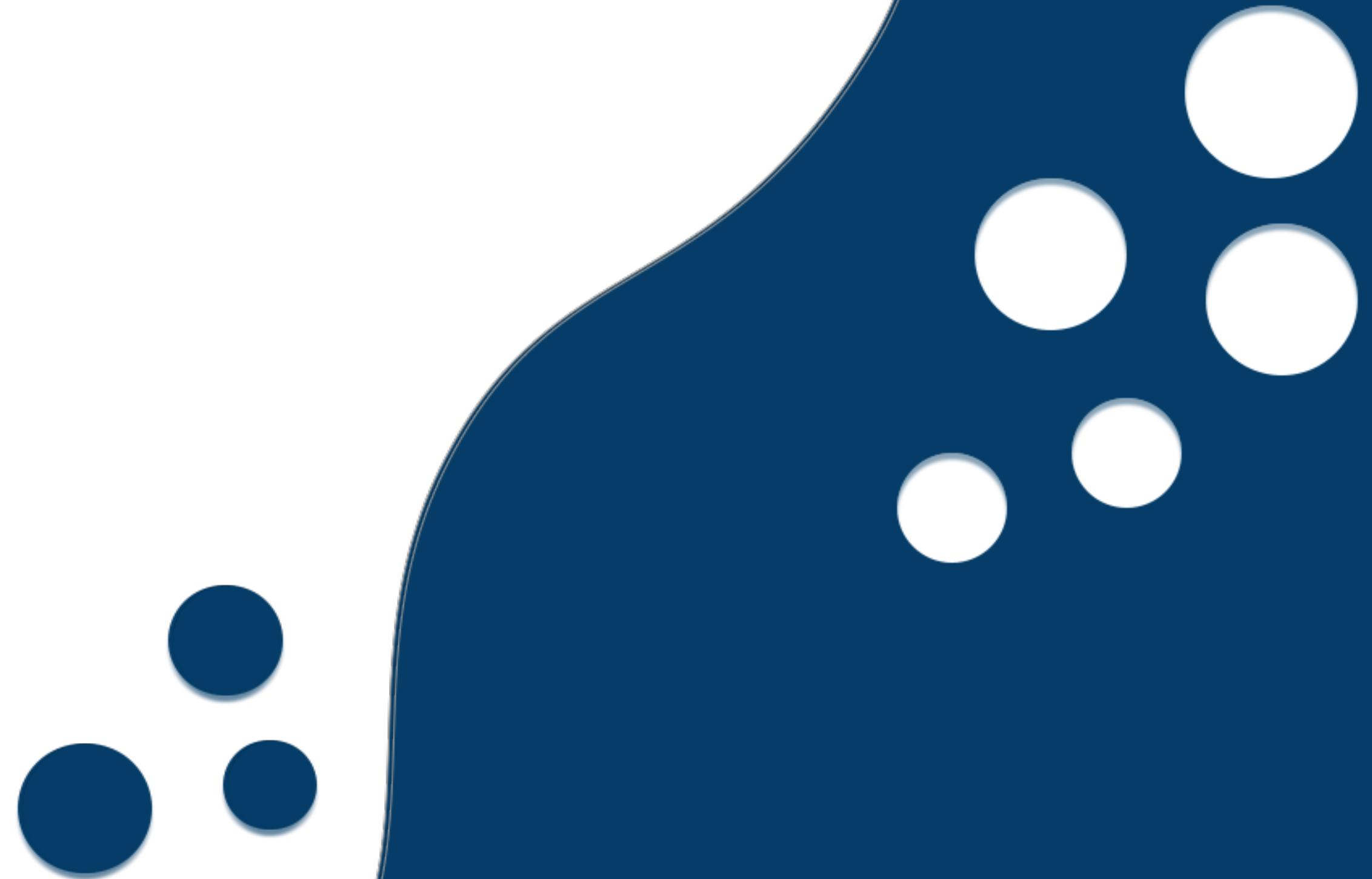


QEESI

USABILITY REPORT

Prepared by

Darian Gleghorn
Martha Clark
Stephen Spencer
Ssu-Ting Wang
Yuqing Chen



Client Kickoff & Goal

Ensure the QEESI is usable by the general population via these focus areas



Ensure online survey is
consistent, valid, and
usable



Easy for the general
population to interpret
the results

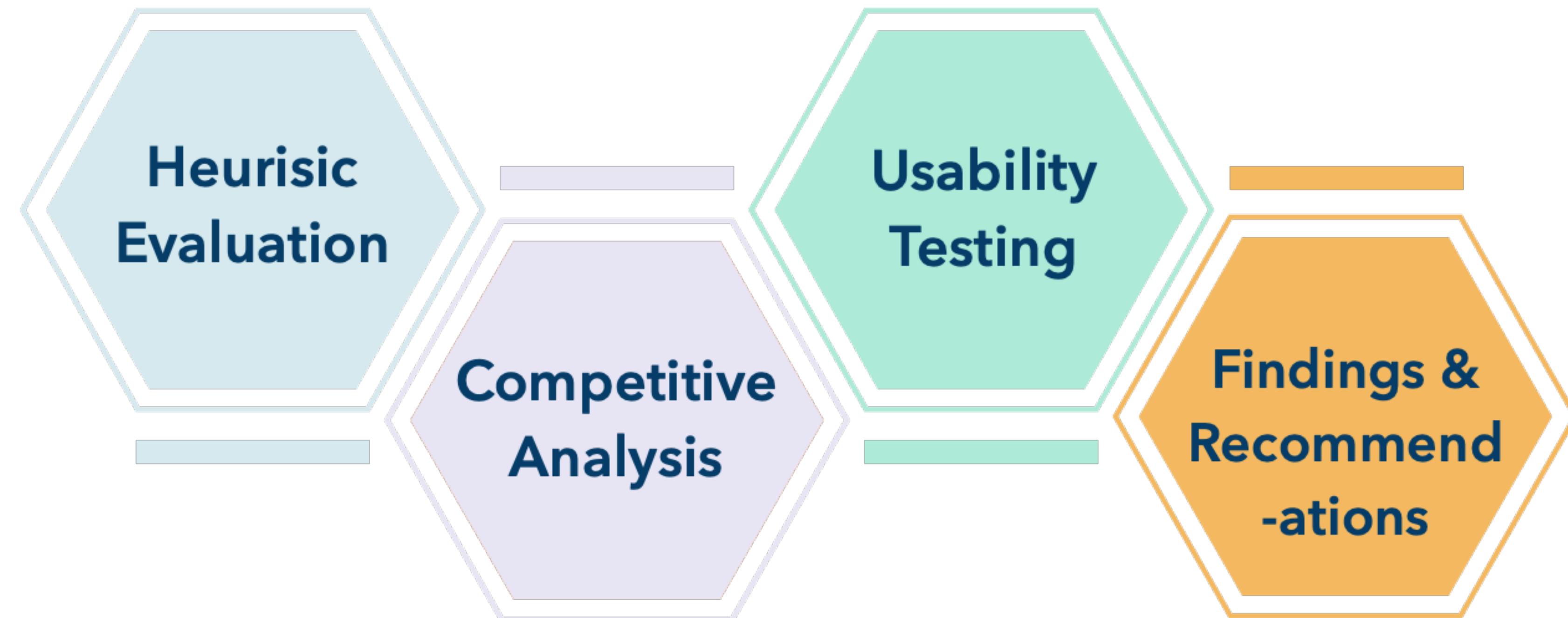


Compare the results
over time



Make QEESI easier to
share with doctor

Process



Heuristic Evaluation

An usability inspection method conducted by evaluators to identify problems in a user interface against a set of Heuristic Principles.

Heuristic Evaluation



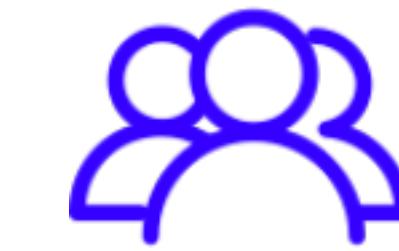
Nielsen's 10 Usability Heuristics

- Visibility of system status
- Match between system and real world
- User control and freedom
- Consistency and standards
- Help users recognize, diagnose, recover from errors
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Help and documentation



Ranking of Usability Issues

- 1 - Low
- 2 - Medium
- 3 - High
- 4 - Critical



3 Evaluators

- Individually evaluated based on heuristics
- Compared findings from individual evaluations
- Discussed and ranked issues found in evaluations

Key Takeaways

1. Wordy instruction & lack of visual hierarchy
2. Easy to lose sight of scale while scrolling
3. Two different color lines in Symptom Star do not match users' expectations
4. No salient way to remind users to save their results
5. Poor Error Reporting

Toxicant Induced Loss of Tolerance (TILT)

Please complete the TILT screening survey below.

Thank you!

Country: Andorra

Please provide your ZIP or Postal code: 888888

QEESI®
Quick Environmental Exposure and Sensitivity Inventory V-1
The purpose of this questionnaire is to help identify health problems you may be having and to understand your responses to various exposures. Complete the survey, describing how you are now.

Prior to activating the "SUBMIT" button at the end of the survey Please consider saving your responses and/or making a printout of your responses using your browser options.

QEESI®

Scoring the QEESI®
The Quick Environmental Exposure and Sensitivity Inventory (QEESI®) was developed as a screening questionnaire for multiple chemical intolerances (MCI). The instrument has four scales: Symptom Severity, Chemical Intolerances, Other Intolerances, and Life Impact. Each scale contains 10 items, scored from 0 = "not a problem" to 10 = "severe or disabling problem." A 10-item Masking Index gauges ongoing exposures that may affect individuals' awareness of their intolerances as well as the intensity of their responses to environmental exposures.

Individuals whose symptoms began or intensified following a particular exposure event can fill out the QEESI® using two different ink colors, one showing how they were before the event, and the second how they have been since the event. The QEESI® displays a "Symptom Star" (Figure 1) which provides a graphical representation of patients' responses on the Symptom Severity Scale.

Figure 1. QEESI Symptom Star illustrating symptom severity in an individual before and after an exposure event (e.g., pesticide application, indoor air contaminants, chemical spill)

Symptom Star

Key Takeaways

1. Wordy instruction & lack of visual hierarchy
2. Easy to lose sight of scale while scrolling
3. Two different color lines in Symptom Star do not match users' expectations
4. No salient way to remind users to save their results
5. Poor Error Reporting

Chemical Exposures

The following items ask about your responses to various odors or chemical exposures. Please indicate whether or not these odors or exposures would make you feel sick. For example, you get a headache, have difficulty thinking, feel weak, have trouble breathing, get an upset stomach, feel dizzy, or something like that. For any exposure that makes you feel sick, on a 0-10 scale rate the severity of your symptoms with that exposure. For exposures that do not bother you, answer "0." Do not leave any items blank.

For each item, click on one number only:
[0 = not at all a problem] [5 = moderate symptoms] [10 = disabling symptoms]

Exposure	Score (0-10)	Reset
1. Diesel or gas engine exhaust	<input type="radio"/>	reset
2. Tobacco smoke	<input type="radio"/>	reset
3. Insecticide	<input type="radio"/>	reset
4. Gasoline (For example, at a service station while filling the gas tank)	<input type="radio"/>	reset
5. Paint or paint thinner	<input type="radio"/>	reset
6. Cleaning products such as disinfectants, bleach, bathroom cleaners or floor cleaners	<input type="radio"/>	reset
7. Certain perfumes, air fresheners or other fragrances	<input checked="" type="radio"/>	reset
8. Fresh tar or asphalt	<input type="radio"/>	reset
9. Nail polish, nail polish remover, or hairspray	<input type="radio"/>	reset
10. New furnishings such as new carpeting, a new soft plastic shower curtain or the interior of a new car	<input type="radio"/>	reset

Total Chemical Intolerance Score (0-100):

Name any additional chemical exposures that make you feel ill and score them from 0 to 10:

(2)

Key Takeaways

1. Wordy instruction & lack of visual hierarchy
2. Easy to lose sight of scale while scrolling
3. **Two different color lines in Symptom Star do not match users' expectations**
4. No salient way to remind users to save their results
5. Poor Error Reporting

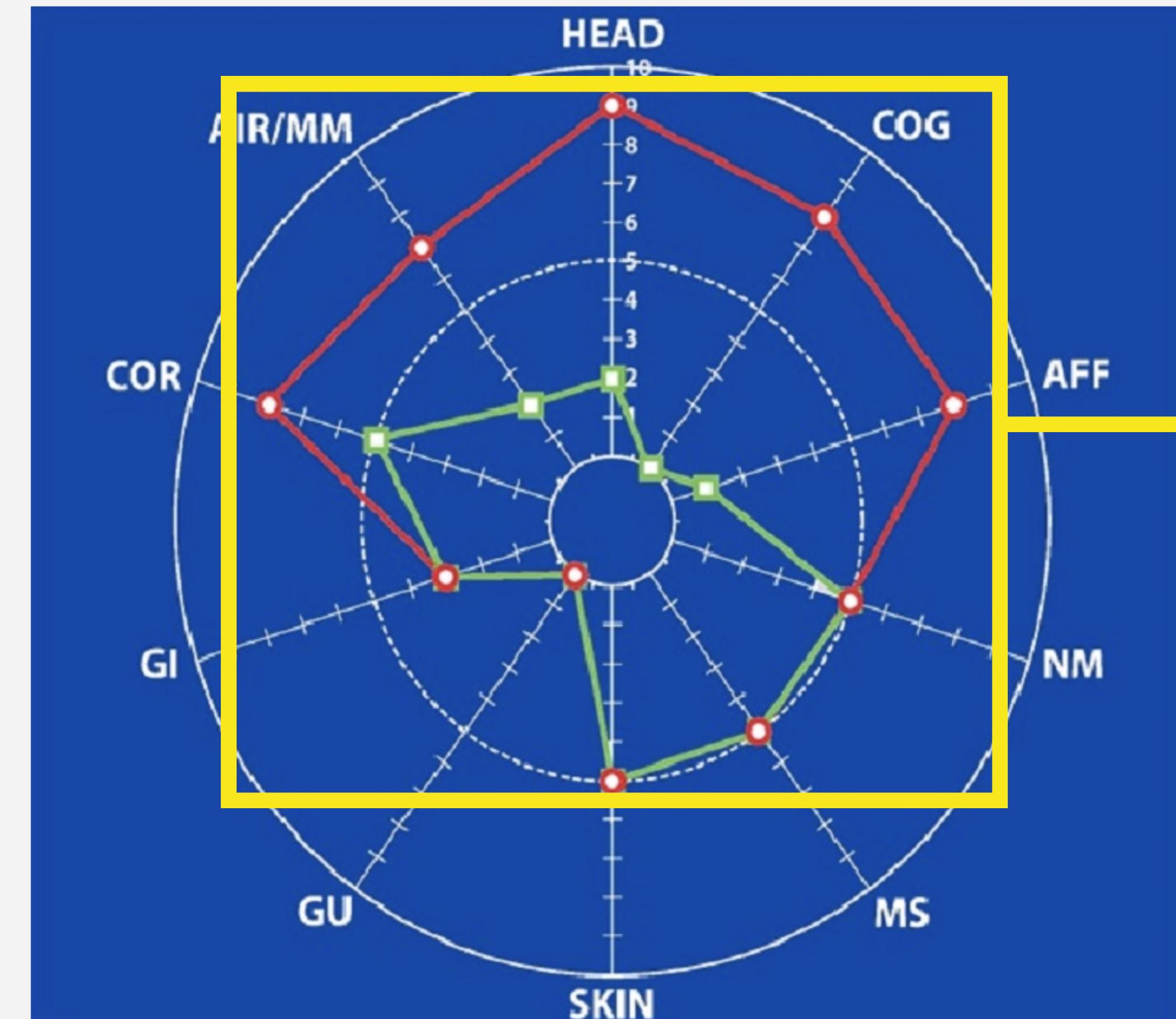
Scoring the QEESI®

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Individuals whose symptoms began or intensified following a particular exposure event can fill out the QEESI® using two different ink colors, one showing how they were before the event, and the second how they have been since the event. The QEESI® displays a "Symptom Star" (Figure 1) which provides a graphical representation of patients' responses on the Symptom Severity Scale.

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Key takeaways

1. Wordy instruction & lack of visual hierarchy
2. Easy to lose sight of scale while scrolling
3. Two different color lines in Symptom Star do not match users' expectations
4. No salient way to remind users to save their results
5. Poor Error Reporting

Reminder in the introduction:

Please provide your ZIP or Postal code:

QEESI®
Quick Environmental Exposure and Sensitivity Inventory V-1
The purpose of this questionnaire is to help identify health problems you may be having and to understand your responses to various exposures. Complete the survey, describing how you are now.

Prior to activating the "SUBMIT" button at the end of the survey Please consider saving your responses and/or making a printout of your responses using your browser options.

QEESI®

Reminder between symptom scores and their explanations:

COR = Heart/chest-related symptoms
AIR/MM = Airway or mucous membrane symptoms

Additional information on scoring and interpreting the QEESI® can be viewed at www.chemicalexposures.com

Prior to activating the "SUBMIT" button at the end of the survey Please consider saving your responses and/or making a printout of your responses using your browser options.

HEAD = Head-related symptoms

Reminder after submitting the result:

Thank you for taking the TILT screening survey. Please consider saving either a print or file copy of your responses for later reference.

4

Key Takeaways

1. Wordy instruction & lack of visual hierarchy
2. Easy to lose sight of scale while scrolling
3. Two different color lines in Symptom Star do not match users' expectations
4. No salient way to remind users to save their results
5. Poor Error Reporting

Do not provide immediate feedback allow users to quickly identify the errors:

7. Problems with balance or coordination, with numbness or tingling in your extremities, or with focusing your eyes? (NM)

8. Problems with your head, such as headaches or a feeling of pressure or fullness in your face or head? (HEAD)

9. Problems with your skin, such as a rash, hives or dry skin? (SKIN)

10. Problems with your urinary tract or genitals, such as pelvic pain or frequent or urgent urination? (For women: or discomfort or other problems with your menstrual period?) (GU)

Total Symptom Score (0-100):

Failed to precisely indicate where the problem was:

responses to various exposures. Complete the survey, describing how you are now.

Prior to activating the "SUBMIT" button at the end of the survey Please consider saving your responses and/or making a printout of your responses using your browser options.

NOTE: Some fields are required!

Your data was successfully saved, but you did not provide a value for some fields that require a value. Please enter a value for the fields on this page that are listed below.

Provide a value for...

• 10. Your ability to clean your home, iron, mow the lawn, or perform other routine chores?

Okay

Doctor: This interview is for research purposes only. You will not receive medical treatment or advice from the researcher. If you have any concerns about your health, please see a healthcare provider. Researchers must contact Dr. Claudia Miller for permission to use the QEESI® in their studies.

Contact
Dr. Claudia Miller, Professor
Department of Family & Community Medicine

5

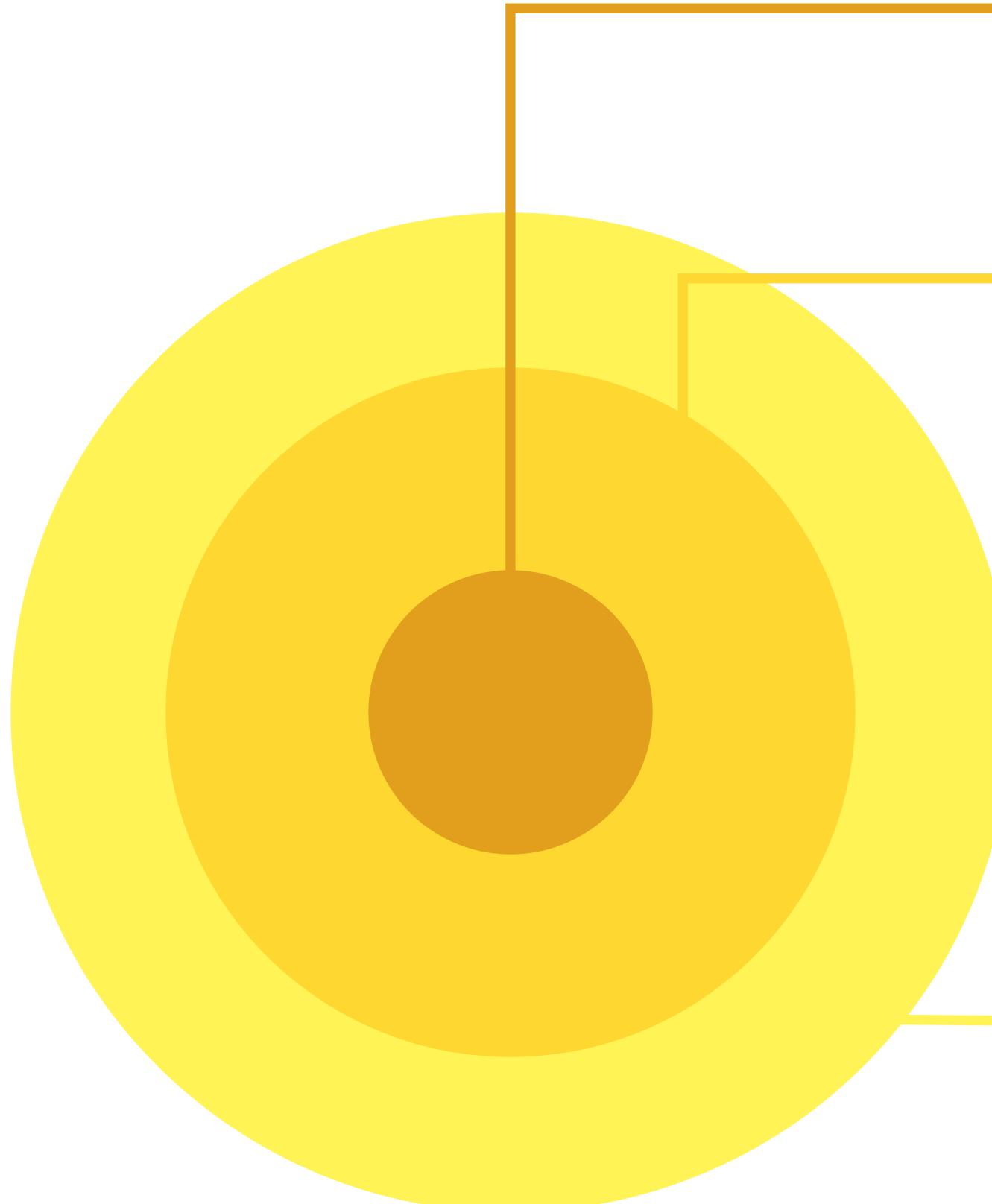
Competitive Analysis

Evaluate competitors to determine which design and feature decisions
are “best practices”

Direct competitors - the most direct rivals in the market

Indirect competitors - different industry, can provide insight into how others deliver similar concepts

Direct & Indirect Competitors



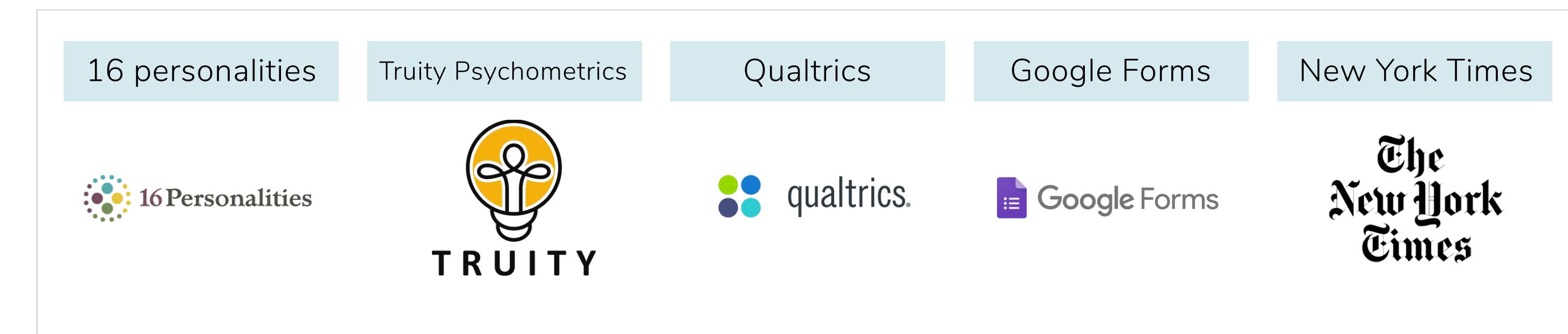
● Direct competitor:

qeesi.org

● Health-related indirect competitor:



● Not health-related Indirect competitor:



Competitive Analysis Results

	Us	Direct	Indirect – Health-related					Indirect – not Health-related		
	QEESI (TILT)	qeesi.org	Mayo Clinic	Psychology Today	M3 Screen	British Heart Foundation	Real Age Test	Essilor Eye Test	16 Personalities	Truity Psychometrics
Feature before assessment										
Estimated time provided				✓					✓	✓
Feature of assessment										
Progress indicator				✓	✓	✓	✓	✓	✓	✓
Split into several pages		✓	✓	✓	✓	✓	✓	✓	✓	✓
Easily identified scale point		✓		✓	✓				✓	✓
Content type	Text	Text	Text	Text	Text	Text & Images	Text	Text, images, interactive media	Text	Text
Track changes over time							✓			

Competitive Analysis Results

Us

Direct

Indirect

Health-related
mindoula®

Indirect – not Health-related

Finding 1

Spreading questions out to few pages and providing progress indicator can help users to have more sense of control to know where they are.

Mental Health Assessment

25%

Over the last two weeks, have you noticed the following?

I feel tense, anxious or can't sit still.



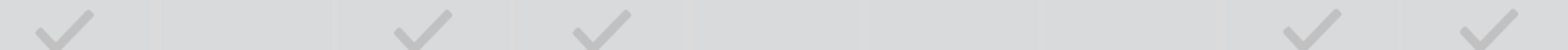
I feel worried or fearful.



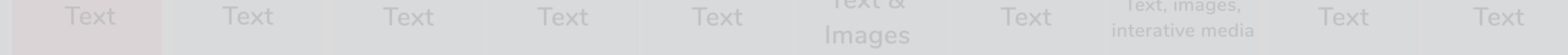
Split into several pages



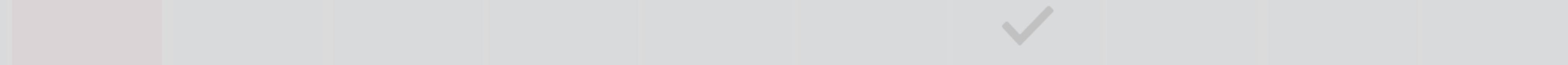
Easily identified scale point



Content type



Track changes over time

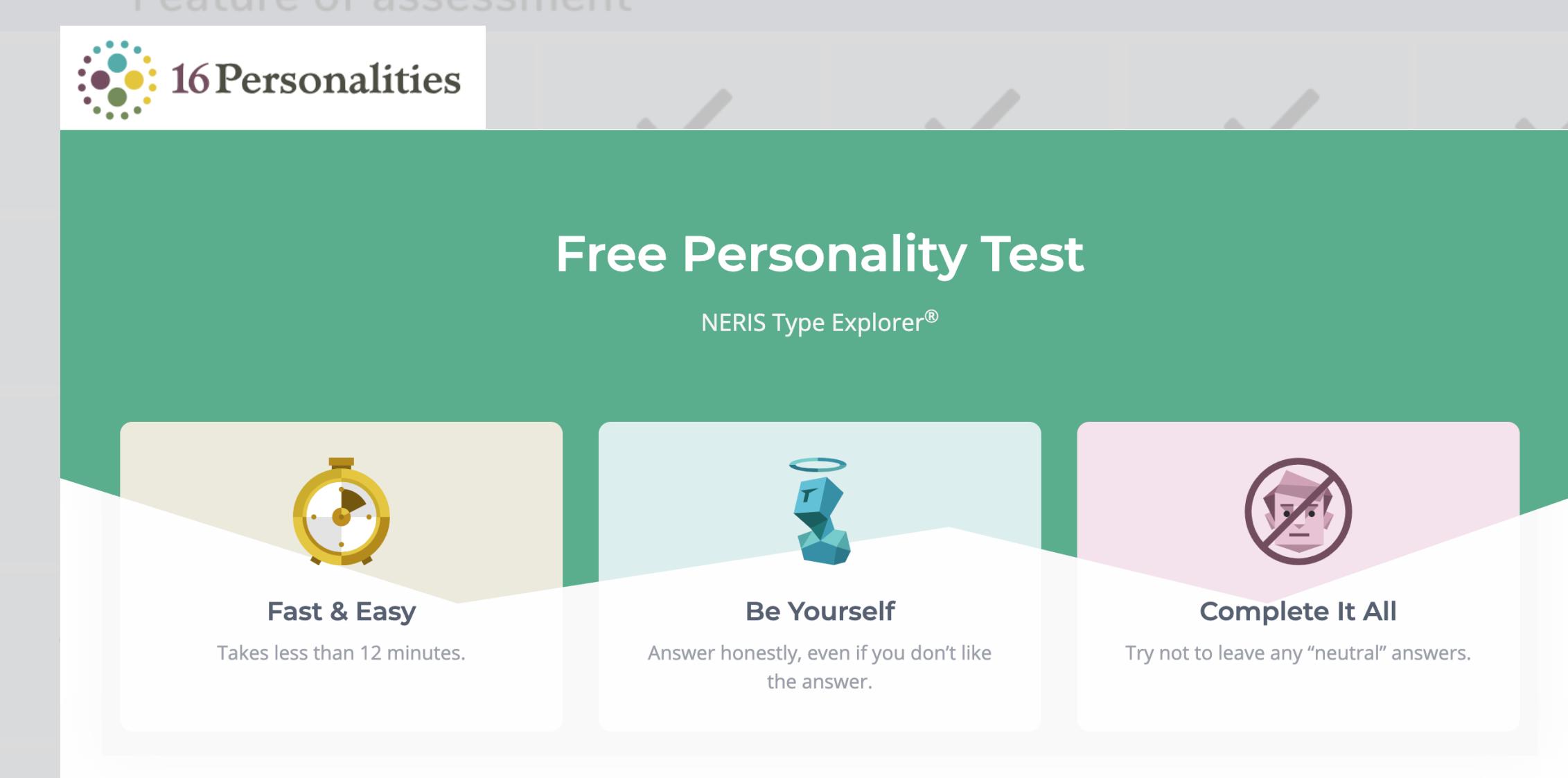


Competitive Analysis Results

Us	Direct	Mayo Clinic	Psychology Today	M3 Screen	British Heart Foundation	Real Age Test	Essilor Eye Test	16 Personalities	Truity Psychometrics
Feature before assessment									
Estimated time provided			✓					✓	✓
Feature of assessment									
Clear instruction & disclaimer	✓						✓	✓	✓

Finding 2

Clear and well-organized instructions can help users read easily. Also, using graphic may help communication.



Competitive Analysis Results

Us

Direct

Indirect – Health-related

Indirect – not Health-related

Finding 3

Using labels, color and size on scale points can help users more easily identify them. They also may be more engaging.

Progress indicator

Split into several pages

Easily identified scale point

Content type

Text

Text

Text

Text

Text

Text & Images

Text

Text, images,
interactive media

Text

Text

Track changes over time

mindoula®

British Heart

Real Age

Essilor Eye

16

Truity
biometrics

I feel sad, down in the dumps or unhappy.



16 Personalities

You enjoy vibrant social events with lots of people.



Competitive Analysis Results

	Us	Direct	Indirect – Health-related	Indirect – not Health-related
Technology today	✓	✓	✓	✓
M3 Screen		✓	✓	✓
British Heart Foundation		✓	✓	✓
Real Age Test		✓	✓	✓
Essilor Eye Test		✓	✓	✓
16 Personalities		✓	✓	✓
Truity Psychometrics		✓	✓	✓
Feature before assessment	✓	✓	✓	✓
Feature of assessment			✓	✓
Progress indicator			✓	✓
Split into several pages		✓	✓	✓
Easily identified scale point		✓	✓	✓
Content type	Text	Text	Text	Text
Text & Images				
Text, images, interactive media				
Track changes over time			✓	

Competitive Analysis Results (Continued)

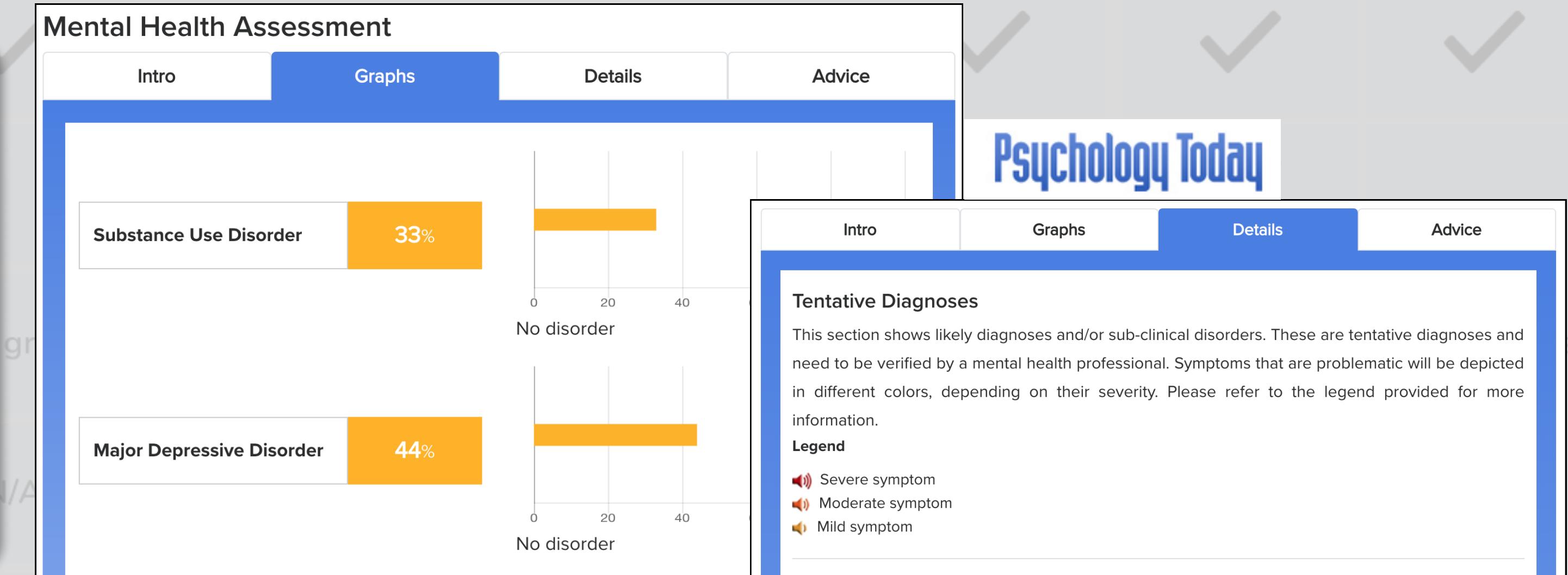
Us	Direct	Indirect – Health-related						Indirect – not Health-related		
		QEESI (TILT)	qeesi.org	Mayo Clinic	Psychology Today	M3 Screen	British Heart Foundation	Real Age Test	Essilor Eye Test	16 Personalities
Feature of results										
Results calculated and analyzed automatically		✓	✓	✓	✓	✓	✓	✓	✓	✓
Provide suggestions			✓	✓	✓	✓	✓	✓	✓	✓
Save Results		✓					✓		✓	
Ways to present results	Spider chart, text, table	Spider chart, text, table	Text	Text, graphs	Text, graphs	Text, articles	Text	Text, graphs	Text, graphs, articles	Text, graphs
Ways to share result	Print	Print	Print	N/A	N/A	Facebook, Twitter, LinkedIn	N/A	N/A	Facebook, Twitter	N/A
Understandable results	1	1	4	3	4	5	2	5	5	4

Competitive Analysis Results

Us	Direct	Indirect – Health-related				Indirect – not Health-related		
QEESI (TILT)	qeesi.org	Mayo Clinic	Psychology Today	M3 Screen	British Heart Foundation	Real Age Test	Essilor Eye Test	16 Personalities
Feature of results								
Results calculated and analyzed automatically	○	✓	✓	✓	✓	✓	✓	✓

Finding 5

Must calculate and analyze
assessment automatically.



Likely Diagnoses
You had symptoms in several categories of disorders covered in this test. This suggests that you should probably consult with a mental health professional for further testing or treatment, especially if you are distressed about the symptoms you are experiencing. There is most certainly a treatment out there that will help improve the symptoms you are experiencing.
The following are the areas of concern detected by the screening:

Competitive Analysis Results

	Us	Direct	Indirect related	Indirect – not Health-related
Ways to present results	text, table	text, table	Text	Text, graphs
Ways to share result	Print	Print	Print	N/A
Understandable results	1	1	4	3
	4	3	4	5
	2	5	5	4

Competitive Analysis Results

Us	Direct		Indirect – Health-related				Indirect – not Health-related		
QEESI (TILT)	qeesi.org	Mayo Clinic	Psychology Today	M3 Screen	British Heart Foundation	Real Age Test	Essilor Eye Test	16 Personalities	Truity Psychometrics
Feature of results									
Results calculated and analyzed automatically	○	✓	✓	✓	✓	✓	✓	✓	✓
Provide suggestions			✓	✓	✓	✓	✓	✓	✓

Finding 7

Consider providing suggestions with the results - steps to take going forward, who to contact, additional materials to read, etc.

Heart Disease Risk Calculator

Since you have a history of cardiovascular disease, [work with your doctor to determine your risk](#).

[Take action](#)

Before increasing your physical activity level, check with your doctor to make sure it's safe for you to proceed.

You have a personal history of heart disease. To help keep your heart as healthy as possible:

- Gradually increase your physical activity toward a goal of at least 150 minutes a week of moderate aerobic activity, 75 minutes a week of vigorous aerobic activity, or an equal combination of moderate and vigorous activity a week. Perform at least 10 minutes of aerobic exercise at one time, and spread aerobic exercise throughout your week. Include



Text, graphs
articles

N/A

Facebook,
Twitter

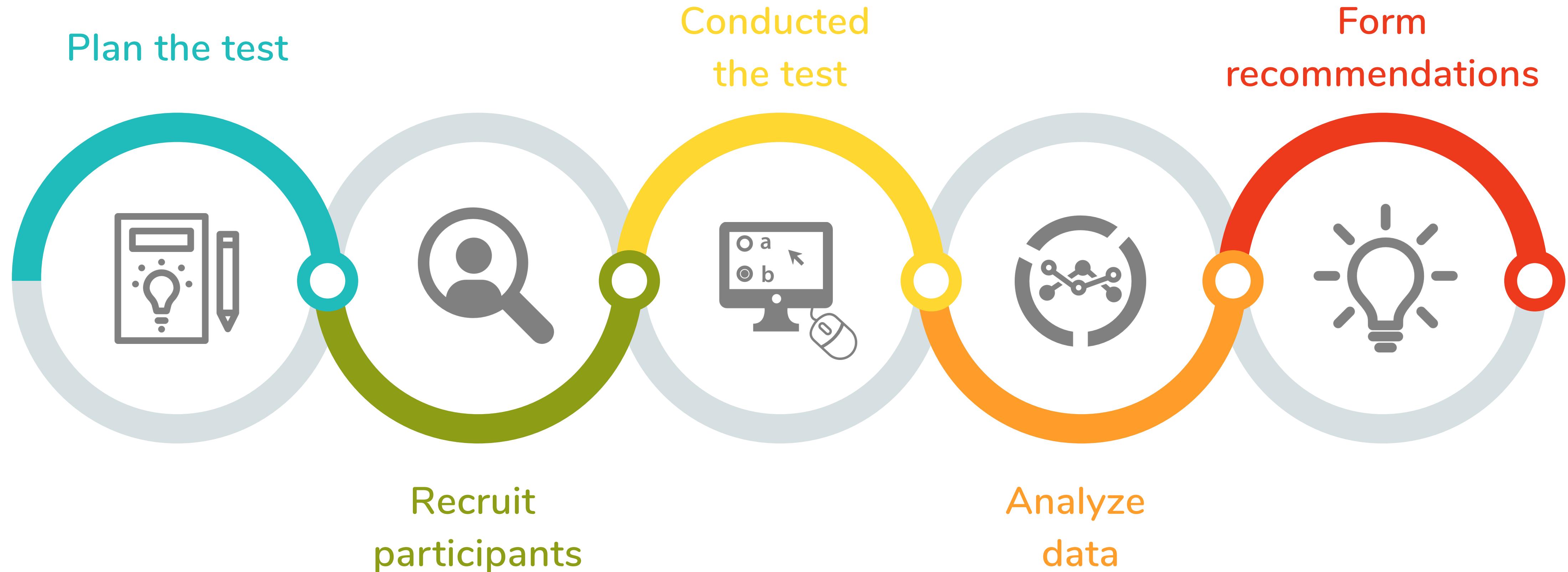
5

4

Usability Testing

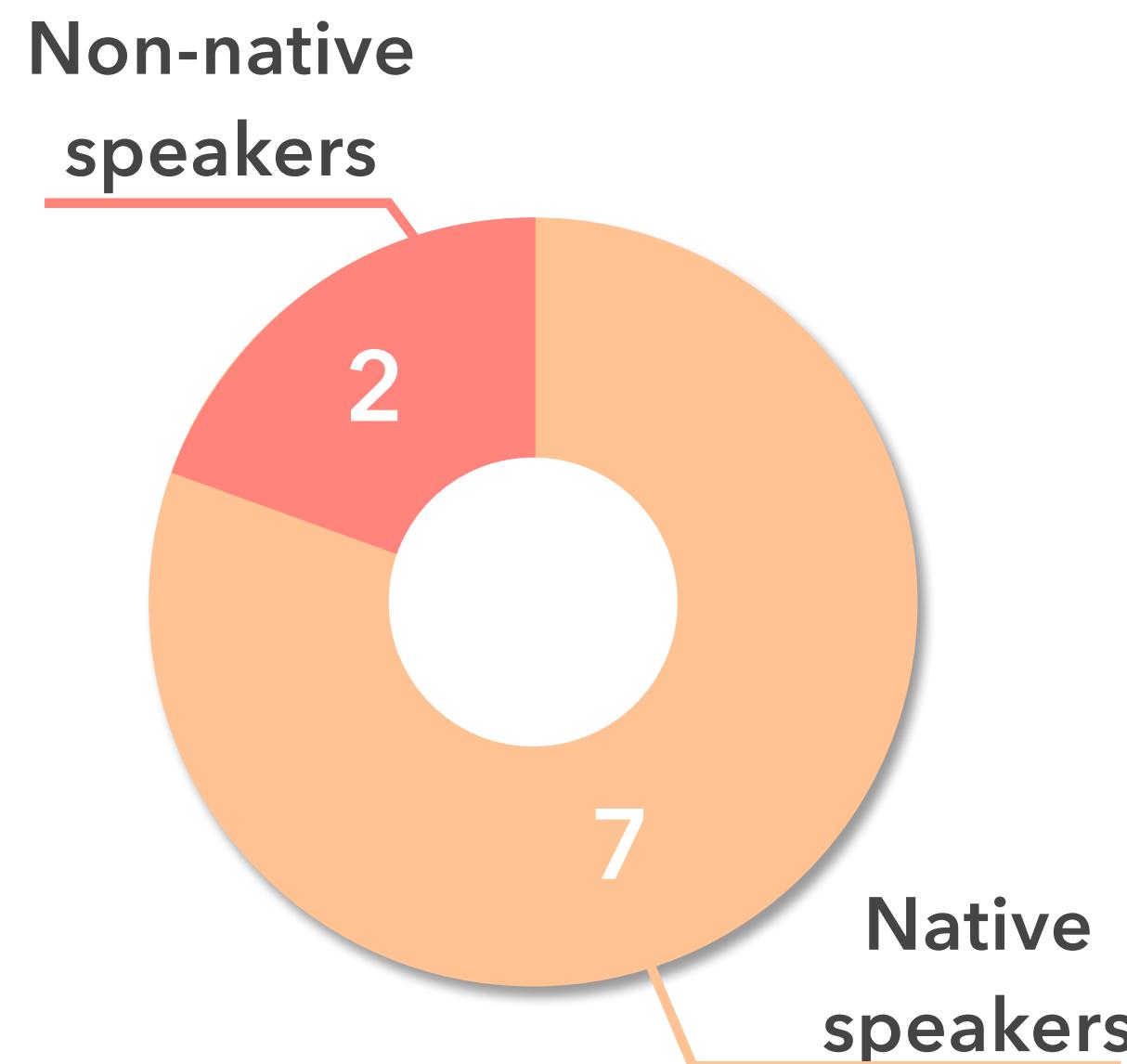
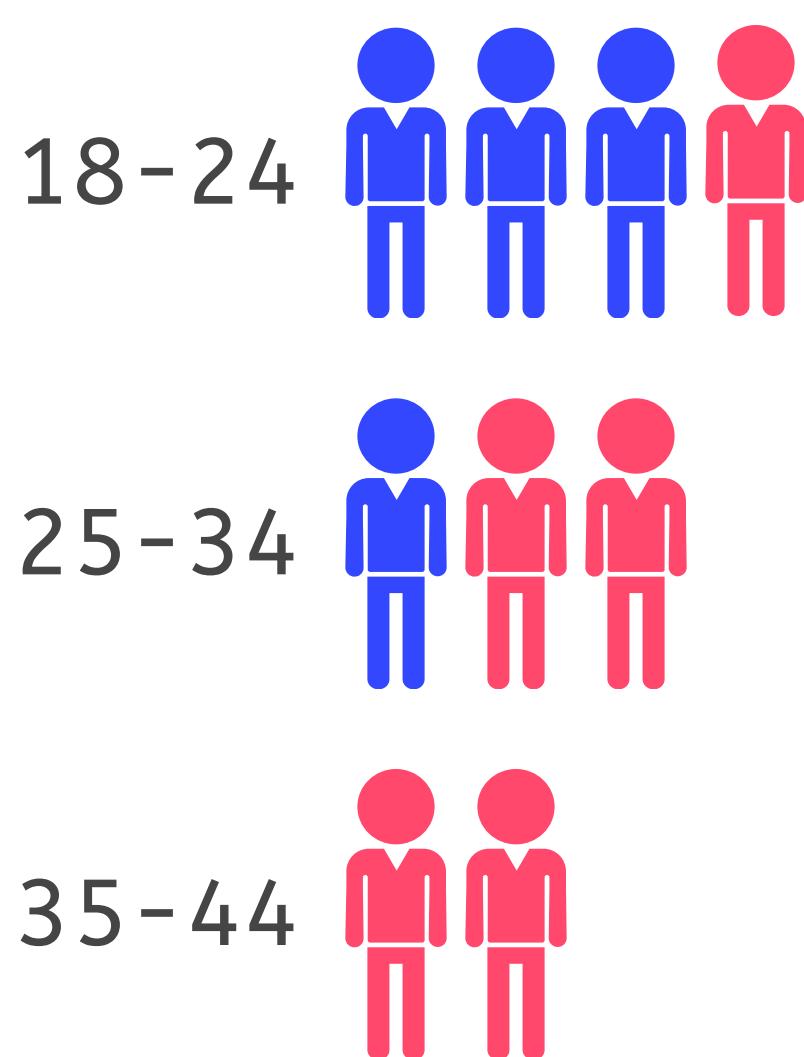
Identify usability issues of QEESI to learn about what obstacles preventing users from responding to questions accurately, interpreting results, and sharing results with doctors.

Process



Demographics

We used the BREESI as the screener to recruit people to take the QEESI. We ultimately recruited 9 participants to conduct usability testing.



- | Technology Used | Count |
|-----------------|-------|
| fitbit® | 3 |
| Google Fit | 2 |
| Google | 2 |
| WebMD | 2 |

Usability Test

1 Moderator

1 Note-taker

5 In-person

4 Remote



45-60 minutes

Task

Your doctor has recommended that you take the QEESI before your appointment and wants to talk through your results during the appointment.

Ask questions about

- Experience with QEESI
- Experience sharing results with doctors
- Other health tracking

Display of Instructions

5/9 participants had trouble with the instructions, which were too wordy and long that they tended to ignore them.



Would be better if they were broken up and not doctor, patient, researcher all together.



Lots of text at the begining, would skip it, mentioning the doctor doesn't seem relevant.



I wouldn't read all the stuff before the chart.

Recommendations - Display of Instructions

**Simplify wording of the directions and make them hierarchical.
Only present relevant information to users.**

Depression test

Feeling sad or miserable most of the time?

When you're going through a tough time it's normal to feel down for a while, emotions like sadness and grief help make us human. But if you're feeling sad or miserable most of the time over a long period of time, you might have depression.

Take this self-test to help figure out whether you're showing any of the warning signs of depression. This won't give you a diagnosis but it will help you decide the next step.

TAKE THE TEST

“It’s so incredible to finally be understood.”

Take our Personality Test and get a “freakishly accurate” description of who you are and why you do things the way you do.

Take the Test →

Ten-Point Scale

6/9 participants thought the 10 point scale was too much.

4/9 needed to scroll back up to see the labels.



The choices are so subjective; what's an 8 compared to a 6?



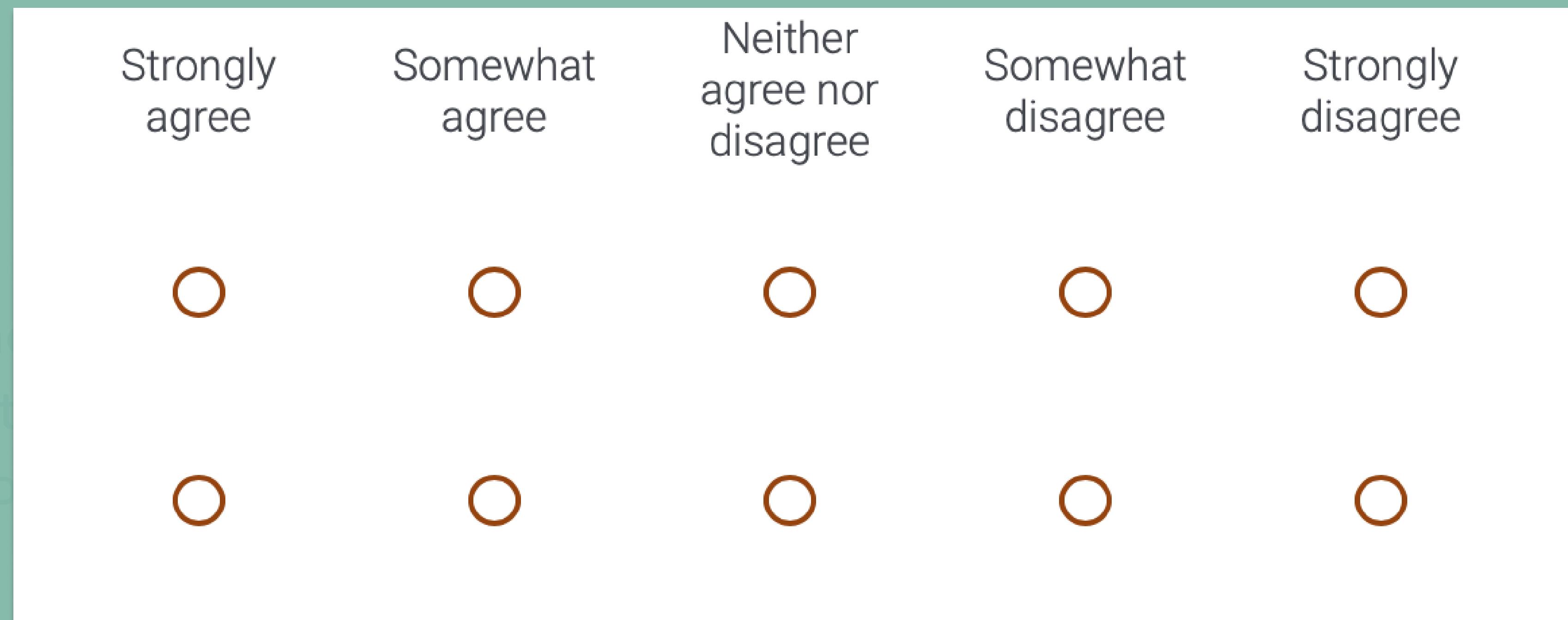
There are too many choices. Five would be better.



The numbers don't follow you, so I don't know which bubble is which, I would end up guessing rather than scrolling back to check.

Recommendations - Ten-Point Scale

Lower the number of options; freeze scale label while scrolling
scroll back up to see the numbers.



Split Survey Into Pages

5/9 participants commented that the assessment was very long, and they had to keep scrolling on the survey.



It's quite long. I wish they had explained how long it would take at the beginning.



Oh, Lord. This is so long.



This page is so long, my hands got tired.

Recommendations - Split Survey Into Pages

Split assessment into several parts and add progress bar
they had to keep scrolling on the survey.

The screenshot shows a section of a personality test. It contains three statements with five response options each:

- I like to be needed by other people
- I would prefer to come up with an original solution to a problem
- I am full of new ideas

Each statement has five empty square input fields and one checked blue square input field. Below the statements is a horizontal progress bar with six segments, each labeled "PAGE 1", "PAGE 2", "PAGE 3", "PAGE 4", "PAGE 5", and "PAGE 6". The first five segments are blue, indicating completed pages, while the last one is grey, indicating the current page. Below the progress bar are two buttons: "< PREVIOUS PAGE" and "NEXT PAGE >". To the right of the main content area is a sidebar with a progress bar from 0% to 100%, a text input field labeled "Other", and a large orange button with a right-pointing arrow.

<https://www.truity.com/test/type-finder-personality-test-new>

<https://www.qualtrics.com/>

Symptom Star

Participants struggled to interpret the symptom star and **4/9** of them thought that the example of the symptom star was their own results.



I'm not really sure how to read this



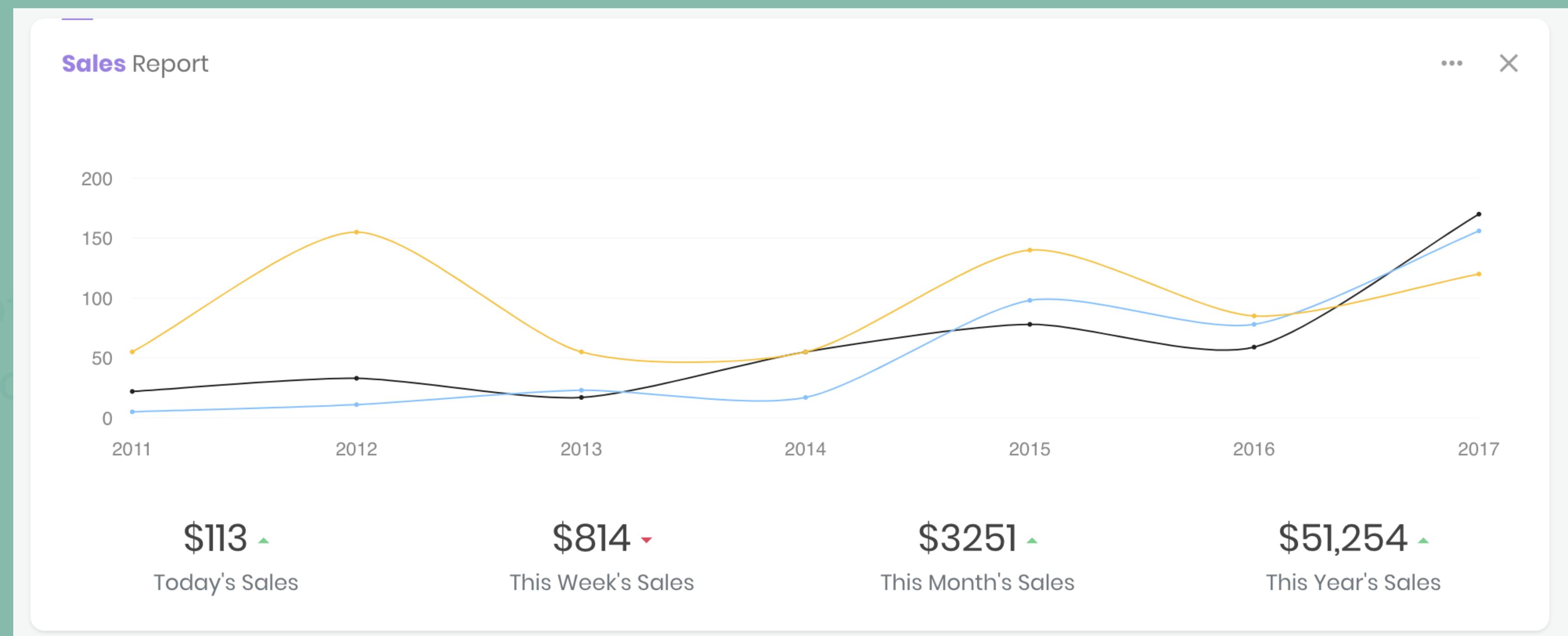
Does that mean high tolerance or is it bad for me? Is it good or bad to have high score?



"Oh! I thought this is my result," said after the test.

Recommendations - Symptom Star

Participants struggled to interpret the symptom star and 4/9 of them thought that the example of symptom star was their own results.
Provide results automatically and possibly change symptom star to other visual graph



Results Sharing

5/9 participants expected to be able to share results electronically with the doctor (e.g., submitting it automatically, and email).



I would expect to be emailed a copy, but they didn't ask for my email address.



I think that when I click "submit," it is automatically sent to the doctor. I would be annoyed if I had to print it out and share results that way.



I hope it has summary page and I'll print it from there after I click submit.

Recommendations - Results Sharing

**Provide easier ways to share and save
(email results, profiles, easy print)**

If you were to control your risk factors for cardiovascular disease to acceptable levels, then your 30 year risk would be:

9%*

Before increasing your physical activity level, check with your doctor to make sure it's safe for you to proceed.

- Eat a healthy diet that emphasizes:
 - Fruits, vegetables and whole grains
 - Low-fat dairy products and low-fat proteins, such as poultry, fish and legumes

[About this tool](#)  [Print Results](#)

[Start Over](#)

The results from this assessment are estimates and should be interpreted as one factor in determining your risk of heart disease. These results may occasionally be inaccurate and may overestimate risk in some populations.

Visual Appeal

6/9 participants felt that the QEESI was outdated and not aesthetically appealing.



I'm not sure why it has to look so boring. It looks like a very serious paper.



On a scale from 1 to 5, it's a 3. It's functional, but it is not particularly creative or attractive.

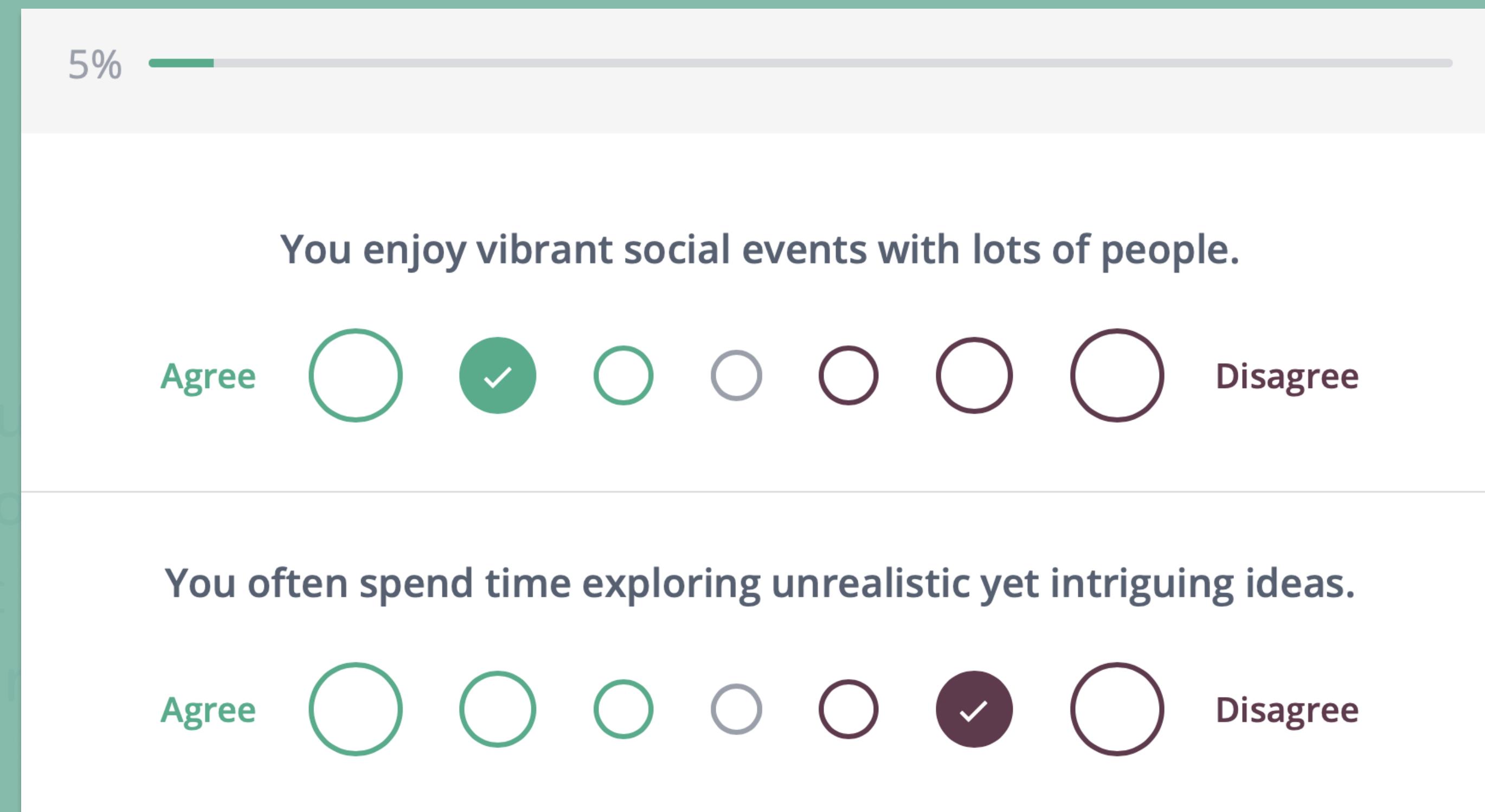


There is no visual appeal to QEESI, the font was kind of small, a large font would have been great.

Recommendations - Visual Appeal

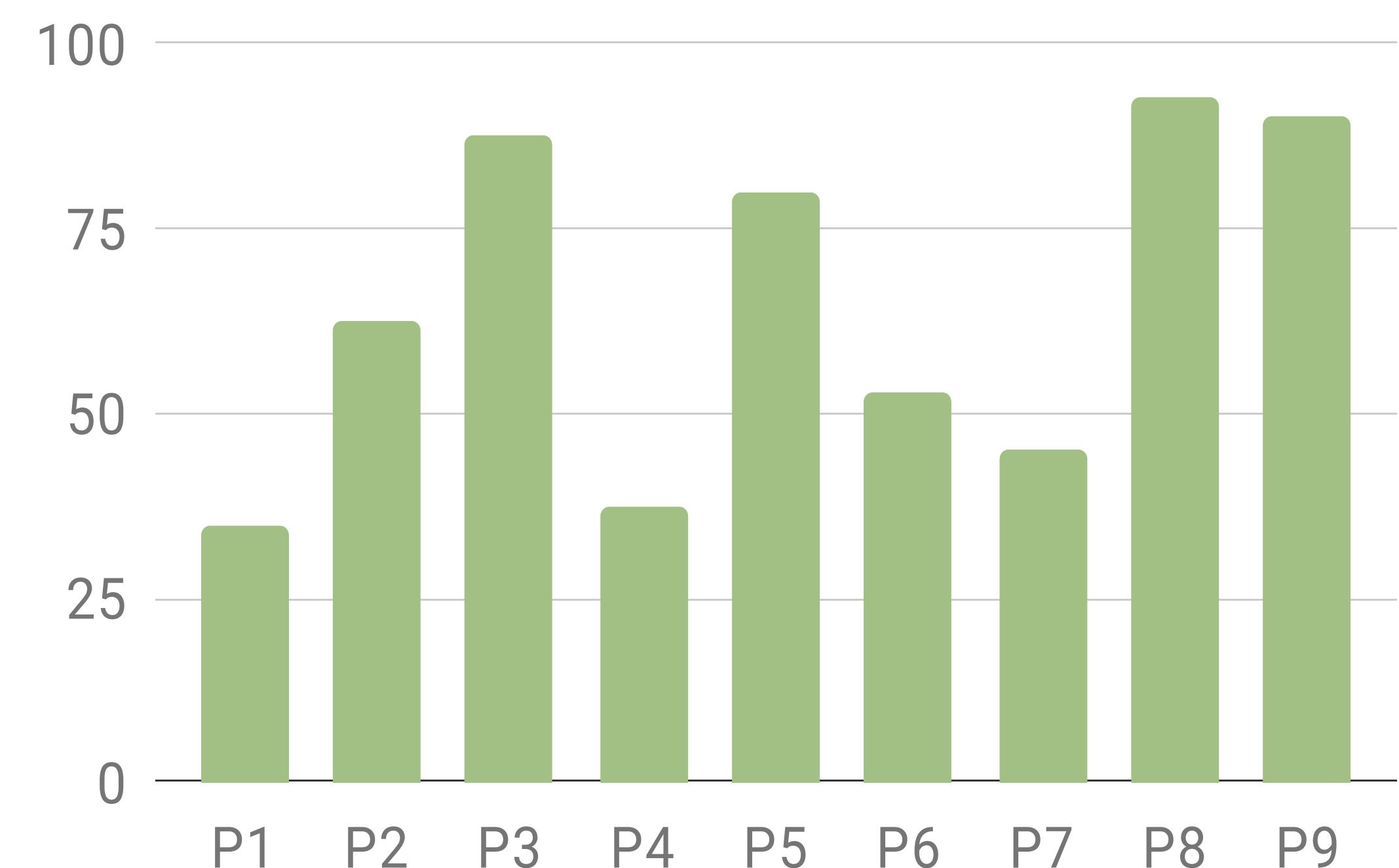
6/9 of them felt that the QEESI was outdated and not aesthetically appealing.

Provide constistant and aesthetically appealing visuals



SUS Evaluation

- System Usability Scale (SUS)
 - 10 question questionnaire to measure usability of a product
- QEESI
 - 64 average SUS score
 - Below industry standard of 68



Summary

Must Haves

- Provide results automatically and possibly change symptom star to other visual graph
- Split survey into pages with progress bar
- Reduce instruction words and write it for target audiences

Nice to Haves

- Investigate lowering the number of options on scale
- Make Likert labels visible at all times
- Provide easier ways to share and save results (email results, user profiles, easy print)

Set Yourself Apart

- Provide suggestions with results
- Enhance visual appeal
- Track changes over time online (create a user profile)