

Name: Chia Wen Cheng

**2022 Winter**

**SurvMeth 630: Questionnaire Design and Evaluation**

**Part I: 1<sup>st</sup> Question Draft Testing and Evaluation**

**Research Question:**

Mental health and well-being of the international students at the University of Michigan

**Purpose of the Research Study:**

Results from this project will be used to construct a multi-cultural, cross-sectional instrument to assess the well-being and mental health of international students enrolled at the University of Michigan. This assessment will assist the U-M community to understand and to offer services that better fit the needs of international students.

**Voluntary Participation:**

You should take part in this study only because you want to. There is no penalty for not taking part, and you will not lose any benefits if you choose not to participate.

Every question is required. But you have the right to stop responding and quit the survey instrument at any time.

You must be an international student 18 years of age or older to be included in the research study.

**Time required:**

This questionnaire takes approximately 5 minutes to complete.

Most of the questions ask about your own feelings **living in the U.S.** There are no “right” or “wrong” answers. Please choose the ones that you feel best described, most comfortable with, or seems “right” for you. Do not worry about the outcome of your responses.

**Disclosure:**

You may ask for help if there is something you do not understand or are not sure how to answer a question.

**Your answers will be combined with others to make totals and averages in which no individual can be identified. All your answers will be kept confidential.**

**Study contacts for questions about the study or to report a problem:**

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Hint for analysts:

Dimension:

I. Quality of Relationship

- a. Courage to Actively Start Relationships
- b. Supportivity
- c. Personal Original Expectations
- d. Maintenance

II. Engagement at Academic Activities

- a. Research Participation Opportunity
- b. In-class Discussion Integration
- c. Communication with Faculties
- d. Background Knowledge Assistance
- e. Scholarships

III. Enjoyment of Extra-curriculum Activities

- a. Student Organizations
- b. Clubs/Volunteer Activities
- c. On-campus Jobs
- d. Off-campus Internships

IV. Levels of Stress

- a. Expenses
- b. Career

V. Satisfaction with Life

- a. Meals
- b. Housing
- c. Shopping
- d. Medical Service
- e. Sense of Belonging

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Questions:

No.	Question	Response	Dimension	Source
1	How often have you actively started building relationships with people here?	i. Always ii. Often iii. Sometimes iv. Rarely v. Never	I-a	Completely New Item
2	How satisfied are you with the emotional help and support that you need from your friends?	i. Very Satisfied ii. Satisfied iii. Neither Satisfied nor Unsatisfied iv. Unsatisfied v. Very Unsatisfied	I-b	Prior Item <sup>1</sup>
3	How much do your relationships meet your original expectations?	i. Can't be better off ii. Better than expectations iii. Neither better nor worse iv. Worse than expectations v. Can't be worse off	I-c	Completely New Item
4	How satisfied are you with maintaining interpersonal relationships you build here?	i. Very Satisfied ii. Satisfied iii. Mild iv. Unsatisfied v. Very Unsatisfied	I-d	Completely New Item
5	How many on-campus research opportunities are you informed in a week on average, comparing to domestic students?	i. All the same (as) ii. 25% less iii. 50% less iv. 75% less v. 100% less than domestic students	II-a	Completely New Item
6	How often have you been engaged/speaking/responding in in-class discussions?	i. Always ii. Often iii. Sometimes iv. Rarely v. Never	II-b	Completely New Item
7	How accessible it is to you to communication with faculties?	i. Very Accessible ii. Accessible iii. Mild iv. Inaccessible v. Very Inaccessible	II-c	Completely New Item

<sup>1</sup> Well-being Questionnaire for PISA 2018. (International Option).  
[https://www.oecd.org/pisa/data/2018database/CY7\\_201710\\_QST\\_MS\\_WBQ\\_NoNotes\\_final.pdf](https://www.oecd.org/pisa/data/2018database/CY7_201710_QST_MS_WBQ_NoNotes_final.pdf).  
 CY7\_201710\_QST\_MS\_WBQ\_NoNotes.

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8	How satisfied are you with assistance on background knowledge needed in your major studies?	i. Very Satisfied ii. Satisfied iii. Mild iv. Unsatisfied v. Very Unsatisfied	II-d	Completely New Item
9	How often have you been informed about qualified scholarship opportunities?	i. Always ii. Often iii. Sometimes iv. Rarely v. Never	II-e	Personal Revisions of Past Items
10	How satisfied are you with the easiness to participate in at least one student organization group at your school/university?	i. Very Satisfied ii. Satisfied iii. Mild iv. Unsatisfied v. Very Unsatisfied	III-a	Personal Revisions of Past Items
11	How often are you informed of the clubs and volunteer activities that you are able to join?	i. Always ii. Often iii. Sometimes iv. Rarely v. Never	III-b	Completely New Item
12	How often have you been informed about qualified on-campus job opportunities?	i. Always ii. Often iii. Sometimes iv. Rarely v. Never	III-c	Personal Revisions of Past Items
13	How often have you been informed about qualified off-campus internship opportunities?	i. Always ii. Often iii. Sometimes iv. Rarely v. Never	III-d	Completely New Item
14	How often do you worry about how much money you are able to manage with?	i. Always ii. Often iii. Sometimes iv. Rarely v. Never	IV-a	Personal Revisions of Past Items
15	How positive do you feel about your post-graduate work?	i. Very Positive ii. Positive iii. Neither Positive nor Negative iv. Negative v. Very Negative	IV-b	Completely New Item
16	How satisfied are you with the availability of foods from your	i. Very Satisfied ii. Satisfied	V-a	Prior Item <sup>2</sup>

<sup>2</sup> Jennifer R. Cosby. (Nov 2017). Measuring Health and Wellbeing of International Students.  
<https://digitalcommons.murraystate.edu/cgi/viewcontent.cgi?article=1070&context=etd>. Murray State University.

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	cultures?	iii.Mild iv.Unsatisfied v. Very Unsatisfied		
17	How comfortable are you with the affordable housings and utilities?	i. Very Comfortable ii. Comfortable iii.Mild iv.Uncomfortable v. Very Uncomfortable	V-b	Completely New Item
18	How satisfied are you with the accessibility (including affordability) buying your daily needs?	i. Very Satisfied ii. Satisfied iii.Mild iv.Unsatisfied v. Very Unsatisfied	V-c	Completely New Item
19	How reliable are the medical services to you? (please consider both medical technologies and your reliability, such as the frequency you are willing to utilize on related services)	i. Very Reliable ii. Reliable iii.Mild iv.Unreliable v. Very Unreliable	V-d	Completely New Item
20	How often do you have the opportunity to share your cultures within this community or influence over what this community is like?	i. Always ii. Often iii.Sometimes iv.Rarely v. Never	V-d	Personal Revisions of Past Items <sup>3</sup>

*Thank you for your co-operation in completing this questionnaire!*

(Please see the following pages for cognitive interview and result analysis examples.)

<sup>3</sup> Sense of Community. Sense of Community Index (SCI). Retrieved on Feb 18, 2022, from <https://www.senseofcommunity.com/soc-index/>.

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## Part II. Questionnaire Testing and Cognitive Interview

Questions with Scripted Probes:

How often do you worry about how much money you are able to manage with?	i. Always ii. Often iii. Sometimes iv. Rarely v. Never	IV-a	Probe 1. What are the sources of your living expenses, and tuitions? How regular do you get your needed living expenses, and tuitions? Probe 2. How much do you get for living expenses, and tuitions? Do you need to cut some desires to save money for living expenses, and tuitions?
How positive do you feel about your post-graduate work?	i. Very Hopeful ii. Hopeful iii. Neither Hopeful nor Hopeless iv. Hopeless v. Very Hopeless	IV-b	Probe 1. What kind of efforts and resources in mind do you think are helpful? Probe 2. What assistances do you think are needed to help you with your post-graduate career? (Do you often compare yourself with American peers in your program? How do you feel after the comparison?)
How satisfied are you with the easiness to participate in at least one student organization group at your school/university?	i. Very Satisfied ii. Satisfied iii. Mild iv. Unsatisfied v. Very Unsatisfied	I-c	Probe 1. What kinds of student organizations are in your mind when you answer this question? Probe 2. Can you share some examples that composed the reasons of your choice?
How much do your relationships meet your original expectations?	i. Can't be better off ii. Better than expectations iii. Neither better nor worse iv. Worse than expectations v. Can't be worse off	III-a	Probe 1. What are your expectations for relationships? Probe 2. Are there concrete examples you can share with concerning the relationships that meet/do not meet your original expectations?
How satisfied are you with the availability of foods from your cultures?	i. Very Satisfied ii. Satisfied iii. Mild iv. Unsatisfied v. Very Unsatisfied	V-a	Probe 1. What kinds of foods/cuisines are you thinking about? Probe 2. What parts of the foods are the most important when you answer this question? Taste, price, favor, distance...

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Unscripted Probes:

What kinds of things are in your mind when you answer these questions?

Will there be differences if these questions were asked last semester?

Results of the Cognitive Interview:

The testing was mostly successful. The interviewee rarely asked further clarification questions. In addition, her reactions showed confidence in her responses and truthiness to me as an interviewer. However, because my questionnaire is aimed at diverse international students, the interviewee sharing similar cultural system with me may be a bias. Furthermore, I know my interviewee very well and she trusts me so much that she often shares her plans and her moods with me. This may be one of the factors that makes the testing successful, but may also cause biases in further interviews. I should speak more slowly so that the interviewees have enough time to think when the questions are being asked, and can answer immediately after the questions are asked. I should also simplify the questions so that it is still fairly clear in verbal.

I designed some sensitive questions such as how much money one is able to manage per month, what is one's post-graduate plan, and what concrete and decisive experiences are in mind when one responded to my questions. When answering those questions, the interviewee showed a little bit of hesitation while thinking about the responses. As I mentioned in the previous paragraph, my interviewee trusts me very well, so she still answered the questions. But I may get refuses on those questions when expanding my interviewees to who I do not know. The last problem drew from the testing is that there are no "not sure/have no experience" in the answer options, which is an issue when I pick a new-to-here international student. So I will add these options into my answer options.

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### **Part III: Revised 2<sup>nd</sup> Questionnaire Draft and Analysis Plan**

#### **A. Questionnaire**

\*This questionnaire is designed to be a **web survey** so it is easier to be delivered to more international students through social media, such as Facebook groups, Slack channels, and Line groups. Click on the [link](#) to see the survey.

\*\*This is an anonymous questionnaire that only collect respondents' gender, races/ethnicities, degrees pursuing and programs. The collection of emails is merely for autosaving responses and sending response copies when requested.



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*Questionnaire Starts Here*

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You must be an international student 18 years of age or older to be included in the research study.

**Time required:**

This questionnaire takes approximately 5 minutes to complete.

Most of the questions ask about your own feelings **living in the U.S.** There are no “right” or “wrong” answers. Please choose the ones that you feel best described, most comfortable with, or seems “right” for you. Do not worry about the outcome of your responses.

**Disclosure:**

You may ask for help if there is something you do not understand or are not sure how to answer a question.

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Hint for analysts:

Dimension:

VI. Quality of Relationship

- a. Courage to Actively Start Relationships
- b. Supportivity
- c. Personal Original Expectations
- d. Maintenance

VII. Engagement at Academic Activities

- a. Research Participation Opportunity
- b. In-class Discussion Integration
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VIII. Enjoyment of Extra-curriculum Activities

- a. Student Organizations
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IX. Levels of Stress

- a. Expenses
- b. Career

X. Satisfaction with Life

- a. Meals
- b. Housing
- c. Shopping
- d. Medical Service
- e. Sense of Belonging

Appendix: (Demographic Section)

- Gender
- Races/Ethnicities
- Cultures
- Degree Pursuing
- Programs

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Questions: Please answer the following questions based on your own feelings **living in the U.S.** with options that best described, you feel most comfortable with, or seem “right” for you.

No.	Question	Response	Dimension
1	I feel comfortable to be the one who actively start building relationships with people.	vi. Strongly Disagree vii. Disagree viii. Neutral ix. Agree x. Strongly Agree xi. I'm not sure./I have no idea.	I-a
2	I am satisfied with the emotional support from my friends.	vi. Strongly Disagree vii. Disagree viii. Neutral ix. Agree x. Strongly Agree xi. I'm not sure./I have no idea.	I-b
3	My relationships are very much in line with my initial expectations.	vi. Strongly Disagree vii. Disagree viii. Neutral ix. Agree x. Strongly Agree xi. I'm not sure./I have no idea.	I-c
4	I am satisfied with maintaining the relationships I have built.	vi. Strongly Disagree vii. Disagree viii. Neutral ix. Agree x. Strongly Agree xi. I'm not sure./I have no idea.	I-d
5	On-campus research opportunities for me are comparable to domestic students as far as I am acknowledged.	vi. Strongly Disagree vii. Disagree viii. Neutral ix. Agree x. Strongly Agree xi. I'm not sure./I have no idea.	II-a
6	I feel involved in any kinds of in-class discussions.	vi. Strongly Disagree vii. Disagree viii. Neutral ix. Agree x. Strongly Agree xi. I'm not sure./I have no idea.	II-b
7	Faculty is accessible (in person or virtually via email, text, phone calls, etc.) for me to communicate with.	vi. Strongly Disagree vii. Disagree viii. Neutral ix. Agree x. Strongly Agree xi. I'm not sure./I have no idea.	II-c
8	My college provides sufficient assistance with background knowledge needed for my major, such as the political, historical, and cultural contexts.	vi. Strongly Disagree vii. Disagree viii. Neutral ix. Agree	II-d

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		x. Strongly Agree xi. I'm not sure./I have no idea.	
9	I am often informed of qualified scholarship/fellowship opportunities.	i. Strongly Disagree ii. Disagree iii. Neutral iv. Agree v. Strongly Agree vi. I'm not sure./I have no idea.	II-e
10	I have many opportunities to get involved or join student organizations.	i. Strongly Disagree ii. Disagree iii. Neutral iv. Agree v. Strongly Agree vi. I'm not sure./I have no idea.	III-a
11	I have many opportunities to participate in volunteer activities or become a member of clubs.	i. Strongly Disagree ii. Disagree iii. Neutral iv. Agree v. Strongly Agree vi. I'm not sure./I have no idea.	III-b
12	There are plenty of eligible off-campus job opportunities for me.	i. Strongly Disagree ii. Disagree iii. Neutral iv. Agree v. Strongly Agree vi. I'm not sure./I have no idea.	III-c
13	I am often informed of qualified off-campus internship opportunities.	i. Strongly Disagree ii. Disagree iii. Neutral iv. Agree v. Strongly Agree vi. I'm not sure./I have no idea.	III-d
14	I SELDOM worry about how much living expenses I can manage with.	i. Strongly Disagree ii. Disagree iii. Neutral iv. Agree v. Strongly Agree vi. I'm not sure./I have no idea.	IV-a
15	I am positive about finding a job that matches my expectations after graduation.	i. Strongly Disagree ii. Disagree iii. Neutral iv. Agree v. Strongly Agree vi. I'm not sure./I have no idea.	IV-b
16	I am satisfied with the availability of food(s) from my culture(s) here.	i. Strongly Disagree ii. Disagree iii. Neutral iv. Agree v. Strongly Agree vi. I'm not sure./I have no idea.	V-a

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17	Housings and utilities here are affordable for me.	i. Strongly Disagree ii. Disagree iii. Neutral iv. Agree v. Strongly Agree vi. I'm not sure./I have no idea.	V-b
18	I am satisfied with the accessibility and affordability of buying my daily-need items.	i. Strongly Disagree ii. Disagree iii. Neutral iv. Agree v. Strongly Agree vi. I'm not sure./I have no idea.	V-c
19	Medical services here are reliable to me. (Please consider both medical technologies and your degree of reliance, such as the frequency you are willing to utilize related services.)	i. Strongly Disagree ii. Disagree iii. Neutral iv. Agree v. Strongly Agree vi. I'm not sure./I have no idea.	V-d
20	I often have the opportunity to share my cultures within this community.	i. Strongly Disagree ii. Disagree iii. Neutral iv. Agree v. Strongly Agree vi. I'm not sure./I have no idea.	V-d
i	Which of the followings best described your gender?	i. Male ii. Female iii. Non-binary gender iv. Prefer not to say	Appendix
ii	Please specify your races/ethnicities. (e.g. Asian, White...)	(A short answer of the respondent)	Appendix
iii	What culture(s) do you subjectively believe you belong to? (e.g. Indian)	(A short answer from the respondent)	Appendix
iv	What degree are you currently pursuing at the University of Michigan?	i. Bachelor's ii. Master's iii. PhD iv. Certificate	Appendix
v	Please specify the FULL name(s) of the program(s) you are in.	(A short answer from the respondent)	Appendix

*You have reached the end of this questionnaire.  
Thank you for your time and co-operation!*

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## B. Analysis Plan

1. Specify research question (from Assignment 1) (5 points)

### Research Question:

Mental health and well-being of the international students at the University of Michigan

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Results from this project will be used to construct a multi-cultural, cross-sectional instrument to assess the well-being and mental health of international students enrolled at the University of Michigan. This assessment will assist the U-M community to understand and to offer services that better fit the needs of international students.

2. Specify item/items used to answer the research question (5 points)

Through literature review, I take a framework composed of five out of the numerous dimensions to assess mental health of a specific group of populations in this study. The examination from relationship quality, involvement in academic activities and extracurricular activities respectively, life satisfaction, and stress of living may not be sufficient to fully interpret the respondent's mental healthiness, but are critical especially to students, and are services already provided by the administrative units at the university. Thus, the results are expected to directly align with the purpose of the study--to improve the offered resources and assistance from the university that helps ameliorate international students' experiences living in the community.

3. Specify how you plan to recode the item/items in your analysis (5 points)

The response options remain all the same throughout the body of the questionnaire, which are "strongly disagree, disagree, neutral, agree, strongly agree, and not sure or don't know." I will recode the first five options to a five-level scale starting from 1 to 5. The higher the score is, the more positive the respondent feels in that subdimension. (Question 14 may be tricky so I highlighted the word "seldom", intending to avoid mistakes in responses.) For the last option in each question, I plan to recode it as "N/A" because this answer is invalid for me to draft recommendations from the results, no matter it means that the respondent has no relative experience or that they are reluctant to declare their feeling.

4. Specify how you plan to handle missing data to the item/items (5 points)

According to the design of Google Form that enables a questionnaire designer to set every question required to answer for submitting the form, there should be no missing data from the original data. However, I recoded the last option in every question in the main body of the questionnaire to "N/A", which can be considered as the missing data. I plan to sum the amount of missing data in each question, and conjecture the possible reasons of getting those answers. If one question resulted in a large proportion of missing data, there might

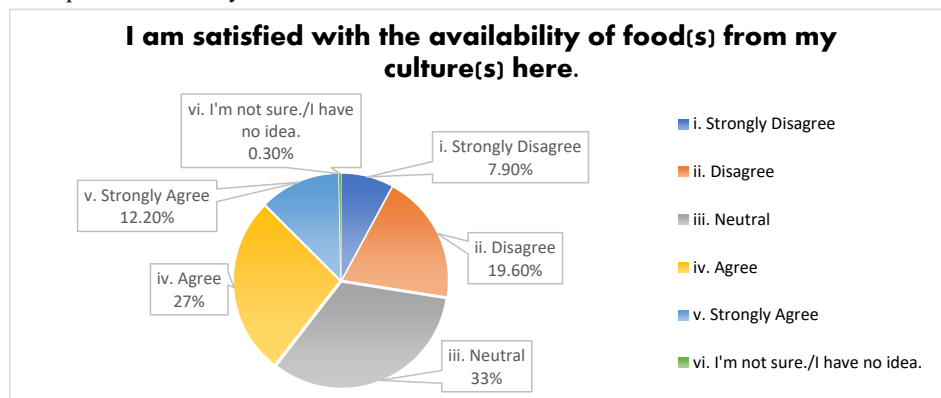
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either be something wrong with the question description or lack of advocacy of relevant services, which I would like to suggest for propagating the service.

5. Specify what analysis you plan to do with the item/items to address the research question (10 points)

I plan to interpret the data with descriptive statistics method that calculate the mean, mode, standard deviation, and so on. With these data, I will be able to see the flaws that negatively impact students' mental health the most, the advantages most helpful to students' well-being, and the variation. I will also be able to compare the differences in responses from different races/ethnicities according to the demographic survey, and contribute approaches that support specific groups within international students at the U-M.

Example of result analysis: Pie Chart



With pie chart, we are able to further analyze a single category in one of the dimensions. In the above result made by me, we notice that the degree of satisfactory about getting foods from students' cultures is only 39.2 percent, with only 12.2 percent of the international students at U-M feeling very satisfied. On the contrary, the degree on unsatisfactory is 39 percent, with 7.9 percent of the surveyees expressing strongly unsatisfied. If U-M would like to make the campus or the near-campus community a more comfortable and relaxed living place to international students, enhancing the choices of cultural foods affordable and accessible to them is without a doubt critical.

Pie chart will be used to assess one category at a time. As an analyst, it will be more ideal to be applied to qualitative analysis with data we collected from the demographic section. By doing so, we can analyze the difference among races/ethnicities and can focus on improving services for specific groups of international students. For example, if we figured out that Taiwanese cuisines such as stinky tofu, chicken chop, and red bean cake are in shortage, we can try to change it.

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#### Part IV. Expert Review on Peer's Questionnaire Draft

##### Research question

*Does verbal expression of empathy in a virtual healthcare assistant affect users' trust in the assistant?*

To answer this research question, the questionnaire will address two secondary questions. Each secondary question corresponds to a construct to be measured by the questionnaire items.

Secondary research questions and their corresponding constructs:

Question	Construct
Do participants find the healthcare virtual assistant empathic?	Empathy
Do participants find the healthcare virtual assistant trustworthy?	Trust

This is an online questionnaire that will be administered in the context of an online experiment. Participants<sup>4</sup> will be answering these questions following a short interaction with a healthcare virtual assistant giving them instructions on how to properly administer a COVID self-test.

**Commented [鄭佳致1]:** Will this questionnaire be distributed to worldwide English native speakers? Or will it only be in the border of the U.S.?

##### Questionnaire

The following questionnaire items will be used to measure the virtual assistant's perceived empathy and participant's feelings of trust towards the virtual assistant. Most of the items for *empathy* are based on a 14-item questionnaire [1] and an 18-item scale (the RoPE scale [2]). Both questionnaires aim at evaluating a robot's empathy or how empathic a robot is perceived. Most of the items for *trust* are based on The Trust Perception Scale-HRI [3].

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<sup>4</sup> Since COVID-19 self-tests are used by a wide variety of people, the inclusion criteria for this experiment are very general. To take part in the experiment, participants need to be 18 years of age or older and they must be native English speakers.



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EMPATHY		
Please indicated how much you agree or disagree with the following statements about the virtual assistant on a scale from 1 (strongly disagree) to 7 (strongly agree).		
id	Item	Comments
EM1	The virtual assistant cares about my feelings.	Taken as is from [2]
EM2	The virtual assistant appreciates exactly how the things I experience feel to me.	Taken as is from [2]
EM3	The virtual assistant was comforting.	Adapted from [2]: "The robot comforts me when I am upset."
EM4	The virtual assistant was encouraging.	Adapted from [2]: "The robot encourages me."
EM5	Sometimes the virtual assistant tried to understand me better by imagining how things look from my perspective.	Taken as is from [1]
EM6	The virtual assistant would find it difficult to see things from my point of view.	Adapted from [1]: "Sometimes <ROBOT-NAME> found it difficult to see things from my point of view."
EM7	The virtual assistant would not feel bad if I am anxious or stressed.	Adapted from [2]: "The robot seems to feel bad when I am sad or disappointed."
TRUST		
id	Item	Comments
TR1	The virtual assistant is responsible.	Adapted from [3]: "What % of the time will this robot be responsible?"
TR2	The virtual assistant is incompetent.	Adapted from [3]: "What % of the time will this robot be incompetent?"
TR3	The virtual assistant is reliable.	Adapted from [3]: "What % of the time will this robot be reliable?"
TR4	The virtual assistant is predictable.	Adapted from [3]: "What % of the time will this robot be predictable?"
TR5	The virtual assistant is benevolent.	New item based on previously identifies sub-dimensions of trust (benevolence)
TR6	The virtual assistant is able to provide me with appropriate information.	Adapted from [3]: "What % of the time will this robot provide appropriate information?"
Please answer the following questions about the virtual assistant.		
TR7	Would you use this virtual healthcare assistant to ask basic questions about COVID-19 (like best protective practices,	New item based on previously identified sub-dimension of trust (usefulness).

**Commented [鄭佳玟2]:** I'd like to hear more about what kinds of behaviors stand for "encouraging" in this topic of study! The reason I pulled this up is merely that I felt confused when first seeing this question.

**Commented [鄭佳玟3]:** Would it be better if "not sure" be added to the answer options for this question? I guess respondents who are more conservative may find it hard to choose from agree and disagree even with different levels.

**Commented [鄭佳玟4]:** This question addresses similar problem as EM6. However, I think for this one, there's a bigger problem that I'd like to mention-it is not only about what the respondents' observed/felt throughout the experiment, but also about the values that respondents hold throughout their lives. So the responds may be biased due to respondents' own values, and their wishes of how others will judge them. For example, a respondent who believes that human beings are born kind and friendly may tend to reply 1 (strongly disagree) even though their experience was very awful from the previous questions. In addition, a respondent who wants others to think of them as a kind person may also take the answer that conflicts with their original thought.

**Commented [鄭佳玟5]:** I may be wrong but should we add something like "virtual assistant's behaviour/instruction is predictable"?

**Commented [鄭佳玟6]:** I'd say this contains two questions-if the virtual assistant is the capable and if the information is appropriate. Reframing it as "The information provided by the virtual assistant to me was appropriate" may be better?

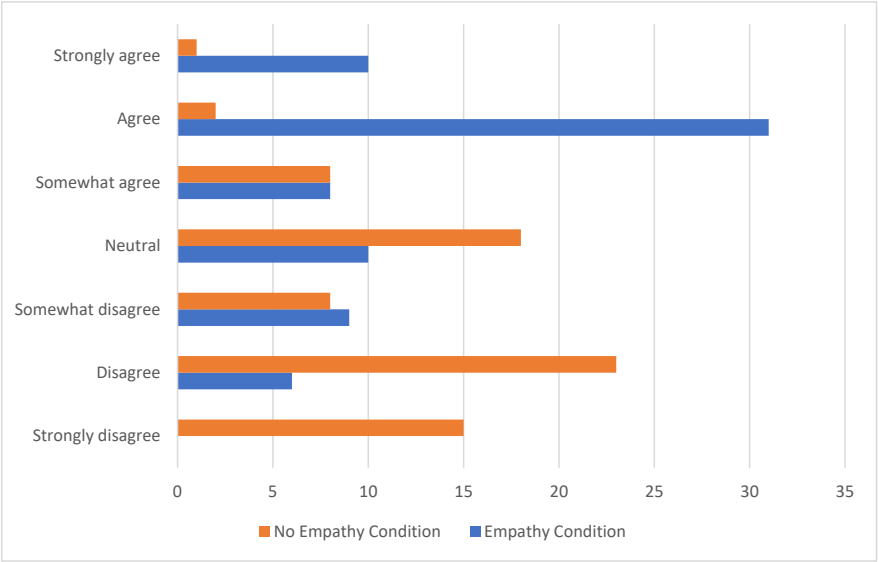
**Commented [鄭佳玟7]:** I'm curious about why you use "would" instead of "will" here?

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	how to take a rapid self-test)?  Yes/No  Please explain:	
TR8	Do you think that this virtual assistant is capable of providing you with adequate information on general health-related questions (like how to lower blood pressure? How to get rid of hiccups?)  Yes/No  Please explain:	New item based on previously identified sub-dimension of trust (competence).

Examples of data analysis

Graph showing participant's ratings of the virtual assistant's perceived empathy for the two experimental conditions (Empathy/No Empathy). Items used for this graph are EM1-EM7.



**Commented [郑佳致8]:** To be honest, I have no idea what the x-axis stands for. I think this graph is the result from one respondent? So we are not aggregating the amount of each answer option from all respondents?

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I can have a similar graph showing ratings of trust using items TR1-TR6.

I would like to show the difference (if any) between ratings of the virtual assistant on trust based on the experimental condition (Empathy/No Empathy). I am not sure how to represent/visualize this data. But here are a couple of ways in which I can do this:

1. Create a trust score out of the scale items TR1-TR6 and compare scores across conditions.
2. Report on ratings for individual items (TR1-TR8) and the difference between experimental conditions.

**Commented [鄭佳致9]:** I'm also not sure how to examine this, but I think the ways you proposed may work!

## References

- [1] Paiva, A., Leite, I., Boukricha, H., & Wachsmuth, I. (2017). Empathy in virtual agents and robots: A survey. *ACM Transactions on Interactive Intelligent Systems (TiiS)*, 7(3), 1-40.
- [2] Charrier, L., Rieger, A., Galdeano, A., Cordier, A., Lefort, M., & Hassas, S. (2019, March). The rope scale: a measure of how empathic a robot is perceived. In *2019 14th ACM/IEEE International Conference on Human-Robot Interaction (HRI)* (pp. 656-657). IEEE.
- [3] Schaefer, K. E. (2016). Measuring trust in human robot interactions: Development of the "trust perception scale-HRI". In *Robust Intelligence and Trust in Autonomous Systems* (pp. 191-218). Springer, Boston, MA.