

## ***Supplementary Material***

### **1 INTERVIEW PROTOCOLS**

#### **1.0.1 Initial Interview Protocol**

##### Opening

Thank you for coming today to participate in our interview. Today, we will be exploring your opinions and preferences around social robots in interactions including:

- Medication Adherence
- Emotional Wellness Coaching/Mood Sensing and Intervention
- Connecting with Others
- Exercise / Physical Therapy
- Body Health Monitoring (e.g., vitals)
- Cognitive Health (e.g., memory) Monitoring
- Financial Literacy/Management

As we explore each category, I will ask a series of questions. Feel free to interrupt or interject for clarification and additional questions. I am happy to rephrase the question. We want this to be more of a dialog so I encourage you to speak as freely as you please. We want to hear all of your opinions surrounding this space.

##### General Questions

- Could you walk me through a typical day?
- What technology do you use on a daily basis?
- Have you ever used voice-based technology like amazon alexa, siri, or google home?
  - (if yes) How have you used it?

A social robot is similar to amazon alexa or google home, however, it engages you in a different way than these devices. While these devices are more transactional (you ask them for something, they give it to you), social robots are more relational meaning they use social cues and movement to engage with you in a more social way. For example, when someone is talking to you, you expect them to make eye contact with you. This is one behavior that a social robot may use to interact more relationally with you.

- What are your initial thoughts about social robots?
  - How do you feel about social robots?
  - What role, if any, do you see a social robot playing in your life?

For the next portion of the interview, we will be progressing through six different areas that a social robot could potentially work with you. You may not currently engage in these activities but we ask that you keep an open mind when thinking about the situations. When you are thinking about a robot in these situations, you can imagine the robot as being your ideal robot that is not limited by what technology can currently do in today's world.

We also want to think about this all being in your home.

### Medication Adherence

When you hear the words medication adherence, what do you think of?

Is it currently a part of your life?

- (if yes) How do you currently manage your medication adherence?
- (if no) Emphasize imagining the situation.

What are your initial thoughts around social robots assisting with medical adherence?

- How do you see it fitting into your life?
- What roles would you feel comfortable giving to a social robot around medical adherence?
  - Would you want the robot to remind you. . . [these questions can be followed up with why]
    - when it was time to take your medicine?
    - of the dosage of your medicine?
    - when it was time to get a refill on the medication?
  - Would you like to be able to receive medication instructions and side effects?
    - Would you like to be able to ask questions to the social robot about your medication?
  - Would you like your robot to track your medication and symptoms and provide you information on when it's important to call your doctor?
  - Would you like your robot to have information on how to get in touch with your doctor?
- We've talked about how you could use a robot to help remind you when to take your medicine, tracking your medical information, and connecting with your care team. What are three things that you think would be helpful for the robot to predict or suggest to you based on it knowing and recording your medical information?
- What roles wouldn't you feel comfortable giving to a social robot around medical adherence?
  - What concerns, if any, do you have about a social robot assisting with medical adherence?
  - What benefits, if any, do you imagine with a social robot assisting with medical adherence?

[some participants may be mixed on if they want the robot for medical adherence. Other cases may be on the extremes of wanting the social robot or NOT wanting the social robot. The following questions are for those on either side of the extreme]

- (if very enthusiastic with no concerns) what would make you uncomfortable to have a social robot assist with medical adherence?
- (if very against social robot) what would make you more comfortable to have a social robot assist with medical adherence?

### Emotional Wellness Coaching/Mood Sensing and Intervention

When you hear the words emotional wellness coaching in the home, what do you think of?

Is it currently a part of your life?

- (if yes) How do you currently manage your emotional wellness?

- (if no) Emphasize imagining the situation.

What are your initial thoughts about social robots assisting with emotional wellness coaching to help you cope with daily life?

- How do you see it fitting into your life?
- Would you want the robot to... [these questions can be followed up with why]
  - guide you in meditation? yoga?
  - help you appreciate moments in your life more?
  - encourage you to think of blessings in your life or things you are thankful for?
  - encourage you to write gratitude letters to thank people in your life?

Your energy and engagement, how positive or negative you are feeling, and how confident you feel in being able to complete tasks are often connected to wellbeing. If tracking these things may help your wellbeing, would you like a social robot to track...

- How energetic you are? [arousal]
- How positive or negative your mood is? [valence]
- How much in control do you feel you have in life? Do you feel you're juggling different aspects of your life (work, health, social life, family, etc.) well or do you feel overwhelmed by them? [dominance/control; fight or flight]
- Would you like your robot to monitor your overall emotional health and mood long-term?
- We've talked about how you could use a robot to help you be more mindful and cognizant of your emotional wellness and also to track things related to your wellbeing. What are three things that you think would be helpful for the robot to predict or suggest to you based on it knowing and recording your emotional wellbeing?
- Would you like your robot to engage in casual conversation with you?
- Would you like your robot to give you little tokens of appreciation or delightfulness such as jokes, fun facts, surprises, or animations?
- Overall, how do you feel about a social robot engaging you in emotional wellness coaching?
  - What concerns, if any, would you have about this interaction?
  - What benefits, if any, do you imagine from this interaction?

[some participants may be mixed on if they want the robot for emotional wellness coaching. Other cases may be on the extremes of wanting the social robot or NOT wanting the social robot. The following questions are for those on either side of the extreme]

- (if very enthusiastic with no concerns) what would make you uncomfortable to have emotional wellness coaching from a social robot?
- (if very against social robot) what would make you more comfortable to have emotional wellness coaching from a social robot?

### Connecting with Others

When you hear the words connecting with others, what do you think of?

How do you currently connect with others?

- (if don't mention any technology) Do you use any technology to connect with others?

What are your initial thoughts about social robots mediating and/or promoting your connections with others?

- How do you see it fitting into your life?
- Would you want the robot to allow you to video-chat with your family and friends?
- Would you want your robot to record video messages to send to another person?
- Would you want your robot to record text messages to send to another person?
- Would you like your robot to remind you to call or talk to friends and family?
- Would you like other people to be able to send messages or call you through your social robot?
- We've talked about how you could use a robot to connect with others. What are three things that you think would be helpful for the robot to predict or suggest to you based on its understanding of how you connect with others?
- Overall, how do you feel about a robot mediating and/or promoting your connections with others?
  - What concerns, if any, would you have about this interaction?
  - What benefits, if any, do you imagine from this interaction?

[some participants may be mixed on if they want the robot for connecting them with people in their lives. Other cases may be on the extremes of wanting the social robot or NOT wanting the social robot. The following questions are for those on either side of the extreme]

- (if very enthusiastic with no concerns) what would make you uncomfortable in engaging in mediating/promoting social connectedness with a social robot?
- (if very against social robot) what would make you more comfortable in engaging in mediating/promoting social connectedness with a social robot?

#### Exercise/Physical Therapy Engagement

When you hear the words exercise and/or physical therapy, what do you think of?

How do you currently manage your exercise and/or physical therapy routines at home?

What are your initial thoughts about social robots promoting or encouraging you in exercise or physical therapy? (can choose exercise if person does not engage in physical therapy)

- How do you see it fitting into your life?
- Would you like your robot to... [these questions can be followed up with why]
  - Guide you through various exercises (perhaps yoga, running, etc.)?
  - Guide you through physical therapy exercises?
  - Track how often you complete your exercises?
  - Track your progress and challenge you to increase your abilities?
  - Share your progress with your friends to keep each other accountable?

We've talked about how you could use a robot to guide you through exercises, track your exercising, and also track your progress. What are three things that you think would be helpful for the robot to predict or suggest to you based on it knowing and recording your exercise and/or physical therapy activities?

- Overall, how do you feel about a social robot promoting or encouraging you with exercise/physical therapy?
  - What concerns would you have about this interaction?
  - What benefits do you imagine from this interaction?

[some participants may be mixed on if they want the robot for exercise/physical therapy. Other cases may be on the extremes of wanting the social robot or NOT wanting the social robot. The following questions are for those on either side of the extreme]

- (if very enthusiastic with no concerns) what would make you uncomfortable in having a social robot engage you in exercise of physical therapy?
- (if very against social robot) what would make you more comfortable in having a social robot engage you in exercise of physical therapy?

### Body Signal Monitoring

When you hear the words body signal monitoring, what do you think of? (If struggling can provide examples of heart rate, blood pressure, sleeping pattern, etc.) (If prefer term “vitals” can use that for understandability)

Is it currently a part of your life?

- (if yes) How do you currently measure, keep track, or manage your body signals?
- (if no) Emphasize imagining the situation.

What are your initial thoughts about social robots helping you keep track of your body signals (i.e. heart rate, blood pressure, sleep pattern, etc.)?

- How do you see it fitting into your life?
- What body signals (or vitals) would feel comfortable with the robot tracking?
- If you had a separate device that you would use to record your body signals, would you want your robot to... (*human driven*)
  - Remind you to check your vitals?
  - Conduct a check-in to see if you took your vitals?
  - Track your body signals *that you tell it* long-term?
    - Provide visualizations of your progress over time?
  - Help you be accountable to managing your vitals?
  - Alert you when you should check in with your doctor?
- Would you want your robot to... (*robot driven*)
  - Measure your body signals using sensors in the robot?
  - Track your body signals *that it records* long-term?
  - Alert friends and family when you should check in with your doctor?

- What body signals would you not feel comfortable with the robot tracking?
- Would you want a robot to monitor your safety?
  - Would you want a robot to notify people if you've fallen? Or had a stroke?
- Would you be comfortable wearing a device that would monitor your body signals and communicate to the social robot?
- We've talked about how you could use a robot to help remind you about checking your body signals, holding you accountable, and also roles the robot could take to help you. What are three things that you think would be helpful for the robot to predict or suggest to you based on it knowing and recording your body signals?
  - Would you like the robot to make lifestyle suggestions on your body signal data?
- Overall, how do you feel about a social robot helping you keep track of your body signals?
  - What concerns would you have about this interaction?
  - What benefits do you imagine from this interaction?

[some participants may be mixed on if they want the robot for vital tracking. Other cases may be on the extremes of wanting the social robot or NOT wanting the social robot. The following questions are for those on either side of the extreme]

- (if very enthusiastic with no concerns) what would make you uncomfortable in having a social robot monitor your vitals?
- (if very against social robot) what would make you more comfortable in having a social robot monitor your vitals?

### Cognitive Health Monitoring

When you hear the words cognitive health, what do you think of?

Is it currently a part of your life at the moment?

- (if yes) How do you currently manage your cognitive health?
- (if no) Emphasize imagining the situation.

What are your initial thoughts about social robots helping you manage and/or monitor your memory or cognitive health?

- How do you see a social robot assisting with monitoring your memory fitting into your life?
- What memory exercises would you feel comfortable engaging in with the robot?
- Would you want to... [these questions can be followed up with why]
  - Play games with your robot so that you can exercise your memory?
  - Record notes or lists?
  - Remind you of where objects are located?
  - Repeat things it has said?
  - Record your daily activities?
    - Would you want to share these with others?
  - Record stories on the robot to store memories and remember your past?

- Would you want to share these with others?
- What memory exercises or recordings would you not feel comfortable engaging in with the robot?
- We've talked about how you could use a robot to help engage you in tasks to help with your memory. What are three things that you think would be helpful for the robot to predict or suggest to you based on it knowing and recording your memory progress?
- Overall, how do you feel about a social robot monitor and/or manage your memory?
  - What concerns would you have about this interaction?
  - What benefits do you imagine from this interaction?

[some participants may be mixed on if they want the robot for cognitive health monitoring. Other cases may be on the extremes of wanting the social robot or NOT wanting the social robot. The following questions are for those on either side of the extreme]

- (if very enthusiastic with no concerns) what would make you uncomfortable in having a social robot engage you in memory exercises?
- (if very against robot) what would make you more comfortable in having a social robot engage you in memory exercises?

### Financial Literacy

When you hear the words financial literacy, what do you think of?

Is it currently a part of your life at the moment?

- (if yes) How do you currently manage your finances?
- (if no) Emphasize imagining the situation.

What are your initial thoughts about social robots helping you manage your finances?

- How do you see a social robot assisting with finances fitting into your life?
- Overall, how do you feel about a social robot assisting with finances?
  - What concerns would you have about this interaction?
  - What benefits do you imagine from this interaction?

[some participants may be mixed on if they want the robot for financial literacy. Other cases may be on the extremes of wanting the social robot or NOT wanting the social robot. The following questions are for those on either side of the extreme]

- (if very enthusiastic with no concerns) what would make you uncomfortable in having a social robot help you manage your finances?
- (if very against robot) what would make you more comfortable in having a social robot help you manage your finances?

### User Feedback

- Thinking of all of these scenarios, would you want the robot to listen to you and adjust it's behavior to best fit you and your needs?
- How would you like to give feedback to the robot so it can fit you better?

- Surveys? Vocal feedback?

Closing Thank you for participating in today's interview. These are all the questions I had planned for today.

Do you have any additional thoughts in your mind?

- What interaction scenario did you find most intriguing? Why?
- What interaction scenario did you find most appalling or shocking? Why?
- Do you foresee yourself ever having a social robot in your home?
  - What would it be for?
  - What are the barriers?
- What do you believe would be the benefits of having a social robot in your home?
- What do you think are the disadvantages of having a social robot in your home?
- What are some things that you think we should consider when designing social robots?

Do you have any other questions?

Thank you, again, for your time today. Please let us know if you need anything for us or have more ideas. I will be in contact for the next parts of the study.

## 1.1 Reflection Interview Protocol

Reflection on the Design Guideline Session The last time we met, you participated in the design guideline generation session with our lab and the other participants.

- What did you think about the session?
- What did you find most intriguing? Why?
- What most appalling or shocking? Why?
- What do you believe would be the benefits of the design guideline session?
  - What did you like about the design guideline session?
- What do you think are the disadvantages of the design guideline session?
  - What would you change about the design guideline session?

Getting into Card Sorting Thank you for coming today to participate in our interview. Today, we are recapping the areas we have been exploring and asking some general questions as well.

Before we get into the categories we have been exploring,

- Broadly, after going through the study, what role do you see a social robot playing in your life?

Now, I'll remind you of the seven categories we started investigating:

- Medication Adherence
- Emotional Wellness Coaching/Mood Sensing and Intervention
- Connecting with Others
- Exercise / Physical Therapy
- Body Health Monitoring (e.g., vitals)



- Memory (Cognitive Health (e.g., memory) Monitoring)
- Financial Literacy/Management

As we explore each category, we will open with a set of questions and then do some card sorting.

#### Medication Adherence

- What are your thoughts around social robots assisting with medical adherence?
  - How do you see it fitting into your life?

\*\*\* CARD SORTING HERE \*\*\*

- What was going through your mind when you were sorting the cards the way you did?
- Overall, how do you feel about a social robot engaging you in medical adherence?
  - What concerns, if any, do you have about a social robot assisting with medical adherence?
  - What benefits, if any, do you imagine with a social robot assisting with medical adherence?

#### Emotional Wellness Coaching/Mood Sensing and Intervention

- What are your thoughts about social robots assisting with emotional wellness coaching to help you cope with daily life?
  - How do you see it fitting into your life?

\*\*\* CARD SORTING HERE \*\*\*

- What was going through your mind when you were sorting the cards the way you did?
- Overall, how do you feel about a social robot engaging you in emotional wellness coaching?
  - What concerns, if any, would you have about this interaction?
  - What benefits, if any, do you imagine from this interaction?

#### Connecting with Others

- What are your thoughts about social robots mediating and/or promoting your connections with others?
  - How do you see it fitting into your life?

\*\*\* CARD SORTING HERE \*\*\*

- What was going through your mind when you were sorting the cards the way you did?
- Overall, how do you feel about a robot mediating and/or promoting your connections with others?
  - What concerns, if any, would you have about this interaction?
  - What benefits, if any, do you imagine from this interaction?

#### Exercise/Physical Therapy Engagement

- What are your thoughts about social robots promoting or encouraging you in exercise or physical therapy? (can choose exercise if person does not engage in physical therapy)
  - How do you see it fitting into your life?

\*\*\* CARD SORTING HERE \*\*\*

- What was going through your mind when you were sorting the cards the way you did?
- Overall, how do you feel about a social robot promoting or encouraging you with exercise/physical therapy?
  - What concerns would you have about this interaction?
  - What benefits do you imagine from this interaction?

Body Signal Monitoring What are your thoughts about social robots helping you keep track of your body signals (i.e. heart rate, blood pressure, sleep pattern, etc.)?

- How do you see it fitting into your life?
- What body signals (or vitals) would you want the robot tracking?

\*\*\* CARD SORTING HERE \*\*\*

- What was going through your mind when you were sorting the cards the way you did?
- Overall, how do you feel about a social robot helping you keep track of your body signals?
  - What concerns would you have about this interaction?
  - What benefits do you imagine from this interaction?

Cognitive Health Monitoring

- What are your initial thoughts about social robots helping you manage and/or monitor your memory or cognitive health?
  - How do you see a social robot assisting with monitoring your memory fitting into your life?

\*\*\* CARD SORTING HERE \*\*\*

- What was going through your mind when you were sorting the cards the way you did?
- Overall, how do you feel about a social robot monitor and/or manage your memory?
  - What concerns would you have about this interaction?
  - What benefits do you imagine from this interaction?

Closing Thank you for participating in today's interview. These are all the questions I had planned for today.

Do you have any additional thoughts in your mind?

- What interaction scenario did you find most intriguing? Why?
- What interaction scenario did you find most appalling or shocking? Why?
- Do you foresee yourself ever having a social robot in your home?
  - What would it be for?
  - What are the barriers?
- What do you believe would be the benefits of having a social robot in your home?
- What do you think are the disadvantages of having a social robot in your home?
- What are some things that you think we should consider when designing social robots?

### Interview Reflection

- What did you think of the interview?
- What did you like about the interview?
- What would you change about the interview?
- What did you think about this interview compared to our first interview?

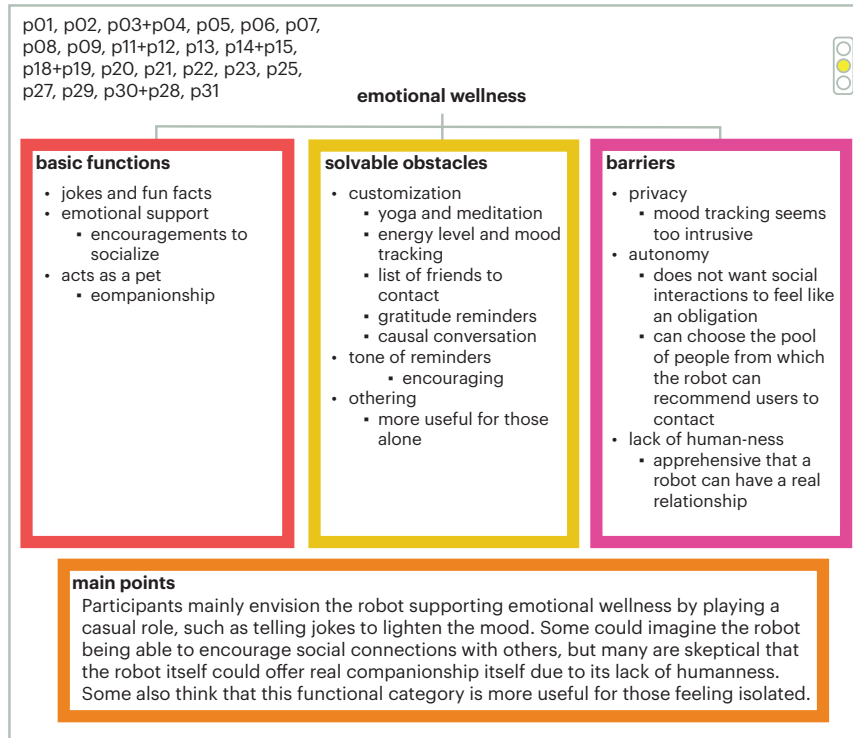
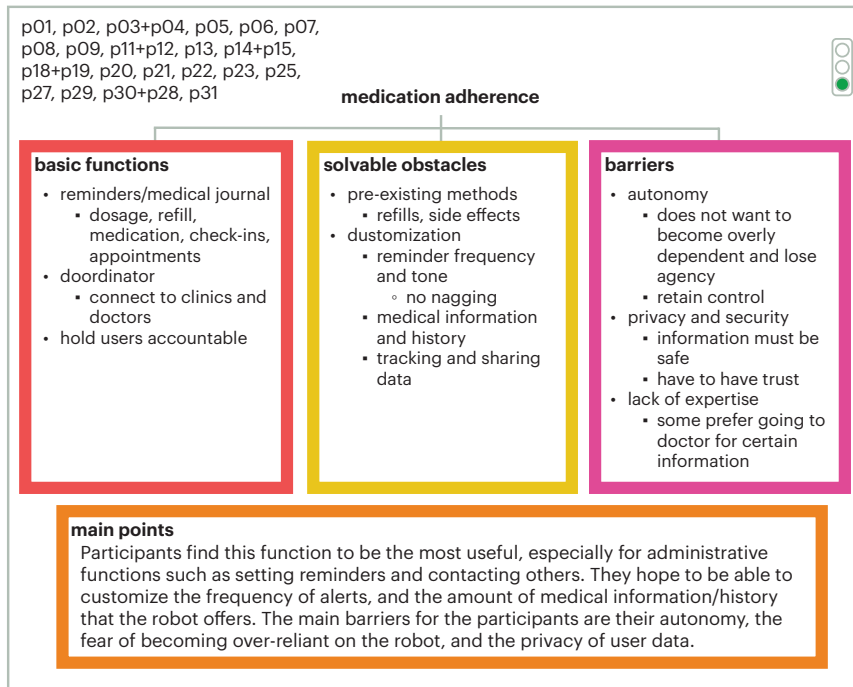
### Overall CoDesign Reflection

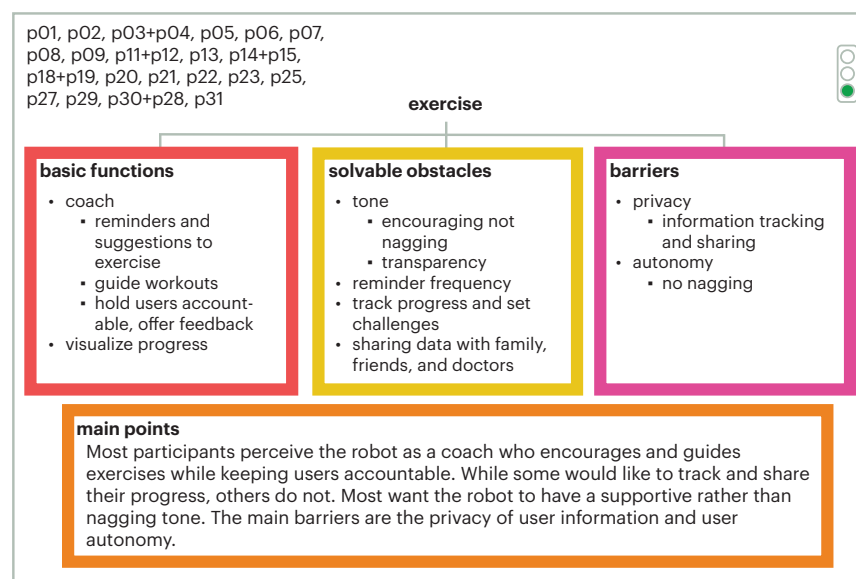
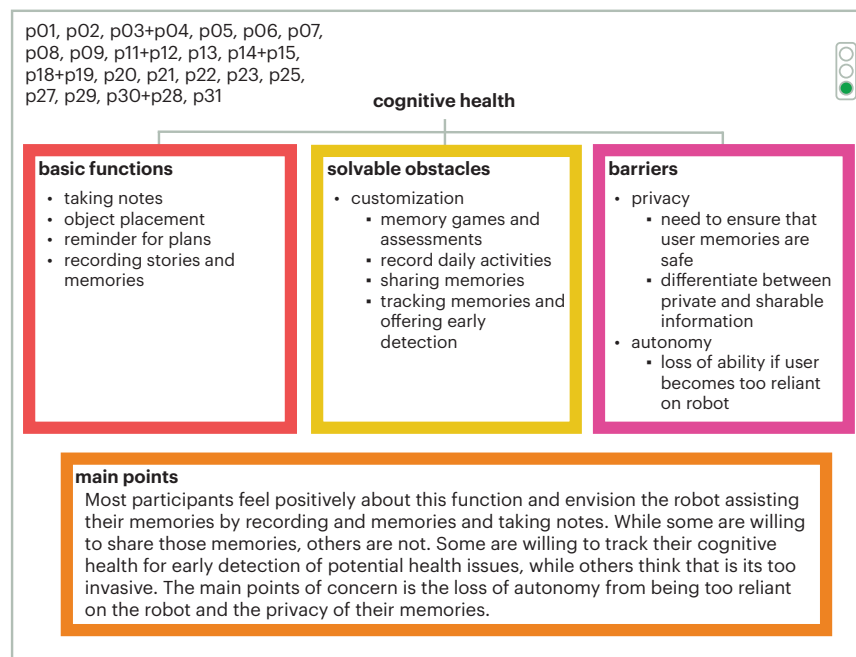
- What did you think of our codesign process?
- What did you like about our codesign process?
- What would you change about our codesign process?
- How would you like to continue our collaboration?

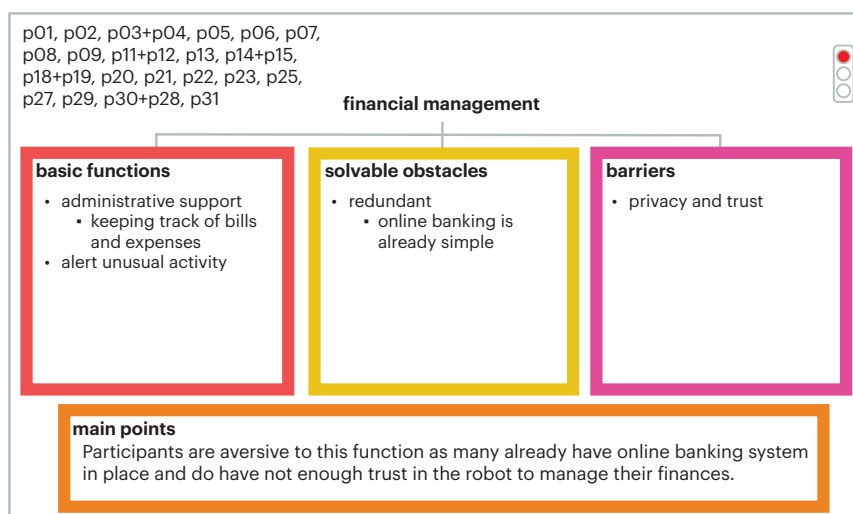
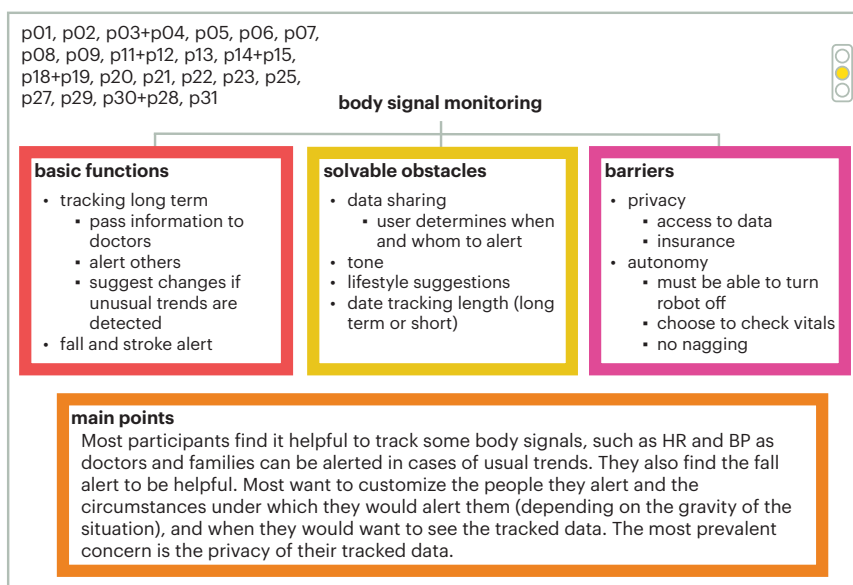
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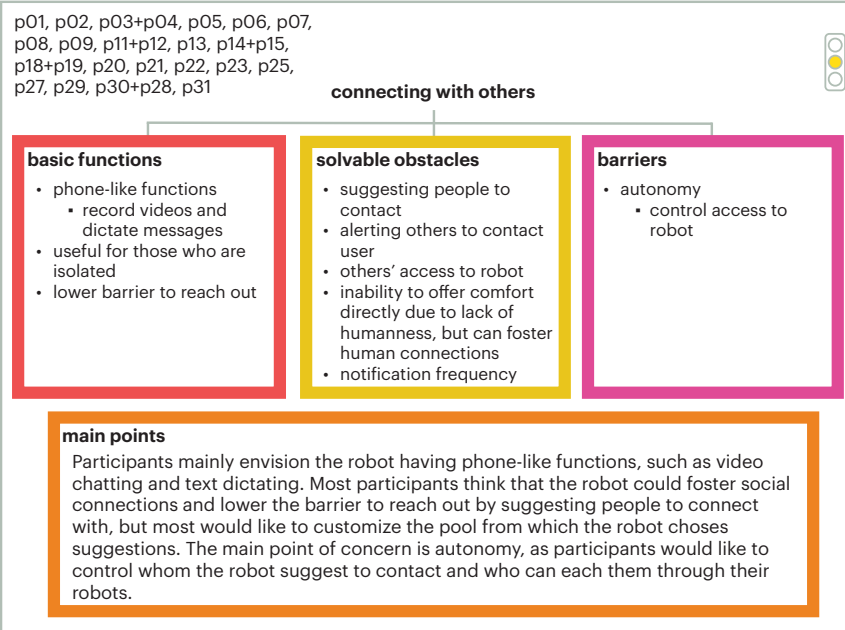
Thank you, again, for your time today. Please let us know if you need anything for us or have more ideas. We will continue to be in touch.

## 2 INITIAL INTERVIEW FINAL DECISION TREES









### 3 REFLECTION INTERVIEW FINAL DECISION TREES

