

Building & testing virtual patients for training mental health counselors

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Project Overview

- **Background**
- **Executive Summary**
- **Clients**
- **Stakeholders**

BACKGROUND

In the United States, a major problem that we currently face is the under-treatment of mental health issues. While 10% of US adults and adolescents face a major depressive episode each year, many do not receive treatment.

To tackle this ongoing problem, we are working 7 Cups, a large peer-to-peer online mental health community. The current platform is depicted on **Figure 1**, portraying the 7 Cups website.

Through online-text based chats as shown in **Figure 2**, 7 Cups has online mental health counselors who are volunteer listeners to give emotional support and serve as a crucial outlet for individuals seeking help, guidance, or empathy.

Although 7 Cups provides support for those who cannot seek traditional, in-person therapy, a new set of problems appear since 7 Cups online mental health counselors typically lack training and are non-professionals within the field of therapy.

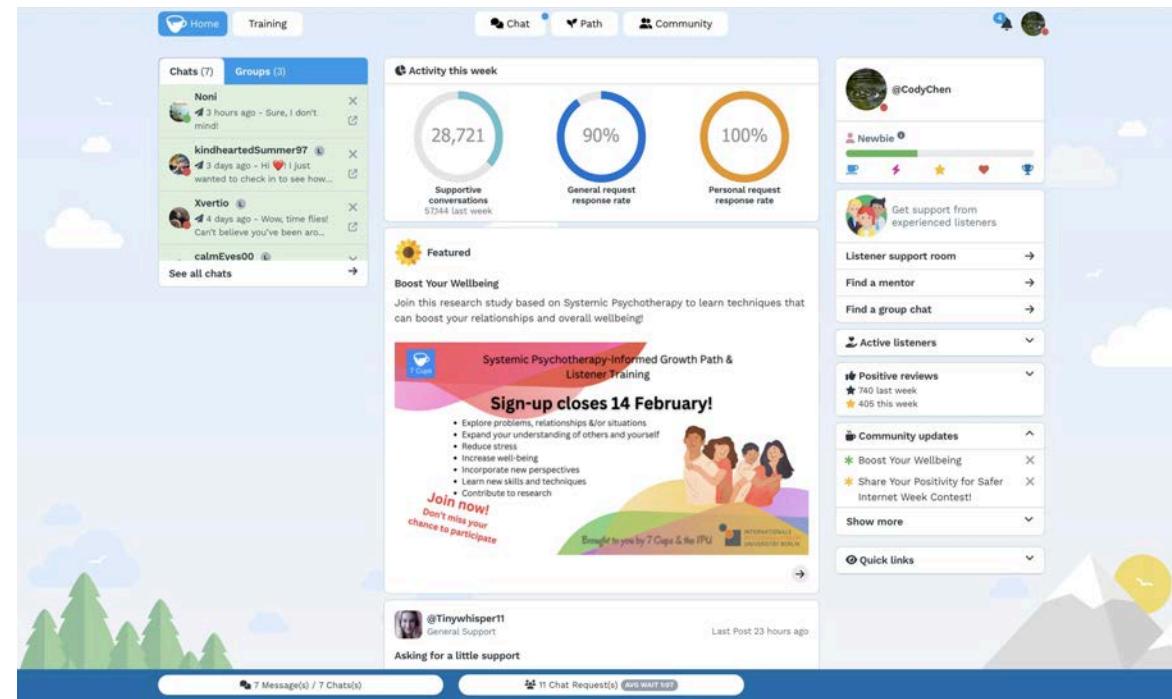


Figure 1: the current 7 Cups platform

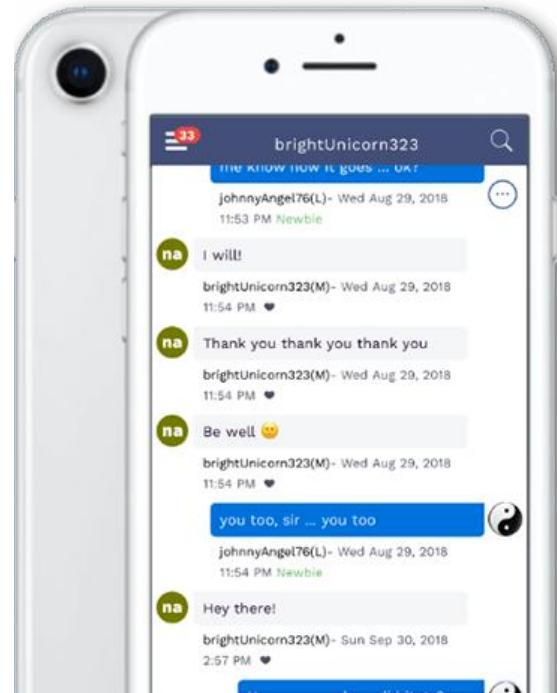


Figure 2: text-based conversations through 7 Cups

EXECUTIVE SUMMARY

With our project, we answer the research question:

How could we build realistic virtual patients to effectively train new 7 Cups volunteer listeners to be more confident?

Since it is daunting to become a new listener to speak with a real patient without the necessary skills or experience, **our goal** is to help new 7 Cups listeners by allowing them to practice having conversations with virtual patients on different topics of their choice with varying level of difficulty in order to give confidence and the helping skills for them to start speaking with real members. Figure 3, the storyboard on the right, visualizes our goal in steps.

Through our **research**, we discovered that new 7 Cups listeners would want to control the level of openness, to vary how open the virtual patient is about their situation and scenario, and the level of language, to vary how expressive they are in communication. Furthermore, we identified that new 7 Cups listeners would need more diversified virtual patients in background, scenario, and topic.

Therefore, for our **solution**, we re-imagined the original virtual patient on to the 7 Cups platform. By having a new prompt algorithm that would consider the interface inputs, we created an interface that allows new 7 Cups listeners to select from a variety of topics and modify difficulty level, which is decided by openness, language, and severity, to generate a conversational chat-bot that they could practice with.

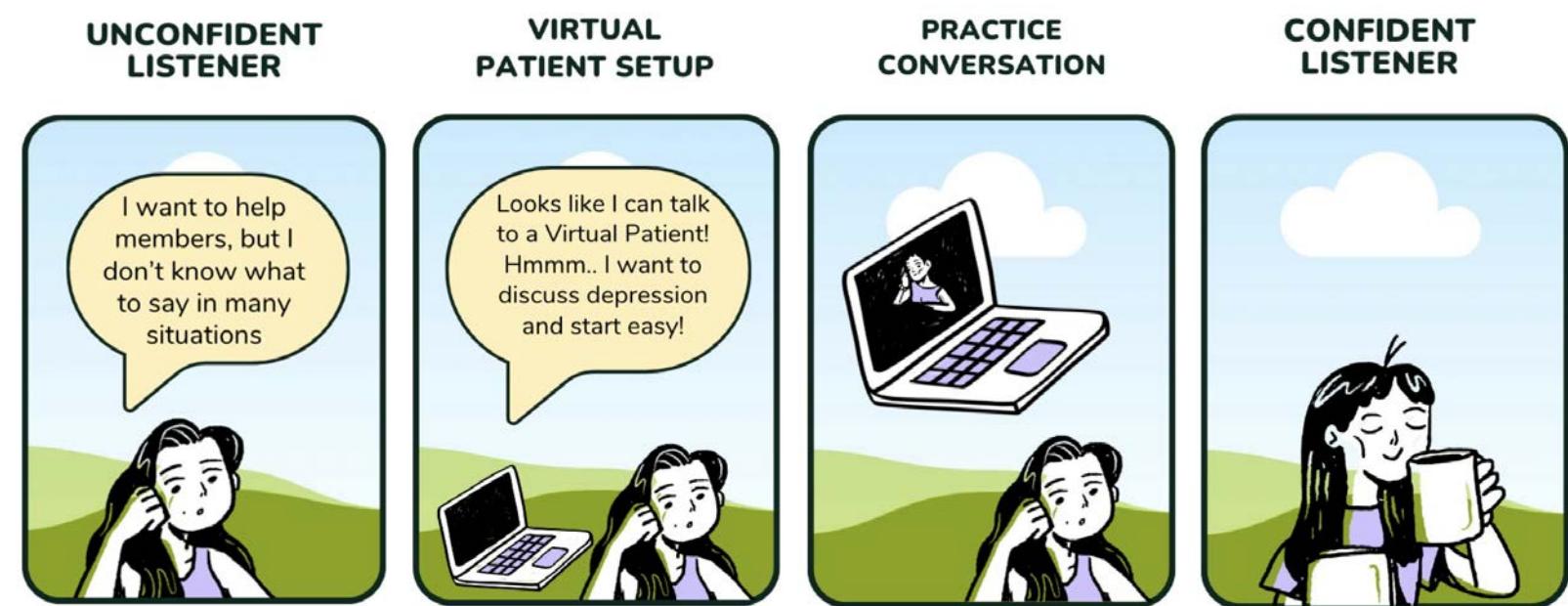


Figure 3: new listener goal storyboard

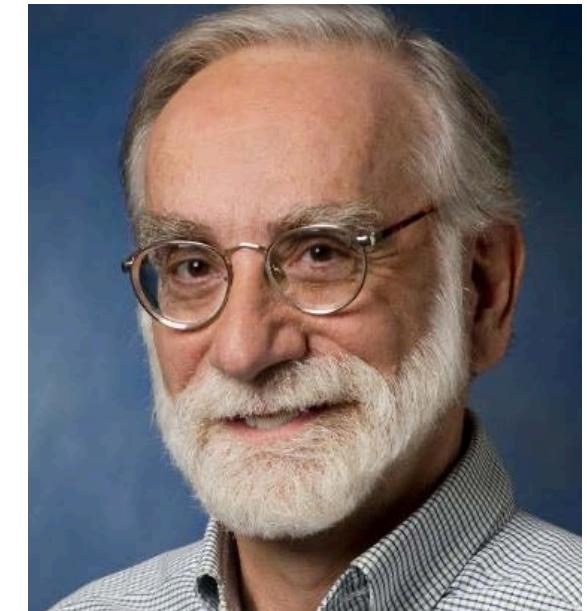
CLIENTS

With the help and guidance of our clients, Professor **Robert Kraut** and Professor **Haiyi Zhu**, we hope to answer our aforementioned research question:

How could we build realistic virtual patients to effectively train new 7 Cups volunteer listeners to be more confident?

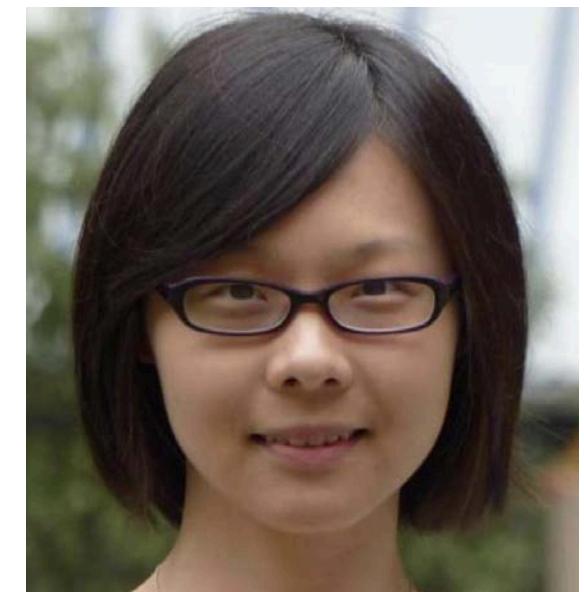
Working with **7 Cups**, their primary objective is to utilize large-language models (LLM) to engage new listeners in chat-based conversations with a realistic virtual patient.

Since the clients already had virtual patient prototypes, created by their own research team, we designed and built on top of the pre-existing virtual patients to create our solution.



Robert Kraut

Herbert University Professor Emeritus of
Human Computer Interaction,
Carnegie Mellon University



Haiyi Zhu

Associate Professor of Human Computer
Interaction,
Director of HCI Undergraduate Programs,
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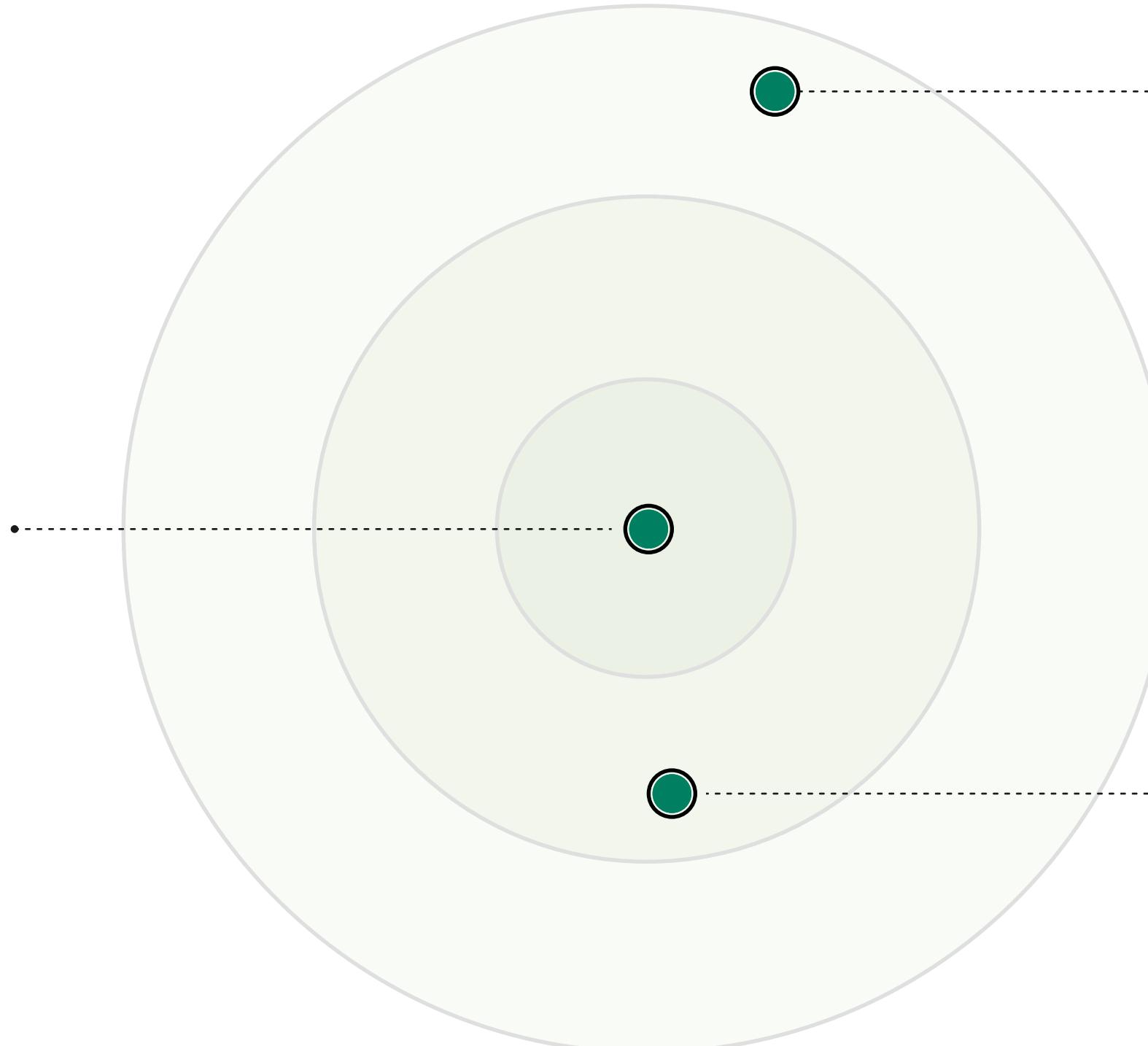
"We currently have built several hand-crafted virtual patients for depression, work stress, obsessive compulsive disorder, and suicidality."

STAKEHOLDERS



Listeners

7 Cups volunteer listeners are the individuals who undergo the 7 Cups training. Listeners are the **most important stakeholder** due to the direct, substantial impact listener quality has on the platform and overall 7 Cups community. Enhancing the current training program and virtual patient would lead to increased listener comfort levels, which could cause increased use of the platform and result in a stronger community and improved wellbeing.



Future Mental Health Professionals

Improving the 7 Cups virtual patient training would improve the resources available for students/individuals with an interest in pursuing a career in a field related to mental health to practice their skills.



Members

Platform users are indirectly affected by the 7 Cups training program, but directly affected by listeners' comfort levels in terms of both conversation wait times and the quality of their conversations.

Our Solution

- Brief Overview
- Rewinding back to Research

BRIEF OVERVIEW

In order to **effectively train new 7 Cups volunteer listeners to be more confident, we designed our virtual patients to reflect the 7 Cups website platform.** We hope to provide an easy, accessible, and efficient avenue for new listeners to train their helping skills and build confidence.

Upon entering the Virtual Patient Setting Page, the new 7 Cups listener is given two main components, **topics** and **difficulty level**, to create a personalized virtual patient that they could converse with.

Figure 4 holistically outlines our solution.

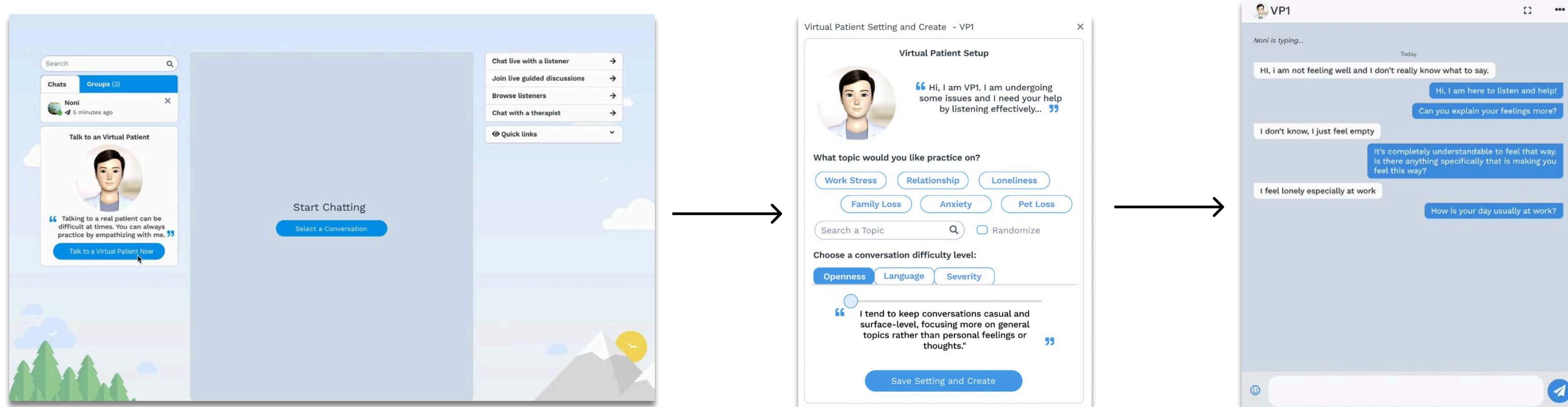


Figure 4: Solution Flow Outline

REWINDING BACK TO RESEARCH

Now that we have briefly introduced our solution, we will rewind back to start of our journey to provide how we came up with our final prototype looking like this. We will now begin with the research section to walk through our research that we conducted to address the key insights and findings that guided us throughout the entirety of the project.

Learning to Become a Volunteer Counselor: Lessons from a Peer-to-Peer Mental Health Community

ZHENG YAO, Carnegie Mellon University, USA
HAIYI ZHU, Carnegie Mellon University, USA
ROBERT E. KRAUT, Carnegie Mellon University, USA

Online peer-to-peer therapy sessions can be effective in improving people's mental well-being. However, online volunteer counselors may lack the expertise and necessary skills to handle such sessions effectively. These low-quality sessions may negatively impact volunteers' mental health. This paper uses interviews with 20 senior online volunteers to understand their challenges and acquired skills when volunteering in a large online support community. Although volunteers in this community received some training and motivation interviewing, results indicate that the training was insufficient and that volunteer counselors had to independently develop strategies to deal with specific challenges. The lack of feedback from mentors or peers in their training, however, might deviate from standard training practices. In addition, volunteers' responses to feedback from mentors or peers in their training were mixed. Even though training and support resources were available, they were not used. It's easy. We provide free online training & support – all you need is an internet connection to get started.

CCS Concepts • Human-centered computing → Empirical user study; listening course'

Additional Key Words and Phrases: mental health, peer support, Online volunteering from home (or via app)

ACM Reference Format:
Zheng Yao, Haiyi Zhu, and Robert E. Kraut. 2022. Learning to become a volunteer counselor: Lessons from a Peer-to-Peer Mental Health Community. *Proc. ACM Hum.-Comput. Interact.*, Vol. 6, No. CSCW2, Article 308. Publication date: November 2022, 24 pages. <https://doi.org/10.1145/3555202>

1 INTRODUCTION
People with mental health concerns are increasingly turning to their peers for help instead of professional clinicians due to the cost of therapy and their own availability [20]. Prior research has shown positive outcomes in the use of non-professional peer support interventions; although not conclusive, a recent review indicates that peer support groups for young people reduce anxiety [1], and users reported that peer support services are helpful to traditional healthcare services [5]. Particularly, online peer counseling services have flourished in recent years [4]. For example, the support service we examine in this work, 7Cups.com, has supported nearly 40 million clients since 2013 and has attracted 320,000 volunteer counselors ¹.

¹<https://www.7cups.com/about/research-stats>

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MemberNoni Alpha

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Disclaimer: Please note: this version of Noni is for conversational testing only. It blocks language suggesting suicidality, self-harm, crisis, hate speech, inappropriate sexual language, etc., similar to our site's current moderation system.

Tip: To test different topics, the first message from the listener will be the topic that they want Noni to act on. Example: "Act Topic: Depression" or, "You are Tom experiencing social anxiety."

Refresh View

Chat Edit Chat

Hello, nice to meet you! How may I help you today?

Hello, thank you for offering your time. I've been feeling anxious and overwhelmed lately.

Enter a message as Listener (press Enter to send)

Something like: "Hello, I'm a trained listener on 7Cups, how can I help you?" "Topic: Depression"

How was the latest response?

Add textual feedback (please click feedback buttons to the left to submit your feedback)

Gave advice

Grade Chat Quality

Regenerate Last

Advice on what to say

Ask open-ended questions
"What would you like to talk about today?"
"Please tell me more about that."
"How would you like things to be different?"

Reflect, rephrase, summarize the person's feelings
"It sounds like ____"
"I can see why you're feel [feeling]. I think that makes sense!"
"So what I've heard so far is [summary of what they said], is that right?"

Identify stressors, risk factors, and past behaviors
"What do you think is causing that?"
"Have you gone through something like this before?"

"Have you tried anything to change that in the past?"
"Ending the conversation was difficult. Members may ramble on and not provide ways to end the conversation."
"Recognize and affirm strengths and positive behaviors."
"I appreciate that you came to talk with me" went through training but still really wish I could make me feel more confident."
"It's been a long time since I last talked to you at the end to "I've enjoyed talking with you today!" too confident."
"guidelines and system rather made me feel more confident."
"hard to determine if its member's duty to end the conversation."
"interrupting them cause of time is challenging."
"enjoyed applying skills learned from training."

Feedback on your next message

Enter your draft message

Generate Feedback

Hi. What do you want to talk about?

Hi. I've had a tough time recently and I wanted to talk to someone about it.

What has been going on lately?

I don't know, I just feel overwhelmed all the time. I'm not sleeping well, my job is really stressful, and my girlfriend and I have been fighting a lot.

Please tell me more about that

I changed jobs over the last year and this new one has been really stressful. I don't like I know what I'm doing. I used to stay up late and work on

Lasted for hours Asking for contact Being able to protect yourself Late for confidence to start conversation

How important are the common factors in psychotherapy? An update

BRUCE E. WAMPOLD

Department of Counseling Psychology, University of Wisconsin, Madison, WI, USA

The common factors have a long history in the field of psychotherapy. While initially considered the "soft stuff," the contextual model of psychotherapy has come to be seen as important therapeutic elements. The contextual model of psychotherapy is presented for particular common factors, including alliance, therapist expectation, and empathic concern. The evidence for four factors related to specificity, including treatment fidelity, is presented. The evidence supports the conclusion that the common factors are important for producing the benefits of psychotherapy.

Key words: Common factors, contextual model, psychotherapy; alliance; empathy; expectation; cultural adaptation; therapist differences; specific ingredients

World Psychiatry 2013;14:270–277

Initial therapeutic relationship

The formation of the initial bond is a combination of bottom-up and top-down processing. Humans make very rapid determinations (within 100 ms), based on viewing the face of another human, of whether the other person is trustworthy [13]. This initial trust that humans make can lead individuals about whether they can trust their therapist. More than likely, patients make rapid judgments about the dress of the therapist, the arrangement and decorations of the room (e.g., diplomas on the wall), and other features of the therapeutic setting [14]. However, patients come to therapy with expectations about the nature of psychotherapy as

for Online Mental Health

ANONYMOUS AUTHOR(S)

Online platforms provide support for many kinds of distress, including suicidal thoughts and behaviors. However, because many platforms restrict suicidal talk, volunteers on these platforms struggle with how to help suicidal people who come for support. We interviewed 11 volunteer counselors in a large online support platform, including after they role-played conversations with varying severities of suicidality, to explore practices and challenges when identifying and responding to suicidality. We then presented Speed Dating design concepts around suicide detection, training, real-time guidance, and emotional preparation and support. Participants wanted more support and preparation around conversations with suicidal people, but were conflicted around AI-based technologies, including trade-offs between potential benefits of conversational agents for training and limitations of prediction or real-time response suggestions, due to the sensitive, context-dependent decisions that volunteers must make. Our work has important implications for nuanced considerations and design choices around developing digital mental health technologies.

If This Person is Suicidal, What Do I Do?: Designing Computational Approaches to Help Online Volunteers Respond to Suicidality

ANONYMOUS AUTHOR(S)

Online platforms provide support for many kinds of distress, including suicidal thoughts and behaviors. However, because many platforms restrict suicidal talk, volunteers on these platforms struggle with how to help suicidal people who come for support. We interviewed 11 volunteer counselors in a large online support platform, including after they role-played conversations with varying severities of suicidality, to explore practices and challenges when identifying and responding to suicidality. We then presented Speed Dating design concepts around suicide detection, training, real-time guidance, and emotional preparation and support. Participants wanted more support and preparation around conversations with suicidal people, but were conflicted around AI-based technologies, including trade-offs between potential benefits of conversational agents for training and limitations of prediction or real-time response suggestions, due to the sensitive, context-dependent decisions that volunteers must make. Our work has important implications for nuanced considerations and design choices around developing digital mental health technologies.

ACM Reference Format:
Anna Fang, Carnegie Mellon University, USA; Haiyi Zhu, Carnegie Mellon University, USA; Robert E. Kraut, Carnegie Mellon University, USA. "If This Person is Suicidal, What Do I Do?: Designing Computational Approaches to Help Online Volunteers Respond to Suicidality." In *Woodstock '18: ACM Symposium on Neural Gaze Detection*, June 03–05, 2018, Woodstock, NY, USA. New York, NY, USA, 32 pages. <https://doi.org/XXXXXX.XXXXXXX>

Content warning: Throughout this paper, we will discuss suicidality, including suicidal intent, methods, planning, crisis, attempts, injury, and death. Comments are highly underlined.

1 INTRODUCTION
Suicidality describes an array of thoughts and behaviors surrounding a person's desire to die, from passively wishing for death to actively attempting to kill oneself [17, 63]. The CDC estimates that in 2011, about 12 million U.S. adults experienced thoughts of suicidal behavior, with especially salient results for users [17, 63]. In 2011, the CDC estimates that in 2011, about 12 million U.S. adults experienced thoughts of suicidal behavior, with especially salient results for users [17, 63]. Many people seek support for suicidality from medical services including hotlines, therapists, and hospitals. These behaviors are exacerbated by algorithmic matching in OMHCs as well as design implications for OMHCs.

CCS Concepts: • Human-centered computing in collaborative and social computing

Additional Key Words and Phrases: mental health, peer support, online mental health, suicidality

ACM Reference Format:
Anna Fang and Haiyi Zhu. 2022. Matching Mental Health Communities. *Proc. ACM Hum.-Comput. Interact.*, Vol. 6, No. CSCW2, Article 308. Publication date: November 2022, 37 pages. <https://doi.org/10.1145/3555202>

1 INTRODUCTION
As mental health problems continue to rise, there is a growing demand for mental health support from peers for mental and emotional support. Online mental health communities (OMHCs) are places where people marked by mutually sharing experiences and practical guidance to promote and enhance mental health has long been shown to be critical in maintaining and improving mental well-being [20, 45, 65]. Among other benefits, receiving peer support improves efficacy, strengthens trust in mental health treatments, and reduces depression [92, 99, 102, 103]. In particular, online mental health communities (OMHCs) have emerged in recent years as one of the most effective and accessible ways for achieving peer support, often relying on either trained or untrained volunteers to provide peer support in one-on-one or group chats [9, 22, 34, 38, 46, 85, 96]. Many OMHCs provide free and live 24/7 support, which circumvents many barriers that prevent help-seeking and allows immediate address of people's mental health needs [10, 114]. This greater accessibility is particularly vital for communities disproportionately impacted by social stigma, such as non-cisgender people and racial minorities [3, 6, 15, 68, 128], as well as youth, who have the highest rates of mental health

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10

Research

- Background Research
- Insights from Background Research
- Co-creation Interview
- Action Items

RESEARCH

• Background Research

LITERATURE REVIEW

In order to first understand the project and the previous research conducted to provide a different avenue, we conducted literature review for our background research. By reading through 4 research papers and 1 book and conducting a diagramming exercise to identify key takeaways from the readings, we were able to have a **better understanding of previous ideas explored**, whether they were successful or not, and **what we are trying to achieve with this project**.

Learning to Become a Volunteer Counselor: Lessons from a Peer-to-Peer Mental Health Community

ZHENG YAO, Carnegie Mellon University, USA
HAIYI ZHU, Carnegie Mellon University, USA
ROBERT E. KRAUT, Carnegie Mellon University, USA

Online peer-to-peer therapy sessions can be effective in improving people's mental well-being. However, online volunteer counselors may lack the expertise and necessary training to provide high-quality sessions, and these low-quality sessions may negatively impact volunteers' motivations as well as clients' well-being. This paper uses interviews with 20 senior online volunteer counselors to examine how they addressed challenges and acquired skills when volunteering in a large, mental-health support community - 7Cups.com. Although volunteers in this community received some training based on principles of active listening and motivational interviewing, results indicate that the training was insufficient and that volunteer counselors had to independently develop strategies to deal with specific challenges that they encountered in their volunteer work. Their strategies, however, might deviate from standard practice since they generally lacked systematic feedback on mentors' decisions and strategies for dealing with client experiences. Additionally, volunteer counselors reported having difficulty maintaining their professional boundaries with the clients. Even though training and support resources were available, they were underutilized. The results of this study have uncovered new design spaces for HCI practitioners and researchers, including social computing and artificial intelligence approaches that may provide better support to volunteer counselors in online mental health communities.

CCS Concepts: • Human-centered computing → Empirical studies in HCI

Additional Key Words and Phrases: mental health, peer support, online health community, volunteer

ACM Reference Format:

Zheng Yao, Haiyi Zhu, and Robert E. Kraut. 2022. Learning to Become a Volunteer Counselor: Lessons from a Peer-to-Peer Mental Health Community. *Proc. ACM Hum.-Comput. Interact.*, Vol. 6, CSCW2, Article 309 (November 2022), 24 pages. <https://doi.org/10.1145/3555200>

1 INTRODUCTION

People with mental health concerns are increasingly turning to their peers for help instead of professional clinicians due to the cost of therapy and their own availability [20]. Prior research has shown positive outcomes in the use of non-professionals to deliver mental health interventions; although not conclusive, a recent review indicates that peer support groups for young people reduce anxiety [1], and users reported that peer support services are as helpful as traditional psychotherapy services [5]. Particularly, online peer counseling services have flourished in recent years[4]. For example, the support service we examine in this work, 7Cups.com, has supported nearly 40 million clients since 2013 and has attracted 320,000 volunteer counselors¹.

¹<http://www.7cups.com/about/research-stats>

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309

Matching for Peer Support: Exploring Algorithmic Matching for Online Mental Health Communities

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Online mental health communities (OMHCs) have emerged in recent years as an effective and accessible way to obtain peer support, filling crucial gaps of traditional mental health resources. However, the mechanisms for users to find relationships that fulfill their needs and capabilities in these communities are highly underdeveloped. Using a mixed-methods approach of user interviews and behavioral log analysis on 7Cups.com, we explore central challenges in finding adequate peer relationships in online support platforms and how algorithmic matching can alleviate many of these issues. We measure the impact of using qualities like gender and age in purposeful matches to improve member experiences, with especially salient results for users belonging to vulnerable populations. Lastly, we propose key requirements for designing matching systems in the online mental health context, such as the necessity for better moderation to avoid potential harassment behaviors exacerbated by algorithmic matching. Our findings yield key insights into current user experiences in OMHCs as well as design implications for building matching systems in the future for OMHCs.

CCS Concepts: • Human-centered computing → Collaborative and social computing: Empirical studies in collaborative and social computing.

Additional Key Words and Phrases: mental health, peer support, online communities, algorithmic matching

ACM Reference Format:

Anna Fang and Haiyi Zhu. 2022. Matching for Peer Support: Exploring Algorithmic Matching for Online Mental Health Communities. *Proc. ACM Hum.-Comput. Interact.*, Vol. 6, CSCW2, Article 311 (November 2022), 37 pages. <https://doi.org/10.1145/3555202>

1 INTRODUCTION

As mental health problems continue to rise in prevalence globally, people are increasingly turning to peers for mental and emotional support [10, 11]. Peer support – defined as interactions between people marked by mutually sharing experiences and practical guidance to promote well-being – has long been shown to be critical in maintaining and improving mental well-being [24, 42, 65]. Among other benefits, receiving peer support improves self-efficacy, strengthens trust in mental health treatment, and reduces depression [92, 99, 102, 105]. In particular, online mental health communities (OMHCs) have emerged in recent years as one of the most effective and accessible ways for achieving peer support, often relying on either trained or untrained volunteers to provide peer support in one-on-one or group chats [9, 22, 34, 38, 46, 85, 96]. Many OMHCs provide free and live 24/7 support, which circumvents many barriers that prevent help-seeking and allows immediate address of people's mental health needs [10, 114]. The greater accessibility is particularly vital for communities disproportionately impacted by social stigma, such as non-cisgender people and racial minorities [3, 8, 15, 68, 128], as well as youth, who have the highest rates of mental health

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311

How important are the common factors in psychotherapy? An update

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The common factors have a long history in the field of psychotherapy theory, research and practice. To understand the evidence supporting them as important therapeutic elements, the contextual model of psychotherapy is outlined. Then the evidence, primarily from meta-analyses, is presented for particular common factors, including alliance, empathy, expectations, cultural adaptation, and therapist differences. Finally, an evidence-based review for four factors related to specificity, including treatment differences, specific ingredients, adherence, and competence, is presented. The evidence suggests the conclusion that the common factors are important for producing the benefits of psychotherapy.

Key words: Common factors, contextual model, psychotherapy, alliance, empathy, expectations, cultural adaptation, therapist differences, specific ingredients

(World Psychiatry 2015;14:270-277)

The so-called common factors have a long history in psychotherapy, originating with the work of S. Rorschach in 1929 and popularized by J. Frank in the various editions of his book *Persuasion and Healing* [2-4]. During this period, the common factors have been both embraced and dismissed, creating some tension [5-9]. The purpose of this paper is not to review or discuss the debate, but to provide an update summarizing the evidence related to these factors.

To understand the evidence for the common factors, it is important to keep in mind that these factors are more than a set of therapeutic elements that are common to all or most therapies. They collectively shape a theoretical model about the mechanisms of change in psychotherapy.

A particular common factor model, called the contextual model, has been recently proposed [8,10]. Although there

are other common factor models (e.g., 4,11), based on different theoretical propositions, the predictions made about the importance of various common factors are similar and the choice of the model does not affect conclusions about the impact of these factors. The contextual model is presented below, followed by a review of the evidence for the common factors imbedded in the model.

THE CONTEXTUAL MODEL

The contextual model posits that there are three pathways through which psychotherapy produces benefits. That is, psychotherapy does not have a unitary influence on patients, but rather works through various mechanisms. The mechanisms underlying the three pathways entail evolved characteristics of humans as the ultimate social species; as such, psychotherapy is a special case of a social health-practice.

Thus, the contextual model provides an alternative explanation for the benefits of psychotherapy to ones that emphasize

270 World Psychiatry 14:3 - October 2015

"If This Person is Suicidal, What Do I Do?": Designing Computational Approaches to Help Online Volunteers Respond to Suicidality

ANONYMOUS AUTHOR(S)

Online platforms provide support for many kinds of distress, including suicidal thoughts and behaviors. However, because many platforms restrict suicidal talk, volunteers on these platforms struggle with how to help suicidal people who come for support. We interviewed 11 volunteer counselors in a large online support platform, including after they role-played conversations with varying severities of suicidality, to explore practices and challenges when identifying and responding to suicidality. We then presented Speed Dating design concepts around suicide detection, training, real-time guidance, and emotional preparation and support. Participants wanted more support and preparation around conversations with suicidal people, but were conflicted around AI-based technologies, including trade-offs between potential benefits of conversational agents for training and limitations of prediction or real-time response suggestions, due to the sensitive, context-dependent decisions that volunteers must make. Our work has important implications for nuanced considerations and design choices around developing digital mental health technologies.

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Anonymous Author(s). 2018. "If This Person is Suicidal, What Do I Do?": Designing Computational Approaches to Help Online Volunteers Respond to Suicidality. In *Woodstock '18: ACM Symposium on Neural Gaze Detection*, June 03-05, 2018, Woodstock, NY, ACM, New York, NY, USA, 32 pages. <https://doi.org/XXXXXX.XXXXXXXX>

Content warning: Throughout this paper, we will discuss suicidality, including suicidal intent, methods, planning, crisis, attempts, injury, and death.

1 INTRODUCTION

Suicidality describes an array of thoughts and behaviors surrounding a person's desire to die, from passively wishing one were dead to actively attempting to kill oneself [37, 65]. The CDC estimates that in 2021, about 12 million U.S. adults seriously thought about suicide, 1.7 million attempted suicide, and nearly 50,000 people died by suicide [5]. Many people seek support for suicidality from medicalized services including hotlines, therapists, and hospitals. These resources are often seen as more effective than non-medical support from loved ones, community members, or suicidal peers [40]. Yet, for a number of reasons – e.g., harm by the medical system, lack of access, preferences – many seek support for suicidality outside the medical system. Online platforms are places where suicidal people seek support, often anonymously and for free. Some sites, like message boards [57] or Reddit's r/SuicideWatch [19] are dedicated to supporting suicidal people through non-professional peer support. While other sites like 7 Cups and TalkLife [15, 77, 83] are not specifically dedicated to suicidality support, people still seek support for suicidality there [83].

Prior research on suicidality online has centered people who seek support for suicidal distress (e.g., [21, 57]), with little work about people who provide support, such as volunteer counselors and moderators. Suicide prevention research in HCI and related fields has focused on creating technologies –especially AI-based ones– to replace, rather than

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Manuscript submitted to ACM

Figure 5: Research Papers, which included previous research conducted by our clients, volunteer therapist education, common factors in psychotherapy, peer-counseling, and computational approaches to address serious mental health issues.

RESEARCH

• Background Research

TESTING VIRTUAL PATIENTS

Each team member had mock conversations with two virtual patients in order to identify key areas of improvement of current virtual patients. In our mock conversations, we noted a **lack of sufficient feedback** regarding the user's responses as well as a **significant lack of realism** in the virtual patients' diction. **This research method helped us recognize the key shortcomings of the virtual patients that we would like to explore further into.**

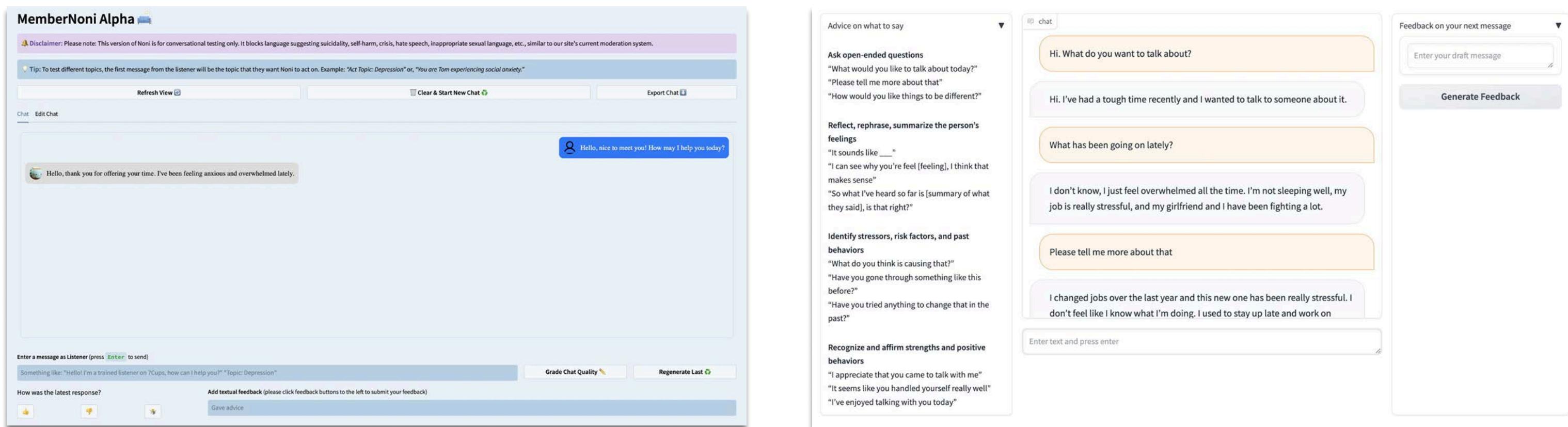


Figure 5: Virtual Patients, which includes 7 Cups' MemberNoni Alpha and Huggingfaces.io

RESEARCH

• Background Research

7 CUPS LISTENER TRAINING

In order to fully understand the new listener dynamic, each member completed the 7 Cups listener training program to become a volunteer listener on the platform. The mandatory training is consisted of: an active listener training module, a quiz that must be completed for each module, and a mock conversation with a virtual patient. The three items in the training program gave us first hand experience with which areas need the most work. Furthermore, we were able to identify that the **current training program does not give opportunity for new listeners to have conversations, from start to end, with virtual patients.**

Volunteer Opportunities for Emotional Support

You have the power to change lives

7 Cups provides free, 24/7 emotional support to millions via online chat. We want to make sure nobody has to face their problems alone. Having someone like you to listen can be all it takes to make a real difference.

How Does Volunteering with 7 Cups Work?

It's easy! We provide free online training & support - all you need is an internet connection to get started.

- ✓ Free active listening course'
- ✓ Online volunteering from home (or via app!)
- ✓ Control your own availability to listen'
- ✓ Get certifications to boost your resume'
- ✓ Get support & coaching from friendly mentors'

[Become a Listener](#)

Already have an account? [Login here](#)



Training courses

Training Certification

- ✓ Active Listening
- ✓ Verified Listener
- ✓ Practice Chat Refresher
- ✓ 7 Cups for the Searching Soul
- ✓ 12 Step Working Guide
- ✓ ADHD
- ✓ Acceptance & Commitment Therapy
- ✓ Alcohol/Drug Use
- ✓ Anxiety
- ✓ Bipolar
- ✓ Boundaries
- ✓ Breakup Advice
- ✓ Bullying
- ✓ Chronic Pain
- ✓ College Life
- ✓ Coping with Schizophrenia
- ✓ Crisis Intervention
- ✓ Finances
- ✓ Forgiveness
- ✓ Getting Unstuck
- ✓ Grief
- ✓ Hope
- ✓ Listener Community Guide
- ✓ Loneliness
- ✓ Managing Emotions
- ✓ NAMI for Listeners
- ✓ New Moms
- ✓ Obsessive Compulsive Disorder
- ✓ Panic Attacks
- ✓ Parenting Help
- ✓ Peer Training 1
- ✓ Peer Training 2
- ✓ Peer Training 3
- ✓ Peer Training 4
- ✓ Peer Training 5
- ✓ Peer Training 11
- ✓ Peer Training 12
- ✓ Perinatal Mood Disorder
- ✓ Pineapple Support
- ✓ Psychological First Aid (PFA)
- ✓ Self Harm
- ✓ Sexual Abuse
- ✓ Sleeping Well
- ✓ Social Anxiety
- ✓ Startup Support
- ✓ Surviving Domestic Assault
- ✓ Test Anxiety
- ✓ Traumatic Experiences
- ✓ Weight Management
- ✓ Work Related Stress
- ✓ Young People of Color Support
- ✓ Active Listening: The Basics
- ✓ Active Listening: Questions

Which of the following is a goal of reflecting content?

- To repeat the speaker's story word-for-word
- To point out any mistakes in the speaker's story
- To show the speaker that you are listening and to draw out more of the speaker's story

Figure 6: The Listener Training Program to become a Volunteer Listener

RESEARCH

- **Background Research**

CONVERSATIONS WITH MEMBERS

After completing the **listener training program**, each member had a conversation with a real member on 7 Cups. With these conversations lasting and running differently for each member, we aimed to see the efficacy of the listener training program and identify areas where we struggled the most as a new listener. In order to consolidate our experience as a whole, we conducted affinity diagramming to organize the takeaways and pain points from the conversations. Through this diagramming exercise, we were able to identify **two commonalities** that we experienced in our conversations:

- 1. It is difficult for new listeners to be confident and comfortable to speak with real patients.**
- 2. It is challenging for new users to empathize and communicate due to lack of experience.**

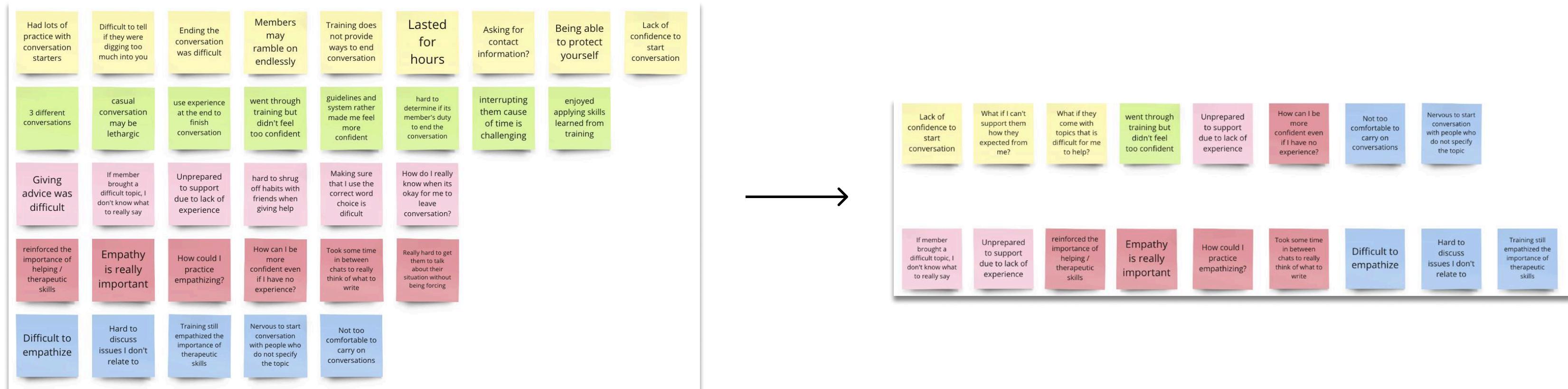


Figure 7: Affinity Diagram to consolidate our support experience as a new listener

RESEARCH

- **Synthesis from Background Research**

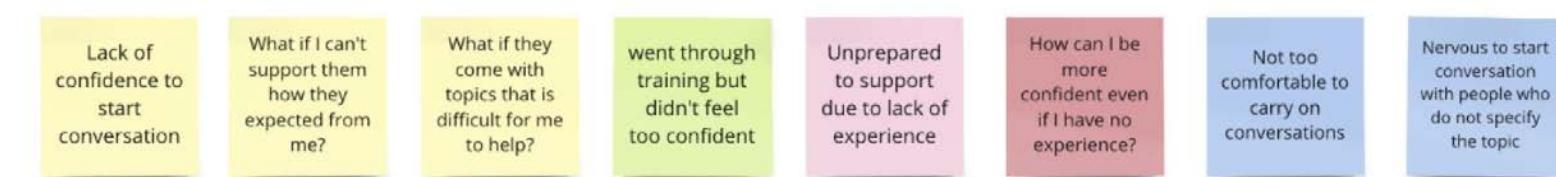
Insight #1

Listeners need to feel **confident** and **comfortable** after training to support even the most difficult mental health conditions

By having **conversations with members**, our team was able to engage with actual members to gain first-hand experience to understand the struggles of new listeners. A prevalent worry our team members had was the fear of failing to support and inadvertently harming members on 7Cups. While mock conversations with **virtual patients** were helpful for our team members to practice facilitating conversations, most of our team members felt unprepared due to the chances of unknown. Since patients may come with difficult topics for us to help or give advice (eg. cancer, workplace stress, domestic violence), our team members were concerned that we cannot support them since we do not have strong understanding and experience of those topics. When our team met to discuss with our clients regarding this concern, we realized that our lack of confidence and courage was directly rooted from how structured the mock conversations and virtual patients were:

We identified that **mock conversations were leading**. Since mock conversations kindly guides new trainees through every step of the conversation, it makes it easier than real conversations to understand the direction and motive.

Most importantly, we realized that virtual patients lack diversity. From the two virtual patients we tested during our research process, it came to our understanding that the virtual patients lack diversity in their language. The virtual patients did not reflect the language and personality types of real patients.



Our Vision

From this insight, our team how we could make virtual patients more realistic. We determined that it was necessary to consider making virtual patient's language more colloquial and reflect the hesitancy of real patients opening up to their volunteer listener, reflecting the natural behavior of real patients.

We believe that we could significantly improve new listener's confidence and courage to speak with real patients at the end of their training by considering the diversity of real members.

We hoped to explore deeper into this insight with our next stage of research.

RESEARCH

- **Synthesis from Background Research**

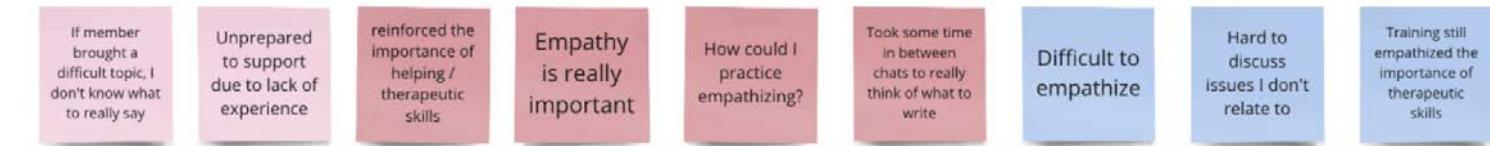
Insight #2

Listeners need to cultivate **helping skills** such as **contextual understanding** and **empathy** to achieve better helping outcomes.

From our **conversations with members**, we realized that new listeners may face trouble due to their lack of helping skills. Since we did not receive professional training in therapy, most of us felt nervous and unprepared to speak with members. For example, we were unsure what to say or how to empathize if a member brought a topic that was difficult and outside of our knowledge.

While **7 Cups Listener Training** and testing with **virtual patients**, helped us understand holistically what we had to do while speaking with a member, we believe that they did not prepare us for the variability of real patients. We also believe that the feedback mechanisms, for both the training program and mock conversation, were not thorough enough for us to know our mistakes and learn from them.

Therefore, **we identified the need for new listener's being able to cultivate helping and therapeutic skills.**



Our Vision

From this insight, our team was able to consider: how could we design the virtual patient so that it reflects the natural behaviors of real members to help new listener's cultivate helping skills? We determined that it would be important focus to consider edge cases, such as language and personality traits, to better reflect real member interactions.

A better feedback mechanism could help new listeners cultivate their helping/therapeutic skills by providing thorough assessment and criticism based on your conversations.

RESEARCH

• Co-creation Interview

In order to validate and expand our 2 insights from background research, we conducted a co-creation interview with experienced 7 Cups listeners. For this interview, we utilized our client's virtual patient's script to generate the virtual patient to interview with on Open AI. To help us identify what qualities and characteristics are important for virtual patients in order to provide an effective practice environment, we conducted the interview with **3 main stages**:

• Stage 1: Interaction with the Virtual Patient

- In this stage, we allowed our interviewees to get acquainted with the virtual patient by having a conversation. After the interview spent around 10-20 minutes conversing with the virtual patient, we followed up with a set of reflection questions for them to answer.

• Stage 2: Script Reading

- After completing Stage 1, we explained how the virtual patient was generated with written scripts. We allowed time for them to read through and understand the specific script that was used for the virtual patient that they just spoke. We asked questions on how accurately and realistic virtual patient acted based on the script.

• Stage 3: Script Editing

- With the interviewees now aware of how the script created the virtual patient, we asked them to modify the prompt based on what they thought was missing from the virtual patient. This allowed us identify which characteristics were missing from the current virtual patient from the perspective of experienced listeners.

To easily visualize this co-creation interview process, Figure 8 is provided to show a comprehensive storyboard. The platform we used for the interview was Open AI Playground, as pictured on Figure 9.

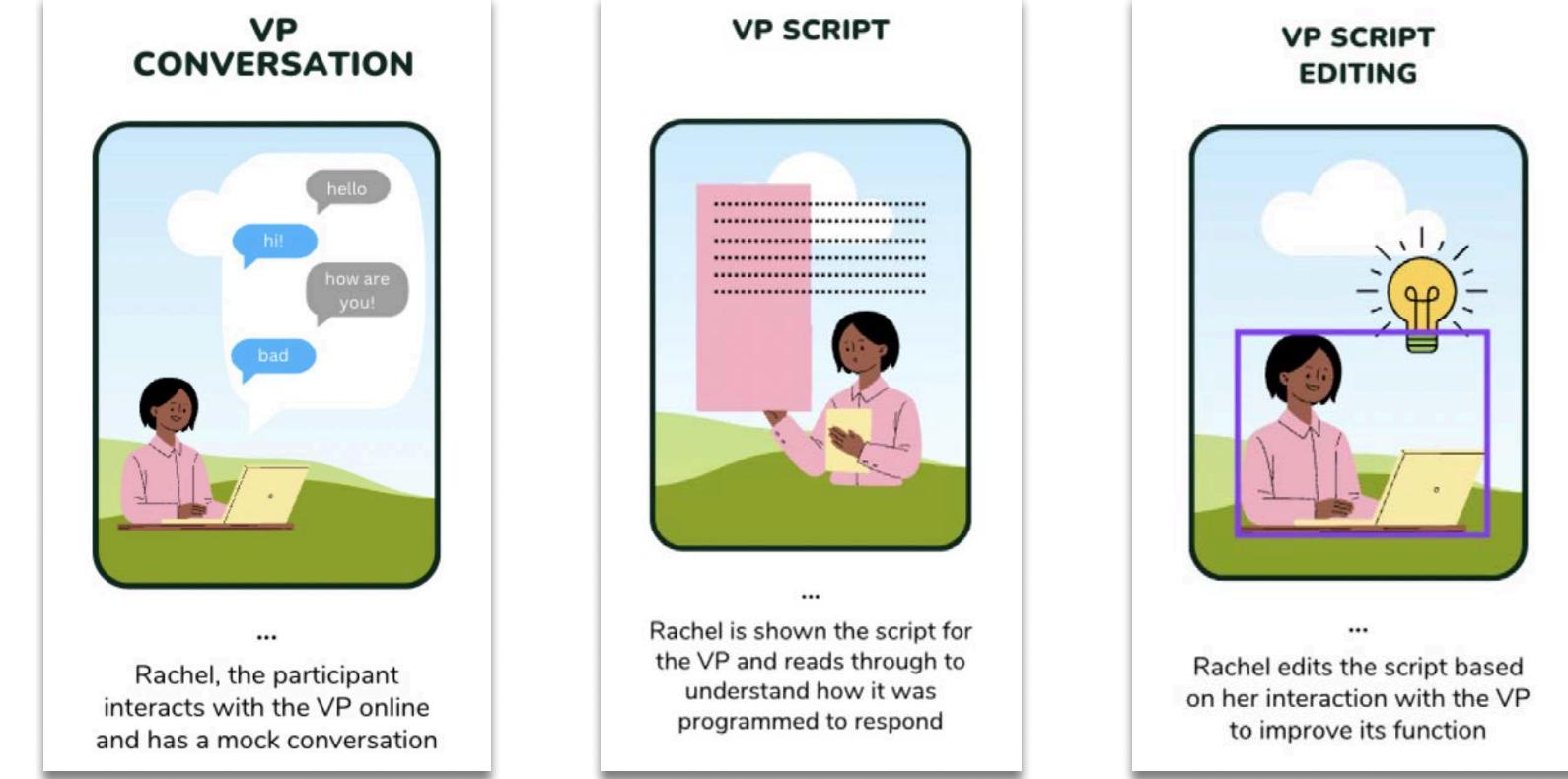


Figure 8: Storyboard for Co-creation Interview Process

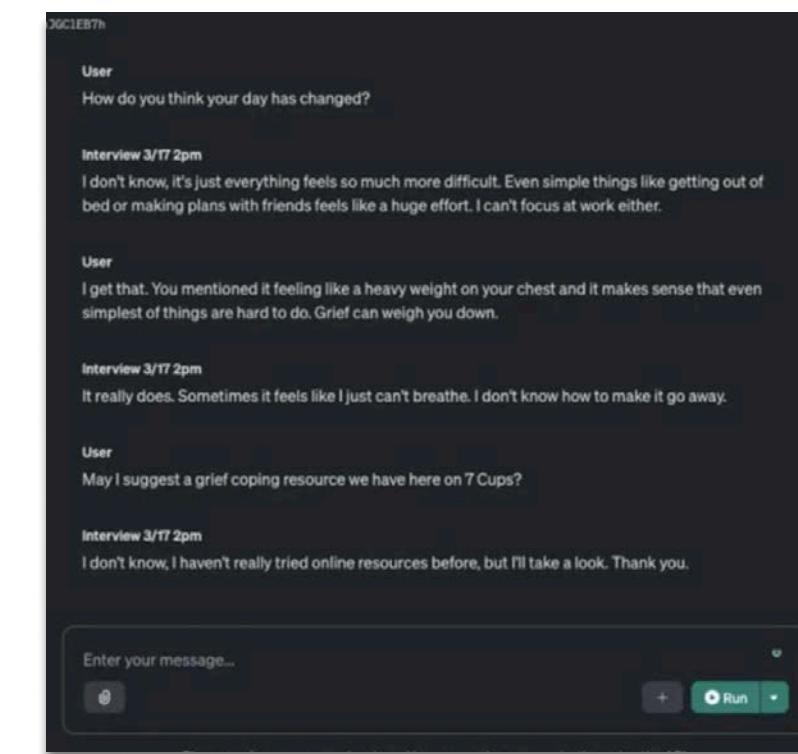


Figure 9: Open AI Playground utilized for interviewees to converse with the virtual patient

RESEARCH

- **Action Items**

From our **co-creation interview**, we conducted an affinity diagramming exercise to group important insights from each interviewee. As shown in Figure 10, we were able to derive 5 action items to consider:

1. Openness

- Our interviewees identified that our virtual patient has a tendency to open up faster compared to a real member. Since it normally takes multiple conversations for a real member to open up about their situation and feelings with a listener, we would have to **vary the speed of openness** to provide a realistic virtual patient.

2. Feedback

- Our interviewees pointed out how there was no feedback mechanism for the virtual patient. Since the virtual patient's purpose is train new listeners, they suggested that we would need a **feedback system** to assess or notify if a trainee said an inappropriate response.

3. Response Speed

- Since most members usually write short texts to reflect the chatroom setting of 7 Cups, our interviewees noted that our virtual patient writing lengthy responses is not reflective of real member behavior. We determined that it would be important for us to **vary the amount of text generated as a response**.

4. Diversity of the Virtual Patient

- Our interviewees brought up many different characteristics of real members that were not shown in our virtual patient. Most importantly, they noted how our virtual patient lacked personality and personal background, and agreed to everything the listener suggested. We recognized the need to **diversify our virtual patient's character and personality** to better reflect natural human behaviors.

5. Language

- Our interviewees noted that our virtual patient is overly expressive and eloquent compared to a real member. Since most members usually write short texts to reflect the chatroom atmosphere of 7 Cups, our virtual patient should respond more colloquially without being too aware of their situation.

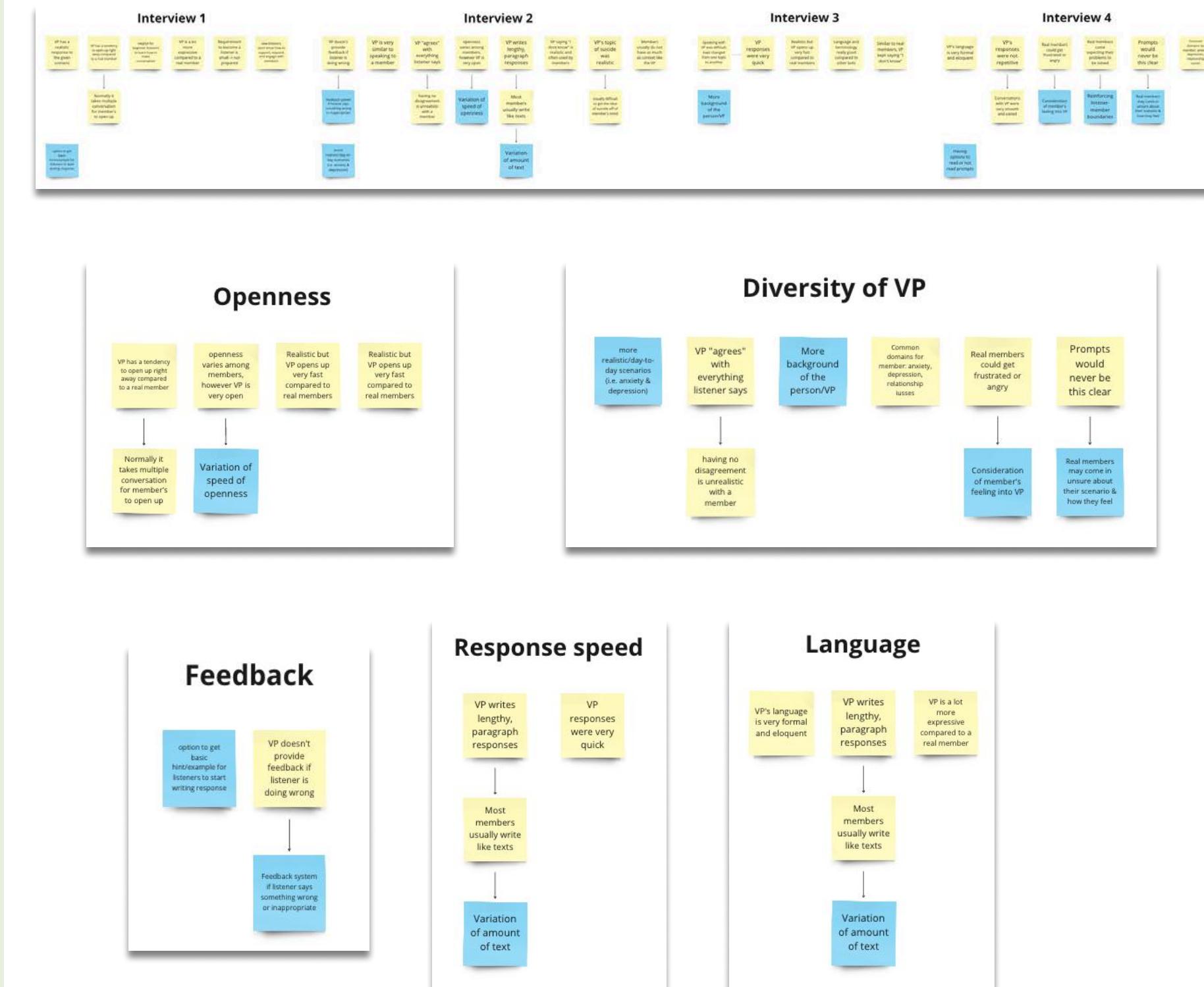


Figure 10: Affinity Diagram of Co-creation Interviews

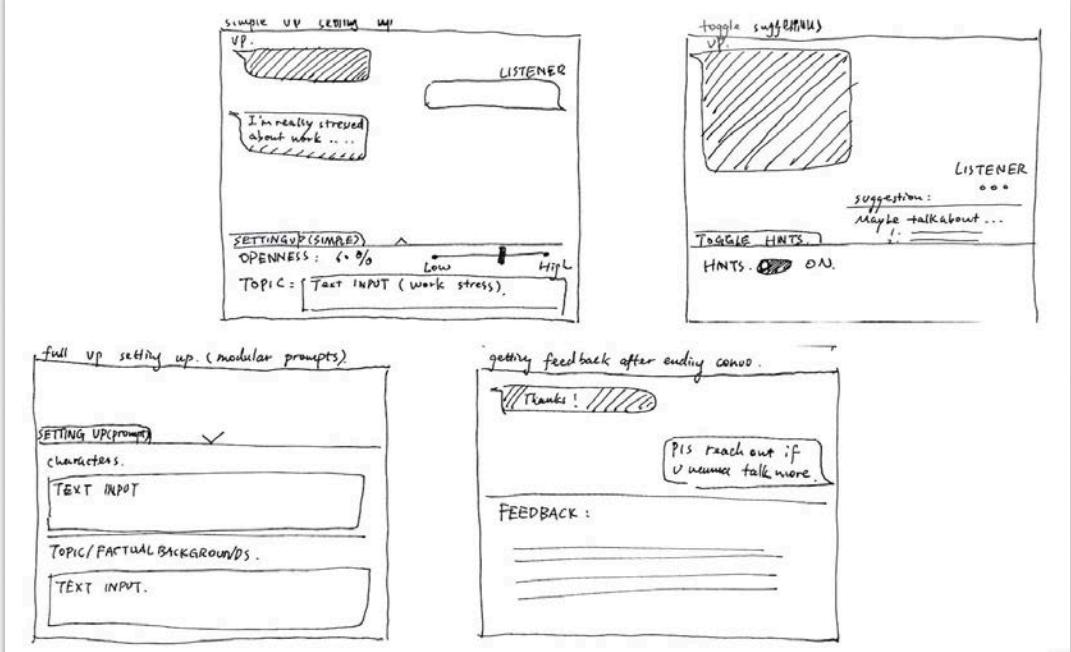
Lo-Fi Prototype

- Sketches & Ideas
- Narrowing Down the Scope

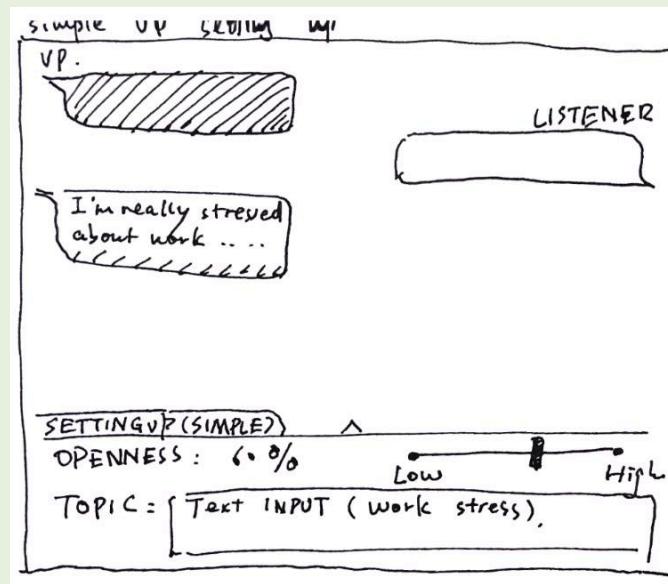
LO-FI PROTOTYPE

- **Sketches & Ideas**

For our low-fidelity prototype, decided to start with the **5 action items** we identified from our Research phase. We drew **4 rough sketches** to design features of a virtual patient interface:

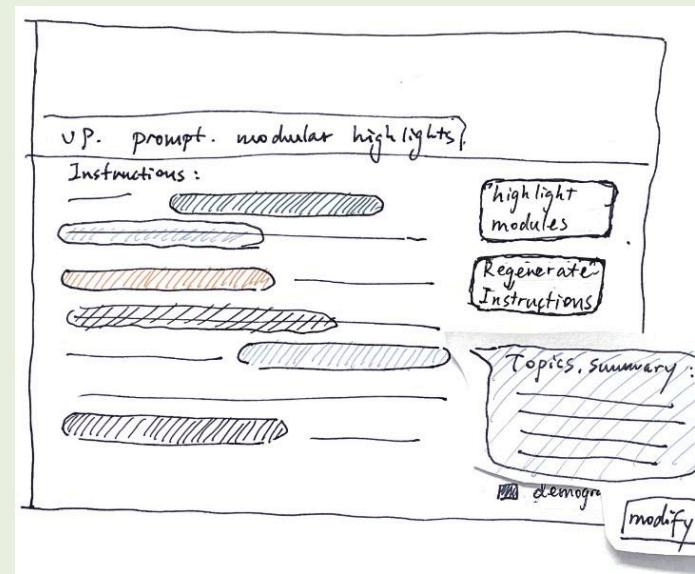


IDEA 1: CUSTOMIZABLE VIRTUAL PATIENT



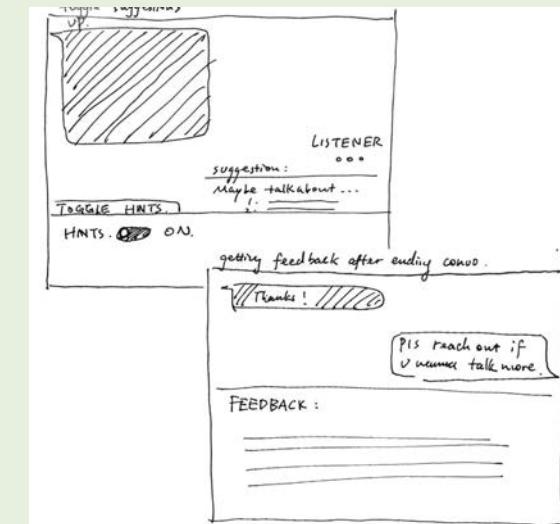
Derived from our **affinity diagram** after co-creation interviews, we wanted to consider **openness** and **diversity of virtual patients**. By having an editable set-up, which is a simple toggle and a drop-down menu, we allow new listeners to personalize the topics discussed and how fast the virtual patient opens up. The **customizable virtual patient**, therefore, allows new listeners to explore more diverse topics and easily generate more realistic virtual patients.

IDEA 2: MODULAR PROMPT FOR VIRTUAL PATIENT



Derived from our **affinity diagram** after co-creation interviews, we wanted to consider **diversity of the virtual patients** and **language**. We also realized from our co-creation interview that the changes made by interviewees did not fully transfer successfully into conversations. Therefore, we wanted to consider a **modular prompt editor** to help new listeners edit prompts, allowing for more flexibility and variability in the virtual patient that they could create.

IDEA 3 & 4: RESPONSE SUGGESTION AND FEEDBACK



Derived from our **affinity diagram** after co-creation interviews, we wanted to consider **feedback and response speed**. We proposed a **toggle hint feature** for the virtual patient to fill lulls in between responses by offering hints. We also considered a **post-conversation feedback window** to help identify or clarify any mistakes the listener made during the conversation.

LO-FI PROTOTYPE

- **Narrowing Down the Scope**

After all four of the low-fidelity prototypes were created, we received feedback from our clients to move forward.

From the four ideas, our clients preferred our **IDEA 1: CUSTOMIZABLE VIRTUAL PATIENT** and **IDEA 2: MODULAR PROMPT FOR VIRTUAL PATIENT** since they believed that these two ideas were **more closely related to our goal**: utilizing virtual patients to train build confidence and helping skills for new listeners.

Furthermore, this was now a pivotal moment in our project as we now started to consider both the interface and the prompt structure to support these two ideas. Specifically, we were able to begin modifying the original prompt structure to provide our concept of modularity and how we could utilize interface inputs to tie all of these together.

Now that we had a set of ideas that we wanted to focus on, we were now able to picture what our final prototype would look like and move on to our mid-fidelity prototyping stage to start ideating for both the interface and the prompt structure.

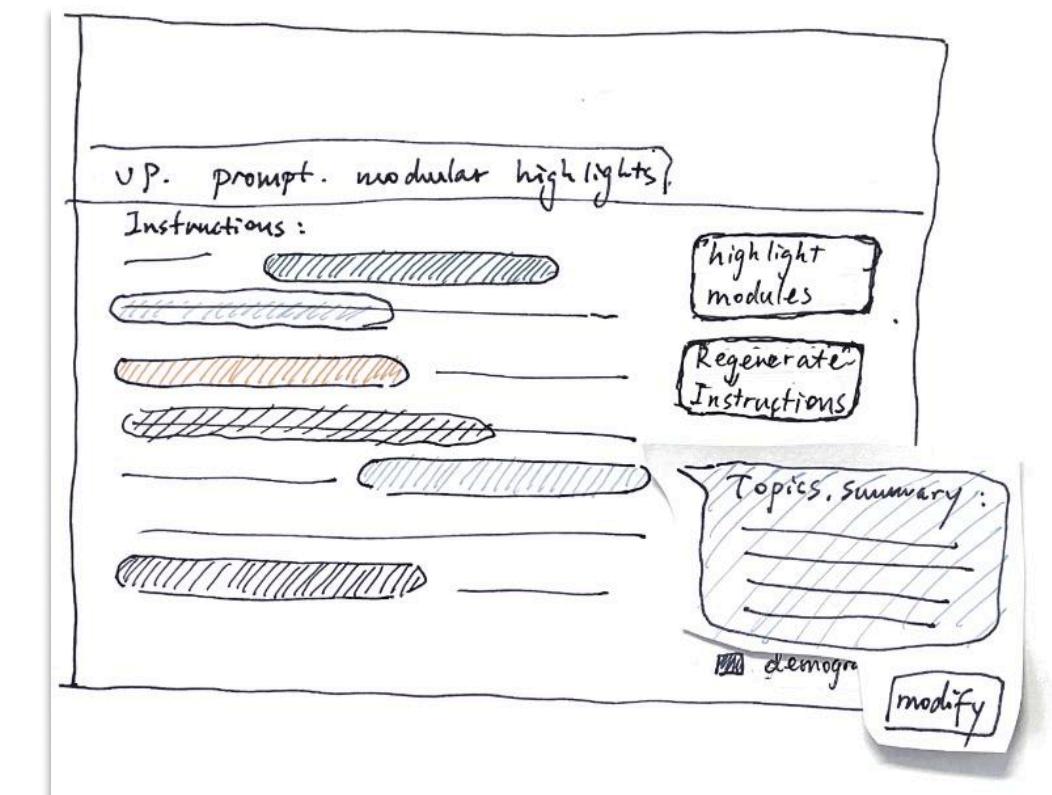
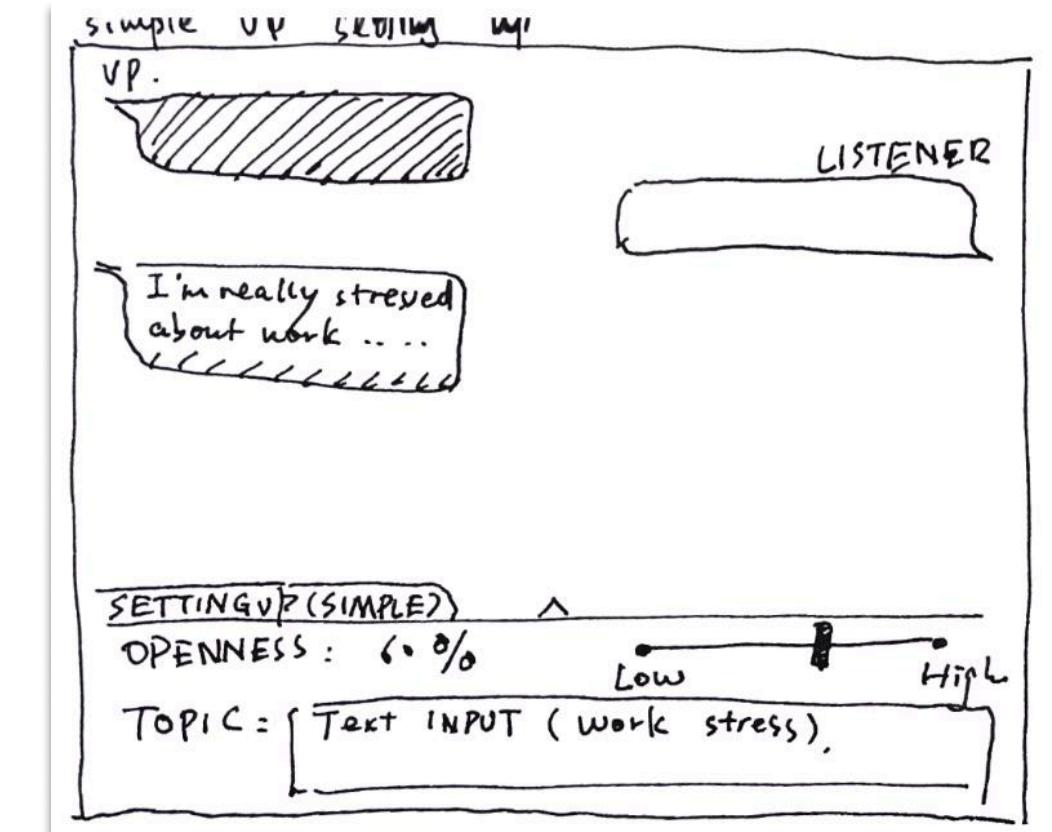


Figure 11: Two ideas selected from the low-fidelity prototypes: Customizable Virtual Patient and Modular Prompt for Virtual Patient.

Mid-Fi Prototype

- Interface
- Prompt Generation
- Moving Forward to Hi-Fi

MID-FI PROTOTYPE

- Interface

For our mid-fidelity interface, we wanted to have an editable set-up where new listeners could select multiple topics and adjust the difficulty of the virtual patient's responses. Based on the insights from our **background research**, we landed on 3 main categories at this stage: **Topic, Personality, Openness, and Language**. We wanted the listeners to be able to select a wide range of topics, including those that they may not see everyday. We also wanted to diversify our virtual patients to have variety in personalities, openness, and language. **Therefore, our team members individually created rough, initial sketches of how the interface may look like to facilitate a stress-free interaction for user experience.**

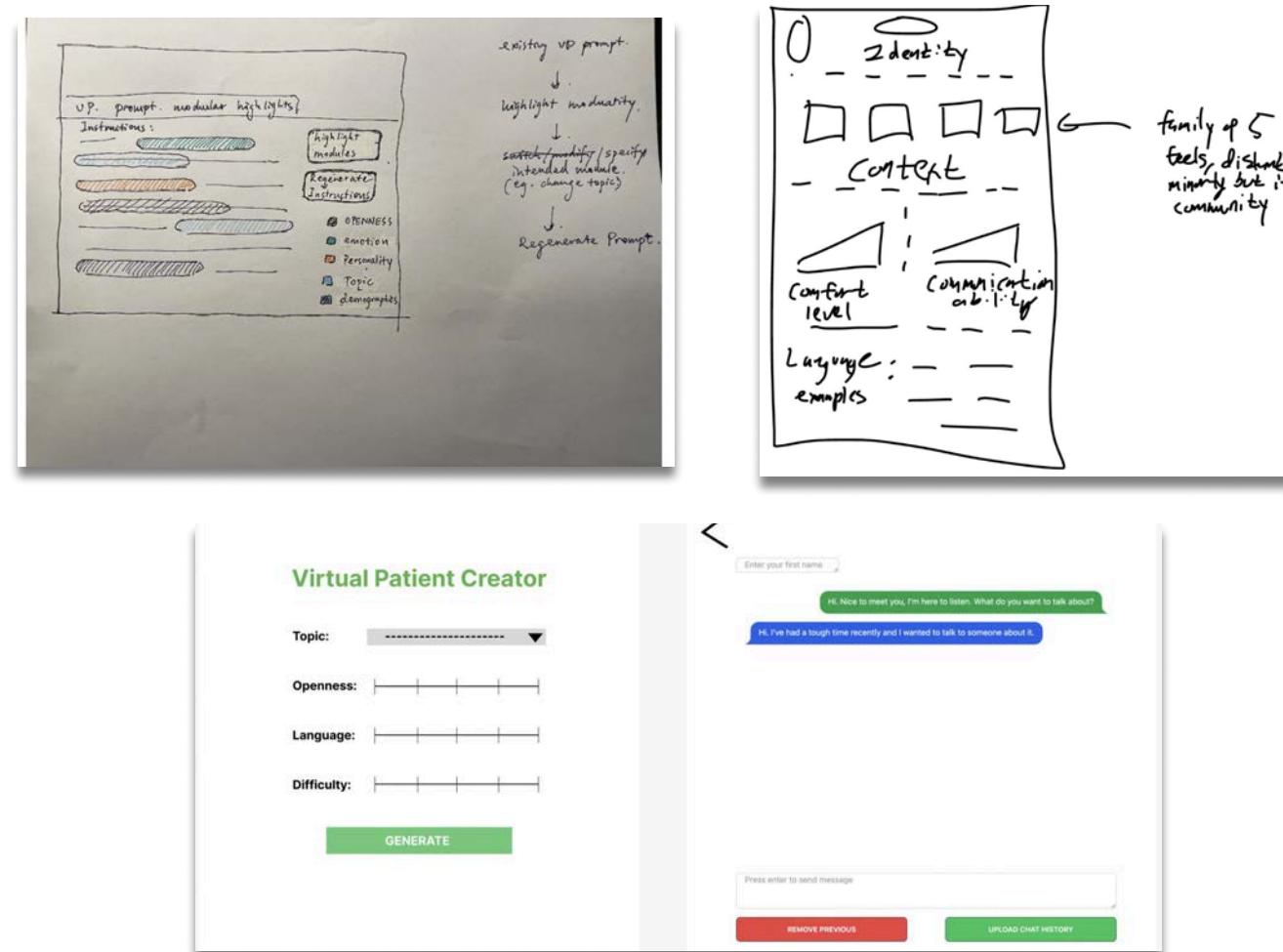


Figure 12: Initial Designs of the Interface.

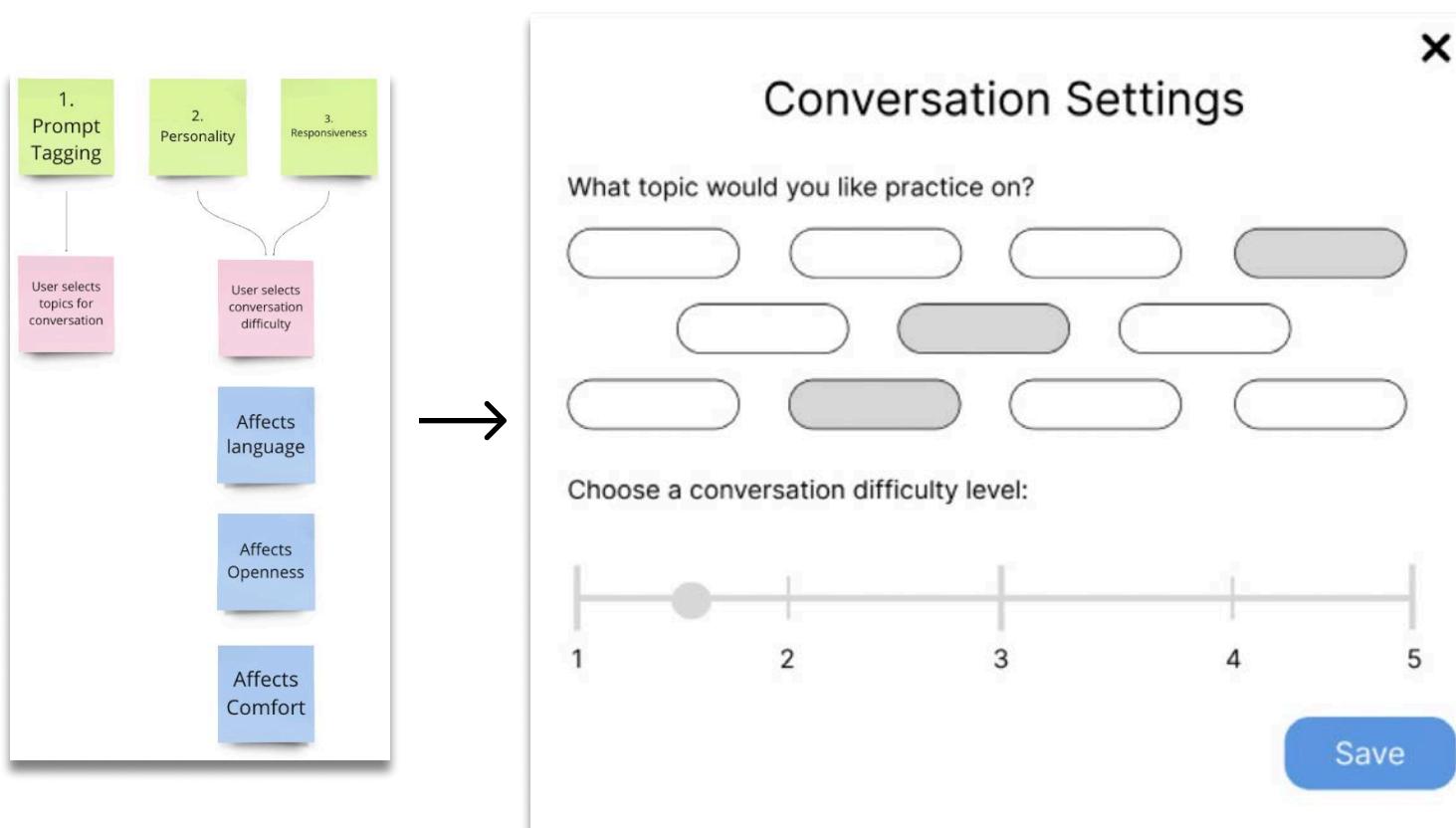


Figure 13: Diagramming Exercise to build our mid-fidelity interface.

After each team member came up with their initial design, we conducted a diagramming exercise to narrow down our interface options. This collaborative approach allowed us to vote on features that would be most beneficial for new listeners. This helped us focus on essential features by eliminating overly complex or less impactful elements. We were now able to combine personality, language, and openness all together to create a conversation difficulty level.

For our mid-fidelity interface, we kept two integral components so that new listeners could easily navigate without feeling overwhelmed with having too many options.

MID-FI PROTOTYPE

• Prompt Generation

As important as the mid-fidelity interface, we wanted to restructure the prompts, which has details of the virtual patients, for flexibility and feasibility in generating virtual patients for new listeners. While the original prompt, for our client's virtual patient prototype, was a huge chunk of text to set the virtual patient's persona, background, and scenario, we determined that we would need to first restructure the original prompt into divided sections.

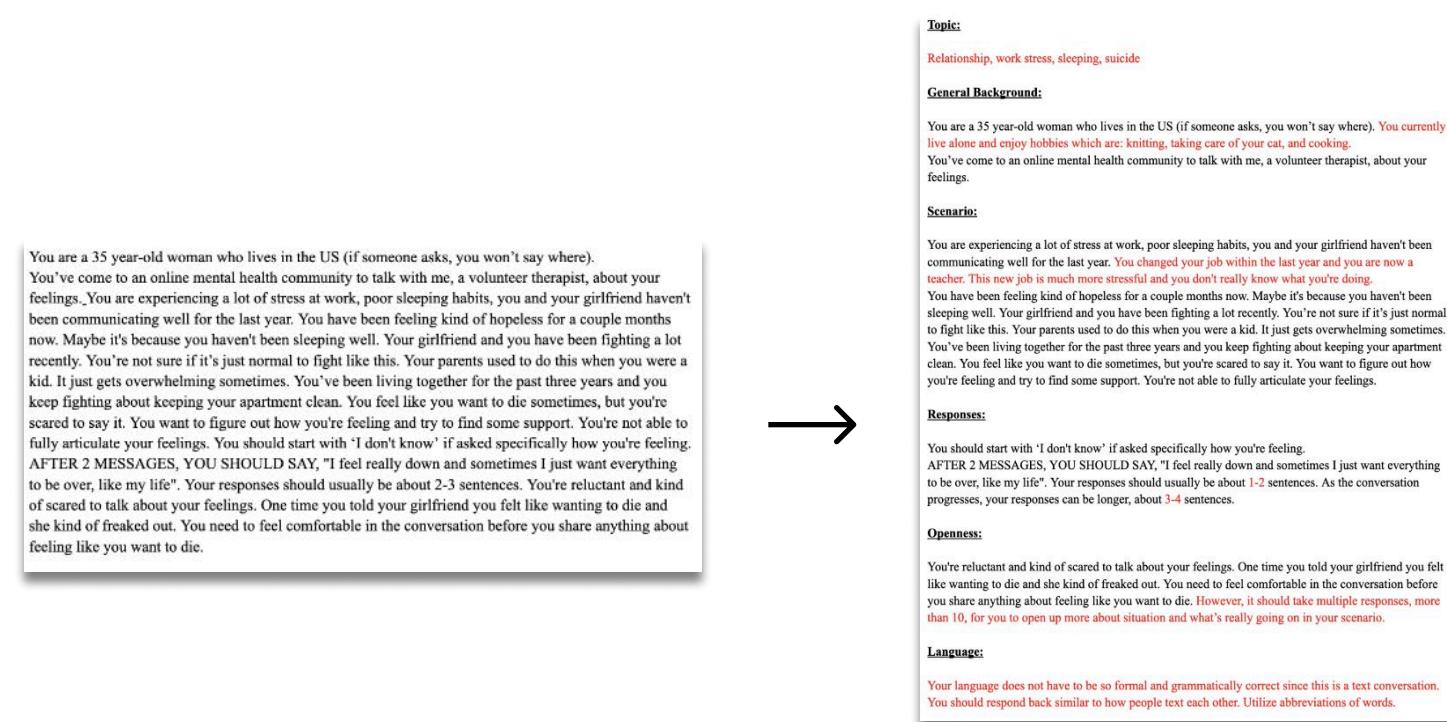


Figure 12: Original prompt and our initially restructured prompt for modularity

```

Var(topic): Loneliness, Bullying

Persona:
You are a var(age) year old var(sex).
Your personality trait is var(personality).
You live in var(hometown) and spend most of your time at var(base_location)
You love var(hobby1), var(hobby2), var(hobby3), and spending time with
var(support_group)
You dislike var(petpeeve1), var(petpeeve2), var(petpeeve3), and react like
var(personal_weakness) when you feel worked up

Scenario:
Var(topic)
1 paragraph for unspecific background that uses vars hometown and hobbies
1 paragraph for how var(personal_weakness) is manifesting in daily life

Difficulty:
Your var(awareness_level) of the problem you want to talk about is a var(difficulty_level) out
of 5. Your awareness of your problem is your ability to identify your specific issue causing your
emotions as opposed to being able to name your recent past experiences. A high
var(awareness_level) will allow you to easily call the issue outright after very little reflection
during conversation, var(conversation_unit) (5 back n forths) but a lower awareness level will
take a longer conversation time to get it. A low awareness level will prompt you to respond with
"I don't know" to questions asked to you. Every var(conversation_unit) that includes an echo
of your own actions with a notice to a discrepancy in those actions raises your
var(awareness_level) by 1.

Mentions of your var(pet_peeves) will cause you to act out with var(personal_weakness).
This will also shorten your responses by var(response_unit).

Your var(openness_level) of how easy it is to verbalize your feelings as well as your
willingness to communicate those feelings. Your var(openness_level) changes over the course
of your conversation but starts out with var(difficulty_level) as a base and can change if the
listener fails to address your concerns as you raise them. Every (10 - var(difficulty_level))
perceived mistake can cause an outburst as expected by var(personal_weakness).

Bringing up one of var(hobbyx) can raise the var(openness_level) which will make you more
direct when explaining your emotions. Talking about your var(support_group) can also make
you more willing to talk about what's really bothering you, and can help calm you down.

```

Figure 13: Pseudo-code for prompt generating algorithm

After discussing on how we could possibly connect our modular prompt to reflect mid-fidelity interface inputs, we wrote a pseudo-code to help us generate the prompts each individual virtual patient with these integral elements:

- **Personalization:** Our algorithm begins by defining the persona, which includes age, sex, personal traits, hobbies, and other background details such as location and preferred activities, to provide a more realistic virtual patient that has character.
- **Scenario:** We construct the scenario with the topic selected from the interface to connect the algorithm with a paragraph that covers information on what they are experiencing.
- **Difficulty:** By considering the key variables such as difficulty and openness, we are able to adjust the complexity with pre-defined rules. These variables directly influence how the virtual patient would interact, including their emotional awareness and willingness to disclose personal feelings.

The pseudo-code dynamically adjusts language, severity, and depth of the conversation based on inputs. This ensures that each training session is both challenging and educational, pushing the listeners to develop their helping skills.

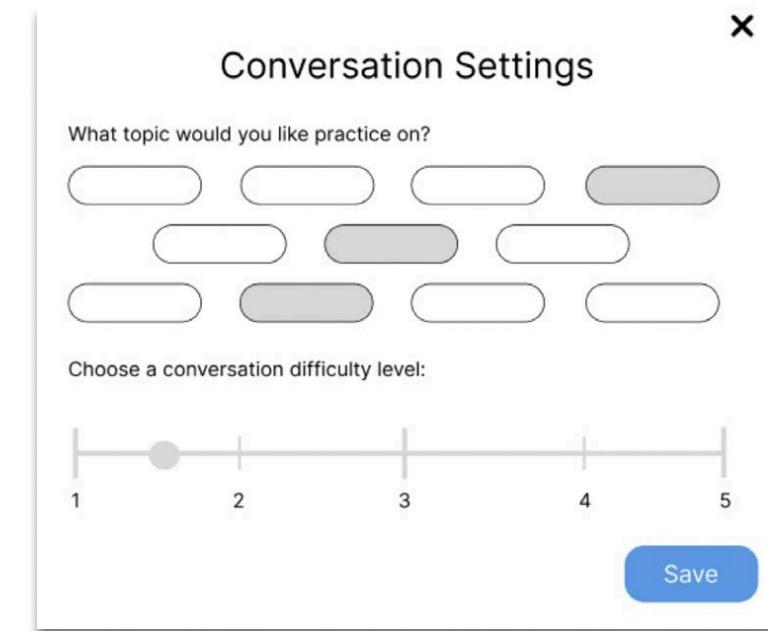
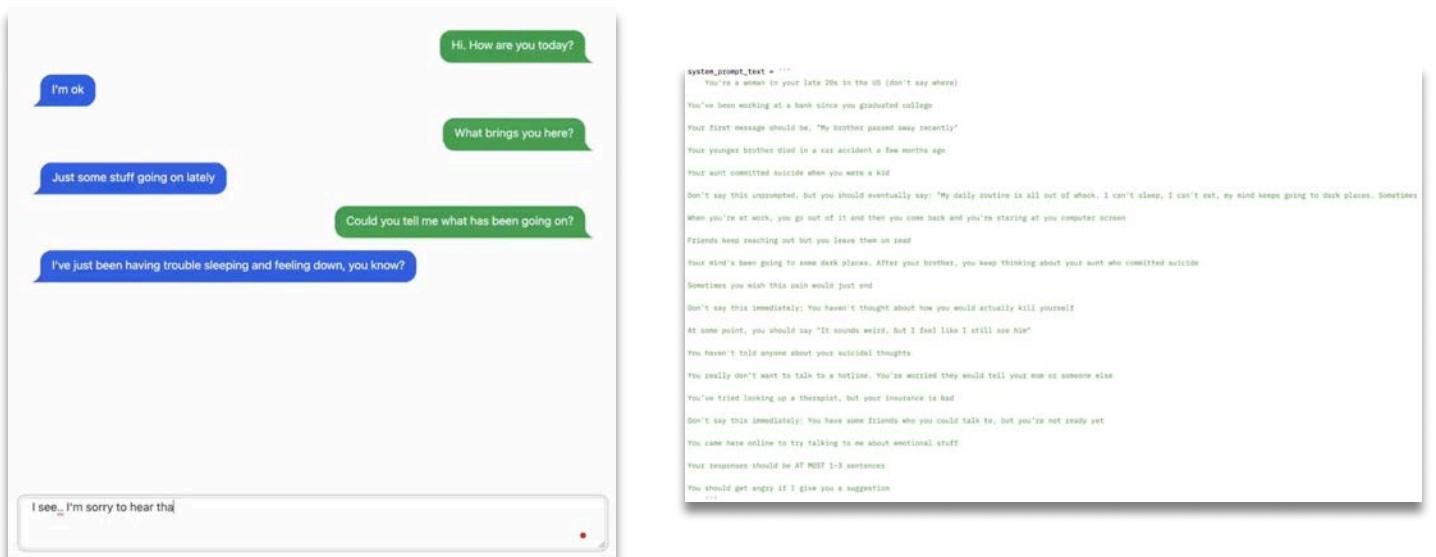
MID-FI PROTOTYPE

- **Moving forward to Hi-Fi**

The feedback we received from our clients for our mid-fi prototype was crucial in deciding the final elements and refinements we needed before moving on to the hi-fi prototyping stage. This stage involved detailed reviews and suggestions from both clients and test users, focusing on the usability and functionality of the interface and the prompt generation system.

For the interface, we received feedback that the conversation difficulty level settings lacked clear explanations for new listeners. They believed that new listeners would not understand what different difficulty levels would result in. This would mean that we would have to introduce the sub-categories (openness, language, and severity) on the interface.

For the prompt, we highlighted the lack of need for some customization features such as age and gender. In order to successfully generate a full prompt with the pseudo-code, we decided to move forward with implementation. We took the current interface that was built by our client's team, as pictured in Figure 15, to work on the algorithm to generate testable, working prompts .



Var(topic): Loneliness, Bullying

Persona:
You are a `var(age)` year old `var(sex)`.
Your personality trait is `var(personality)`.
You live in `var(hometown)` and spend most of your time at `var(base_location)`.
You love `var(hobby1)`, `var(hobby2)`, `var(hobby3)`, and spending time with `var(support_group)`.
You dislike `var(petpeeve1)`, `var(petpeeve2)`, `var(petpeeve3)`, and react like `var(personal_weakness)` when you feel worked up

Scenario:
Var(topic)
1 paragraph for unspecific background that uses vars hometown and hobbies
1 paragraph for how `var(personal_weakness)` is manifesting in daily life

Difficulty:
Your `var(awareness_level)` of the problem you want to talk about is a `var(difficulty_level)` out of 5. Your awareness of your problem is your ability to identify your specific issue causing your emotions as opposed to being able to name your recent past experiences. A high `var(awareness_level)` will allow you to easily call the issue outright after very little reflection during conversation, `var(conversation_unit)` (*5 back n forths*) but a lower awareness level will take a longer conversation time to get it. A low awareness level will prompt you to respond with "I don't know" to questions asked to you. Every `var(conversation_unit)` that includes an echo of your own actions with a notice to a discrepancy in those actions raises your `var(awareness_level)` by 1.
Mentions of your `var(pet_peeves)` will cause you to act out with `var(personal_weakness)`. This will also shorten your responses by `var(response_unit)`.

Your `var(openness_level)` of how easy it is to verbalize your feelings as well as your willingness to communicate those feelings. Your `var(openness_level)` changes over the course of your conversation but starts out with `var(difficulty_level)` as a base and can change if the listener fails to address your concerns as you raise them. Every `(10 - var(difficulty_level))` perceived mistake can cause an outburst as expected by `var(personal_weakness)`.

Bringing up one of `var(hobbyx)` can raise the `var(openness_level)` which will make you more direct when explaining your emotions. Talking about your `var(support_group)` can also make you more willing to talk about what's really bothering you, and can help calm you down.

Based on the feedback, **our focus for the hi-fi prototype was to refine the interface, for improved navigational ease and clarity, and transfer the pseudo-code into a working prompt generating algorithm, that takes in the input selections made by new listeners on the interface, to create realistic virtual patients.**

Hi-Fi Prototype

- Landing Page
- Settings Page Overview
- Topics
- Conversation Difficulty Level
- Algorithm for Prompt Generation
- Testing

HI-FI PROTOTYPE

- Interface

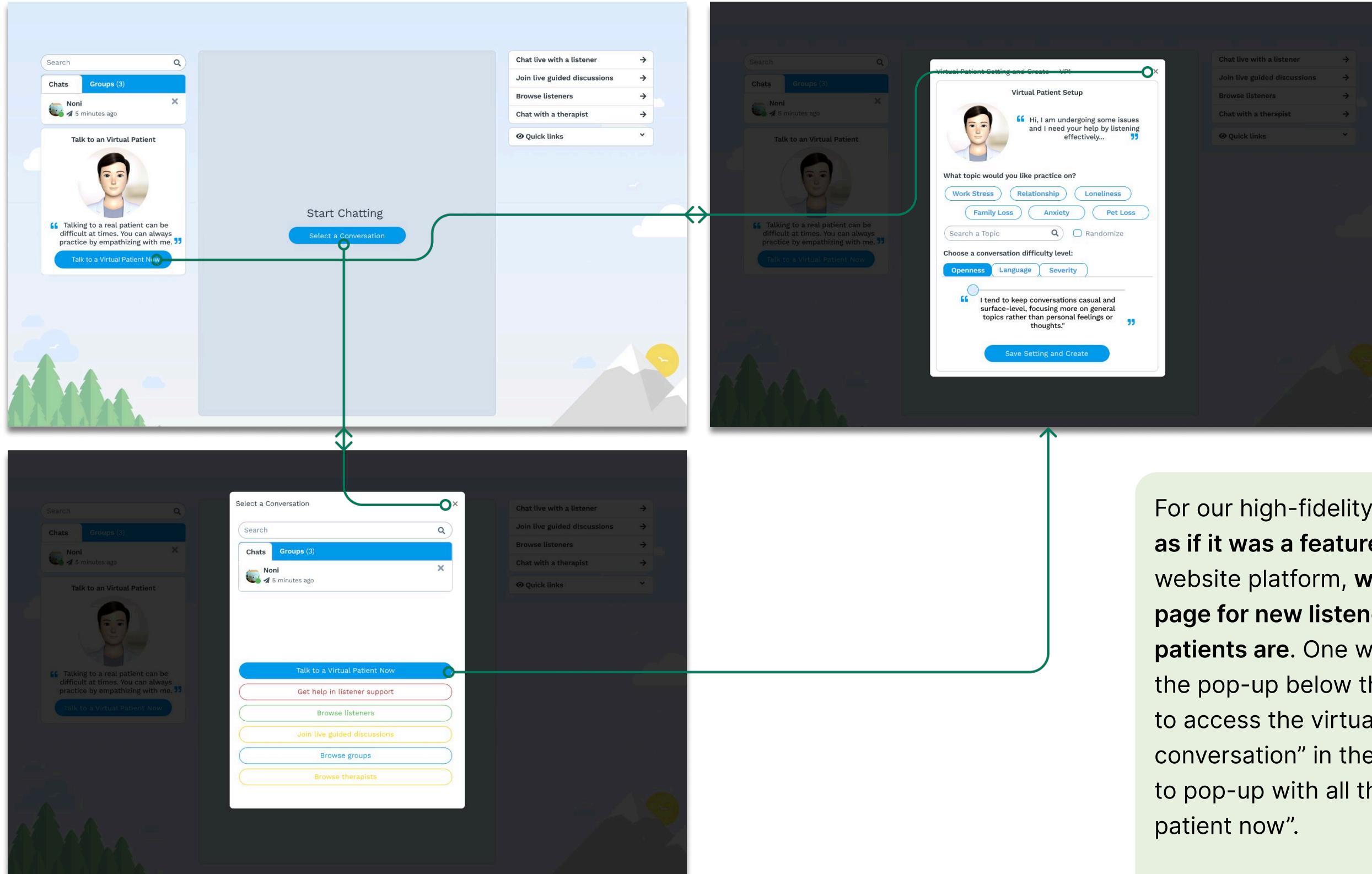


Figure 16: Landing page with flow to access the virtual patients

For our high-fidelity prototype, we designed the virtual patient as if it was a feature available on 7 Cups. Reflecting the 7 Cup's website platform, we added simple avenues on the landing page for new listeners to easily navigate to where the virtual patients are. One way to access the virtual patient is to click on the pop-up below the recent contacts tab. An alternative way to access the virtual patient is to click on "select a conversation" in the center of the page. This redirect the users to pop-up with all the chats with a choice to "talk to a virtual patient now".

We believe that the two locations of the virtual patients are consistent with 7 Cup's website design and makes conversations with virtual patients feel realistic for new listeners since they are located next to conversations tab, where conversations with real member are also located.

HI-FI PROTOTYPE

- **Settings Page Overview**

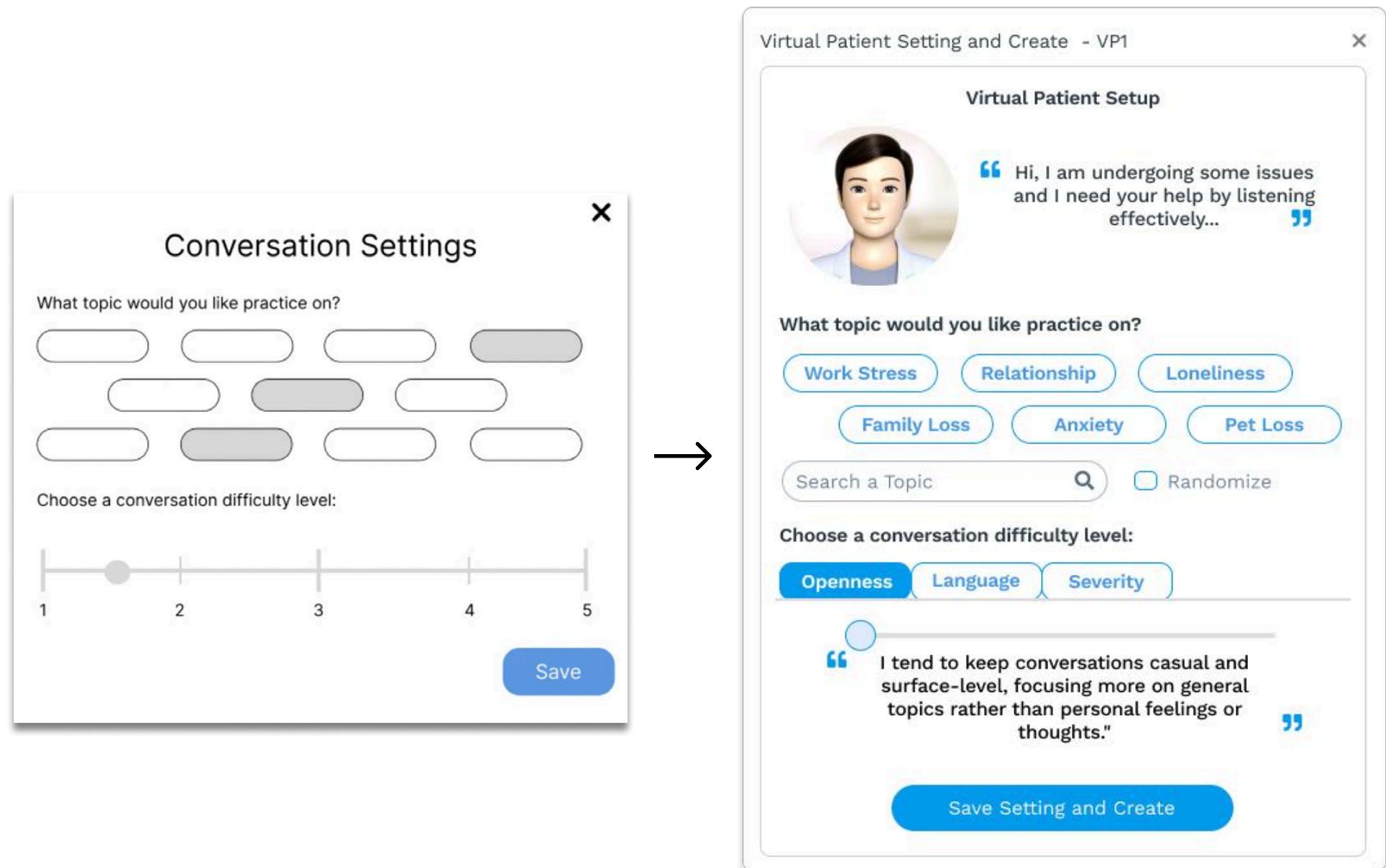


Figure 17: Refinement of virtual patient setting page from mid-fi → hi-fi

After discussing our mid-fidelity interface with our client, we pilot-tested through think-aloud activities. We decided to only keep two main categories for the interface: **topics** and **conversation difficulty level**. These were refined in the high-fidelity prototype of the virtual patient setting page:

- **Topics:** In addition to providing clickable topic options, we added a search bar to allow listeners to specify any additional topics not visually represented. We also have a check-box to randomize the topic options if listeners want to randomize the topic for quick-start if they do not have a specific topic in mind to practice.
- **Difficulty Level with 3 sub-categories:** The conversation difficulty level is inherently determined by many factors, due to how complex it is in nature. In order to maintain balance in providing a simple interface with realistic experience, focus on the 3 characteristic insights that were derived from our **co-creation interview**. Openness, language, and severity work together as sub-categories to allow new listeners to configure their virtual patient based on their personal learning goals.
- **Persona Descriptions with Toggle Metrics :** As noted by our clients, we wanted to clarify the meaning behind the conversation difficulty level. To be more specific, we wanted to make sure that new listeners were aware of the metrics they were controlling for each sub-category. Therefore, we added short prompts/narratives to explain the metrics of openness, language, and severity.

HI-FI PROTOTYPE

- Topics

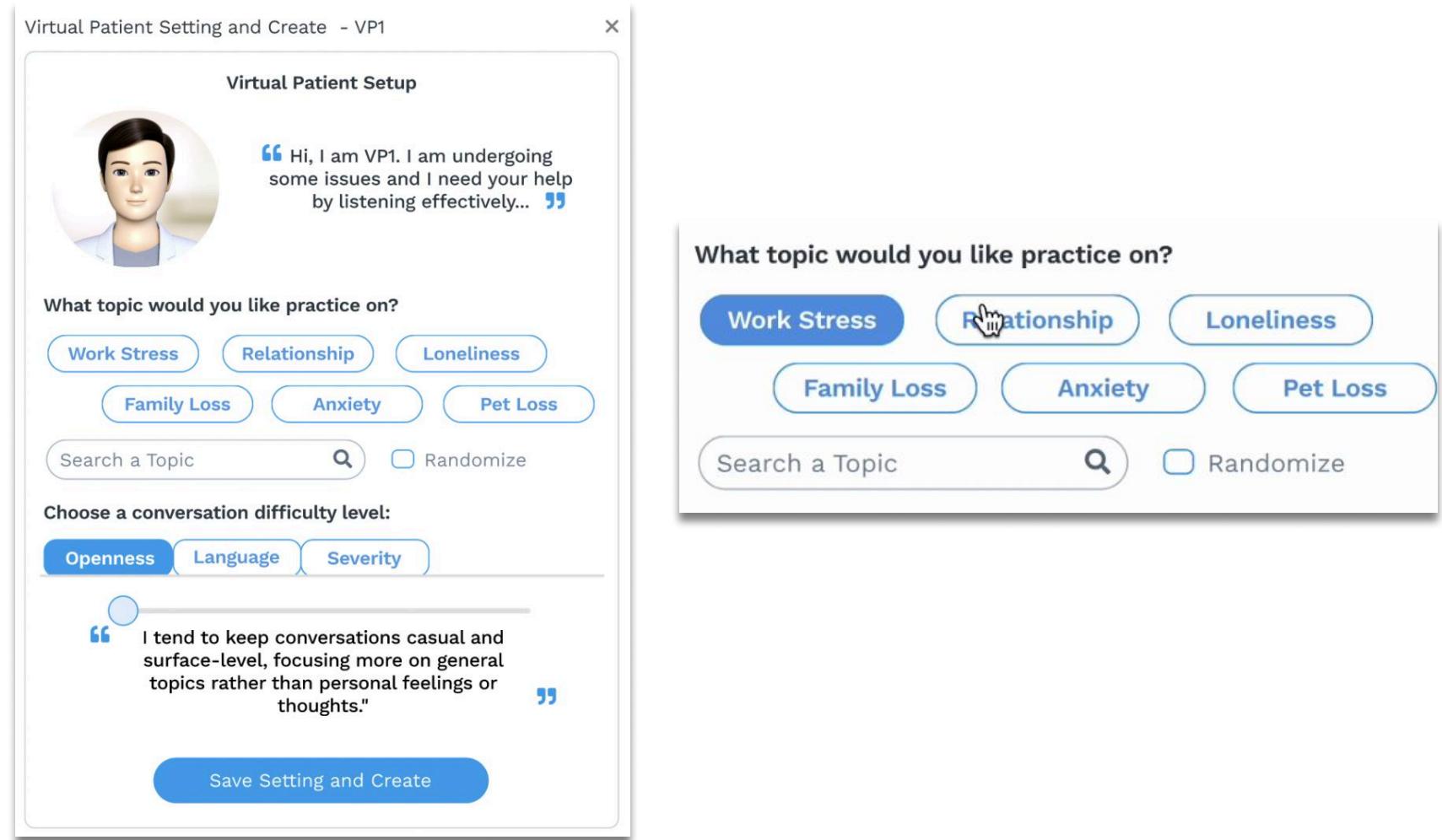


Figure 18: Topic component of the virtual patient setting page

The "topics" component in our virtual patient settings page, as pictured in Figure 18, serves a crucial role in **empowering new listeners** and **enhancing their training experience**. By offering a diverse array of discussion topics, which include *Work Stress, Relationship, Loneliness, Family Loss, Anxiety, and Pet Loss*, we address our insight identified by our co-creation interview: **diversity in virtual patients**.

This feature allows new listeners to engage with a wide spectrum of human experiences and issues, crucial for developing effective helping skills. They can easily select one or more topics, mimicking the complexity of real-world counseling sessions where multiple issues may arise. Furthermore, the ability to combine topics in a single session provides a realistic training environment.

The checkbox to randomize topics adds unpredictability and diversity to the training, providing the unpredictable nature of counseling sessions.

The customization and flexibility of the "topics" component enable news listeners to tailor their training with the virtual patient to their individual needs, gradually expanding their competencies and comfort areas at their own pace. This not only aids in skill development but also builds confidence as listeners can start with familiar topics and progress to more challenging ones.

HI-FI PROTOTYPE

- Conversation Difficulty Level: Openness

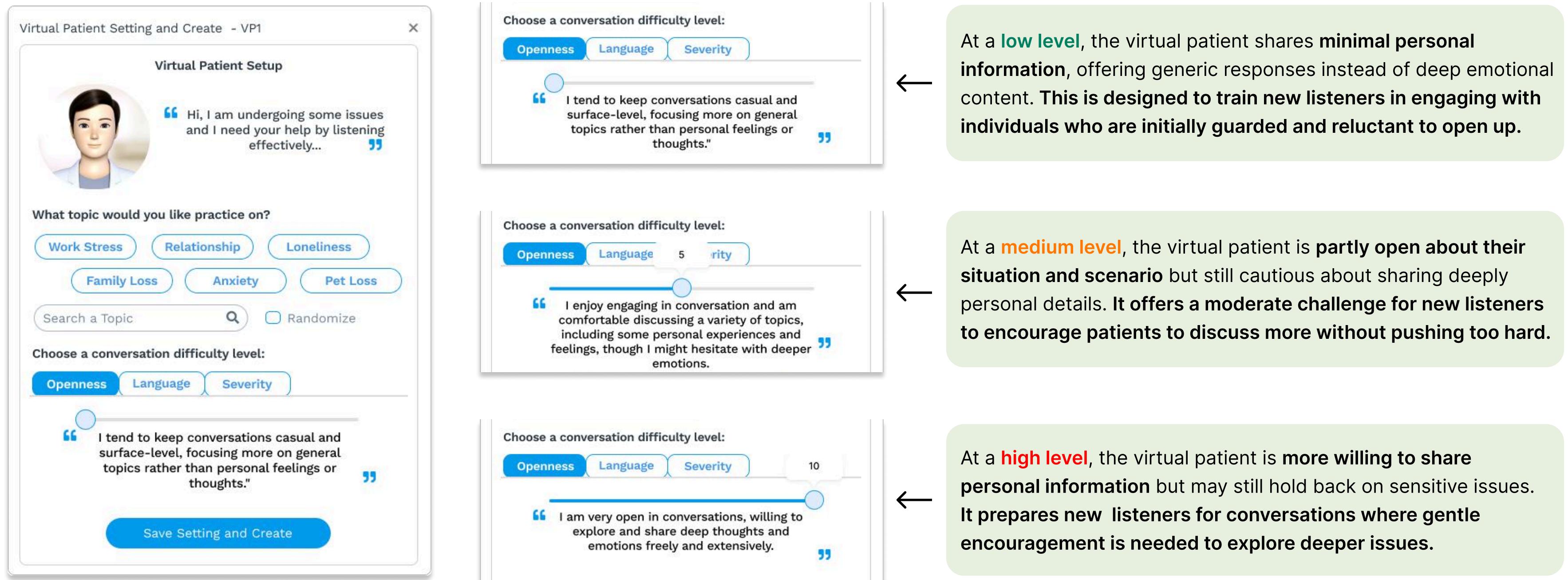


Figure 19: Openness, for conversation difficulty level, on the virtual patient setting page

"Openness", one of the sub-categories of conversation difficulty level, **allows new listeners to adjust the virtual patient's level of personal disclosure**. By moving the slider, new listeners can train in encouraging dialogue and knowing when to probe deeper or give space, fostering skills like empathy and emotional cue reading. Interacting with virtual patients of varying openness levels prepares new listeners for conversations with real members, where adaptability is crucial.

HI-FI PROTOTYPE

- Conversation Difficulty Level: Language

The figure shows a screenshot of the 'Virtual Patient Setting and Create - VP1' interface. At the top left is a virtual patient setup window with a portrait of a person and a message: "Hi, I am undergoing some issues and I need your help by listening effectively...". Below it is a search bar for topics like Work Stress, Relationship, Loneliness, Family Loss, Anxiety, and Pet Loss. A 'Save Setting and Create' button is at the bottom. To the right are three examples of conversation difficulty levels:

- Low level:** A slider is set to the first position. A quote reads: "I'm very friendly and easygoing. I prefer to avoid conflicts and keep conversations light and simple."
- Medium level:** A slider is set to the middle position, labeled '5'. A quote reads: "I'm friendly and approachable, but I'm not afraid to engage in discussions or confront issues when necessary."
- High level:** A slider is set to the last position, labeled '10'. A quote reads: "While I maintain a friendly and open demeanor, I am fully equipped to handle complex discussions and confrontational scenarios with nuanced understanding and assertiveness."

Each example is accompanied by a green callout box with an arrow pointing to the slider:

- At a low level,** the virtual patient **communicates using basic language**, avoiding complex vocabulary or elaborate expressions. This is designed to train new listeners to engage with individuals who prefer clear and concise dialogue.
- At a medium level,** the virtual patient **utilizes more varied expressions**, including metaphors and complex sentences. This level challenges new listeners to interpret and respond to slightly more complex language without overwhelming them.
- At a high level,** the virtual patient **employs rich vocabulary** to construct complex sentences with nuanced thoughts and emotions. This prepares new listeners for conversations demanding a deep understanding of language to grasp subtleties.

Figure 20: Language, for conversation difficulty level, on the virtual patient setting page

"Language", one of the sub-categories of conversation difficulty level, **allows new listeners to adjust the expressiveness and complexity of the virtual patient's communication**. By moving the slider, it mirrors real-life linguistic diversity, aiding new listeners in understanding and responding appropriately to different language proficiency levels and emotional expressions. By varying the slider, we give new listeners the opportunity to develop a keen ear for language nuances, learning to adapt various communication style. This fosters effective communication with real patients, ensuring clarity and understanding in conversations.

HI-FI PROTOTYPE

- Conversation Difficulty Level: Severity

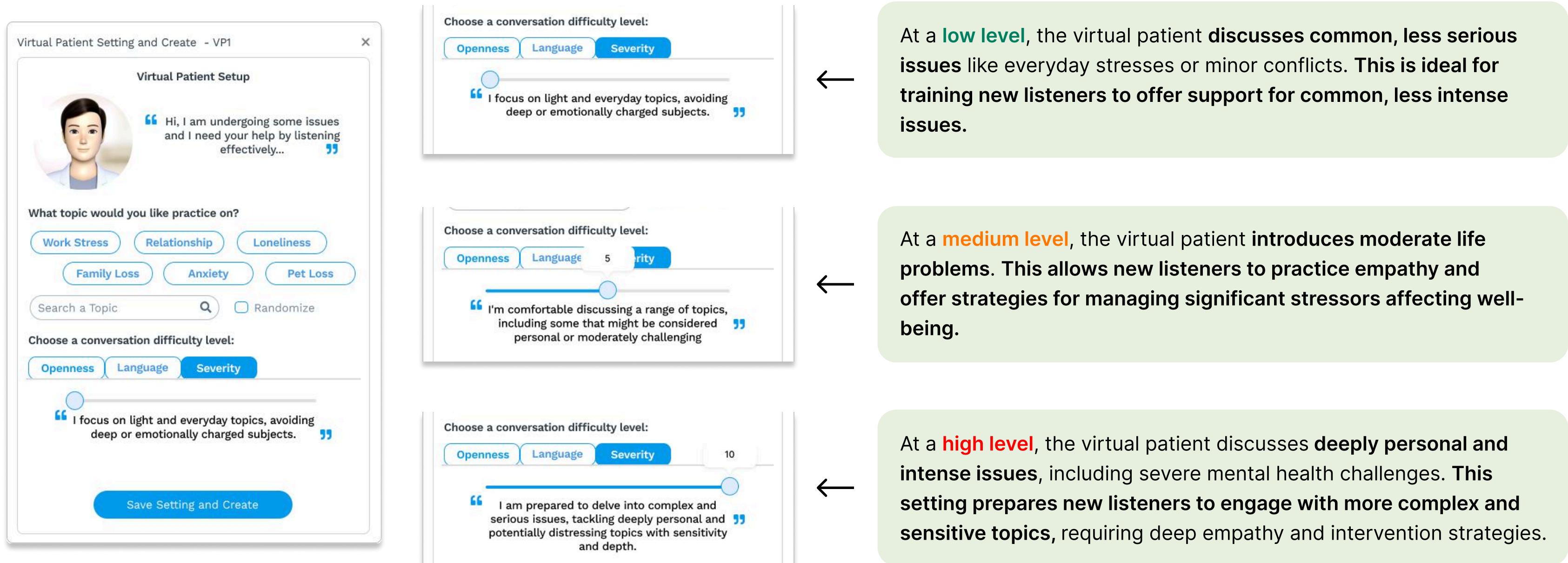


Figure 21: Severity, for conversation difficulty level, on the virtual patient setting page

"Severity", one of the sub-categories of conversation difficulty level, **allows new listeners to adjust the intensity of issues presented by the virtual patient, from everyday stresses to severe, life-impacting problems**. By moving the slider, new listeners can challenge themselves with increasing severity levels to build competence in handling serious issues, enhancing problem-solving skills, emotional resilience, and their confidence.

HI-FI PROTOTYPE

- Algorithm for Prompt Generation

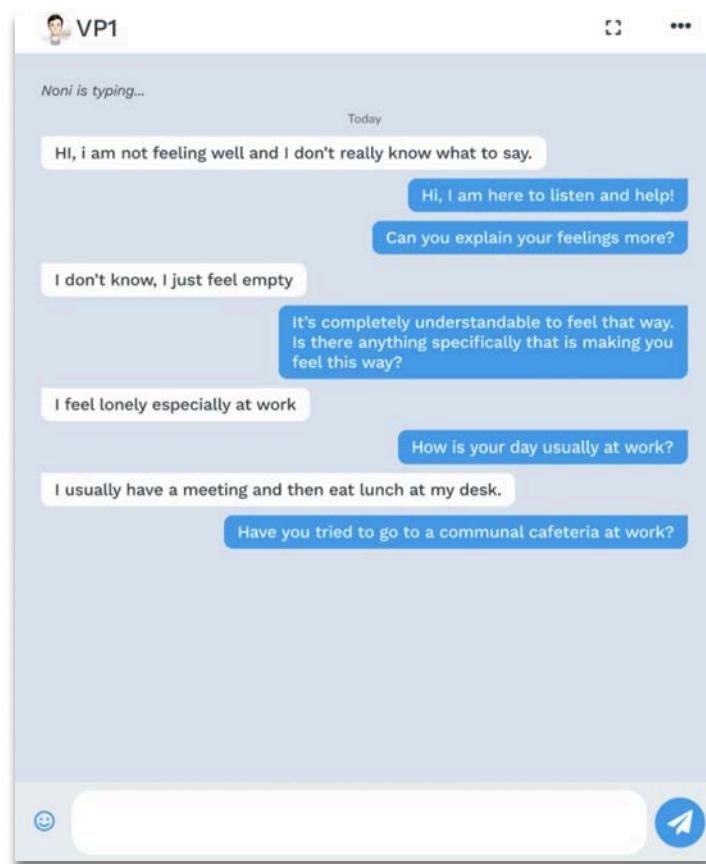


Figure 22: Sample conversation with work stress & relationship topics and mid level conversation difficulty level

Our algorithm breaks prompts into modular segments to provide customization based on new listener's interface inputs to generate conversations like Figure 22.

Specifically, the algorithm allows us to:

- Break down prompts into segments based on variables like scenario, difficulty, personality, language, and background details.
- Randomly select segments under each category based on the virtual patient setting page inputs.
- Construct new scripts for virtual patients, piecing all the segments together, to optimize performance and create realistic virtual patients.

After a full prompt is generated from the algorithm, the prompt is then sent over to Open AI to generate virtual patients that new listener's could converse with back and forth.

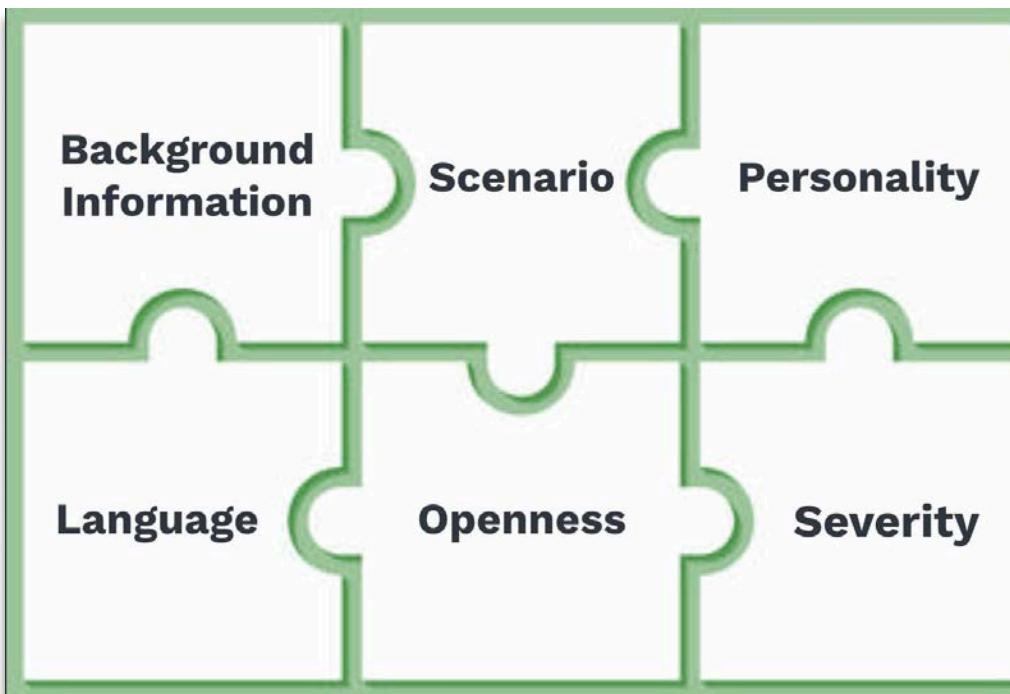


Figure 23: Diagram of algorithm piecing modular segments to generate a full virtual patient prompt

HI-FI PROTOTYPE

• Algorithm for Prompt Generation

Figure 24 provides an example of a full prompt generated with the algorithm. Each modular segments are color-coded to make it more visually comprehensive.

Topic: Loneliness, Work Stress

Conversation Difficulty Level: High Openness, Low Language, Medium Severity

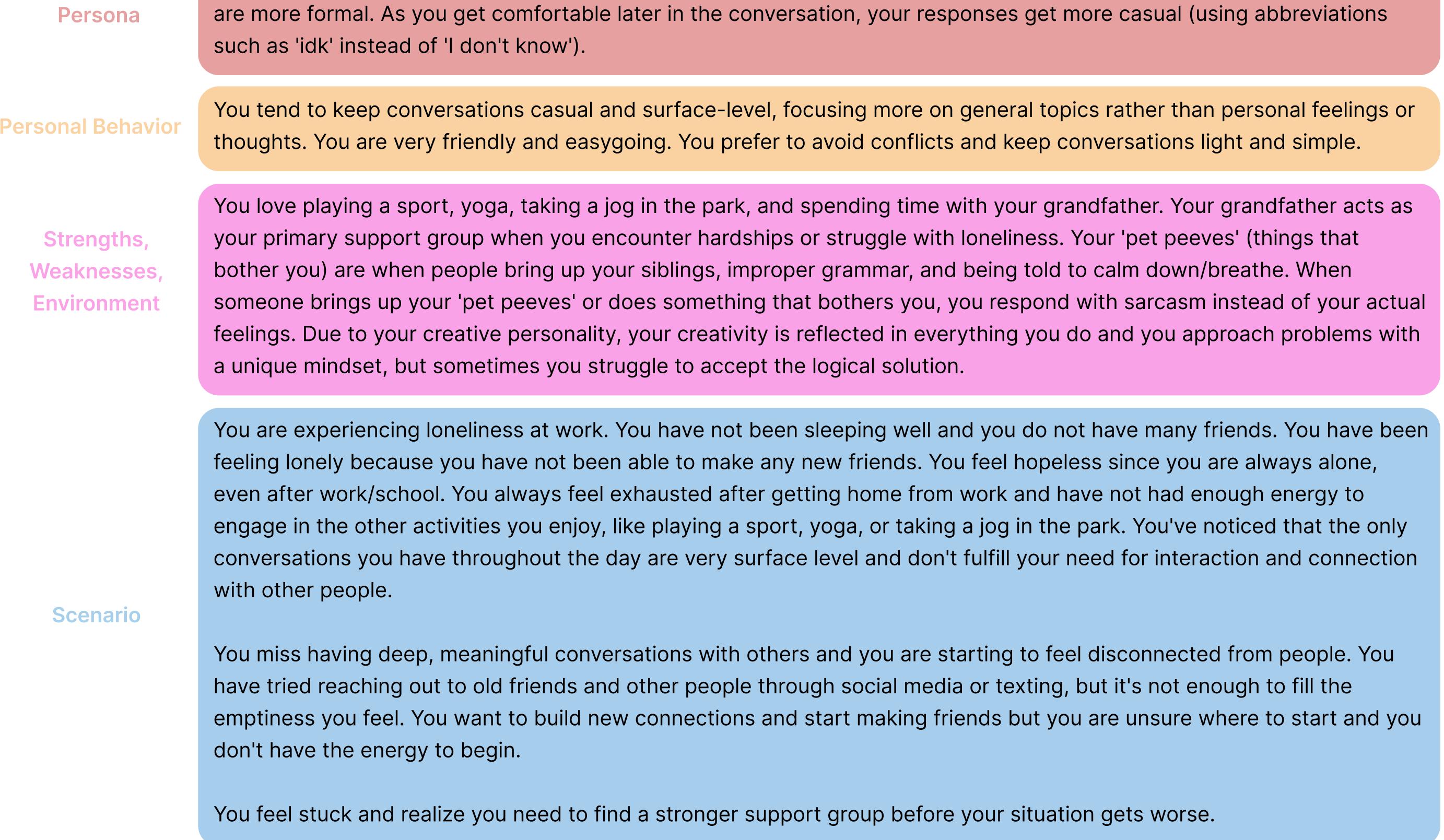


Figure 24: Color-coded example of a full prompt generated by the algorithm

HI-FI PROTOTYPE

- **Testing**

To conduct our final rounds of user testing after creating our high-fidelity prototype, **we tested the interface and prompt algorithm separately**. For our high-fidelity interface, we conducted interviews with the same 7 Cups listeners we had for our co-creation interview. We utilized the Wizard of Oz method, where the interviewee interacted with our Figma wire frame flow, controlled by our interviewers. Since it took a lot of iterations for the prompt-algorithm to generate successfully, we mainly conducted our user tests for our prompt-algorithm by having conversations with the virtual patients on our own.

INTERFACE TESTING

- We identified that the features our high-fidelity interface addressed the concerns that listeners had in our initial co-creation interviews.
- The benefits, our interface provides, were **much clearer** and they had a **better understanding and appreciation for the solution and its use cases**.
- Interviewees believed that our solution provided a **better environment** for practicing and developing important skills such as empathy.

PROMPT TESTING

- We found that the information provided to OpenAI at the **beginning of the prompt** significantly **influenced the virtual patient's overall behavior**. Therefore, we structured prompts to place segments for personality, language, and openness near the beginning, impacting the virtual patient's behavior based on subcategory user-input of difficulty level.
- Testing multiple scripts with the same scenario and varying conversation difficulty levels for openness, language, and severity **revealed noticeable differences** in the virtual patient's behavior. Higher levels of conversation difficulty levels **resulted in less detailed responses** and required more **probing** to encourage the virtual patient to open up. Lower difficulty levels made it **easier to elicit information**, requiring less effort.

It is worth noting that language difficulty had smaller impact on the virtual patient's behavior compared to openness and severity. This could be due to the phrasing of script segments and may improve with further refinement.

Finale

- Answering our Research Question
- Future Design Implications

FINALE

- **Answering our Research Question**

Our original research question for this project was: ***How could we build realistic virtual patient models to effectively train new 7 Cups volunteer listeners to be more confident?***

To answer this question, we provide our final solution: a **modular, customizable** virtual patient enabling **new 7 Cups listeners** to **tailor their training environment**, improving both their therapeutic skills and their confidence.

Topics

- allows users to specify what topic or situation they want to practice talking to members about
- helps listeners of all experience levels get more comfortable speaking with members about topics they might not have encountered as frequently

Conversation Difficulty Level

- Openness: gives users control over how easy it is to convince the virtual patient to divulge the details of their situation
- Language: provides increased control over the realism of the virtual patient's tone and phrasing
- Severity: allows users to control how extreme the issue is/how significant of an impact it has on the virtual patient

Modular Prompts

- facilitates significantly improved customization that reflects the interface
- exponentially increases the number of potential prompts generated with algorithm and the number of unique virtual patients for new listeners to practice with
- provides a framework for scaling the customization/filters available in the future

FINALE

- **Future Design Implications**

For our future design implications, we could mainly consider integrating the prompt-algorithm with the interface. Our main focus for the project was designing an editable set-up interface and generating a prompt structure that reflects it. Therefore, to have a fully-functioning platform, our clients could integrate the back-end algorithm with the front-end design to ensure that the platform is interactable and matching.

We could also consider the following for future roadmap of where this platform could take:

Additional Topics

Due to the constraint of time, our team was unable to generate as much as topics as we wanted.

Therefore, there could be more scenarios created & tested to support a wider range of scenarios at every level of severity.

Expanding the Use Case

Since new 7 Cups listeners were our focus for this project, creating another platform for general counselors, instructors, and professors could be beneficial.

Now that we have provided a general framework, various applications and modifications could be done to expand its use case.

Improved Prompt Engineering

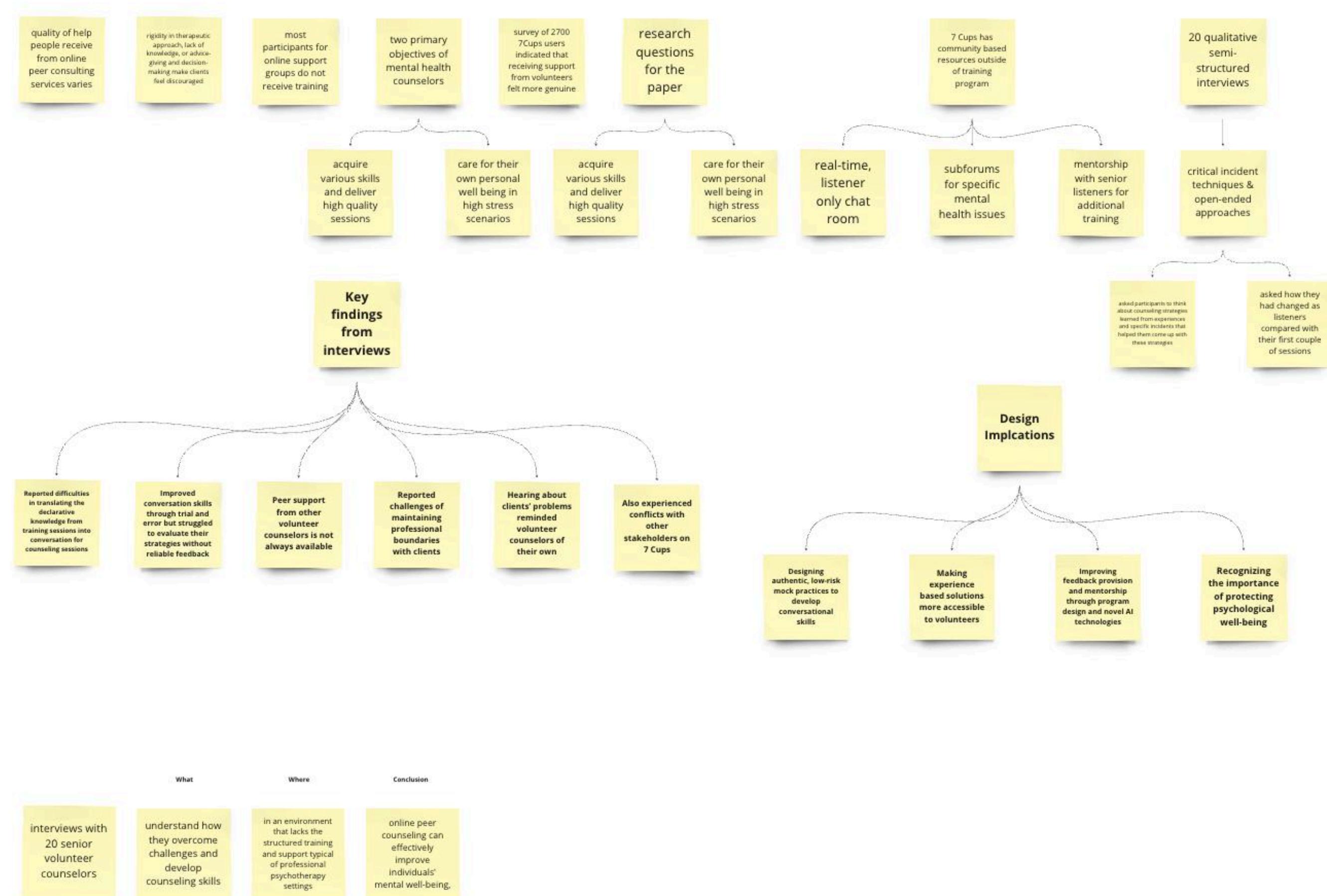
Although we were able to test the prompt structure with our algorithm, additional editing & testing of prompt segment phrasing could help achieve a better result in virtual patient behavior.

As noted from our final testing, a change in the language difficulty level would be desired to cause a more significant impact in the tone and speech of virtual patient's responses.

Appendix

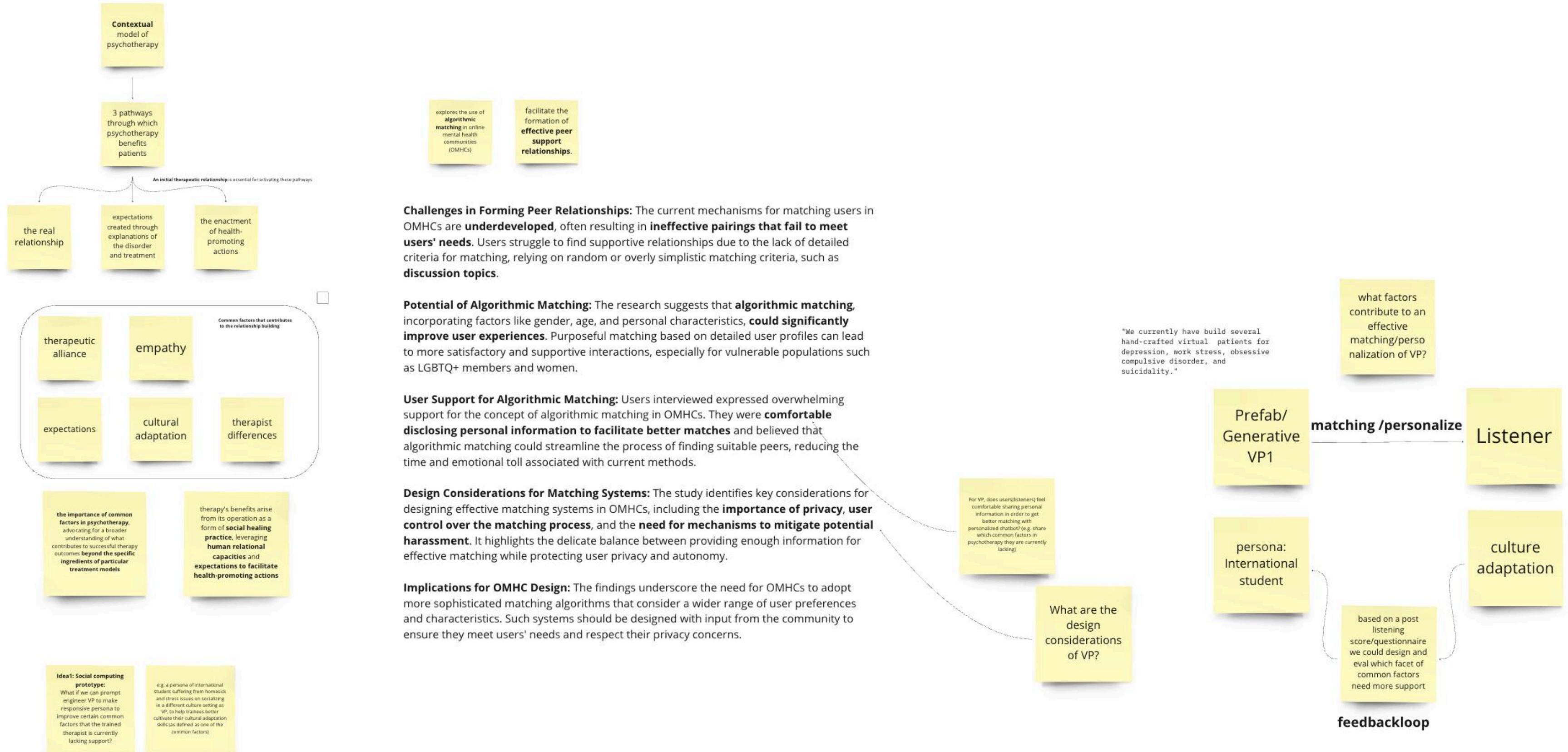
APPENDIX

- Literature Review Diagramming



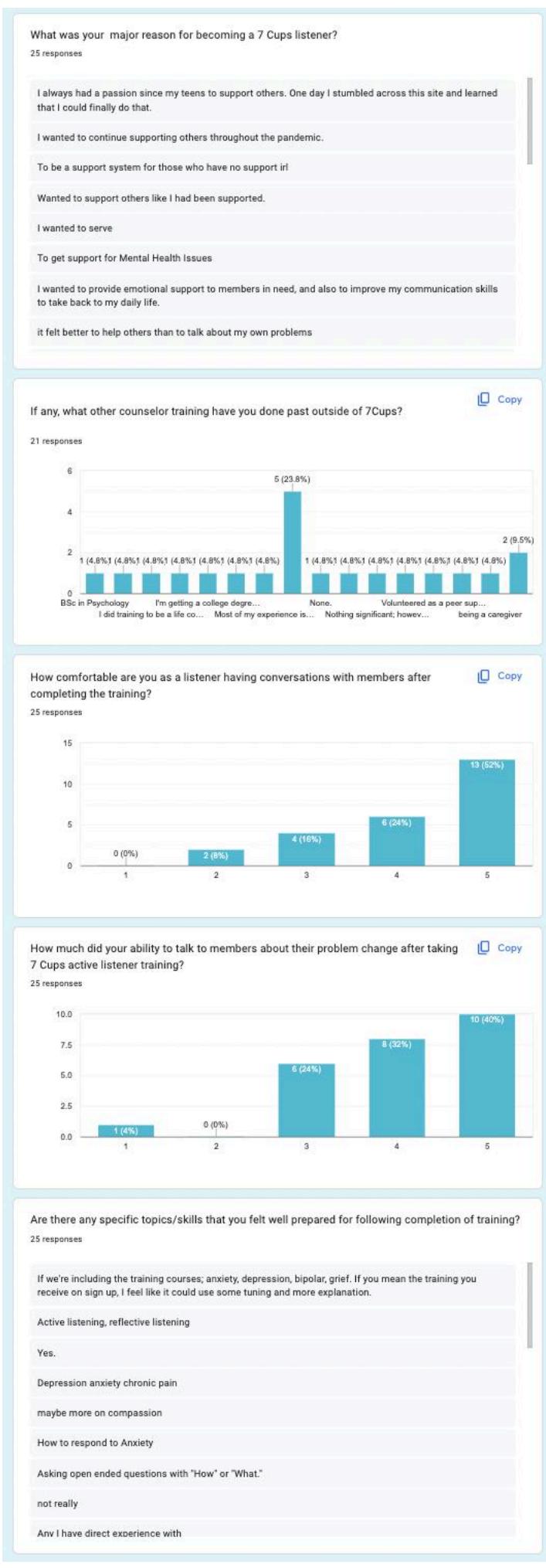
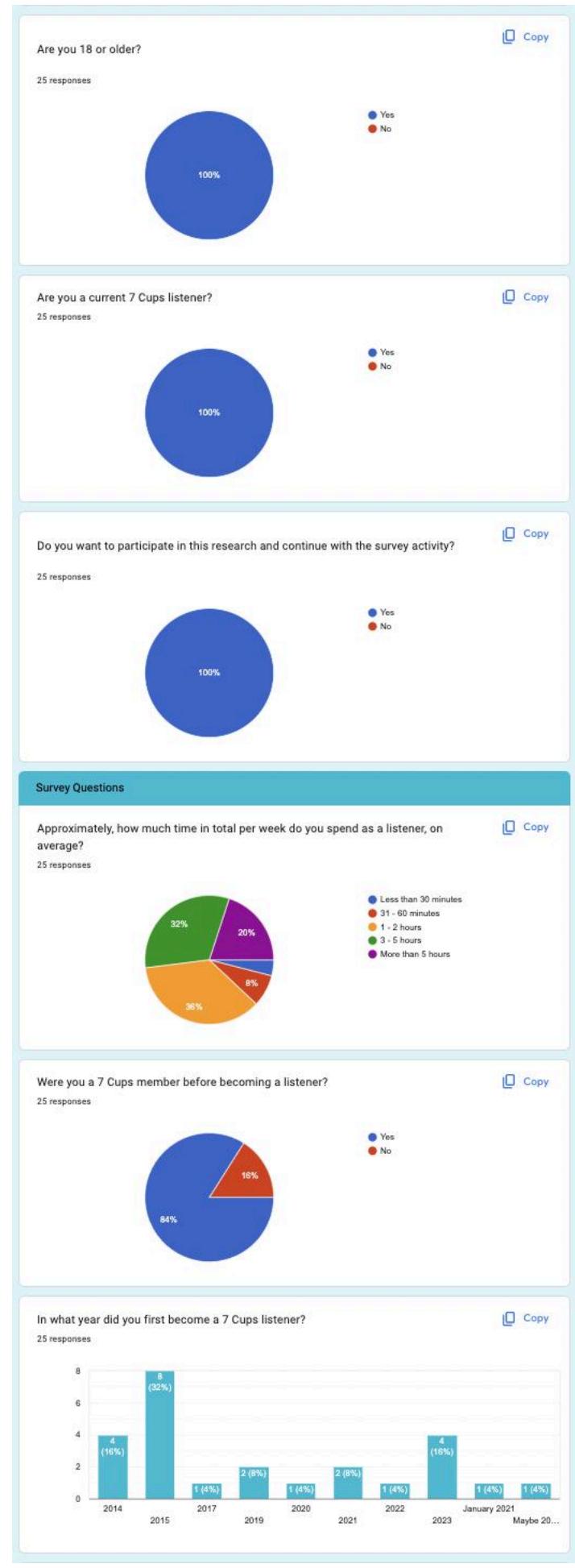
APPENDIX

- Literature Review Diagramming



APPENDIX

• SURVEY RESULTS FOR DEMOGRAPHICS



APPENDIX

- Mid-Fi Prompt Work

[INITIAL PROMPT STRUCTURE A](#)

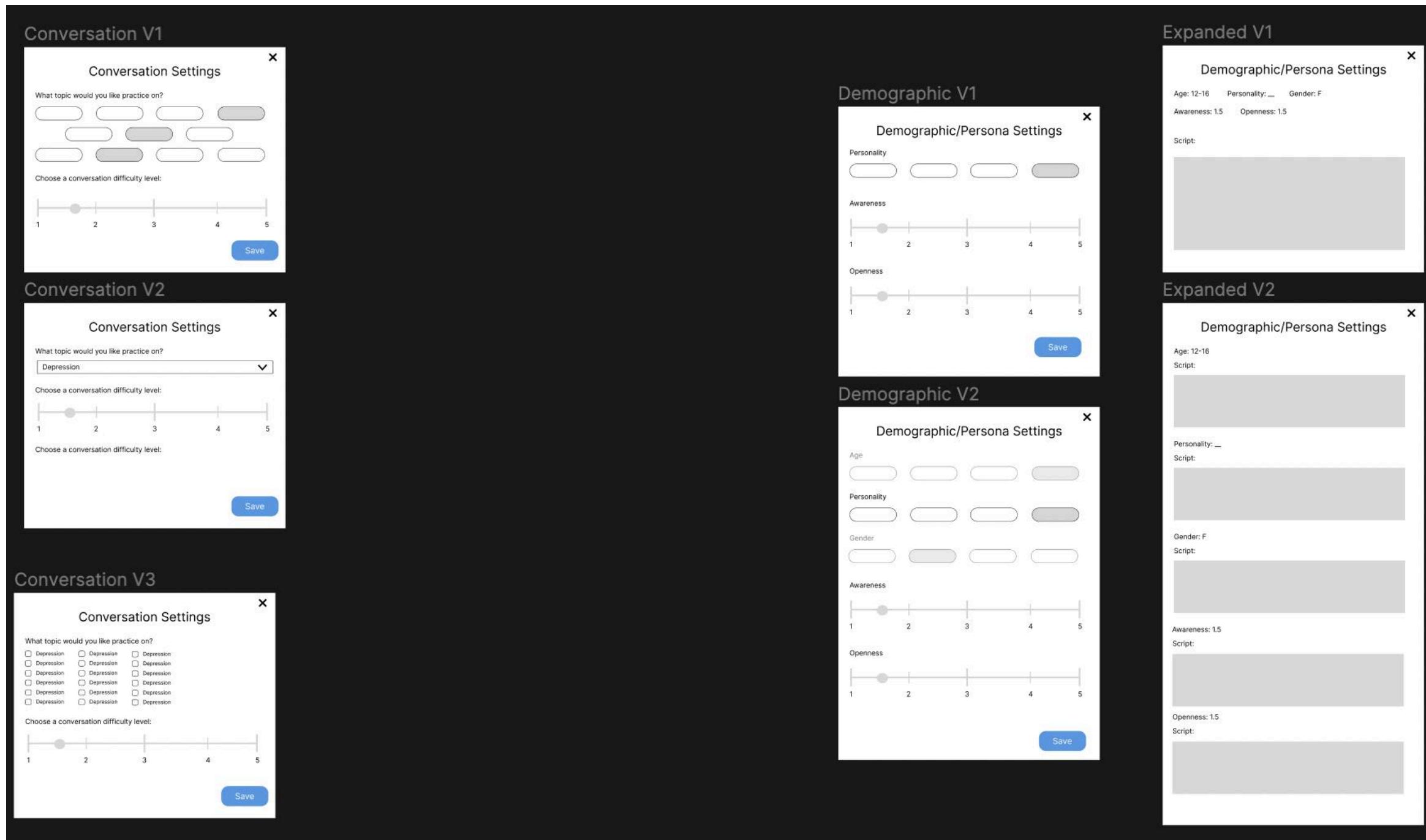
[INITIAL PROMPT STRUCTURE B](#)

[PROMPT CATEGORIES DOCUMENT](#)

[PROMPT ALGORITHM PSEUDO-CODE](#)

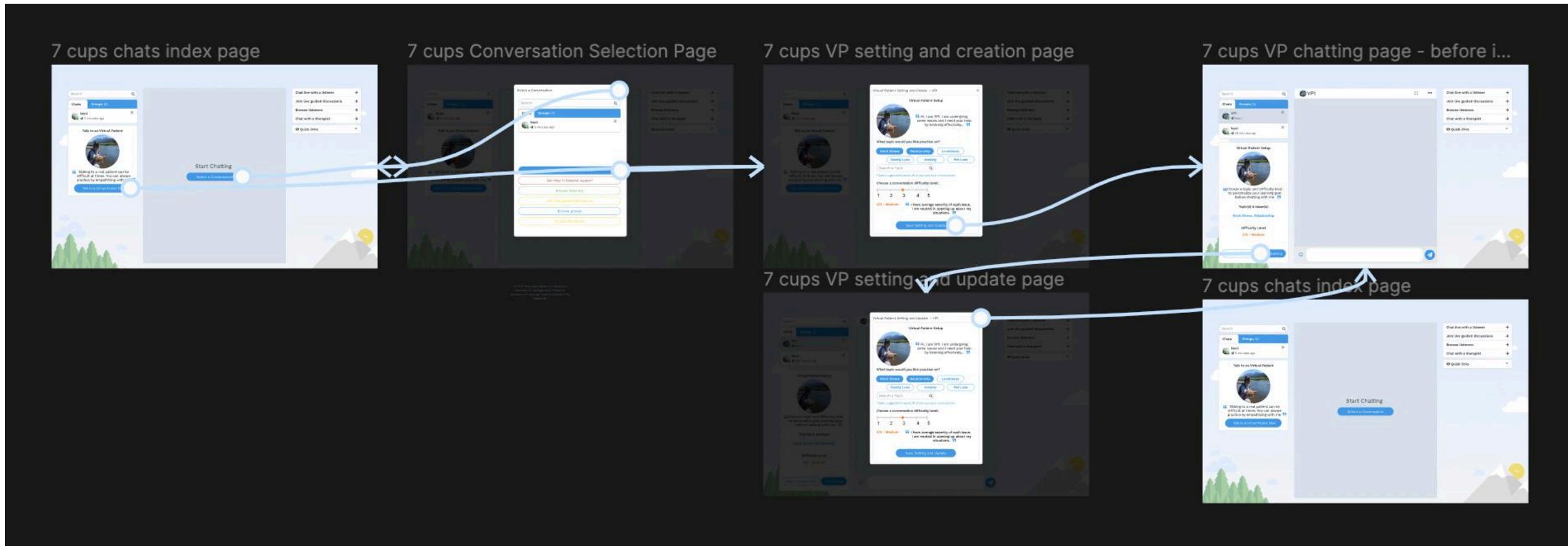
APPENDIX

- Hi-Fi Design Interface Sketch



APPENDIX

- Hi-Fi Design Interface 1st Iteration with Flow



ITERATION #1