Designing Chat Guidance for Positive Psychological Change

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Abstract

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Mental illnesses affect 25% of the U.S. population, and are the leading cause of ill health worldwide—far above physical illnesses. Common barriers of time, money, stigma, and lack of professionals to meet demand make it difficult for the majority of people to get the psychological support they need.

To address this need, I engaged people experiencing mental illnesses in a study to understand the risks they face in seeking support online, and to involve them in envisioning futuristic technologies for mental health peer support online. Building on insights from this study, I designed an online peer-to-peer chat tool, called *Chatback*, which guides peers to have online supportive chats using prompts for reflecting on troubling emotions together. I designed these prompts—the chat guidance—by drawing on evidence-based principles from Cognitive Behavioral Therapy and Motivational Interviewing, psychotherapeutic techniques that promote change by guiding people to examine their thoughts, feelings, and motivations.

This work builds on prior efforts in developing online therapy interventions by contributing a practical activity that peers can use to develop supportive relationships and reflect on immediate

situations troubling them. Chatback differs from these prior efforts by not presupposing a person's knowledge of principles introduced by a therapist, or having consumed relevant instructional modules from online psychotherapy programs. It also differs from prior approaches by engaging peers in developing supportive relationships through sustained interaction during chats, rather than individual self-help courses or crowd-help microtask platforms. To investigate the potential role of Chatback in addressing everyday emotional management, I conducted the following research: (1) foundational qualitative research using interviews and design activities to understand the needs and risks of online peer support experienced by people with mental illnesses, (2) conceptual analysis to identify psychotherapy techniques that peers can readily adopt to address a range of everyday emotional concerns (3) iterative design research using low-fidelity prototypes to create minimal viable chat guidance, and (4) formative evaluation research using mixed methods to compare Chatback to unguided peer support chats in a field experiment.

I present characteristics of emotionally supportive chats that real-time chat guidance should facilitate—such as guiding peers to reciprocate support, give each other strategies for addressing emotional concerns, share common interests, and build rapport over time. I demonstrate how the guided chat framework in Chatback facilitates skillful chats between peers that complement traditional therapy and other forms of mental health self-management strategies. This work informs the design of brief social interventions for peers that can bridge gaps in mental health care by empowering peers to help each other. In this work, I answer the following research questions:

RQ1: What are the unmet needs of peers seeking technology-mediated support for mental health?

RQ2: How can technology be designed to guide emotionally supportive interactions between peers?

RQ3: What are the tradeoffs of guided versus unguided online emotional support between peers?

RQ4: In what ways do guided chats affect psychological change?

In the process of answering these research questions, I demonstrate the following thesis:

Online chat guidance can provide low-barrier access to psychotherapy techniques, help peers to form supportive relationships through deeply insightful chats, and promote positive changes in feelings, thoughts, and motivations.

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[1] Any opinions, findings, conclusions or recommendations expressed in this work are those of the authors and do not necessarily reflect those of Microsoft Research.

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DEDICATION

To my brothers, Shaun and Colm, my parents,

Joan and Gerard, and my husband, Aaron, with love.

Chapter 1. INTRODUCTION

1.1 MENTAL ILLNESS PREVALENCE AND IMPACT

Mental illnesses affect as many as one in five American adults. Recent reports estimate that 43.6 million adults have any mental illness (e.g., depression, anxiety), and 9.8 million have a serious mental illness (e.g., schizophrenia, bipolar disorder) [50]. Moreover, many people in the general population are negatively affected by stress and subclinical depression and anxiety that do not meet thresholds for diagnosis; yet these negative emotions interfere with everyday life [207]. Unfortunately, less than half of people with mental health challenges access care by professionals [50]. The consequences of being without mental health care are substantial, with mental health disability costing people their jobs, and, unfortunately in a growing number of cases, their lives due to suicide [95]. Mental illness is the leading cause of years lost to disability globally [257], exceeding the negative impact of physical illnesses in the United States. The economic cost has been estimated at $300 billion per year as people miss days at work and are less able to maintain focus or interact with others [203].

1.2 BARRIERS TO ACCESSING TRADITIONAL MENTAL HEALTH CARE

Several barriers to accessing mental health care mitigate help-seeking, including stigma, cost, lack of transportation, and lack of care providers [9,19,50,219]. Demand for mental health care substantially exceeds supply of care providers, with a ratio of 1 psychiatrist to 30,000 people in need of care in some areas[2]. This demand is especially acute in rural areas where the fewest professionals are available, as compared to the continental U.S., as shown on the map of psychiatrists by state[3] (Figure 1.2.1). In eleven states, there are only 30-120 psychiatrists available. The demand for care is unlikely to be met by training additional professionals and traditional treatment options alone. Instead, new approaches are necessary that can dramatically expand the capacity of mental health care.

[2] http://www.hrsa.gov/shortage/
[3] https://www.bls.gov/oes/current/oes291066.htm

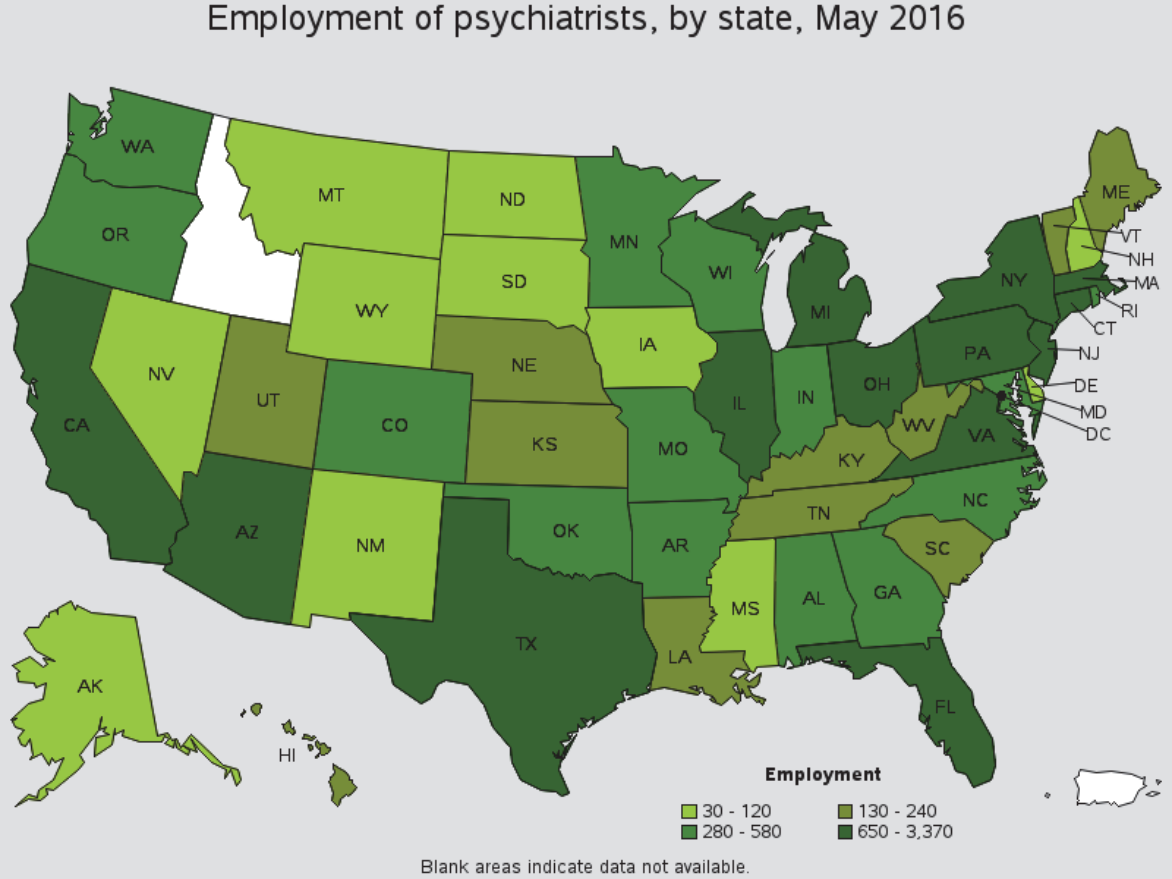


Figure 1.2.1 Employment of psychiatrists by state. Map accessed from "Occupational Employment and Wages, May 2016: Psychiatrists." U.S. Bureau of Labor Statistics, Division of Occupational Employment Statistics, webpage last modified March 31, 2017.

1.3 ALTERNATIVES TO TRADITIONAL CARE

The traditional paradigm of psychiatric care has been criticized by many stakeholders, including clinicians and ex-patients. Clinicians have argued for the need to "reboot" psychotherapy practice, in part through technological dissemination, to reduce the prevalence of mental illness [133]. Ex-patients and consumers have argued for the need to "talk back" to psychotherapy and create grassroots forms of community care among peers [141]. Both of these perspectives are important for informing next steps in digital alternatives to traditional care.

1.3.1 *Peer support for mental health*

One of the most promising ways to meet the demand for mental health care is to build the capacity of peers who have experienced and are recovering from mental illnesses. Peers' position as role models with first-hand experiences of disability, stigma, and recovery provides hope to people with mental illnesses, and enhances their engagement in self-care [72,128]. Moreover, peer support transcends traditional health care delivery settings, making it appropriate for outreach to minority and underserved populations [76]. Peer support is the backbone for several well-established forms of mental health services, such as Alcoholics Anonymous, crisis counseling, and telephone support lines. This peer-to-peer support can take many forms, including peer-led and peer-run organizations, and peer-support workers providing care and support within traditional organizations and services [204,232]. Recent student campus movements that bring awareness to mental illness experiences, such as Project LETS[4], combine in-person support with media campaigns to spread awareness among peers, encourage support-seeking, and reduce stigma.

Most of this peer support has traditionally been face-to-face, but is being transformed through online access. For example, peers use social networking sites and online communities to reach out to one another, using a variety of text- and video-based tools [*e.g.,* 3, 4]. Moreover, peers show a strong interest in learning peer counseling skills online to provide each other with emotional support—signaling an important unmet demand among peers for guidance in delivering online support to each other [32].

1.3.2 *Digital mental health interventions*

Prior efforts at delivering psychotherapy skills training online have opened the door to peer-based digital mental health interventions. These efforts can be categorized into three models of psychotherapy skills training for nonexperts: (1) Peer certification; (2) Self-help treatment; (3) Micro-interventions. The first skills training model—peer certification—includes interventions wherein one person is trained and thereby certified to support many people. For example, 7 Cups of Tea[5] and Crisis Textline[6] offer online skills training to volunteers who are subsequently certified to contribute several hours per week to support help-seekers. In other examples of this certification

[4] http://www.letserasethestigma.com/
[5] https://www.7cups.com/
[6] https://www.crisistextline.org/

model, peers who offer online counseling are trained and monitored in-person by clinicians [e.g., 3,30]. The second skills training model—self-help treatment—includes traditional psychotherapy treatments that are digitized and packaged as online psychoeducational courses for individuals. For example, Beating the Blues[7] and MoodGym[8], are online courses in Cognitive Behavioral Therapy that train people to use techniques on themselves. Such courses typically require a large time investment of eight weeks, on par with in-person forms of those therapies. The third skills training model—micro-interventions—includes modular approaches that enable users to learn bite-sized skills to suit their needs in the moment [41,42,85]. For example, conversational agents, such as Woebot [97], help users to learn skills through interacting with an agent that delivers psychoeducational content. These three approaches to delivering skills training online provide evidence of a diverse and exciting design space of digital mental health interventions that could help bridge gaps in care for people with mental illnesses. With the exception of the peer certification model, these prior approaches reveal a bias toward interventions for individuals rather than peer-based approaches. In my dissertation work, I introduce a chat guidance model for skills training that facilitates a new peer-to-peer social practice for mental health.

1.4 MOTIVATION FOR DESIGNING CHAT GUIDANCE

As described above, technology design for peers to help each other lags behind the design of interventions for individuals. This state of affairs is unfortunate given the substantial evidence that peer support is effective and beneficial for long-term recovery from mental illness [74,104,211,226,262]. Few efforts scaffold peer supporters to use best practices, such as effective principles of talk therapy [208–210], in online settings. Providing online scaffolds could improve the quality, scalability, and efficacy of online peer counseling. Yet, we need insight into how to design peer support counseling guidance that is useful, appropriate, and effective. Human-computer interaction researchers and designers are well-positioned to design technologies for and *with* mental health peer supporters to create tools that enhance peer counseling skills to address the unmet need for mental health support.

In this work, I show how technology can play a role in building the capacity of peers with mental illnesses to support each other by providing chat guidance for online peer support chats. In

[7] http://beatingthebluesus.com/
[8] https://moodgym.com.au/

the tradition of human-computer interaction research, I used interviews, design activities, and prototype evaluation to understand how tools can shape new opportunities for peers to develop supportive relationships for everyday emotional management. I interviewed people with a range of mental health challenges to understand how they used technologies for peer support; I conducted design ideation with them to envision future peer support tools; and I designed and evaluated a guided chat tool, called *Chatback,* for peers to have online supportive chats that promote positive psychological change. This dissertation answers the following research questions:

RQ1: What are the unmet needs of peers seeking technology-mediated support for mental health?
RQ2: How can technology be designed to guide emotionally supportive interactions between peers?
RQ3: What are the tradeoffs of guided versus unguided online emotional support between peers?
RQ4: In what ways do guided chats affect psychological change?

In the process of answering these research questions, I demonstrate the following thesis:

Online chat guidance can provide low-barrier access to psychotherapy techniques, help peers to form supportive relationships through deeply insightful chats, and promote positive changes in feelings, thoughts, and motivations.

1.5 RESEARCH OVERVIEW

To demonstrate my thesis, and to answer my research questions, I conducted research in three stages: (1) Understanding; (2) Designing & Prototyping; (3) Evaluating (Figure 1.5.1). This research process is typical of technology design in the tradition of human-computer interaction [77,118,199]. It begins with ethnographic fieldwork to understand the views, behaviors, and needs of stakeholders. This foundational knowledge about the potential users and their context feeds into the iterative design phase of brainstorming many designs and then converging on a chosen design that strikes appropriate tradeoffs. Then, the chosen design is materialized as a prototype at a level of fidelity that suits the goals and setting of evaluation (e.g., whether evaluation will capture user interactions in a lab or in the wild) [144]. Finally, a prototype is formally evaluated to assess outcomes of interest—ranging from quantities of user inputs to qualities of user experiences, and beyond. The insights gained from the evaluation stage are subsequently used to inform better design or to point to new areas to explore.

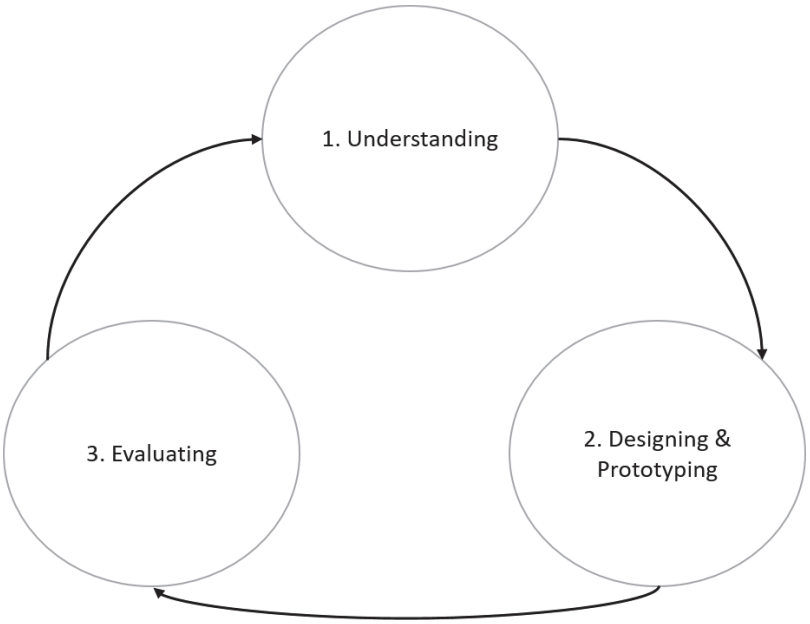


Figure 1.5.1 Overview of my research process.

Related work can be found in **Chapter 2**. **Chapter 3** describes the ethical and political orientation of my research, which underpins my approach to understanding, designing, building, and evaluating. Below, I briefly describe the three stages of my research, and point to the chapters that contain in-depth findings from each stage.

1.5.1 *Understanding stakeholders: An interview study*

For the first stage of my research, I conducted a qualitative interview study. This study involved 18 people with a diverse range of mental illness experiences. I conducted the interviews in the field, travelling to people's homes and peer support groups in different parts of the Seattle Metropolitan Area. I used several data collection instruments during the interview:

- a short survey of technology use for peer support,
- a semi-structured interview protocol about experiences using technology for mental health peer support, and
- a written prompt for participants to sketch a futuristic peer support tool and write a story about it, and a "spec sheet" for detailing key features and values embedded in their tool.

The details of this study are described in **Chapter 4.** I found that peers connected with each other using a range of technologies that they perceived as "crucial" to their mental health, and that they faced several challenges in mitigating the risks of seeking emotional support through technology.

1.5.2 *Designing Chatback: Adapting psychotherapy techniques for peers*

For the second stage of my research, I conducted design ideation. The foundation of my design work was based on both my understanding of stakeholders gained in stage 1, and my analysis of evidence-based psychotherapy techniques. In **Chapter 5**, I explain my design goals for low-barrier mental health tools, and I present an analysis of three psychotherapy techniques—cognitive restructuring, accurate empathy, and change talk—that can facilitate online peer support for emotional concerns. Then, I introduce Chatback, its implementation, and its underlying framework. I show how I iterated on several Chatback designs using low-fidelity prototyping techniques—such as paper prototyping and sketching—to gradually converge on a chosen mid-fidelity design to evaluate in a field experiment.

1.5.3 *Evaluating Chatback: For mental health and beyond*

For the third and final stage of my research, I conducted a field experiment comparing Chatback to unguided chat between peers. This field experiment involved 40 people with a diverse range of mental illnesses, each of whom was paired with an anonymous chat partner, making 20 pairs. Ten pairs were assigned to use Chatback, and 10 pairs were assigned to use a control condition of unguided chat, for eight chats over two weeks. Additionally, six pairs from the control condition continued in the study for an additional two weeks to use Chatback. This partial cross-over experimental design captured a between-subjects comparison (n=40) with every participant experiencing only one condition in "Phase1," and a within-subjects comparison (n=12) with a subset of control participants who experienced Chatback in "Phase 2." This approach allowed me to conduct a feasibility trial using the between-subjects data, and to gather rich perspectives on tradeoffs of the two tools using the within-subjects data.

Figure 1.5.2 shows the study flow, including each "Test" that evaluated participant's symptoms in each phase. These tests were quantitative measures of the following outcomes: depression symptoms (PHQ-9 [136]), anxiety symptoms (GAD-7 [233]), Stress and Coping (RISCI [93]), Emotion Regulation (ERQ [111]), Positive and Negative Affect (PANAS [249]),

and Stigma (PSOSH [245]). I also collected quantitative measures after each chat, including participant's level of satisfaction, effort, frustration, and perceived closeness with their chat partner. In addition to outcome measures, I collected qualitative data, including feedback submitted after each chat (a total of 280 responses to 140 chats), post-study survey feedback (40 responses), and in-depth follow-up interviews with a purposive sample of 12 participants.

I present results from the between-subjects data in **Chapter 6**, followed by longitudinal analyses of participant trajectories session-by-session in **Chapter 7**. These chapters focus on implications for guiding emotionally supportive interactions between peers. In **Chapter 8**, I present results from the within-subjects data, with a focus on implications for supporting behavior change.

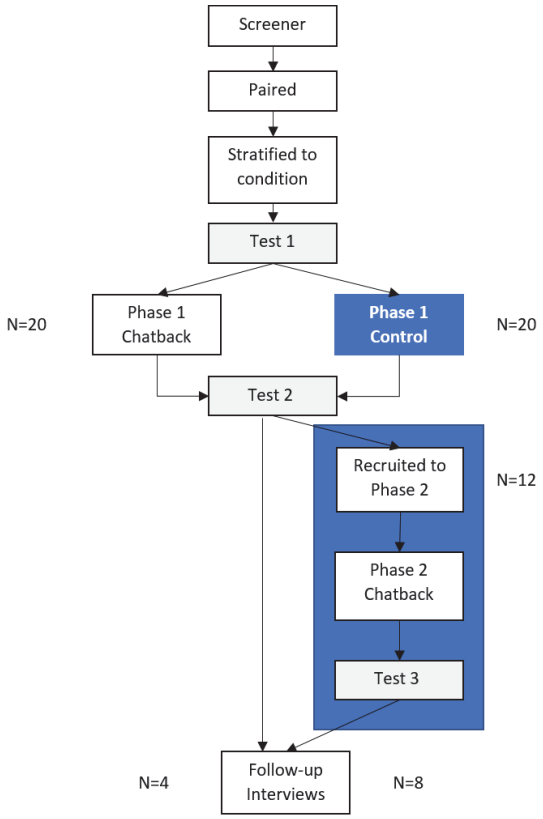


Figure 1.5.2 Study flow for my evaluation of chat guidance using a partial cross-over experimental design.

1.5.4 *Summary of key contributions*

The contributions of this work are: (1) An understanding of the needs, risks, and perspectives that shape technology-mediated support for individuals with mental illnesses; (2) Design goals and a theoretical framework for chat guidance that supports everyday emotional management; (3) Insight into tradeoffs of embedding such chat guidance in peer support interactions; and (4) Evidence of the ways in which chat guidance can promote cognitive, emotional, and motivational change. **Chapter 9** elaborates on these contributions and identifies avenues for future work.

Chapter 2. RELATED WORK

To inform my work on mental health technology design, I drew from a range of social science and human-computer interaction (HCI) research. In this chapter, I focused on prior work that describes how peers engage with each other offline and online for mental health support, how technology can be designed to facilitate peer support, and what forms of training and guidance for peers have been used. Based on my analysis of this prior work, I identify areas of opportunity in the design space of peer-based mental health technology.

2.1 OFFLINE PEER SUPPORT

Peer support is effective in a wide range of mental health services [204]. Peer support groups for mental health encourage information sharing and behavioral modeling that can lead to greater autonomy on the road to recovery. These peer groups typically provide some form of guidance to members to influence how people conduct themselves and their interactions with the group. Examples include the 12 steps of Alcoholics Anonymous programs [260,263], the six steps of Schizophrenics Anonymous [214], and the cognitive and behavioral guidelines of GROW [228,262] and Recovery Inc. [104]. Research on the benefits of such peer organizations shows that they reduce symptoms and rehospitalizations [73,74,226] and enhance peers' sense of mastery in managing their illnesses [151]. Importantly, people receiving help not only benefit, but people who provide support benefit as well [38,174,217]. In particular, acting as a supporter builds skills that improve social and occupational functioning and reduce dependence on other resources, such as social security [217]. Thus, helping peers to help each other is an important design opportunity for promoting many of the benefits of peer support online.

2.2 PEERS' USES OF TECHNOLOGY FOR MENTAL HEALTH

People with mental illnesses value technology for support. For example, a recent survey found that people with schizophrenia rated texting and phone calls as the most useful technologies for getting social support from family, friends, and peers [106]. This survey also revealed that technology use by people with schizophrenia and psychosis is comparable to that of the general population, and suggests that their attitudes toward using technology are generally positive [106]. In addition,

attitudes toward the use of mobile phone interventions for mental health have been positive, and these interventions are expected to become more important in people's recovery journeys [96]. More work is needed to best take advantage of mobile technologies for use among peers to achieve mental health goals.

Beyond the use of texting and phone calls for support, people with mental illnesses go online to find peers. Online peer support communities are beneficial in management of illnesses such as breast cancer [59,117], rare diseases [148], and epilepsy [123]. Mental illness is no exception. Peer support is a primary motivation for people who go online for mental health [198]. People with mental health conditions often prefer going online for support because of the benefits of anonymity, empowerment, and access [126,162,195,198]. However, people who have the goal of going online for emotional support experience a tension between self-presentation and help-seeking [139,180]. Seeking emotional support requires sensitive disclosure, anonymity, and more *implicit* rather than explicit requests for support [20]. Such sensitivities are especially true in the mental health domain wherein stigma deters people from seeking help [19,219]. Sometimes these sensitivities can result in lurking in online communities, rather than actively asking for support or disclosing personal issues, such as was the case of veterans who also faced mental health challenges transitioning back to civilian life [227]. Research from an HCI and CSCW perspective is necessary to understand how to help people achieve the benefits of peer support for mental health without the potential drawbacks, and what role technology can play in facilitating successful support.

2.3 PEER-BASED DIGITAL INTERVENTIONS FOR MENTAL HEALTH

HCI researchers and technology designers are shaping the frontier of digital mental health. However, many digital interventions for mental health focus on solitary use or use with clinicians [8,83,154,155,172,188]. Some systems provide an aspect of peer support, but often that support is either moderated or facilitated by health care professionals, which is problematic because interventions that rely upon professional mediation are limited in the extent to which they can scale to bridge gaps in care. For example, *HORYZONS* [139] was the first online social therapy that encouraged peers with schizophrenia to learn about cognitive and behavioral strategies in a clinician-moderated and dedicated social network for clients of a specific institution. This moderated online social therapy was designed to ensure safety, clinical efficacy, and supportive

accountability among its members. Alvarez et al. [6] found that it promoted high engagement in the use of the peer-to-peer social networking features; 85% of the patients ranked highly the importance of peer moderators who were previous users of the tool, and 90% reported wanting to become online peer moderators. Peer support combined with a behavioral intervention is also found in *MindBalance* [79], where peers can comment on and "like" psychoeducational content, and *Panopoly* [173], wherein peers compose positive alternatives to each other's negative thoughts [173]. Other approaches leverage the co-design process for empathetic interventions among peers with mental health issues, such as the interactive objects *Spheres of Wellbeing* [239], or designs to reduce self-harm among peers at hackathons for mental wellbeing [35].

HCI research has also expanded our knowledge of how people use unmoderated online communities and social networks to support their mental health. Peers with depression and other conditions seek information, emotional support, and advice online [20,69,91,143]. As such, social media and peer support platforms provide insights into people's mental health needs such as when, why, and how people seek help [55,112,183,190]. Dyadic peer support offers another model for peer support and has commonly been used in face-to-face peer support programs [72,87]. Research has extended this approach to technology-mediated mentoring programs (e.g., [53,206]) and people in group technologies also adapt private messaging features to access their own dyadic support (e.g., [1,180]).

Despite these benefits, internet support groups have not been shown to be effective at providing mental health benefits [109]. Participating in online communities for mental health can be distressing and exacerbate symptoms, even when people report having positive experiences [131,222,237]. Evidence of online interactions between peers with depression show that people have negative experiences with unsupportive members, distressing content, and conflict of beliefs [143]. Moreover, people can also struggle to identify the right rhetorical strategies for asking for support in online communities, and thus they could benefit from additional scaffolding around conversations [44]. Training peers and providing scaffolding could reduce the incidence and impact of negative experiences with emotional support online.

2.4 Training and Guidance for Online Peer Support

To mitigate the negative effects of going online for mental health peer support, research and commercial ventures are scaling peer support training online. For example, the 7 Cups of Tea

website[9] provides users with training on active listening techniques for supportive chats. The website also provides guidance in addition to training the active listeners—an automated chat agent periodically interjects advice into the chats to reinforce best practices. This active listening training has also been adapted for specific peer populations. For example, Baumel and Schueller [23] adapted the 7 Cups of Tea training for women experiencing perinatal depression. They found that the majority of participants rated the trained peers as helpful, and that the system was highly usable. However, few of the women who received help would volunteer to become supporters, which is surprising given that prior work has found that peer support networks tend to exhibit generalized support exchange between members [38,251]. Future work can provide insight into motivations and incentives that drive engagement of supporters in online interventions. In another study, Barak and Bloch [15] studied SAHAR, an Israeli crisis service, that trains its online counselors extensively during weeks of in-person training to handle supportive instant messaging chats. They found that trained non-expert counselors conducted successful sessions that were qualitatively similar to those of expert therapists. Crisis Textline trains its volunteers online to provide effective text-messaging crisis interventions [5]. These efforts are encouraging, and suggest that developing peer-based supportive chat tools that guide the use of evidence-based techniques could further enhance the success of online peer-to-peer emotional support. In the HCI domain, Slovak et al. have already provided insights for design work targeted at training novice counselors to use social-emotional skills [231].

Design guidelines for mental health technologies primarily target the design of systems for individuals or client-clinician interaction [64,80]. Some research has provided insight into the tradeoffs of designing for peer supporters, such as tensions between privacy and social connection [79], and between inclination toward positive self-presentation and necessity for honesty and disclosure [139]. However, more work is needed to understand design considerations for enabling peer support in online mental health systems, particularly research that engages people with mental illnesses as designers. Previous work in HCI has involved people with mental illness experiences in focus groups and pilot studies in formative stages of design. In contrast, research that engages peer supporters in sketching and design ideation is likely to be particularly fruitful for generating designs that reflect the needs and values of these stakeholders.

[9] https://www.7cups.com/

2.5 AREAS OF OPPORTUNITY

Overall, prior work raises important questions about the role of technology in mental health peer support, the challenges of using technology among peers with mental illnesses, and the opportunities for designing tools that enhance peer-to-peer mental health care. My research goal was to answer these questions and to broaden the understanding of technology use for mental health support beyond solitary or clinician-mediated internet use. I have identified the following areas of opportunity for future research:

Understanding the roles and risks of technology for peer support: Few, if any, studies have investigated peers' perspectives of using technology for mental health peer support. Research should give insight into people's attitudes, values, needs, and concerns that influence adoption, use, and abandonment of technologies for mental health peer support. Including peer supporters as stakeholders in the design process will encourage designers to account for their values.

Engaging people with mental health challenges in design ideation: Peer support began with the slogan "Nothing about us without us!" Designers should heed this warning and maintain the spirit of empowerment that characterizes the peer support movement. Design methods offer an unprecedented opportunity to involve peers in the design of treatments and interventions. Participatory and co-design methods could be especially helpful in navigating the tensions in engaging people with mental health challenges in design, especially for mitigating the effects of stigma, marginalization, and oppression in the research and design process.

Innovating tools for developing supportive relationships: The majority of technology innovation in mental health has been focused on individuals, or client-clinician interaction. Peer-to-peer solutions have been underexplored, despite the known benefits of this type of support for health outcomes and engagement. In particular, work has not focused on tools for developing supportive relationships through sustained interaction. Such tools could enable people to learn and practice skills that promote greater interpersonal success and self-management.

Chapter 3. DESIGN ORIENTATIONS FOR ENVISIONING MENTAL HEALTH TECHNOLOGIES

Human-computer interaction is characterized by orientations to technology design that emphasize different facets of humans, computers, and their environments. The most common design orientations include an emphasis on "users" in user-centered design [235], "humans" in human-centered design [13,40], and "activities" in activity-centered design [57,182]. Design methodologies such as Value-Sensitive Design [102] and Participatory Design [176,224] orient designers to focus on human values and direct participation of stakeholders, respectively. Each of these orientations to design reveals unique ethical and political commitments that shape how designers choose, frame, and solve problems with technologies. Envisioning mental health technologies poses complex political and ethical challenges as does any "wicked problem." [33]. It is incumbent upon technology designers tackling large-scale social issues like mental health to ask themselves, as Susan Cozzens has, "What goal is this movement pursuing, and why?" [65].

Technology designers are concerned with ethics and politics when they decide what *problems* should be solved, what *solutions* are desirable, and which *people* should benefit. In human-computer interaction literature, these decisions are often cast as "difficult properties of design" (e.g., [49]), rather than as ethical and political questions about the role of technology in shaping power and privilege. Feminists have critiqued the obfuscation of ethics in design, to point out that values shape the types of designs that are created and for whom (e.g., [113,114]). Lucy Suchman [236] critiqued assumptions underlying technology design by drawing on feminist theorizing:

> "Within prevailing discourses, anonymous and unlocatable designers, with a license afforded by their professional training, problematise the world in such a way as to make themselves indispensable to it and then discuss their obligation to intervene, in order to deliver technological solutions to equally decontextualized and consequently unlocatable users."

This bias toward problematizing the world in ways that make designers "indispensable" is evident in many of the early approaches to mental health technologies. Digital mental health treatments—such as cognitive behavioral therapy programs disseminated through CD-ROMs early

on in the 1990s [78] and then websites[10]—were designed primarily by clinicians for patients. These efforts at scaling mental health care were important first steps and have been shown to be highly effective [8]. However, the assumptions underlying these designs could be partially the reasons for low adoption [9,90]. Clinical assumptions that characterize mental health as reduction in "symptoms," stakeholders as "patients," and engagement as "compliance" have produced a **medical orientation to design.** This medical orientation to design prioritizes the clinician's perspective on mental health and emphasizes patient compliance to regular interaction with digitized treatments. Approaches to engagement with mental health technologies reveal this medical orientation—when patients fail to adhere to digital treatments, guides are introduced to improve adherence [21].

Alternative orientations to designing mental health technologies are needed that prioritize the problems, solutions, and benefits deemed most important by people experiencing mental illnesses. One of the most influential design methodologies to challenge the prevailing discourse of technology design, was the Participatory Design tradition developed in Scandinavia in the 1970s [84,224]. Participatory Design emerged in opposition to dominant technical approaches that were producing technologies in labs that substantially replaced, subsumed, and marginalized skilled workers within organizations. A **participatory orientation to design** acknowledges the fundamental injustice of designing technologies that automate human work and disenfranchise skilled workers. One of its primary aims was to collapse the boundary between production and use of technology by involving workers *as participants* in the production of the technologies they would use. This situated and local design approach differed dramatically from the dominant paradigm of designing "from nowhere" to "unlocatable users" [236].

A participatory orientation to design has been widely adopted in health-care settings to prioritize the perspectives and expertise of patients in the design process, including mental health technology design [60,155,246]. For example, Birbeck et al. [35] engaged people who self-harm in a hackathon for mental wellbeing wherein they became makers of their own tools. Yarosh and Schueller [261] involved children in a series of participatory design workshops both to learn positive psychology techniques and to apply those techniques to technology design. These approaches represent a strong commitment to learning from people's experiential knowledge, and teaching them new technical and psychological skills in the process.

[10] https://www.beatingthebluesus.com/

Recently, human-computer interaction scholars have introduced another alternative design orientation: social-justice oriented interaction design [81]. A **social justice orientation to design** strives to facilitate equitable social change through technology design that attends to "the ways that individuals experience oppression, including how benefits, burdens, obligations, power, opportunity, and privilege have been (in)equitably distributed within society." A focus on distributive justice—on ethical questions regarding the distribution of benefits and burdens across members of a society [137]—is at the core of a social justice orientation to design. It requires designers to acknowledge inequality and oppression in the organizations, communities, or societies within which they are designing, and to use technology design to address power relations that produce oppression.

In outlining this social justice approach, Dombrowski, Harmon, and Fox [81] present goals and commitments for ethically and responsibly addressing large-scale social challenges in HCI. This social justice orientation is a powerful alternative to prior approaches to mental health technology design because it requires commitments to *conflict*, *reflexivity*, and *personal ethics and politics*. These commitments are not typically explicitly addressed in clinical or computer science orientations to design, and therefore present an exciting opportunity to generate new avenues for technical exploration in mental health. Below, I outline my personal ethics and politics for a social justice orientation to mental health technology design, and demonstrate how these have shaped my design approach.

3.1 COMMUNITARIAN ETHICAL STANCE

In this dissertation, I adopt a **communitarian ethical stance** [31,89]. A communitarian ethical stance views research and design as moral when the distribution of benefits and burdens that it promotes *strengthens community life* [65]. I express this communitarian ethical commitment through research and design that attempts to reduce inequity through capacity-building. Cozzens [65] describes capacity-building research and design as that which: "spreads professional expertise to disadvantaged groups and communities, increasing their capacity to produce and absorb knowledge and innovation."

Adopting this ethical stance, I framed the problem of mental health care access as *an unequal distribution of the benefits of psychotherapy skills for helping oneself and others*. I shaped my solution to this problem by *building the capacity of peers to use expert psychotherapy skills*

with each other to form supportive relationships and promote mutual positive change. Finally, this ethical stance has influenced my choice of evaluation methods in *qualitatively understanding the benefits and burdens of computer-mediated mental health support among peers*.

This ethical stance has contributed to the substantial difference between my approach and prior work. Many technical approaches to mental health aim to scale evidence-based psychotherapy (e.g., [79,97]), which can partly address unequal distribution of the benefits of psychotherapy skills. However, the emphasis is often on self-help rather than mutual help or collaboration—the supportive expertise of therapists that promote social connection, empathy, and understanding, is not usually made available to people with mental health experiences in these systems. Moreover, the capacity-building is often medically oriented, focusing on strict programs of skills that take weeks to learn [8]. Focusing on diverse experiences and ways of knowing in communities of people with mental illness can provide a path forward for design that is more flexible and closely aligned with their values and practices. These ethical considerations relate closely to the political milieu of mental illness and disability, which I discuss below.

3.2 Political stance on mental illness and disability

Politics is concerned with achieving power in a society. People experiencing mental illness and disability are historically underrepresented in politics, and are marginalized from power [258]. They often have unfair disadvantages in accessing information, opportunities, knowledge, and wealth, among other goods. From a political standpoint, the experience of mental illness can also be disabling because it can result in losing the power to choose appropriate treatments and being subjected to state-authorized institutionalization.

The politics of disability and mental illness are highly contentious and debated because they involve high-stakes struggles for human rights and personal liberty [75,141]. Political movements such as Mad Pride organized by ex-patients of psychiatric care affirm a view of mental illness as a form of neurodiversity rather than a problem to be "cured" [221]. Psychiatric survivors have resisted oppression by drawing attention to social barriers to inclusion in civic life, and have taken an active part in fighting for their civil rights [51,141]. They "talk back" to psychiatry by protesting maltreatment, and offer alternative peer-based interventions for mental health. This grassroots political organizing by people who experienced psychiatric care as stigmatizing and

oppressive, actively oppose the intertwining of psychiatry and state that is perceived to exert undue economic and state influence over the diagnosis and treatment of mental illness. The view of these activists is that coercive state and economic forces make people vulnerable and susceptible to inappropriate care.

Government support of the medicalization and pharmaceutical treatment of mental illness has threatened alternative, peer-based social interventions. For example, the 2002 President George W. Bush era agenda posed threats to mental health care consumers, including budget cuts to consumer mental health services (e.g., peer-run crisis lines) and required mental health screening (i.e., being labelled) [141,184]. The highly political language for medicalizing, screening, and categorizing 'abnormal' and 'normal' mental states, carries with it great power to promote certain 'cures' and to disenfranchise individuals who do not conform to norms—a central focus of Foucault's account of the social construction of 'madness' [100]. Such abstract categories are culturally relative, revealed by changes made over the years to the Diagnostic and Statistical Manual of Mental Disorders that once included diagnoses such as 'homosexuality.' Thus, people who express strong views or engage in behaviors that are contrary to conventional norms are at risk for being labelled insane and treated accordingly. Moreover, people with mental illness experiences are disabled by stigma and demonization in cultural media that has stereotyped them as violent and undesirable [48].

These medical, economic, political, and social factors combined can make mental illness an extremely disabling experience. Moreover, the experience of extreme and altered mental states, such as hallucinations, panic, or depression, can be highly functionally impairing and uncomfortable [71,130,218]. Adopting a political stance on mental illness can require a willingness to hold multiple perspectives in balance because mental illness is a complex, and often deeply misunderstood, medical and social construction, as well as a personal identity. I attempt to choose a middle ground among these multiple perspectives. I ascribe to a social model of disability that attends to the ways in which society disables people through stigma and harmful policies [187], while acknowledging the experience of mental illness as functionally impairing.

My work in this dissertation does not directly target the political goals of psychiatric survivors. It is a limitation of this dissertation that it primarily targets the symptoms of mental distress (e.g., low mood, anxiety), rather than systemic causes of oppression, such as barriers to

political participation, pervasive stigma in society, and sensationalism in the media. However, aspects of my approach could contribute to this 'mad' political agenda and to greater social justice.

First, by targeting capacity-building through making expert psychotherapy skills more accessible, my approach is an attempt to open the black box of talk therapy and make its mechanisms usable by non-experts. This strategy can potentially reduce inequities between experts and people experiencing mental illness, and give people the tools to help each other without complete reliance on experts or expensive treatments.

Second, by taking a pluralistic view of mental illness, my approach does not require people to adhere to illness labels that are stigmatizing and can be oppressive when forced upon them. Allowing people to self-identify and explore similarities and differences beyond diagnostic labels can enable people to resist medicalization and further reduce reliance on experts. This approach can also increase opportunities for agency and community-building.

Third, by focusing on connecting peers with each other, I affirm the value of social connection and peer communities that work to undo the disabling isolation of being marginalized in dominant cultures. Peer communities and expertise have played an important role in the recovery and empowerment of people with mental illnesses [72,76]. Indeed, peer support for psychiatric survivors emerged from the civil rights movement to reclaim power over their bodies and minds and to form alternatives to traditional psychiatry [74].

Chapter 4. UNDERSTANDING PEERS' NEEDS FOR SUPPORTIVE TECHNOLOGIES

Peer support has been shown to empower people with mental illnesses, and address gaps in care. It could scale to wider audiences through technology, but technology design for mental health peer support lags far behind tools for individuals and clinicians. In this chapter, I present findings of how people engage with technology for mental health peer support without involvement of therapists and traditional health-care providers. I identify opportunities for designing technology to foster peer support for mental health: enabling peers to match based on fine-grained in-the-moment characteristics, making support accessible through various media, and mitigating risks of self-harm and stigma. I contribute a detailed understanding of how to design for these opportunities to address gaps in mental health care and empower peers to support each other.[11]

4.1 METHODS

4.1.1 *Participants*

I recruited participants with a range of mental illnesses who used technology for peer support (see APPENDIX A: Interview study recruitment call). People with mental illnesses can be wary of participating in research because of their experiences with stigma, marginalization, and oppression [246]. To build trust with and gain access to participants, I used a referral sampling technique whereby gatekeepers who established my trustworthiness and who controlled access to mental health peer support communities spread the word to individuals in their peer support networks. I contacted gatekeepers through an organization for mental illness and through in-person peer support groups in a large metropolitan area. The inclusion criteria approved by my Internal Review Board stated that participants had to be 21 years or older, and had to use technologies for mental health peer support (see APPENDIX B: Interview study information sheet). Word of the study spread to diverse networks of peers of both younger and older adults, yielding a sample with an age range of 22-68: (M=42.8). I included diverse gender identities: 10 male, 6 female, and 2 gender queer/transgender. Participants self-reported diagnoses of mental illnesses. Table 1 summarizes

[11] Parts of this chapter are adapted from O'Leary, K. et al. *Design Opportunities for Mental Health Peer Support Technologies*. CSCW'17 [183].

Table 4.1.1 Mental illness diagnoses of participants with characteristics and common treatments as described by the National Alliance on Mental Illness [179]. N is the number of participants. Three participants self-reported multiple diagnoses.

Mental illness	**N**	**Characteristics**	**Common treatments**
Schizophrenia	5	Hallucinations; delusions. Negative symptoms often include being emotionally flat or speaking in a dull, disconnected way; Cognitive issues/disorganized thinking.	Antipsychotic medications, psychotherapy, electroconvulsive therapy
Bipolar disorder	4	Unusual and intense shifts in mood from extreme highs, to extreme depression. Manic episodes can include hallucinations and depressive episodes can include social withdrawal.	Antipsychotic medications, mood stabilizers, antidepressants, psychotherapy, electroconvulsive therapy
Eating disorder	2	Severe disturbances to a person's eating behaviors, often with obsessions with food, body weight, and shape. Can include low self-esteem.	Antidepressants, anti-anxiety medication, psychotherapy, nutritional counselling
Dissociative identity disorder	1	In response to trauma, significant memory loss of specific times, people and events; a sense of detachment from emotions, and a lack of a sense of self-identity.	Psychotherapy, eye-movement desensitization and reprocessing
Depression	4	Changes in sleep, appetite, concentration, energy. Social withdrawal. Feelings of hopelessness and low self-esteem.	Antidepressants, antipsychotic medications, mood stabilizers, psychotherapy, electroconvulsive therapy, light therapy
General anxiety	4	Persistent, excessive fear or worry in situations that are not threatening. Avoidance and social withdrawal.	Anti-anxiety medication, psychotherapy, exposure therapy
Posttraumatic Stress Disorder (PTSD)	3	Intrusive memories, avoidance, dissociation, hypervigilance, changes in sleep, concentration, energy.	Antidepressants, antipsychotic medications, mood stabilizers, psychotherapy

these conditions, and the key characteristics and treatments as described by the National Alliance on Mental Illness [179].

Participants also had other comorbid health conditions that they mentioned affected their access to technology and support. These include physical impairments (N=3), hearing impairments (N=1), substance abuse (N=2), and Autism Spectrum Disorder (ASD) (N=3). Two participants experienced psychotic symptoms and three struggled with cognitive impairments (such as

confusion, difficulties with memory and comprehension), which they specifically reported as interfering with their technology use.

4.1.2 *Study procedures*

I conducted six face-to-face interviews in people's homes, eight at their peer support group meetings, three in a university setting, and one interview over the phone to accommodate the participant's request for feeling comfortable during the interview. An American Sign Language (ASL) interpreter was present at one interview with a participant whose first language is ASL. Interviews began with a short survey of the types of tools used for peer support and demographic information (see

APPENDIX C: Interview study demographic questionnaire and APPENDIX D: Interview study questionnaire on peer technology use). Interviews focused on a discussion of the tools the person used to give and receive peer support, their positive and negative experiences of using tools for peer support, and their reasons for avoiding tools (see APPENDIX E: Interview protocol on uses of technology for peer support).

After this discussion, participants were prompted to imagine a tool that would help someone with a mental health challenge to participate in peer support (see APPENDIX F: Design activity). This design activity was intended to elicit the motivations, needs, and values that should influence design. Participants were asked to complete a worksheet about the features, users, and values relevant to their design idea, and then use the pens, pencils, and markers provided to sketch their tool. Finally, they were asked to write a short scenario when the tool would be used. This activity was based on Woelfer's method of engaging people who are marginalized in design [256].

All interviews were conducted one-on-one with me. Interviews lasted between 25 and 112 minutes; short interviews happened in 8 cases when participants had already completed the design activity ahead of time during the peer support group meeting where they were recruited. The participant who interviewed over the phone emailed her design to me. Participants were given $25 cash for participating.

4.2 Analysis

I analyzed the transcripts using an inductive approach [225]. First, to derive codes representing dominant concepts in the data, I read and coded through each transcript. I then clustered related codes into overarching categories using an affinity diagraming approach, wherein I arranged coded excerpts printed on strips of paper into piles according to similarity. To validate the coding scheme, I iterated on the affinity diagramming with an independent researcher, who was not involved in study design or data collection but who has volunteered in peer support groups for mental health challenges. The categories that emerged from my affinity diagraming served as a set of codes that I used in a second round of coding the transcripts (see APPENDIX G: Interview study coding manual). Discussions were conducted with my collaborators at every stage to further ensure validity.

4.3 Findings

Overall, I found that participants used a variety of technologies for mental health peer support. Table 4.3.1 summarizes types of technology used by participants and age range of individuals using them. The most prevalent technologies used among my participants were Facebook (N=9) and online communities (N=8). Most technologies were used by all age ranges. Snapchat (N=2), however, was not used by participants over 30 years of age and participants under 33 years of age

Table 4.3.1 Types of technology used for mental health peer support.

Technology	***N***	***Age range***
Facebook	9	22-68
Online forum	8	24-63
Texting	7	22-68
Phone call	6	33-68
Email	5	24-68
Instant messaging	4	22-68
Blogs	3	22-68
Video call	3	22-63

did not use phone calls. I did not observe trends in technology use by mental illness in my sample—all technologies were used by participants with different mental health issues.

I identified four major themes from my analysis: (1) peers access just-in-time support through technology; (2) peers are empowered by technology to define themselves beyond diagnostic labels; (3) peers value accessible communication channels; and (4) peers find it challenging to manage digital risk. I describe each theme, and include examples of design sketches from participants.

4.3.1 *Peers access just-in-time support through technology*

Participants used a variety of technologies for peer support as a just-in-time lifeline during crises and in times of isolation. The all-hours availability of peer support through technology proved essential. For example, Terry explained how he uses Facebook when he's depressed: *"It could be three in the morning, and you're lonely, and you're feeling bad and may be suicidal. And you can turn on the laptop and you can chat with people all over the world, where it's the middle of the day*."

The global reach of technology also helped Sarah connect with a peer in Brazil at a crucial moment. She was having a relapse in symptoms, and went on Skype to see if her peer was online: *"One time I remember is that I was sort of in a lapse. I just hadn't eaten anything all day. And then it was 9:00 PM. And then I'm on Skype. And then he messaged me online, and it's actually like 3:00 AM in Brazil or something. But he stays up all night 'cause his PTSD. He can't sleep."* In another example; Sue described the global reach of technology as "*excruciatingly crucial*" to communicate with the outside world because of her situation of being restricted by lack of resources in a rural area: *"I was living in a really rural area. And the resources I need, they're very limited. But when I found people in Australia and people in Africa and all over the world that were sharing these common experiences, it really, literally opened up my world."*

Fred, who was dealing with depression and anxiety, found that technology enabled low-barrier connection to peers he knew locally, and used phone calls with a peer to meet his need for support at a crucial time in the morning: *"It just was such a lower barrier, and you don't need to get in the car or whatever. So the fact that you just get on the phone and do it – that's pretty amazing. It opened up the opportunity for things like having a counseling session first thing in the morning. I had a series of them with a friend that, literally just, first thing in the morning, 7:30*

AM, you have like, just a couple minutes, and you know, stuff like that's really unique because I think a lot of people have problems getting up."

Interestingly, one participant also used technology to transition to just-in-time support offline. Casey used Facebook messenger to connect with a trusted peer in the park when he was experiencing a crisis during a depressive episode: "*I was depressed. So I took off. I went to the park, and I was like, 'Hey, I know someone who goes here a lot. Let's go on Messenger.' And I found her and I sent her a message that says 'I'm at the park if you want to come over.' And she came over and I chatted. […] So I used technology to get over a crisis, and I got together [with her].*"

4.3.2 *Peers are empowered by technology to define themselves beyond diagnostic labels*

Participants felt empowered by technology to choose peers depending on their needs and state of mind at a given point in time. Diagnostic labels were not usually perceived as the primary means for finding affinity with peer supporters. Sue described the advantages of being able to use technology to seek support beyond diagnostic labels: *"You don't have to have a referral, you can just on your own kind of scope what there is out there. There's a lot of freedom in choosing. You get to have enough power to say I don't go by that label because that label doesn't serve me. That way it lets me kind a see what fits to my life."*

This was particularly true for individuals with multiple diagnoses or challenges of misdiagnoses. For example, Sally, who went through several diagnoses by clinicians, said, "*I'm less likely to talk about a diagnosis today because I sort of feel like they're really immaterial."* Sally explained her trials with misdiagnoses: "*I had been diagnosed previously with depression. And then my first hospitalization they [clinicians] said repetitive, major depression. Previous to that it had been dysthymia. So I was diagnosed with bipolar type II after my third hospitalization."* Ultimately, Sally received a subsequent diagnosis that remains her official diagnosis to this day.

The ability to tailor peer support to changing needs and recovery orientations was highly valued. Sarah described how she would choose peers who were an exact match: *"I'm sort of more inclined to use technology rather than in-person because it lets me quickly find people who are an exact match for me. Because I have been to in-person support groups, but of course I don't really control the overall ideology of the group or the setting or who comes and who doesn't. But with the forums, I can choose to message the person whose posts I like the best."*

Yvonne explained another reason why characteristics other than diagnosis were important: *"I'd have to say that the reason I do all women [support groups] is that I think often there are things that women want to talk about such as sexual abuse or other personal things like that, that they won't talk about if there is men present. That's why I have a tendency to focus on the women's group."* She regularly connected with a group of women over group conference calls and video chats.

However, in contrast to these perspectives on seeking support beyond diagnostic labels, Clayton expressed that he would feel safer in a dedicated online support group associated with his illness, *"The importance of that is we're all delicate people and if you were on this website, you're putting your info out there and you're putting trust out there. So you need your info to be verified and you need the trust to be reciprocated 'cause you'll need to believe the advice you're getting and people need to believe what you're gonna tell them."* For Clayton, labels were an important badge of trust and reassurance that supporters were like him.

Participants' designs reflected the importance of being able to identify similar peers according to salience of need, recovery orientation, and current feelings. Sarah designed an app called *Shared Feelings* (Figure 4.3.1a) that matched peers with similar in-the-moment feelings and urges. She explained, "*people could check mark the feelings that they're having and any reasons that they think it's happening and then basically the app would match them behind the scenes."*

Similarly, Kelly designed an app called *Connect Us* that would allow users to scan topics related to life situations so that peers could organize around common struggles regardless of specific mental health challenge (Figure 4.3.1b): *"If somebody was feeling isolated or lonely or*

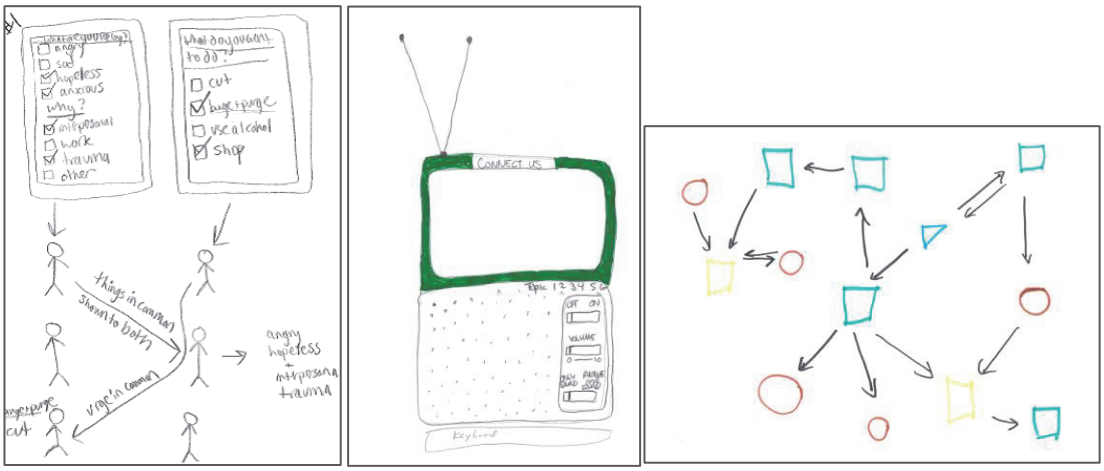


Figure 4.3.1 Designs for matching based on similarities. (a) Shared Feelings, (b) Connect Us, (c) Something Fishy.

had a topic that they couldn't go to their friends or relatives to talk about it, they could go on a station and the stations would have topics like job, divorce, like life situation type thing. Then they could click on it and see if anybody's there and then they could have questions." Her tool was a radio connected to a keyboard and screen so that the user could tune into peer conversations via audio, video, or text.

Riley created an app called *Something Fishy* (Figure 4.3.1c) that "*forms communities based on what your need is,"* that enabled peers to leverage each other's strengths: *"Basically people would sign up for whatever support they felt like they could offer. Like I'm good at making coffee for this person, or I'm good at whatever…So it's basically going to connect all the people to the things they need."* Additionally, this tool featured automatic translation of peer conversations and posts to create access regardless of language.

Leveraging people's strengths to help each other was also emphasized by Coleen, who designed an app that matched peers on the basis of shared belief systems and goals, *"You could pull up the app to see what this person's accomplishments were, what their belief system is, how long have they been working, where did they get their training, and then they would be like, 'I think I might be a good fit.'"* This tool was more directed at finding a peer to begin a mentoring relationship, rather than a one-off conversation. Thus, participants' designs reveal that different characteristics can become more or less salient to finding similarity depending on the time horizon of support. Peers' perceived agency in finding a match was one of the most important advantages of using technology to seek peer support for mental health.

4.3.3 *Peers value accessible communication channels*

Accessibility through multiple communication channels was another reason that technology was empowering for participants. In addition to mental health challenges, several participants experienced impairments that affected their support-seeking strategies. For example, Riley is hard of hearing, and uses American Sign Language as well as speaks English. She explains, *"I think being not really in the hearing community, not really in the deaf community, computers were really how I connected with people. So I found the old AIM chat and that was the first experience [with mental health peer support]. And it was a new way to communicate. And for deaf folks and hard of hearing folks, you can't call people on the phone or don't have access to people one-on-one in person the same way."*

In another example, Alex described how technology helped him to use visuals on platforms such as Facebook to express himself: "*I have Asperger Syndrome. Sometimes people with Asperger Syndrome find it difficult to express themselves. I tend to sometimes be one of those persons. […] Facebook and other services on the internet are sometimes very visual. I'm a person that likes to think in pictures. I really like that about Facebook."* Drew experienced physical impairments that made technology the ideal form of peer support for him: "*My husband and I are both mobility-impaired. So, I use a technology called [video chat app], and it basically is a way to gather with people of like minds…And so, I have a group of people that I kinda – it's sorta like an e-AA meeting."*

For some participants, accessibility needs varied with changes in their mental illness experience. As Kelly recovered from medication withdrawal, she found accessing peer support over the phone was preferable to face-to-face meetings: *"The [peer support crisis line] is over the phone. So that was another piece that was still part of my recovery from this. So the little steps that I was ready to do that were available instead of actually driving to go see somebody or being face to face yet."*

Similarly, early in her mental illness experience, Sally found it difficult to connect with people in person. She found that online connection was more accessible at that point: *"I didn't know how to reach out to people in person and was really too sick for a long time to do that. I was trying to find out how I could reconnect with people. But it had to be in a way that was safe and within the time constraint that I had, which was that in those days I did a lot of sleeping."*

During the design activity, participants created tools that could scaffold access to peer support through different modes of engagement. For example, Fred designed an app that would

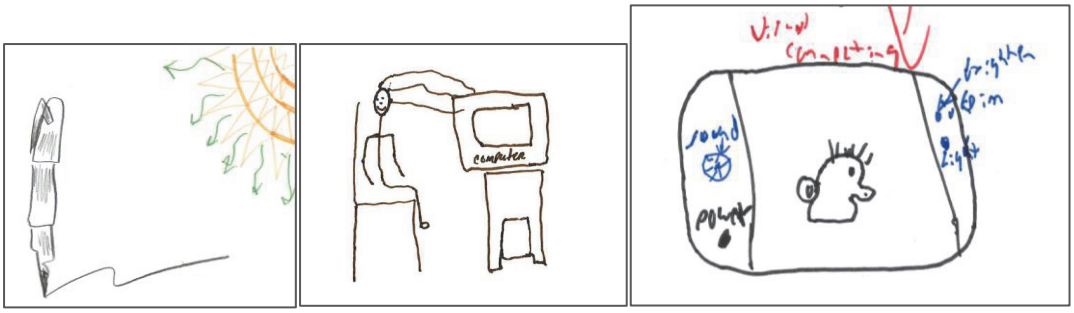


Figure 4.3.2 Designs for accessible engagement. (a) The Pen, (b) Insightful Inquiry, (c) Visual Connection

allow people to slowly ramp up their engagement through the mode of listening to group conversations. He explained, *"I'm sorta picturing this tool you can enter as a lurker – just like a listener, you can at least get that safety. You're not put on the spot where you need to be doing anything actively. I think that's a barrier too – that'll make you kinda scared to participate. […] And there's a richness in listening to other people."*

Another pathway to engaging in peer support were tools that scaffold narrating experiences. These tools, like *The Pen* and the *Insightful Inquiry,* enabled people to express themselves, and connect emotionally. Daniel explained *The Pen* (Figure 4.3.2a), "*I mean it can take you places in your mind and in your emotions. And I think that's what's really important for a peer-to-peer is to learn to express themselves and that's why I put a pen."* Similarly, the *Insightful Inquiry* (Figure 4.3.2b) was a tool Paul imagined could help him understand and reflect on his thoughts: *"These are diodes connected to his head and this is a computer, and […] visualizations come through on the screen—things people see in their mind's eye then they can observe it with their physical eyes."* He explained the advantages of this: "*Then I can make mention of things that I've observed in meditation or noticed in conversation that would prove beneficial to the [peer support] interaction."*

Finally, Alex, who found visual information accessible, designed a tool called *Visual Connection* (Figure 4.3.2c) for video communication that enabled immediate support. "*Something like a Nintendo machine. It's something you carry in your pocket. You press it and it comes on, and automatically, the person you are talking to is right there, so the person will always have supports if they need them."* When asked about why a dedicated tool was preferable to a smartphone, Alex replied that it was more accessible, *"some people find phones complicated to use, this is just easier."*

These designs highlight the importance of designing peer support technologies with accessibility in mind. Participants had a range of accessibility needs and media (e.g., text, audio) preferences that shaped how participants engaged with technology for mental health peer support.

4.3.4 *Peers find it challenging to manage digital risk*

Participants had many positive experiences with using technology for mental health peer support. However, technology was experienced as risky at times. Perceived risks varied according to participants' attitudes and past experiences with online threats. Unfortunately, perceived risks

often resulted in participants limiting use, avoiding, and even abandoning technology for peer support, with the consequence of furthering isolation.

4.3.4.1 Exacerbation of symptoms

Participants found it difficult to anticipate risks of reputation damage, exacerbation of symptoms, and self-harm online. For example, Clayton described how triggering content unpredictably exacerbated his symptoms: *"I have actually really a lot of problems with technology so… I mean even yesterday morning I got emails that sent me into a rage almost so I mean I think there's a lot of ways that these things could be improved, no doubt about it."* At one point, his rage resulted in using a tone and writing content that damaged his relationship with a peer: *"I finally had a breakdown where I sent [her] a bunch of bad stuff."*

These experiences of being triggered caused him to withdraw from technology-based support and limit his use by: "*turning it [texting] on and off kind of. Like I check texts almost like they're emails kind of."*

Unanticipated triggering content can also result in self-harm, as Matthew said: "*I might hear something I don't want to hear from somebody and harm myself. That's generally the safety issue."* To deal with this, Matthew limits his use of Facebook: *"I don't touch Facebook in certain situations. I'll try and just back off Facebook lately all-around."* In one case, a participant was warned by a peer that content could trigger her because of the trauma she had experienced, as Sally explained, "*I actually had one person who had a part who warned me about further involvement with this group because of a particular kind of trauma that I have. I really heeded that."* The stewardship of her peer supporter enabled her to avoid harm and re-engage with online support when she was further into recovery.

4.3.4.2 Safety concerns, cyber-bullying, and harassment

Participants also found it difficult to detect and thwart cyberbullying. Riley described the dangers of being invited to meet a stranger offline early in her use of technology for peer support: "*There was a little bit of trouble, too, because I would just find people to chat with. And they were – I was really young, and they were random strangers. And so one guy invited me to a university to meet him. […] So it was a little bit scary situations that I would get myself into."* Alex tried to be wise about false friends by being cautious with information sharing, "*I'm careful as to any information I give out. Facebook, in a way, is a bit like that. If you were to sign on to friends that aren't friends*

and strangers instead, that might not be the best thing. There are some, I don't know how to put it, weirdos out there that take advantage of people and that's not cool."

Gary expressed a similar concern with being contacted by strangers on the internet: "*I don't feel comfortable talking to strangers on the Internet. I would rather talk to them in person in a safe place first so I don't get hurt and get taken advantage of*." His strategy was to find face-to-face peer support groups and use the phone to maintain relationships with peers within the group whom he trusted.

Another serious risk is explicit bullying and harassment. Terry described the consequences of trolls: "*I don't go in chat rooms much because – in fact, I haven't for about a year because there'll be some trolls in there that are trying to knock you down or making fun of you or – one thing or another, just to be pests*." Terry withdrew from the community under attack.

Sue described how the community she was a part of dissolved because of attacks: "*The people that had it [online bulletin board] there were doing it as a public service, but it was so popular they couldn't possibly moderate all of it. They didn't have enough money. They couldn't be on there 24/7. And on occasion it would get really out of hand. It'd get their attention. They'd erase things and delete things. But there was so much damage done. So, they took it down. But – so the viciousness of that was shocking. And so I got offline for quite a while*."

These experiences of cyberbullying demonstrate that online communities for mental health can become risk-prone because of attacks from people with malicious behavior who are hostile toward, or seeking to exploit people with mental illnesses. In contrast to maintaining contact with familiar peers using more personal, one-to-one technologies like texting and messaging, using online forums carries greater risk for exposure to outside threats.

4.3.4.3 Self-stigma and reputation damage

Withdrawal from digital peer support was not only a *reactive* risk management strategy; many participants *proactively* avoided using technology to manage risk. Self-stigma and shame was a common reason for proactively avoiding support-seeking. For example, Matthew talked about risk to his reputation if he sought support: *"When I do really need help, it's usually like, then I feel even guiltier, like I'm feeling bad already and then I just feel guiltier calling for help. Especially if it's a crisis…. And then, even if you do reach out and it does go well, then people kinda know like, in your circle, okay, he's kinda extreme that way."*

Similarly, Trish described avoiding support because of perceived risks of reaching out: "*I had all these negative self-thoughts happening already and so the idea of putting myself out there and then getting rejected was like I couldn't handle that. It was like, I can sort of handle me rejecting me, but I don't know how much I can handle other people rejecting me. So yeah, it just felt like riskier."*

Finally, Paul described how negative emotional contagion could put him and his supporter in a risky situation, which he preferred to avoid: *"Sometimes I'm very cautious about opening up on heavier things because they [supporter] might start floundering in the water and panicking and want to take me down with them. Like oh no just won't do anything fancy in the conversation. I just keep it basic."* This reveals a concern for *creating* triggering content, that parallels the concern of receiving it, as mentioned above. Later, he added, *"There's a lot of responsibility in conversation."*

Aside from avoidance, the most common proactive risk management strategy was anonymity. Anonymity was valued highly by every participant except for Casey, who did not perceive using technology for support as risky, *"I'm just such a social guy, I put myself way out there. And that's my comfort zone. If I'm here hidden from all the – my other friends, I'm not comfortable. I need to be out there exposed. ...All my information is out there with friends. And I've stayed safe just 'cuz I'm such a nice guy. I mean, people love me. They're not going to do anything to hurt me.*" Later, he added, *"I would say that there's a possibility of an issue coming up. It just hasn't happened yet."* Thus, people's attitudes and past experiences with technology risk played an important role in online safety behaviors.

Peers created designs that helped them to mitigate the risks of seeking help online. These designs enabled *proactive* risk identification and intervention. Clayton found it difficult to control his rage that had resulted in reputational damage online. He designed a bear (Figure 4.3.3a) that would warn him of his feelings and intervene to keep him safe: *"The anger one's the one that I'm having trouble figuring out in my life. So if I'm trying to program this guy [Bipolar Bear], maybe he blows out so much that you simmer down. I've only got through three stages of the moods and modes and then, I don't know, this guy – there should be another version that is kind of like a computerized safety net, you know?"*

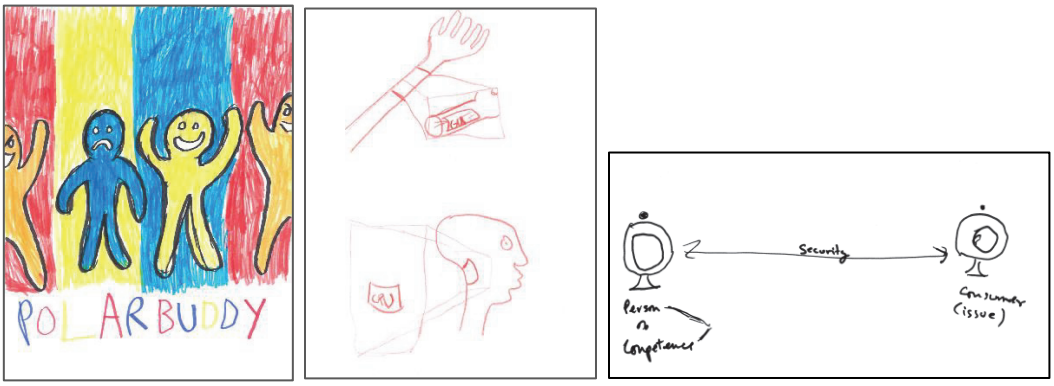


Figure 4.3.3 Designs for mitigating risk. (a) Bipolar Bear, (b) Telepathator, (c) Person of competence.

Matthew designed a tool called the *Telepathator* (Figure 4.3.3b) that would read his thoughts and warn the police if he was thinking of suicide: *"Basically, it's like a computer in your arm and one in the back of your head. And they connect to your neural system, and then you could – like, telepathically call 911. 'Oh no, I'm suicidal,' or if you need help like that. It'd be like an emergency measure thing."*

Two other designs by participants addressed safety concerns. *Freedom School* by Sue emphasized training and certifying peers so that they could "*turn trauma into growth*," and "*stop the downward spiral of the medical model*." In her vision, peers would be able to take courses through an online portal to become consumer providers, increasing their capacity to help themselves and others. Similarly, Drew focused on developing the peer as a "person of competence" (Figure 4.3.3c) who could be trusted to coach people through issues. Both of these participants had completed peer support specialist trainings and had experienced how important it was for ensuring quality peer-to-peer care.

Overall, risk was difficult for peers to manage, often resulting in withdrawing from online support. Designs that addressed risk focused on proactively detecting and intervening risk as well as training peers to give safe and effective support.

4.4 Discussion and Implications

Previous work in HCI, for example [6,79,139] has featured an extensive role of monitoring or moderating by therapists in their designs. The benefits of involving therapists are many, especially from a safety standpoint. However, one of the major limitations highlighted in these prior studies is scalability, availability, and time burden. The aim of this study has been to provide insight into

how peers use current technologies *in the absence of traditional care providers*, and how I might design technologies to better enable peers to support each other to address gaps in care.

Based on my empirical findings and the designs created by my participants, I propose the following technology design opportunities for fostering peer support for mental health. I connect these design opportunities beyond the mental health domain to prior research on peer support for online communities. Rather than an exhaustive review of peer support research, my focus is on outlining key opportunities for fostering mental health peer support, including nuances designers and researchers should consider as they develop peer support technologies for mental health.

4.4.1 *Matching peers on similarities beyond diagnosis*

In contrast to dominant approaches that organize health communities around diagnostic labels, many participants desired tools that would help them to find peers on the basis of more fine-grained characteristics, like shared feelings, beliefs, and needs. This finding resonates with Park et al. [189] who found that patients with depression followed users on Twitter who posted content that matched their emotions.

This design consideration is consistent with recommendations from Civan et al. for patients with breast cancer [58], and Hartzler et al. for individuals with various cancer diagnoses [116], and even for caregivers of individuals with cognitive illnesses (Tixier and Lewkowicz) [242], who recommend connecting peers in online communities on the basis of similarities other than disease label. For example, Civan et al., recommend enabling peers to search for each other on the basis of treatments, side effects, health knowledge, role, and lifestyle [58]. For people with mental illnesses, recovery orientation could be an additional characteristic that is particularly salient to peers. In contrast to physical diseases—such as cancer—that convey visible signs of the disease and have objective diagnostic criteria, mental illnesses are often invisible to others and provide no clear objective diagnostic criteria or biomarkers. Thus, identification of peers within mental health communities can be more heavily based on attitudes toward recovery than strict diagnostic labels [73,141]. Moreover, some groups for mental illnesses advocate for perpetuating behaviors that *prevent* recovery, such as online pro-anorexic communities [52,54]. Therefore, helping peers with mental illnesses to declare their recovery orientation could be important for identifying healthy and safe peer relationships.

Another salient characteristic for matching peers with mental illnesses that differs from most research on health communities, is moment of need. Many participants' support-seeking had a noticeable temporal aspect wherein "just-in-time" support was crucial. Sometimes these moments of need were unpredictable, like when Casey felt depressed and messaged a peer to meet in the park. However, some participants had regular times when it was particularly difficult to cope, such as mornings for Fred, or middle of the night for Terry. Systems that enable peers to be matched on the basis of temporal aspects of need might be beneficial for intervening at the right time.

4.4.2 *Enhancing accessibility for meaningful participation*

Our findings demonstrate that people with mental health challenges face comorbid physical, sensory, and cognitive impairments that change their ability and access to support. Having access to support through various media (e.g., audio, visual, textual) was essential for sustaining participation in peer support.

Many participants' designs featured alternative modes of engagement that would enhance the accessibility of peer support technologies. For example, Kelly's design *Connect Us* provided several ways to engage in the community, through listening to different topics over audio, chatting over video, or using the keyboard to chat via text. Fred's design also featured listening in over audio feeds of peer discussions as a mode of engagement that was both accessible and safe. Alex's design of *Visual Connection* featured video communication with an interface that was easier to use than a smartphone. Clayton's *Bipolar Bear* also used visual feedback, in his case, to help him mitigate the risks of getting angry online. Riley's design featured automatic translation between different languages.

Traditional approaches to accessibility in HCI and CSCW that focus on physical and sensory impairments could benefit users with mental illnesses. Accessibility was an issue for participants experiencing temporary motor and cognitive impairments from side-effects of medications or psychosis, and more permanent hearing, physical, or social impairments. Designers could draw on approaches like Ability-based Design [255], that account for situational impairments.

Moreover, as research in the medical literature shows [e.g., [107,160,243], people with mental illnesses particularly benefit from design approaches that account for cognitive

impairments. Many of my participants mentioned difficulties with writing, reading, and interfaces due to medications and symptoms. Designing for cognitive impairments is beginning to emerge as a focus in HCI [142,159] and such work should include people with mental illnesses.

4.4.3 *Proactively mitigating risk*

Many participants shared with us the benefits of spaces of peer support that technology made possible, such as online forums and social media. Some participants explicitly mentioned the importance of excluding clinicians from these spaces to preserve the agency in defining one's self and advising each other. However, there are risks, as discussed by many participants, of designing for peers only. These risks represent an important area of opportunity for technology design and future research.

Technology design could better serve people with mental illnesses to proactively manage risk. Many participants described how their mental illnesses sometimes impaired their ability to censor their words and actions, resulting in reputational and relationship damage. Usable and proactive privacy tools (e.g., [248]) could be essential for helping people with mental illnesses to assess their online behaviors, such as the tone and language of their writing, *before* disclosing potentially harmful information. Such privacy tools could help people to reduce harmful interactions and online risks resulting from intense emotional reactions. Another need for proactive tools is when people are at risk for suicide. Automated intervention can be facilitated by on-going work by De Choudhury and her collaborators on the use and development of language processing tools and predictive models for detecting suicidal disclosures in online communities [12,56]. As other previous work by Peredes et al. suggests, it is unwise to detect an emotional problem for the user without offering solutions [188]. This may be particularly true in cases where users may be at risk for harming themselves.

Additionally, it will be crucial to train peers to ensure peer support systems are ethical and safe. This point was emphasized by participants who had received peer support training, and by those who had found it difficult to know with whom it was safe to open up about issues, or who to trust for advice. For example, Sue and Drew both designed tools focused on the competency of individuals using the system, while Paul, Matthew, Trish, and Clayton raised the issue of being able to trust a peer supporter to handle difficult and emotionally sensitive topics. There is a plethora of online psychoeducational interventions for individuals that have shown to have high efficacy

across a range of mental health conditions [8,79,154]. There is also a strong tradition of training peer supporters in face-to-face mental health care settings [72,214,228,232]. My work suggests that designing online tools to train peer supporters and enhance their skills to help each other is an important step in making it safe and beneficial to access mental health peer support online.

Beyond training peers, mitigating risk could utilize machine learning techniques that suggest salient helpline numbers, alternative behaviors based on interests (e.g., going out for a walk or listening to music), strategies based on evidence-based therapy techniques (e.g., mindfulness and cognitive-behavioral therapy), or peers available to help. Approaches that detect malicious behavior or provide features for flagging, reporting, and blocking attackers of online communities will also ensure safe spaces for peers.

Overall, usable privacy, machine learning, and peer training point to several opportunities for innovating systems that promote safe peer-to-peer mental health support. These design opportunities do not negate the involvement of clinical expertise, rather they point to next steps for designing scalable mental health systems wherein peer expertise can develop and flourish. My research advocates opportunities to build tools that enhance supportive interactions for peers by: (1) surfacing similarities beyond diagnosis; (2) improving accessibility; and (3) proactively mitigating risk through training and intervention.

Chapter 5. DESIGNING CHAT GUIDANCE WITH PSYCHOTHERAPY TECHNIQUES

Innovations in peer support tools for mental health could make a substantial difference to people with mental illnesses for whom the role of technology is "excruciatingly crucial," "essential," and "lifesaving," as some of my participants indicated in the previous chapter. However, peers need tools to proactively mitigate the risk of disclosing mental distress online. Peer training in supportive techniques was one way in which peers envisioned safer online tools. In this chapter, I present an analysis of three psychotherapy techniques that can empower peers to help each other shape their thoughts and feelings to drive positive psychological change. I then demonstrate how I implemented these techniques as chat guidance in a tool I designed, called *Chatback*.

5.1 ANALYSIS OF PSYCHOTHERAPY TECHNIQUES

The three psychotherapeutic techniques that I focus on are: (1) cognitive restructuring; (2) change talk; and (3) accurate empathy. **Cognitive restructuring** helps people to directly identify, challenge, and reframe negative beliefs that lead to distress and maladaptive behaviors [28–30,47,161]. **Accurate empathy** helps people to feel understood and supported in relieving distress and changing their behaviors [11,164,210]. **Change talk** helps people to articulate personally significant reasons for positive emotional and behavior change [7,10,43,168,212]. These three techniques have strong scientific evidence in promoting a wide range of positive psychological changes, but we know little about how to implement them in technology interventions. Below, I discuss each technique and its theoretical background, and then I describe how I implemented the techniques in Chatback.

5.1.1 *Cognitive restructuring: A technique for supporting positive cognitive change*

Cognitive restructuring is a technique for encouraging problem solving through analyzing and altering one's internal beliefs and attitudes [26,30,161]. It can facilitate positive cognitive change, especially adjustments in one's thoughts and feelings about oneself, which can lead to new feelings and behaviors. Cognitions—the internal beliefs about oneself, past, future—are restructured through identifying distorted thoughts (*i.e.*, irrational or extreme thoughts), and replacing them

with new thoughts [30,46]. The underlying theory of cognitive restructuring is that cognitive change promotes emotional change, which in turn encourages behavior change [26,28,30].

Aaron Beck developed cognitive restructuring for combatting depression based on his theory that depression is caused by a systematic negative bias in cognitive processing [28]. In a thematic analysis of interviews with depressive patients, Beck [27] identified patterns of negative, unrealistic thinking that he distilled into five types of *cognitive distortions*: arbitrary interpretations, selective abstractions, overgeneralizations, magnifications and minimizations, and inexact labelling. Beck [28] theorized that the negative thinking styles of depressive patients reinforced their negative view of the world, the future, and themselves across most or all situations, consistently undermining positive information. Without access to positive input, Beck [28] theorized that depressive people have a reduced capacity for generating solutions to problems leading to an "all-pervasive sense of futility" [p.13]. Therefore, Beck's *cognitive therapy* for depression targets the distorted cognitions theorized to intensify negative feelings and maladaptive coping styles.

Cognitive restructuring is effective across a range of mental illnesses, making it especially compelling for designing online systems that appeal to a broad spectrum of clients. Over the past 40 years, researchers have begun to identify commonalities among mood disorders, such as anxiety and depression that have considerable overlap [17]. This research suggests that mood disorders such as depression, generalized anxiety disorder, panic disorder, and post-traumatic stress disorder, are characterized by similar cognitive and behavioral avoidance strategies, related to an underlying "negative affect syndrome" or generalized neurotic syndrome. These common maladaptive strategies may be remedied by a unified treatment approach that includes emotional and behavioral activation. Unified protocols for *transdiagnostic* treatment (i.e. for treatment that transcends any particular disorder), are emerging that address common problems of people experiencing emotional distress [17,92]. Cognitive restructuring is a central mechanism within unified treatment protocols.

Another advantage of cognitive restructuring for technology design is that it has already been adapted for popular audiences, most famously in David Burns' paperback "Feeling Good: The New Mood Therapy" [46]. Similarly, online interventions that are usually targeted at a specific subset of clients based on diagnosis, such as depression or bipolar disorder, can be made more palatable to a general audience. Online interventions can leverage transdiagnostic approaches that

feature cognitive restructuring as a mechanism of change for clients facing low mood, high anxiety, or other emotional distress, such as anger. This mechanism can be made accessible to people—as evidenced by Burns' success—who have never been diagnosed, or who do not qualify for diagnosis. Craske et al. [66] found that among 300 undergraduate students, 68% had experienced an uncued emotion (i.e. not triggered by the environment) that caused distress, but would not identify as having an illness.

5.1.2 *Accurate empathy: A technique for supporting helping relationships*

Accurate empathy—a technique that involves seeking and communicating an accurate understanding of another person's experience— can facilitate shared understanding in supportive relationships [165,210,212]. Self-changers often rely upon such relationships to navigate difficulties and prevent relapse into old behaviors [201].

Accurate empathy involves not only ascertaining the feelings of a person seeking support, but also gaining insight into the beliefs of theirs that may be hindering change. Supporters can provide accurate empathy by responding to support-seekers in particular ways. These empathetic responses are called reflective statements [165,212,244]. Reflective statements demonstrate an understanding of another person's thoughts, feelings, and motivations by using the words of the person experiencing them [165]. These reflective statements range from simple reflections that repeat the person's words, to more complex reflections that focus, exaggerate, or reframe their words.

Carl Rogers who founded client-centered therapy in the 1950s, argued that therapy produces change through the same general mechanisms at work in friendships and other helping relationships [209,210]. He explicitly denied that mechanisms of therapeutic change, as he defined them, required professional knowledge, or understanding of specific disorders [210]. Rather, the "necessary and sufficient conditions" of change are interpersonal and communication skills, especially genuine expression of emotion, unconditional positive regard, and empathic understanding [210]. Rogers hypothesized that specific techniques differentiating other therapy approaches are only effective insofar as they provide a channel for the general mechanisms of empathy and positive regard. Moreover, the use of nonjudgmental reflective listening is rated by peers as the most highly desired skill in a peer supporter [32], thus peers desire to learn and experience this skill with each other.

5.1.3 *Change talk: A technique for supporting motivational change*

Change talk is a person's own arguments in favor of changing [10,168,212]. It helps people to articulate their personally significant motivations, desires, and commitments to change. Change talk can be relatively weak—like statements of desire to change—or strong—like commitments to implement change. Research shows that a client's change talk toward the end of a psychotherapy session—called commitment language—is most influential on behavior change [7,175].

Change talk is a central component of Motivational Interviewing, a treatment developed by William Miller in the 1980s [164,168]. Motivational Interviewing has demonstrated superiority over other treatment methods for supporting clients with substance abuse problems to change their behaviors, including clients from minority and underserved populations. It has been widely adopted for encouraging people to adopt healthy behaviors such as exercise [168].

The effect of Motivational Interviewing techniques like change talk have been shown to enhance outcomes when paired with another treatment approach, such as cognitive therapy [43,120]. Eliciting change talk as part of, or following from, the contemplation of new cognitions could strengthen the influence of restructured thoughts on behavior. This form of self-persuasion, as opposed to social persuasion, may be desirable in psychological interventions because client resistance and therapist confrontation are correlated with poorer outcomes [166,191]. Change talk is a powerful technique that is applicable across a wide range of situations and can be embedded in technologies to complement other techniques for positive change. Below, I describe the implementation of each technique in my design of Chatback.

5.2 CHATBACK IMPLEMENTATION

I implemented the three psychotherapy techniques, described above, as chat guidance for peers to talk about everyday troubling emotions. I chose to implement the techniques as chat guidance, rather than as an online course or specialized therapy for a specific diagnosis. This approach enabled me to achieve four design goals that align with the needs of peers: (1) *brief* and easily executed on the order of minutes rather than hours of therapy, (2) *immediately applicable* to distressing emotions in everyday life (rather than teaching general principles in a course), (3) *general purpose* for people who do not necessarily meet symptoms for clinical diagnosis; and (4) *user-driven* without special coaching or regular interaction with a therapist.

I derived these design goals based on my findings, discussed in Chapter 4. Design goals one and two reflect my findings that peers go online for just-in-time support to address immediate concerns, thus interventions need to be brief and immediately applicable. Design goal three reflects my findings that peers seek similarity beyond diagnostic labels because these labels often change over time, can be stigmatizing, and are not as relevant as in-the-moment feelings for online support-seeking. Thus, interventions should be general purpose for a range of troubling emotions and without requiring a diagnosis. The fourth design goal reflects my finding that peers require accessible interventions that lower barriers to engagement, which points to a need for interventions that can be learned without much cognitive effort or time, or specialized knowledge. These design goals helped me to focus on designing accessible, in-the-moment practice with psychotherapy techniques that are broadly applicable to everyday emotional management.

5.2.1 *Early prototyping*

As a way to test different types of chat guidance, I first used paper prototypes deployed with convenience samples of volunteers. The first Chatback prototype was a business card with prompts printed on one side, and instructions printed on the other side (Figure 5.2.1). The business card could fit in a wallet and be carried around for use in times of need. When needed, a tester used their phone to text their chat partner "Chat…?" and wait for the reply "back!" to begin a session, or various permutations of this greeting. Because of the extreme space constraints of the business card, early versions of Chatback did not contain any cognitive restructuring techniques which would have required a list of types of thoughts and further instruction. Thus, the early Chatback protocols focused on reflective listening throughout the chat and mild change talk at the end of the chat (i.e., "I want…"). This allowed me to test minimum viable chat guidance to see whether the idea had any merit in facilitating supportive relationships.

Several volunteers tested early prototypes for different lengths of time, the longest being two weeks. A pair of new PhD students at the University of Washington were interested to try it as a way to get to know each other and receive emotional support during the first weeks of their program. I interviewed this pair after their two-week trial of the low-fidelity tool. This pair said that the card helped them to become closer friends, and provided a "social contract" for emotionally supportive behavior, saying "Like a counsellor it helps to know that the card is there." They also noted specific mental health benefits over the two weeks, such as greater awareness of

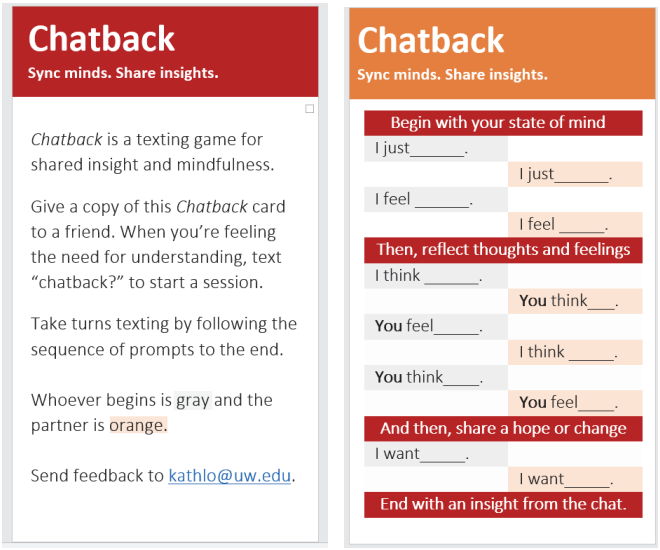


Figure 5.2.1 Early paper prototype of Chatback printed on a business card.

feelings and strategies: "I know what I need to do, I need to take this in stride" and "Writing it out helped me to realize what I was feeling." Challenges like remembering the prompts, or keeping track of which prompt to use were also surfaced during this pilot test.

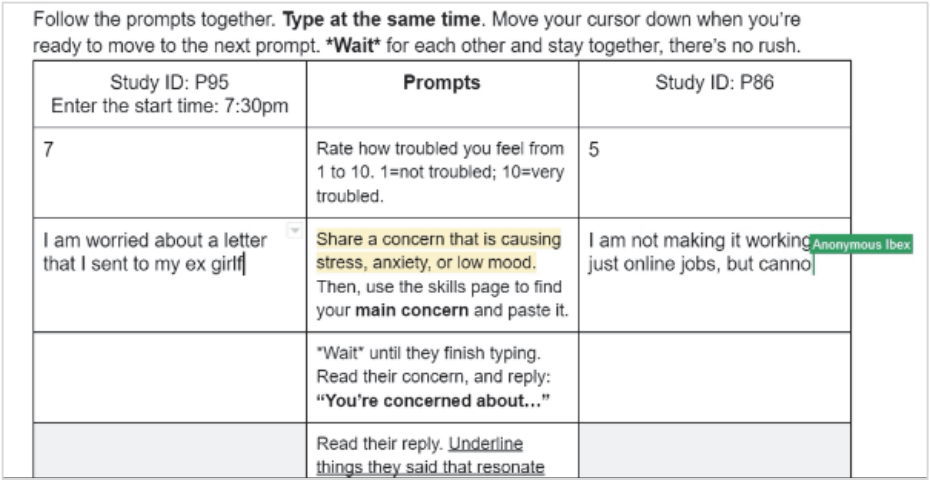
From these early pilot tests using paper prototypes, I learned about the acceptability of chat guidance and the kinds of positive psychological benefits it could provide. These tests also gave me evidence that peers can readily adopt prompts without any training to provide each other with meaningful emotional support. I began working with a talented student, Tabitha Kim, to mock up a mobile application of Chatback (Figure 5.2.2). This process of sketching and creating mock-ups of a mobile application challenged me to think about how to implement prompts, match peers, and onboard users in ways that are consistent with the aesthetics and user experiences of other consumer applications on the market. It helped me to envision a lightweight yet powerful tool focused on intimate chats between "buddies" who could be strangers, rather than familiar friends as was the case with the paper prototypes.

Figure 5.2.2 Mockups of Chatback mobile application.

Getting into the mindset of designing for consumers in the mobile app market helped me to anticipate the need to balance delivering enormous amounts of evidence-based clinical information, against the attitudes of consumers accustomed to lightweight social media apps for social chat like Snapchat and GroupMe. However, this design exercise was not sufficient grounds for building out an entire application. The paper pilot tests gave me insight into how familiar pairs handled the prompts, but I still did not know how the prompts would affect relationships between strangers. Therefore, I implemented a mid-fidelity Chatback template in Google Docs that allowed me to study benefits and drawbacks Chatback for strangers seeking emotional support.

5.2.2 *Chatback template*

The final implementation of Chatback, exemplified throughout the remainder of this dissertation work, is a template containing a set of prompts based on psychotherapy techniques that guide peers to have a supportive chat (Figure 5.2.3). This mid-fidelity prototype of Chatback is a Google Doc containing the template and prompts. Using a Google Doc limited my ability to enforce the use of



Follow the prompts together. **Type at the same time**. Move your cursor down when you're ready to move to the next prompt. ***Wait*** for each other and stay together, there's no rush.

Study ID: P95 Enter the start time: 7:30pm	**Prompts**	Study ID: P86
7	Rate how troubled you feel from 1 to 10. 1=not troubled; 10=very troubled.	5
I am worried about a letter that I sent to my ex girlf	Share a concern that is causing stress, anxiety, or low mood. Then, use the skills page to find your **main concern** and paste it.	I am not making it working Anonymous Ibex just online jobs, but canno
	"Wait" until they finish typing. Read their concern, and reply: **"You're concerned about..."**	
	Read their reply. Underline things they said that resonate	

Figure 5.2.3 Google Docs prototype of Chatback, used in the field evaluation.

techniques or to provide *in situ* help for performing them correctly. However, the Google Docs prototyping approach provided useful constraints on my design that helped me to create minimum viable scaffolding for peers to use expert psychotherapy techniques. Moreover, the relative popularity of Google Docs allowed me to test my concept early in a field deployment without having to introduce users to an unfamiliar technology.

In Chatback, the three psychotherapy techniques described above—cognitive restructuring, accurate empathy, and change talk—are implemented as a set of prompts to guide a supportive text-based chat between two people, who remain anonymous to each other. The prompts are displayed in a Google Doc containing the Chatback template, which a chat dyad collaboratively edits. As they chat, the prompts encourage each person in the chat to apply the techniques of cognitive restructuring, accurate empathy, and change talk to work through their problems and support one another. Throughout the chat, chat partners are prompted to use the "skills page," a webpage that describes types of thoughts, feelings, and strategies, each time they apply a technique (See Figure 5.2.5Figure 5.2.6Figure 5.2.7).

The Chatback template contains three columns: (1) a middle column containing the prompts; (2) a right column for one partner's replies; (3) a left column for the other partner's replies (Figure 5.2.3). The prompts in the middle column of the template guide the sequence of the chat, ensuring that chat partners alternated equally between opening up about troubles and empathizing with each other. This design choice was intended to bring the benefits of reciprocity in support-giving to both people in the chat, an important feature of peer support [38,169,263]. Chat partners typed responses to the prompts at the same time, and waited for each other to finish

typing before moving onto the next prompt together. See this video for a demonstration of Chatback https://www.youtube.com/watch?v=66TaznNIcW8.

5.2.3 *Chatback framework*

I designed Chatback based on a problem-solving framework, similar to problem-solving therapy and cognitive behavioral therapy [26,68]. I chose this approach to guidance because it involves the use of specific psychotherapy techniques for identifying and reflecting on thoughts and feelings, which have strong evidence in treating a range of mental illnesses [47,149]. I based the chat guidance on techniques with broad applicability because I wanted the chats to serve a diverse set of users. Furthermore, I wanted to align my design with current movements within clinical science and practice that are focusing on common elements and "transdiagnostic approaches" due to benefits in adopting broad approaches for eventual implementation [17,18].

I designed the sequence of prompts in Chatback, according to theorized causal mechanisms within cognitive and motivational therapies, to maximize the benefit of each psychotherapy technique. I sequenced prompts in the following order:

- *Cognitive prompts:* First, delve into troubling thoughts using **cognitive restructuring** to gain a shared understanding of the problem.
- *Emotional prompts*: Then, share the feelings caused by the thoughts and use **accurate empathy** to connect thoughts and feelings.
- *Motivational prompts*: Lastly, develop solutions to problems through using **change talk** at the end of the chat.

As shown in Figure 5.2.4, this sequence of psychotherapy techniques is grounded in the theoretical foundations of cognitive therapy and Motivational Interviewing. The theory of cognitive therapy [30] emphasizes that thoughts cause feelings; therefore, within the chat framework, cognitive prompts are sequenced *before* emotional prompts. The chat guidance prompts users to share and label their distressing thoughts, and then to share and label their distressing emotions that are "related to" those thoughts. The theory of Motivational Interviewing models several types of change talk on a spectrum of weak to strong effects on behavior change outcomes [165,167,168]. The chat framework emphasizes both weak and strong forms of change talk at different times in the chat to maximize their impact. At the beginning of the chat, the guidance prompts users to

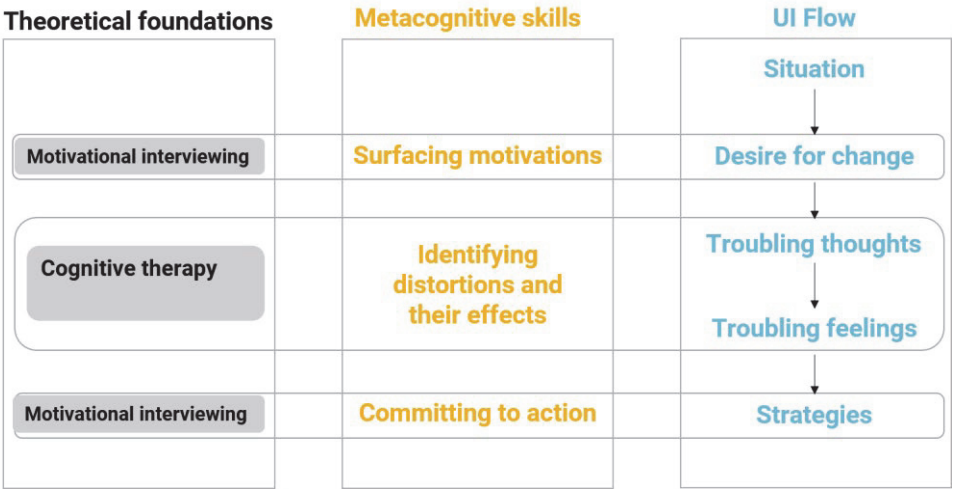


Figure 5.2.4 Theoretical foundations informing the sequence of psychotherapy techniques in the chat guidance user interface (UI).

share their desire for change—a relatively weak form of change talk in terms of its influence on behavior change, but appropriate for surfacing motivations early on in the problem-solving process. At the end of the chat, the guidance prompts users to state a commitment to try a strategy—a relatively strong form of change talk that has been shown to have the greatest influence on behavior change when used at the end of a therapy session [7]. Thus, the underlying chat framework upon which the chat guidance user interface is built, is designed to translate theoretical foundations of a clinical practice into a lightweight social practice among peers. Drawing on this chat framework, the user interface layer choreographs the use of powerful psychotherapy techniques via simple prompts that promote shared reflection on thoughts, feelings, and motivations.

Chatback features six *expressive* prompts accompanied by six *reflective* prompts (Table 5.2.1 Prompts based on established psychotherapeutic techniques contained in Chatback.). Each of the prompts instructs the use of a "metacognitive skill"—a skill for analyzing or observing thoughts and feelings. The *expressive* prompts instructed the use of skills for opening up about a problem (prompts 1 and 2), delving into problematic thoughts and feelings (prompts 3 and 4), and moving toward solutions at the end (prompts 5 and 6). Users applied the skills by using the "skills page"—a separate web page I created with brief descriptions of types of thoughts, feelings, and strategies that users can apply to their current situations (APPENDIX L: Chatback skills page used in field experiment). Peers used the skills page by identifying an appropriate type of thought,

Table 5.2.1 Prompts based on established psychotherapeutic techniques contained in Chatback.

	EXPRESSIVE PROMPTS	EXAMPLE SKILLS FOR IDENTIFYING TYPES OF THOUGHTS & FEELINGS	REFLECTIVE PROMPTS
1.	Share a **concern** that is causing stress, anxiety, or low mood. Then, use the skills page to find your main concern and paste it.	I have an esteem concern that... I have a love/belonging concern that… I have a safety/security concern that…	Read their concern, and reply: "**You're concerned about…"**
2.	Open up about how you **want** things to be different. Then, use the skills page to find a desired feeling and paste it.	I want to feel peaceful… I want to feel powerful... I want to feel joyful…	Read their wants, and reply: "**You want…**"
3.	Share your **thoughts** about the situation. Then, use the skills page to find a distressing thought you're having, and paste it.	I have a personalizing thought... I have a worst-case scenario thought… I have an overgeneralizing thought...	Read their thoughts, and reply: "**I hear…**"
4.	Describe your **feelings** related to your distressing thoughts. Then, use the skills page to find the troubling feeling you're experiencing and paste it.	I'm feeling scared... I'm feeling mad… I'm feeling sad…	Read their feelings, and reply: "You're **feeling**…"
5.	Suggest one thing the other person **can try**: "I'd try [in your situation]..."	N/A	Read their **suggestion**. Underline ideas.
6.	Use the skills page to find a type of **strategy** that can help you, and say what you'll try next.	I'll try a mindful strategy of... I'll try a physical strategy of... I'll try a social strategy of...	Read their **strategy**. Thank your chat partner.

feeling, or strategy, then copying it and pasting it into the guided chat template. Then they expressed how it fit their current situation.

The *reflective* prompts helped users to reflect their understanding of their chat partner's thoughts and feelings with accurate empathy. These prompts encouraged the use of *reflective statements*—statements that summarize or extend the meanings in a person's disclosures—that are traditionally used by therapists to build understanding and rapport [164].

For example, when prompted to open up about distressing thoughts, chat partners use the skills page to match types of cognitive distortions, e.g., "Worst case scenario" to their own thoughts (Figure 5.2.5). The prompts for change talk promote both strong and weak forms of change talk at different points in the chat. Early in the chat, people are prompted to state their desire for change and how they want things to be different. At the end of the chat, people are prompted to state a strategy they will try as a next step toward change (Figure 5.2.6). Throughout the chat, Chatback prompts guide the use of empathetic reflective statements that reframe thoughts, feelings, and motivations. To strengthen the sense of shared understanding through empathy, and to surface the accuracy of that empathy, Chatback prompts chat partners to underline text in the reflective statements they received to show what resonated (Figure 5.2.7). This act of underlining was meant to further promote feelings of mutual understanding.

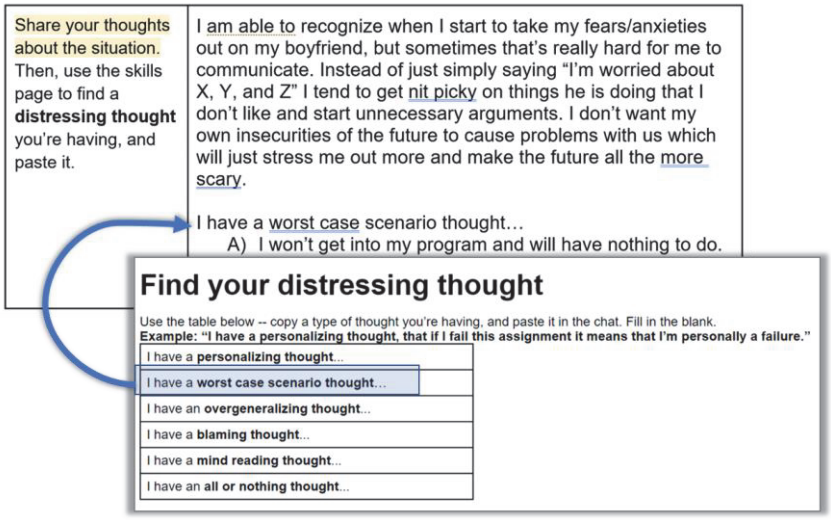


Figure 5.2.5 Cognitive restructuring. A user identified a type of distressing thought on the skills page and copied and pasted it into the Chatback template.

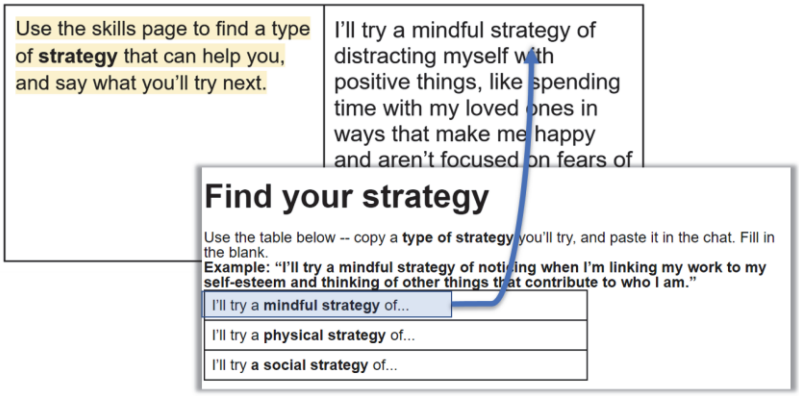


Figure 5.2.6 Change talk. A user identified a type of strategy on the skills page that they want to try and copied and pasted it into the Chatback template.

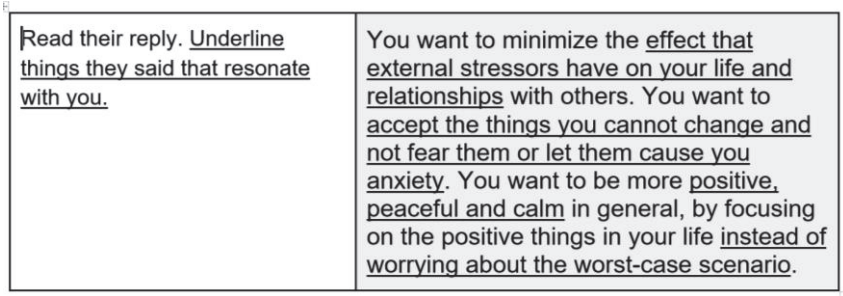


Figure 5.2.7 Accurate empathy. A user underlined words that resonated with her in her chat partner's reflective statement.

I designed the overall Chatback psychotherapy framework to promote positive changes in peers' thoughts, feelings, and motivations. The implementation was meant to be low-barrier and to provide a minimum viable prototype to test in the field. The next chapter details findings from a field experiment in which I compared Chatback to unguided chat between peers, and observed qualitative and quantitative differences between peer support in each type of chat.

Chapter 6. EVALUATING PEER SUPPORT CHAT GUIDANCE IN THE FIELD

To understand the tradeoffs in designing chat guidance for mental health peer support, I conducted a two-week field experiment with 40 people experiencing mental illnesses comparing two types of chats—chats guided by prompts (i.e., using Chatback), and unguided chats. Qualitative feedback from participants revealed that guided chats and unguided chats had distinct styles of interaction and appeared to confer unique benefits. Guided chats promoted deep discussions that lead to self-insight, but were less pleasurable than unguided chats. Giving and receiving advice increased the perceived depth (*e.g.,* power and impact) of guided chats. In contrast, chatting openly about shared interests and experiences in unguided chats promoted a sense of smoothness, which has been shown to be an important dimension of success in traditional therapy sessions [234]. Both of these types of chats lead to clinically significant changes in depression and anxiety for some individuals, facilitating *remission* (i.e., dropping below the threshold for clinical intervention) or *recovery* (i.e., improving by at least 50%) [136,205]. Results show that anxiety was significantly reduced from pre-test to post-test, and that on average, it went down more with unguided chats.[12]

6.1 PARTICIPANTS

Forty participants were recruited on Facebook, online through the National Alliance for Mental Illness, and through flyers posted on a large university campus (see APPENDIX H: Supportive chat recruitment). Interested people were given an information sheet (see APPENDIX J: Supportive chat information sheet) and completed a screener to ensure they met the inclusion criteria: were that participants had to be 21 years or older, have access to computer and internet 24/7, and have a desire to relieve troubling emotions (see APPENDIX I: Supportive chat enrollment questionnaire). Participants ranged in age from 21 to 63 ($M = 30$, $SD = 10$), had a variety of education levels from some college to master's degrees, and had a broad spectrum of self-identified mental illnesses, including bipolar, depression, anxiety, and eating disorder. Thirteen participants did not report a mental illness (Table 6.1.1).

[12] Parts of this chapter are adapted from O'Leary, K. et al. *"Suddenly we got to become therapists for each other": Designing peer support chats for mental health.* CHI 2018. To appear.

I matched participants based on similarity of age (within five years in age of each other), gender identity, educational attainment, and self-identified mental illness, in that order. Similarity in age was prioritized over all other matching characteristics because I expected similarly-aged peers to have relatable emotional troubles. Also, my prior work, discussed in Chapter 4, found that peers with mental health challenges prefer to find similarity beyond their diagnostic labels [183]. In cases where scheduling conflicts did not permit peers to be paired by age, I made the match based on the next most salient characteristic, *e.g.,* gender identity. No pairs were known to each other prior to the study. I stratified the assignment of pairs to each condition, so that the groups were balanced in terms of age and gender identity. This approach to assignment was meant to reduce biases in the data that could be attributed to those demographic characteristics.

Table 6.1.1 Participant demographic data. Some participants reported more than one mental illness.

		Guided chat participants (N=20)	**Unguided chat participants (N=20)**
Gender	*Nonbinary*	0	2
	Female	15	13
	Male	5	5
Race	*Hispanic*	1	2
	African American	1	0
	Asian	2	5
	Mixed race	1	2
	White	15	11
Age	*Range*	21-63	21-55
Education	*Bachelor Degree*	7	6
	Some College	5	5
	Associates Degree	2	3
	Master's Degree	6	6
Self-identified mental illnesses	*Depression*	12	7
	Anxiety	9	6
	Bipolar disorder	0	3
	Autism	0	1
	Eating disorder	1	0
	ADHD	1	0
	Dissociative identity disorder	0	1
	None specified	6	7

6.2 PROCEDURES

My procedures were approved by my institution's Human Subjects Division prior to recruitment. Participants were randomized to one of two conditions: eight guided chats with a peer (n=20) or eight unguided chats with a peer (n=20).

6.2.1 *Guided chat condition (Chatback)*

The guided chat condition (i.e., Chatback) was prototyped in a Google Doc for peers to collaboratively edit a template containing the prompts—the prompts guided the use of the cognitive and emotional techniques throughout the chat (see APPENDIX K: Chatback prototype used in field experiment). The peers typed their responses to the prompts in text boxes, replying to them in a sequence enforced by the template, and using the skills page when prompted (see APPENDIX L: Chatback skills page used in field experiment). They were provided with brief instructions before the study began (see APPENDIX N: Chatback instructions for field experiment).

6.2.2 *Unguided chat condition (Control)*

The control condition was also prototyped in a Google Doc for peers to collaboratively edit. The only difference from the guided Chatback condition was that the peers chatted freely with each other, without any prompts exhibiting the psychotherapy techniques. The peers were directed to have "a supportive chat about concerns causing worry, stress, or low mood." They were also provided with brief instructions before the study began (See APPENDIX M: Control condition instructions for field experiment).

6.2.3 *Data collection*

Participants remained with the same chat partner for the duration of the study. I scheduled chat partners for four chats per week over two weeks, and sent email reminders prior to each chat (see APPENDIX O: Chat reminder email). Prior to the study, all participants completed web-based versions of the 9-item Patient Health Questionnaire (PHQ-9)—a common measure of depressive symptoms [147], and the 7-item Generalized Anxiety Disorder scale (GAD-7)—a common measure of symptoms of anxiety [233] (see APPENDIX Q: Supportive chat test 1: Outcome

Measures). Participants were assigned to a condition prior to completing these measures to avoid influencing condition assignment. After each chat, participants submitted feedback on what they liked and disliked about that chat (see APPENDIX P: Chat feedback survey). Finally, after the two-week study all participants completed the web-based measures again, as well as open-ended questions about their experience (see APPENDIX R: Supportive chat test 2: Additional questions).

Additionally, upon completing the unguided chat condition, 6 pairs (n=12) crossed over into the guided chat condition to complete 8 guided chats with their same chat partner over two weeks. They completed a third post-test survey of the above-mentioned measures, that included open-ended questions about their experience (see APPENDIX S: Supportive chat test 3: Additional questions). The purpose of this follow-on study was to investigate more deeply the perceived tradeoffs of guided and unguided chats from the perspectives of participants who had tried both conditions.

Twelve participants were purposively sampled for follow-up interviews (see APPENDIX T: Supportive chat follow-up interview protocol). Eight of these 12 participants were sampled from the cross-over participants and thus could directly speak to the tradeoffs of experiencing both unguided and guided chats. Four of the 12 participants were chosen for interviews based on the change between their pre- and post-depression and anxiety scores, along the spectrum from poor outcomes (i.e., no change or increase in symptoms) to excellent outcomes (i.e., reduction in symptoms by 5 or more points). This sampling rationale for the follow-up interviews allowed me to gather a range of perspectives on the tradeoffs of guided and unguided chat tools.

6.2.4 *Safety protocol*

I was on call for the duration of the study and read every transcript and feedback survey within three hours of it being submitted. I assessed potential risks based on the following criteria: (1) mention of self-harm or harm to others; (2) mention of exacerbation of symptoms (i.e., worsening mood, frustration, triggering content). If the participant met any of these criteria, the protocol was to contact them immediately to discuss the issue, and take appropriate action, including: leave the study early but be paid in full, receive information about available national resources (i.e., hotlines), receive referral to the consulting clinician. I engaged these safety procedures in response to exacerbation of symptoms three times throughout the study. In two cases, I established safety and participants continued with the study. In one case, although the participant was not in acute

danger, they did report highly troubling mood and opted not to continue with the study and instead to be paid in full and access appropriate resources.

6.3 ANALYSIS

We performed quantitative analyses on the response data for symptoms of depression and anxiety, and qualitative analyses on the participants' feedback on what they liked and disliked about each chat session.

6.3.1 *Quantitative analysis of outcomes*

We analyzed the response data from the PHQ-9 and the GAD-7. My experiment was a 2 × 2 mixed between-within-subjects design. My between-subjects factor was *Chat Type*: guided chats or unguided chats. My within-subjects factor was *Test Time*—pre-test or post-test. After exploring my data and determining it was suitable to parametric analysis of variance, I utilized a linear mixed-effects model to analyze my data. *Chat Type* and *Test Time* were fixed effects while *Participant* was a random effect [101,202]. Responses were either the *Score* on the PHQ-9 instrument, or the *Score* on the GAD-7 instrument.

6.3.2 *Qualitative data analysis*

I conducted both deductive and inductive coding of the feedback from participants on what they liked and disliked about each chat session (see APPENDIX U:). I used iterative stages of coding, as described in [94]. Initially, I applied structured codes *deductively*, using codes derived from qualities shown to influence client outcomes and evaluations of talk therapy: deep and smooth [234]. Deep sessions are associated with valuable, "heavy" therapy sessions that delve into serious topics and produce insights. Smooth sessions are associated with pleasant, easy-going therapy sessions that touch on various topics without closely examining underlying issues.

Table 6.3.1 Qualitative analysis codes with frequencies of occurrence in each condition, guided and unguided chat.

		Guided chat replies N=136	**Unguided chat replies N=144**
SESSION Quality	Deep	31 (22.8%)	12 (8.3%)
	Smooth	7 (5.1%)	54 (37.5%)
HELPFUL Qualities	Personal connection	24 (17.6%)	32 (22.2%)
	Problem solution	25 (18.4%)	5 (3.5%)
	Focused awareness	16 (11.8%)	4 (2.8%)
	New perspective	14 (10.3%)	9 (6.3%)
	Understanding	13 (9.6%)	3 (2.0%)
	Reciprocity	31 (22.8%)	11 (7.6%)
	Continuity	10 (7.4%)	16 (11.1%)
	N/A	4 (2.9%)	10 (6.9%)
NONHELPFUL Qualities	Unwanted responsibility	14 (10.3%)	41 (28.5%)
	Unwanted thoughts	12 (8.8%)	7 (4.9%)
	Misperception	7 (5.1%)	1 (0.7%)
	N/A	47 (34.6%)	62 (43.0%)

In addition to these two qualities of deep and smooth, studies have revealed helpful and nonhelpful qualities of talk therapy sessions that are influential [86]. Helpful qualities—which refers to qualities that facilitate helpful sessions—include: personal connection, problem solutions, focused awareness, new perspectives, and understanding. Nonhelpful qualities, that can hinder the benefits of therapy sessions, include: unwanted thoughts, unwanted responsibility, and misperception. I deductively assessed participant's feedback for those codes. Additionally, I was sensitive to participant feedback that did not fit these predetermined, structured codes [37]. Through iterative, inductive coding of the feedback, I identified two additional helpful qualities: reciprocity of giving and receiving support, and continuity of chat partners over time.

Using this qualitative approach, I analyzed 136 responses for 68 guided chat sessions and 144 responses for 72 unguided chat sessions. Participants using guided chat completed 6.8 chat sessions on average, and 7.2 chat session on average using unguided chat; thus, there were more responses to the unguided chat sessions. Note that not all responses were assigned a deep, smooth,

helpful quality, or nonhelpful quality, but each response could warrant multiple qualities, or N/A when no quality was specified (Table 6.3.1).

6.4 FINDINGS

Below, I present findings from my mixed-methods analysis. First, I show my statistical results that reveal the effect of the two types of chat tools on the outcomes of depression and anxiety. Second, I present the qualitative findings from the chat feedback that shed light on the differences between guided and unguided chats. Third, I present results from my interviews with participants after they completed all chat sessions.

6.4.1 *Effect of chat tools on depression and anxiety*

Our analysis of variance showed that *Chat Type*—guided or unguided—did not have a significant effect on depression, as measured by PHQ-9 scores ($F_{1,38} = 0.87$, *n.s.*). Pre-test depression scores (M = 9.25, SD = 6.04) were marginally higher than post-test depression scores (M = 8.00, SD = 5.74) although the repeated measures factor of *Test Time* failed to reach significance (F1,38 = 2.88, p = .098). I found no significant *Chat Type* × *Test Time* interaction ($F_{1,38} = 0.17$, *n.s.*).

For anxiety, as measured by GAD-7 scores, my analysis of variance found that *Chat Type* did not have a significant effect ($F_{1,38} = 0.32$, *n.s.*). However, *Test Time* did have a significant effect on anxiety ($F_{1,38} = 7.94$, $p < .01$). Specifically, average GAD-7 scores went from 8.63 ($SD = 5.50$) down to 6.45 ($SD = 4.66$) from the pre-test to the post-test. No significant *Chat Type* × *Test Time* interaction was found ($F_{1,38} = 1.94$, *n.s.*), indicating that this reduction was not statistically significantly different for either chat type, although on average the decrease was greater for unguided chats (from 8.45 to 5.20) than for guided chats (from 8.80 to 7.70).

6.4.2 *Feedback on qualities of chats*

In addition to these quantitative results, I found a striking qualitative difference between the two types of supportive chats. These two different types of chat tools primarily emphasized two different qualities—depth and smoothness—that impact outcomes of talk therapy.

6.4.2.1 Perspectives on Deep Chat Sessions

Depth is associated with valuable, powerful, and insightful sessions that lead to a sense of accomplishment [234]. Guided chat sessions were perceived as deep 22.8% of the time, compared to 8.3% of the time in unguided chats. Participants remarked on how the guidance promoted depth. For example, P50 found value in the prompts for focusing on thoughts in depth*: "I liked the section where it asks you to discuss your thoughts because I feel like you can really open up in that section."* P40 felt that "*the format with multiple prompts"* helped her to go deep: *"I really shared in depth what I was going through*." P51 said the reflective statements she received from her chat partner, that were prompted by the guidance, helped her experience self-insight: "*I like the parts when your partner gives their feedback on how they think you feel as this can open you up to things you may be experiencing but did not really realize."* Thus, the chat partners' shared focused awareness of each other's troubling issues throughout the guided chat, promoted insight. P02 said, "*Having my feelings reflected back to me helped me hear myself better*." This shared focused awareness was mentioned in 16 of 136 replies to guided chats (11.8%), compared to only 4 of 144 replies to unguided chats (2.8%).

The guided chat not only promoted sensitive disclosures of thoughts and feelings, it also explicitly guided peers to help each other, which was perceived as highly valuable. Positive experiences with reciprocity of giving and receiving support were found in 31 of 136 replies to guided chats (22.8%) compared to only 11 of 144 replies to unguided chats (7.6%), and contributed to deep qualities of accomplishment and insight. P21 said: "*I feel a sense of accomplishment and satisfaction by helping my partner through her problem and giving a strategy to try.*" She added: "*Sometimes this helps me sort out my own issues*." Similarly, P46 said, "*It makes me feel better that I could help someone else while receiving help at the same time*."

Finding solutions to current problems also enhanced perceived depth through creating value and insight. Problem solutions were mentioned in 25 of 136 replies to guided chats (18.4%), compared to only 5 of 144 replies to unguided chats (3.5%). P46 commented that the guided format *"Reframed my concerns to a more defined and actionable reality*." Similarly, P26 said a guided chat "*made me realize I had not taken all the actions I could to put my mind at ease*." P56 said, "*I got some really good advice out of this chat*." However, in some cases advice could backfire and cause misperception, a quality mentioned in 7 of 136 replies to guided chats (5.1%), compared to only 1 of 144 replies to unguided chats (0.7%). As P09 said, "*I disliked getting bad advice that*

was unhelpful and I ended up feeling judged or just unheard/unseen." P26 felt that her advice was unhelpful to her chat partner: "*I don't think I fully understood my partner's concern, and that any suggestions I made missed the mark with them*."

Being guided to focus on a problem during the chat was also a hindering factor when it caused participants to fixate unwantedly on negative issues. Participants reported having to "dredge up" a problem, even when feeling well, because the guidance was focused on addressing troubling situations. This focus on problems provoked unwanted thoughts in 12 of 136 replies to guided chats (8.8%), compared to just 7 of 144 replies unguided chats (4.9%). As P08 emphasized, "*It's just difficult to dredge up a troubling feeling when you aren't feeling very troubled, and that can sort of MAKE you feel troubled in the end.*"

Deep chat sessions that were valuable and powerful were facilitated more often by guided than unguided chats. Despite some of the drawbacks of unwanted thoughts arising from focusing on concerns, and "bad advice" when misperceptions occurred, 34.6% of guided chat replies contained no mention of nonhelpful qualities. These typically deep sessions provided many benefits to participants, including reciprocity of giving and receiving support, focused awareness of concerns, and solutions to problems.

6.4.2.2 Perspectives on Smooth Chat Sessions

Unguided chat sessions were perceived as smooth 37.5% of the time, compared to only 5.1% in the guided chat sessions. In contrast to depth, smoothness is associated with pleasant and relaxing sessions [234]. Participants used unguided chat as an opportunity to share experiences and special interests, and distract them from the stress of everyday life. As P48 said, "*It was a nice distraction on a busy day.*" Many participants commented that unguided chats were easy: "*It was easy; both of us were feeling good*," (P07), "*It was easy and had a kind of flow*," (P39), and "*It was a casual conversation and very pleasant"* (P22). Smoothness was the overwhelming quality that participants mentioned liking about unguided chats.

A sense of personal connection on topics of mutual interest was another desirable quality mentioned in 32 of 144 unguided chat replies (22.2%), and in 24 of 136 guided chat replies (17.6%). While this quality did not distinguish the two types of chats, it was particularly associated with smoothness and ease of conversation. P01 said, "*The person was cool and I could relate to a*

lot of things," and P70 said, "*It's cool feeling like I'm chatting with someone I'm close with*." P67 also said it was "*like I'm talking to a friend*."

Personal connection between chat partners was reinforced by the continuity of having the same chat partner over time. This quality of continuity helped chat partners to build rapport, which contributed to smoothness and ease of chats. As P12 said of her unguided chat, "*Just a nice check in. We're developing a rapport*." And P31 said, "*I feel like I've developed a connection of sorts to my partner, and that is enjoyable."* P22 mentioned that continuity of chat partners avoided the sunk cost of introductions in the unguided chat: "*I was so glad that I could chat with the person I chatted with yesterday. I felt I didn't spend more energy to get along with the chat partner*." Continuity was mentioned as a liked quality in more of the unguided chats—it was liked in 16 of 144 replies to unguided chats (11.1%) and only 10 of 136 guided chats (7.4%).

Qualities that hindered smoothness included unwanted responsibility in choosing chat topics or in helping chat partners. Despite being overwhelmingly perceived as smooth, unguided chats often placed unwanted responsibility on participants for initiating, maintaining, or ending the chat—a disliked quality mentioned 41 of 144 replies to unguided chats (28.5%), compared to just 14 of 136 guided chat replies (10.3%). Participants found it difficult to know how to choose topics to begin with, or to find new topics to talk about as the chat unfolded. P16 said, "*At first, it was a little hard to get started because I didn't know what to ask*," similar to P01 who mentioned: "*Sometimes, continuing the conversation was hard; there were a few lulls where I didn't know exactly what to say*." P31 actually reflected on wanting more guidance: *"After a while it felt hard to have such an unguided conversation. I think some prompt ideas or suggestions or something with a little more structure would have been nice.*" Indeed, that direction is precisely what the guided chats provided.

Participants also reported unwanted responsibility in asking about their chat partner's trouble in the unguided chat, which inhibited smoothness. Sometimes helping was overwhelming, as P18 said, "*I wanted to ask questions about their experiences, but felt like that might be intrusive. I didn't know how to handle it*." Sometimes the inability to reciprocate help made participants feel guilty or uncomfortable: "*A little worried I made it all about me*," (P48), and "*I sometimes felt like I was oversharing*" (P23).

Smooth chat sessions that were easy-going and pleasurable, were facilitated more often by unguided than guided chats. They were sometimes inhibited by unwanted responsibility in

choosing chat "moves," such as topics, questions, and supportive comments. However, 43% of the time in unguided chat there was no mention of nonhelpful qualities. These typically smooth sessions brought the benefits of personal connection on shared interests, and feelings of rapport from continuously exploring interesting topics with the same chat partner.

6.4.3 *Perceived tradeoffs of depth and smoothness*

The follow-up interviews with 12 participants helped us to understand the tradeoffs of guided versus unguided chats. Eight of these 12 interviewees (i.e., P01, P16, P18, P23, P65, P67, P70, and P72), had tried both chat tools; having completed their use of the unguided tool, they agreed to participate for two additional weeks to try the guided chat tool and give us their feedback on tradeoffs. The other four of the 12 interviewees (i.e., P46, P27, P37, P49) had tried only the guided chat tool. Interviewees were sampled based on their relative improvements on depression and anxiety (Table 6.4.1). I present insights from these interviews.

Table 6.4.1 Interviewees' changes in symptoms. "Pre" indicates the pre-study score; "Post" indicates the post-study score. Depression scale (PHQ-9) range is 0-27; Anxiety scale (GAD-7) range is 0-21. Δ indicates pre-post change. Positive Δ numbers indicate improvement; negative Δ numbers indicate worsening. * denotes clinically significant change. Total change is sum of PHQ-9 and GAD-7 change.

		DEPRESSION			ANXIETY			
	ID	Pre	Post	Δ	Pre	Post	Δ	Total Δ
Guided chat	P46	17	7	*10	13	5	*8	18
	P27	12	7	*5	12	7	*5	10
	P37	16	19	-3	13	15	-2	-5
	P49	4	10	*-6	0	5	*-5	-11
Unguided chat	P72	16	8	*8	18	9	*9	26
	P70	18	16	2	15	8	*7	16
	P65	20	15	*5	15	12	3	14
	P16	12	9	3	12	5	*7	8
	P01	22	20	2	19	18	1	6
	P18	3	1	2	0	2	-2	0
	p67	18	24	*-6	14	10	4	0
	P23	4	5	-1	4	8	-4	-8

In contrasting the two types of chats, participants noted the tradeoffs of unguided versus guided chats. P01 explained: "*It was harder for it [concern] to become a main topic in the unguided tool. I don't really know why, but they just kind of naturally moved from topic to topic.*" P16 similarly said of unguided chat: "*It's very easy to gravitate to kind of off topic conversations or just kind of sidestep or avoid talking about that thing that's actually bothering you.*" Her anxiety lessened by 7 points, from severe anxiety to mild anxiety after using unguided chat, suggesting that her avoidance of troubling issues contributed to reducing her symptoms. P65 said that avoidance of disclosing problems in unguided chat was partially due to low expectations of emotional support. She contrasted this lack of emotional support in unguided chat with her experience in the guided chat: "*It [guidance] made you actually feel that the other person listened to you and is understanding what your problem is. Other than they're just being like, 'Oh, yes. I understand. Oh, I'm so sorry this happened to you.' And move on*." P18 described the difference between the two types of support this way: "*the way I would describe it is, suddenly, I got to become therapists for each other*."

However, P23 viewed the focus on concerns in guided chat as a drawback, and felt that unguided chats about lighter topics were more appropriate at times: "*I think that [guided] kind of just forces you to get deeper into things that maybe not everybody's okay with. Like maybe, you want to keep things superficial*." P01 suggested finding a balance between depth and smoothness in peer support chats, "*They [chats] need a little less structure than the guided chat but a little more instruction than the unguided chat."*

Beyond contrasting the two types of chats, participants revealed that both types of peer-support chat tools could be useful for times when people need additional self-care options, depending on stress levels, seasons, and available therapy. P70 noted that her "*need for something like this would fluctuate a lot."* She explained that she would use a chat tool *"in times when my anxiety is high*." P16 had a similar perspective: "*I get seasonal depression. There are times where things are really stressful and that's when I might turn to this*." P23 said, "*I guess it would really depend on my friends and how supportive they are being*." P72 explained that her therapist "*wasn't able to see me at all this winter,*" and that she used the chat tools during the study to supplement her usual care. She experienced a drop in her anxiety by 9 points, from severe to mild, which indicated that the unguided chat successfully helped her to manage her illness while she was unable to access professional care. P18, who was currently in therapy, noted that the peer support chats

complemented her traditional care because she didn't have to "*worry that this person would try to get me to take new medication as a therapist in real life might have*."

Guided chats in particular, showed promise for complementing more traditional forms of care because of the ways in which participants reported implementing the skills in their everyday lives. P37 mentioned that she began to internalize the guidance as a form of self-reflection: "It's just like, building upon that reflective piece. Like, 'how am I feeling today? What's going on? What is that I'm worried about?'" P16 similarly said, "I would find myself throughout the day thinking whenever anything bad or stressful happened […] I would start to go through that process in my head." And P23 said that after experiencing guided chat, "I was definitely more aware of going through like okay, 'this is how I'm feeling about this situation. What can I do to change this?'" P67, whose depression score dropped 7 points after using guided chat, from severe depression to moderately severe, also began using skills to solve challenges: "I like thinking about it [distress] that way. Like okay, I'm feeling this way. I should try and do this [strategy] to make me feel better." P46, who experienced a clinically significant drop of 10 points in his depression score from moderately severe to mild depression, said of the guidance, "it gave you an algorithm or a process to think through with the issues."

These findings from the follow-up interviews suggest that unguided chat sessions allowed peers to "keep things superficial" when opening up felt risky or when a pleasurable distraction from stressors was desired. Guided chats, in contrast, enabled peers to "become therapists" and emotionally support each other. Furthermore, the peers reported internalizing the prompts from the guided chats as a form of self-help that they implemented in moments of distress between chats. Both types of chats supplemented mental health care for these participants in different ways, and, in many cases, substantially reduced their symptoms of depression and anxiety.

6.5 Discussion and Implications

Participants in the guided chat condition reciprocated support, achieved new perspectives, and solved problems. In some cases, even when guided chats were deep and led to positive outcomes, participants disliked having to "dredge up" unwanted negative thoughts. This finding is consistent with prior research that suggests online communities for mental health can be distressing, even when people report having positive experiences [143,237]. In contrast, participants in the unguided chat condition tended to focus on pleasant topics that distracted from troubles. Aspects such as

warmth, relationship, and other interpersonal factors that were liked in unguided chats have been found to be as important in driving change in talk therapy as specific psychotherapy techniques like those represented in the guided chats [45,186,250]. Moreover, the tension between depth of discussion on serious topics versus free socializing on pleasant topics has also been observed in other peer communities. For example, peers in online communities for diabetes [177], and peer support networks of caregivers [145], value the chance to chat socially and "off-topic" without necessarily addressing mutual concerns. Similarly, I found that peers with mental illnesses derived benefits, including symptom reduction and sense of interpersonal closeness, from chatting about shared interests.

Unguided chats, however, also had drawbacks. The lack of any guidance made it burdensome to initiate, maintain, and end a chat. These drawbacks of unguided chats exacerbated participants' fears of being "intrusive," when asking about troubles, and their feelings of guilt for "oversharing," when opening up about concerns. These findings highlight that people seeking emotional support typically make implicit rather than explicit requests for support [19,20], and experience tension between self-presentation and help-seeking online [180]. I found that guidance mitigates this tension in seeking emotional support by providing a framework and explicit scaffolding for sensitive disclosures.

Below, I present design implications that I envision as next steps in technology for peer-based supportive chats. Overall, my findings point to three design implications for online chat tools for peer-based mental health care: (1) Engage people during highs and lows (2) Design beyond the "session"; and (3) Promote connection on shared interests.

6.5.1 *Implication 1: Engage people during highs and lows*

People with mental health issues experience highs and lows: sometimes depression symptoms are particularly severe, and other times they lessen. Highs and lows can fluctuate with seasons or with stressful times. My participants desired engaging in the chat tools for both pleasant and serious topics, and derived benefits from both. One design implication of this finding is that chat tools for mental health might provide maximum benefit if users find benefits *other than* direct application to their troubles, such as a sense of community and kinship with their peers. These social factors most likely played an important role in the outcomes of unguided chat. Thus, I encourage designers

of mental health chat tools to design guidance that engages users and provides them with benefits when they are experiencing the lows of illness and the highs of remission.

My guided chat tool enforced a rigid progression through a static problem-solving framework. A next step would be to design guidance as a sidebar to an unguided chat for when participants need help choosing a chat "move" (*e.g.,* topic, question), articulating an issue, or giving support. Systems using natural language processing could adapt to chats as they turn to more or positive or troubling topics, providing appropriate scaffolds. Such adaptive guidance could help peers to not only solve problems, as was the case with my guided chat tool, but also help peers to build social connection—an important preventive factor in mental health [241,259].

My guided chat prototype utilized a problem-solving framework as the basis for its design; however, many other talk therapy approaches could be embedded as guidance. For example, some talk therapies focus on solutions, such as Solution-Focused Brief Therapy [229], some on social support, such as Supportive Therapy [215], and others on motivations, such as Motivational Interviewing [165]. Analyses of crisis support sessions reveal that sessions that focus more on solutions are perceived as more helpful [5]. Guidance could be designed to tip the balance in favor of exploring solutions, rather than delving deeply into problems, which some participants felt "went a little bit too in-depth." Leveraging more resource-oriented approaches that focus on solutions and strengths [200] could be especially appropriate in peer settings wherein providing and receiving thoughtful advice was highly liked. Ultimately, a balance of problem- and strengths-oriented guidance could help engage users throughout highs and lows of mental illness.

6.5.2 *Implication 2: Design beyond the "session"*

Our study was designed for chat partners to stick together for eight sessions over two weeks. I found that participants used the study as an opportunity to get to know one another. An implication of this finding is to design beyond the single "session" to help peers carry forward topics, strategies, and questions to their next chat. Helping chat partners to develop conversation topics over many sessions could increase engagement in peer support chats over time. This implication may also be relevant in online chat interventions with online communities (*e.g.,* 7 Cups of Tea) and chat bots [*e.g.,* 12, 27] wherein engagement may be improved by features that support "checking in" on ongoing concerns, interests, or goals. Moreover, a "session" is an arbitrary unit

that defines traditional talk therapy, but does not have to artificially constrain technology design [223].

Chat guidance could be designed to help peers choose topics at the end of chats to follow up on, and provide nudges toward those topics at the beginning of the next chat. By using guidance to bridge the connection between isolated chat sessions, systems could help peers to develop supportive accountability—a sense of shared responsibility for investing in one's own and each other's mental wellness [170]. Supportive accountability is facilitated by the bond formed between people as well as the legitimacy of the supporter as influenced by expertise, reciprocity, trustworthiness, and benevolence. It is an important factor in improving engagement in online mental health interventions [139,170].

Moreover, many participants mentioned using the guided chat skills beyond the confines of the chat sessions. Designs could help users to reflect between chat sessions on the skills that they used during prior sessions, to reinforce learnings. Such designs could encourage users to apply beneficial psychotherapy skills in moments of distress, for example by providing data on the reflective statements, strategies, or new perspectives from chat partners who were especially helpful. Another possibility would be to enable users to draft initial replies to chat prompts when in immediate distress, in anticipation of working through the issue in the next chat session. Finally, designing beyond the session could also include providing users with trends in clinically and personally significant mental health outcomes. For example, users could submit the PHQ-9 and GAD-7 surveys periodically so that the chat application could run the analysis of outcomes over time and provide feedback to the users about trends that are developing. More personally significant outcomes, such as achieving specific recovery goals may be another, perhaps less stigmatizing way, to help users visualize their progress from using chats. The overall takeaway is that designing beyond the single chat session could significantly expand opportunities for providing value to peers, and for engaging them in supportive encounters.

6.5.3 *Implication 3: Promote connection on shared interests*

One of the major strengths of unguided chat was that it enabled chat partners to develop a personal connection based on shared interests. The guided chat, on the other hand, focused on troubling issues. People with mental health issues do not always prefer to be matched with peers based on their diagnoses or illness-centered characteristics [183]. Rather, they seek similarity on in-the-

moment needs and feelings that change over time. Building the foundation of rapport on shared interests, such as favorite movies, pets, *etc.*, could enable a sense of comfort in seeking help in times of need. Guidance could help peers to talk about shared interests, for example, based on user input of their interests and areas of strength. Such guidance could offer ideas during lulls in the chat, or surface similarities as the chat unfolds.

This design implication may be particularly relevant to chat tools that match strangers anonymously with one another online. However, previous work on face-to-face dyadic interventions for mental health (i.e., trauma) [39] has focused on strengthening supportive bonds between familiar pairs, such as spouses, friends, and family members. Moreover, a recent survey on peer attitudes toward accessing online support found that the majority desired to receive peer counseling from someone they know, such as a romantic partner [32]. Thus, designers could design chat tools that facilitate both strong and weak social ties through a focus on shared interests that can enhance intimacy and safety in coping with troubling situations together.

6.5.4 *Conclusion*

In this chapter, I presented tradeoffs in facilitating emotionally supportive chats with and without psychotherapy chat guidance. Guided and unguided chats reduced symptoms of depression and anxiety, but did so in qualitatively different ways. Guided chats were perceived as deeply valuable for gaining solutions and insights, but in some cases provoked unwanted focus on troubles. Unguided chats were experienced as smooth and easy-going, but tended toward distraction from troubles rather than emotional support. In the following chapter, I further explore tradeoffs of these two types of chat tools based on a linear mixed-effects analysis of improvements over time for each participant across eight chat sessions.

Chapter 7. FROM STRANGERS TO FRIENDS: ENGAGING PEERS IN ONLINE EMOTIONAL SUPPORT

In the prior chapter, I demonstrated that guided and unguided chats provide unique benefits. In this chapter, I build on these findings by demonstrating longitudinal trends in outcomes of troubling mood, feelings of closeness, and frustration, over the course of eight chat sessions. I use these chat session measures, combined with post-study survey feedback, to demonstrate how guided and unguided chats helped strangers to develop supportive relationships over a short time span, and how the chat guidance provides additional benefits to unguided chat. These findings build on the prior chapter by exploring different types of data collected during the field experiment comparing guided and unguided chats.

I first describe the chat session measures that I collected after each chat. I then present my analysis and results, followed by a discussion of the ways in which the post-study qualitative feedback sheds light on results from the quantitative longitudinal analysis. Finally, I present three design implications for facilitating emotional support online.

7.1 CHAT SESSION MEASURES

This chapter focuses on data captured after each chat session between participants. This data is from the same participants as described in section 6.1. After each chat, participants rated *Troubling Mood*, *Closeness*, *Effort* and *Frustration*. Additionally, at the end of the two-week study, participants provided qualitative feedback on their supportive chat experiences.

7.1.1 *Troubling mood rating*

After each chat, participants were asked to rate their troubling mood on a scale from 1 to 10, where 1 was “not troubling” and 10 was “very troubling.” Although several measures of mood are available, such as the Brief Mood Introspection Scale [158], and the Four Mood Scale [157], I chose to use a shorter mood scale than these previously validated measures because I had limited space in my low-fidelity prototype to fit scales with multiple dimensions and in excess of 20 intervals. I also wanted to make the mood rating as frictionless and fast as possible to get a high

response rate. Thus, I used a simple 10-point scale which balanced tradeoffs of granularity, graphical presentation, and user effort.

7.1.2 *Perceived interpersonal closeness scale*

The Perceived Interpersonal Closeness Scale is a validated measure of feelings of closeness between two people [196]. It consists of a set of seven pictures of two circles—"Self" and "Other"—that are at different stages of overlapping, representing different levels of closeness (Figure 7.1.1). Participants rated closeness from 1 to 7, where 1 is "not close" (i.e., the circles have zero overlap), and 7 is "very close" (i.e., the circles almost completely overlap).

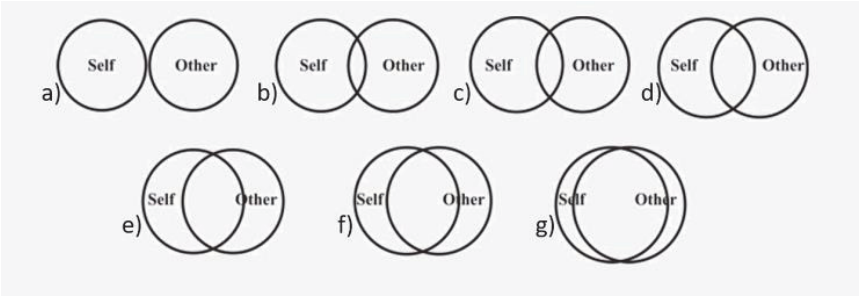


Figure 7.1.1 Perceived Interpersonal Closeness Scale

7.1.3 *Frustration*

The *Frustration* measure on the NASA Task Load Index [115] asked users: "How insecure, discouraged, irritated, stressed or annoyed were you?" I was particularly interested in this frustration measure as a means of understanding participants' levels of insecurity and stress during their chats. Although this somewhat noisy measure combines many possible sources of "frustration" I chose to use this validated scale rather than create a new frustration measure that could have introduced other sources of noise or bias. Users recorded their answers on a 7-point Likert scale, from "very low" to "very high".

7.2 DESIGN AND ANALYSIS

For this between-subjects experiment, I had two conditions: Chatback and control. I collected 136 ratings of closeness and frustration, and 127 ratings of post-mood, from 68 guided chats. In the control condition, I collected 144 ratings of closeness and frustration, and 133 ratings of post-

mood, from 72 unguided chats. Post mood scores were not always completed, perhaps because this rating was requested at the end of the chat within the chat template, rather than in the feedback survey, making it easily missed or ignored by participants. Nine post-mood score ratings were missing from Chatback, and 11 post-mood score ratings were missing from the control condition. Data was analyzed with mixed-effects models, however, that are robust to missing data.

I consulted with a statistics student, Stewart Renehan, who built a mixed-effects model to address the session-dependent questions. This mixed-effects model models the relationship between a set of predictors, (session number, age, gender, condition, Pre PHQ score, Pre GAD score, person, and team) and the output variable of interest (post-session mood, closeness, and frustration). In this case, we added the interaction between condition and session number as a predictor variable so that we could view effects over time. After the model was built, the coefficient for the interaction between session number and Chatback was examined to answer the session-dependent question: "Does (x) improve from one session to the next more for Chatback than for the control?" The coefficient for the interaction between condition and session number told us, on average, how much more or less, Chatback improved quantity (x) from one session to the next than the control. We tested the null hypothesis that this coefficient was zero.

The "mixed" part of the mixed-effects model means that both random effects and fixed effects are included in the predictor part of the model. Examples of fixed effects are age, gender, Chatback vs. control, Pre-PHQ, and Pre-GAD; these effects are fixed throughout the study. Random effects include person, group, and time; these are the sources of the random variation in the outcome variable. Person is nested within Group, to tell the model that there is a group effect associated with two people being on the same team. The random effects allow the model to incorporate different levels of correlation in the data.

7.3 SUBJECTIVE FEEDBACK

At the end of the two-week study, participants provided subjective feedback on their supportive chat experiences. They were asked: (1) "What was the most important takeaway from your supportive chat experience?" (2) "What was the most important difference, if any, that your supportive chat experience made in your life over the past two weeks?" (3) "What was the most negative aspect of your supportive chat experience?" (4) "How strongly do you feel that it is important to have access to online supportive chats like this in your life? Why?"

7.3.1 *Qualitative analysis*

I coded post-study feedback inductively, in an iterative process outlined in [37]. My main goal was to understand: "How were Chatback and control supportive chat experiences similar or different?" First, I coded Chatback and control responses separately to generate several initial codes. Second, I merged the codes from both data sets and removed any redundancies, to arrive at a final set of unique codes based on the entire data set. Third, I re-coded the data using the final set of codes to discover similarities and differences in supportive chat experiences.

7.4 RESULTS

I present the quantitative results first, followed by the themes from the qualitative data.

7.4.1 *Post-mood score improvement over time*

Chatback participants improved an additional 0.288 mood points (SEM=0.077), on average, from one session to the next as compared to the control group (Figure 7.4.1). A t-test for whether the difference in slopes was nonzero showed a statistically significant result of $p<.0001$ ($t(251) = 3.74$), supporting the claim that the post-session mood of Chatback participants improved more from one session to the next than control individuals. Examining Figure 7.4.1, post-session mood

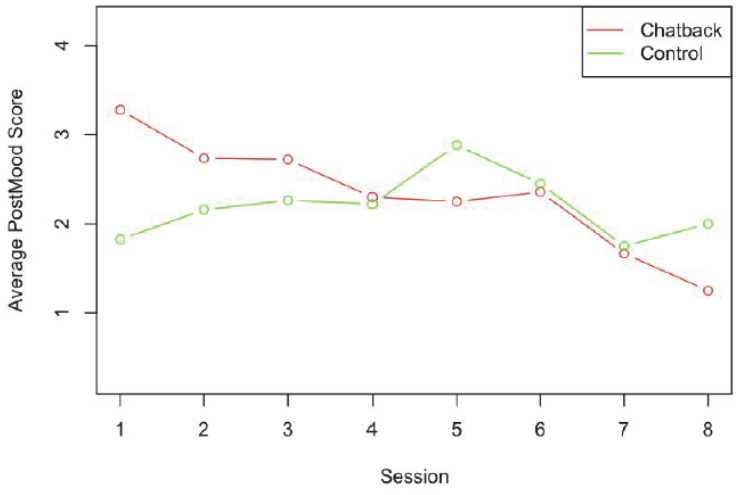


Figure 7.4.1 Post-mood score improvement over time

remains roughly level for the control group while it decreases over time for the Chatback group. Thus, it may be more appropriate to interpret this result as Chatback improves post-session mood over the course of the sessions, while unguided chat does not.

7.4.2 *Closeness improvement per session*

Chatback participants improved an additional 0.156 closeness points (SEM=0.073), on average, from one session to the next as compared to the control group (Figure 7.4.2). A t-test for whether the difference in slopes is nonzero produces a p-value of $p<.002$ ($t(271) = 2.12$), supporting the claim that the closeness of Chatback individuals improves more from one session to the next than control individuals.

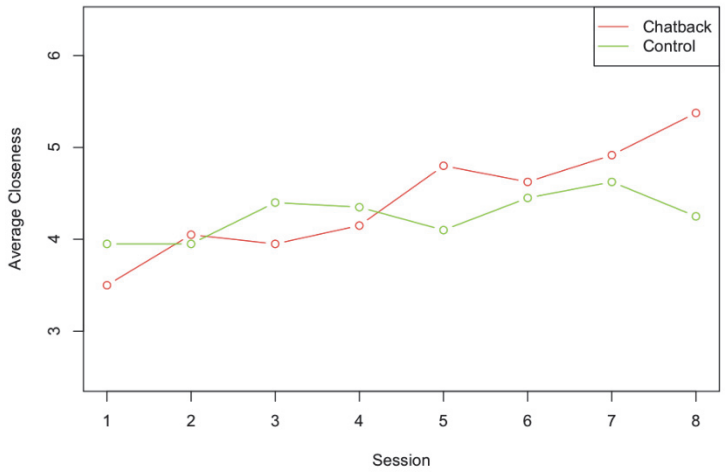


Figure 7.4.2 Closeness improvement over time

7.4.3 *Frustration improvement per session*

Chatback participants improved an additional 0.180 frustration points (SEM=0.067), on average, from one session to the next as compared to the control group (Figure 7.4.3). A t-test for whether the difference in slopes is nonzero produces a p-value of $p<.004$ ($t(271) = -2.69$), supporting the claim that the frustration of Chatback individuals improves more from one session to the next than control individuals.

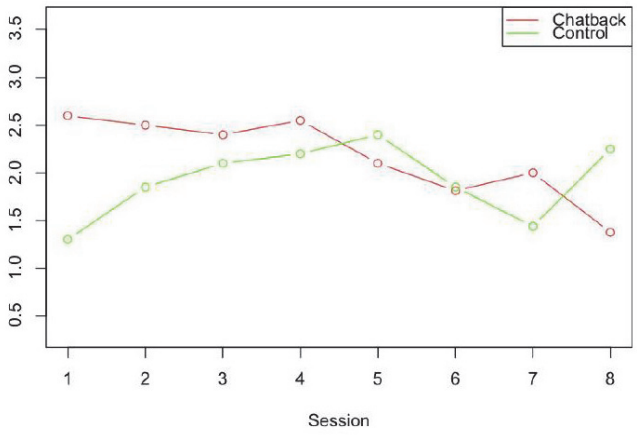


Figure 7.4.3 Frustration improvement over time

7.5 FEEDBACK ON CHAT QUALITIES

To understand why the guided chats of Chatback resulted in greater closeness, more improvement in post-mood scores, and less frustration over the two-week study, I delved into the qualitative feedback data collected at the end of the study. I found that both types of chat—with and without a guided framework—encouraged feelings of friendship that relieved loneliness. However, chat experiences differed between the two conditions along three dimensions: (1) the feelings of **safety** in opening up; (2) the role of **mutuality** in enriching the experience; and (3) the importance of **similarity** in beliefs between chat partners.

7.5.1 *Feelings of safety*

Using the guided chat, participants described feelings of safety in chatting about topics that typically felt risky to disclose, even to professional therapists. P33 said, *"having that as an outlet free of judgement is so essential. I was able to open up more and say things I am usually too scared to say even to counselors*." In a similar vein, P51 said, "*I had a bad experience with a counselor in feeling like I was being judged so I have always felt like even that was not an option to me. This chat made me realize I am not crazy and that others go through the same thoughts I go through and feel the same exact way as me!*" P56 noted how the mutuality of giving and receiving help may have contributed to feelings of safety: *"I found it to be incredibly soothing in a way I had not expected. Being able to talk about your issues with someone who is also voicing their concerns*

makes for a safe space where there is non-risk of being judged or ostracized. Hugely important." P46 said: "*This tool is a safe, efficient, effective and convenient way to resolve many of life's issues*."

These experiences of safety using the chat framework contrasted with participants' experiences in unguided chat that were often characterized by a sense of risk. For example, P16 kept sensitive topics to herself, "*I really need to find a professional therapist. I felt uncomfortable talking about anything but the most mundane issues. I didn't want to impose by digging into my own issues and probably unintentionally encouraged my chat partner to likewise stick to surface issues.*" P54 felt similar discomfort: "*Talking about deeper emotional feelings and especially with a stranger was a little out of my comfort zone. At first, and even throughout, I didn't really know what to say.*" This discomfort with addressing emotional troubles may have led participants to use unguided chat as a way to distract themselves from distress, as P10 said: "*it felt good, even the distraction was helpful, although my problem didn't get solved, at least I stopped thinking about it for a while*." Similarly, P12 said: "*I generally felt better after chatting, but it didn't change the overall issues that were causing me stress.*" P23 commented that, even though her experience in the study was supportive, she was wary of such unguided chats in the wild: "*I could see this becoming something unsupportive as well if someone with less pure intentions 'supports' someone really in need and offers up negativity instead of support, validation, comfort, etc*."

7.5.2 *Role of mutuality*

Another difference between the two types of chats, was that participants using Chatback felt that the mutuality of support-giving and receiving enriched their experiences. P21 said that mutuality promoted a sense of equity: "*A big benefit over a one-sided counselling or therapy session was the satisfaction of helping the other person […] I never felt like I was being 'shrinked' or talked down to.*" P26 noted the benefits of shifting her perspective to focus on her chat partner's concerns: *"[it] reminded me that we all have anxieties in our lives, and gave me a boost if I was able to help my partner in some small way.*" P08 said that her most important takeaway was that: "*It takes so little to make a true connection with someone. […] possibly because when we share our worries with each other we bond more easily.*" The mutuality of opening up to each other may have facilitated closer bonds. P27 described mutuality as helping to form a close feeling of intimacy: "*I would love*

to participate regularly in this sort of anonymous intimacy. It has many of the benefits of a good therapist, but with the addition of mutuality."

However, unguided chats also provided important benefits even though they were not always mutual. For example, P18 mentioned positive changes in her self-perception: "*Before this, I was fully convinced that every time I talked, I sounded like a moron, a jerk or a serial killer. Not...really, now. […] I am much more optimistic about myself.*" P01 said that the unguided chat helped them by: "*keeping me focused on going from day-to-day and completing this daily activity.*" And P72 said: "*I think this experience was actually very helpful to my mental well-being these past two weeks. I felt heard and understood, and felt like a had a fresh, unbiased perspective on my problems so I could face them with more clarity*." The act of chatting, even without guidance, gave participants the experience of reduced stigma, clarity, and a friendly routine in times of isolation.

7.5.3 *Importance of similarity in beliefs*

The feedback about unguided chats suggested that sharing similar beliefs was important for receiving benefits, such as improved mood. P70 said that her chat partner "*ended up being really similar to me in a lot of ways (beliefs and stuff). It was super cool to get the chance to interact with them.*" P05, who was randomly paired with another mom, said: "*I used to participate in an online moms group before the site closed and [the unguided chat] was similarly really useful. The combination of anonymity + bonding/commiserating/sharing was really great.*" However, when beliefs conflicted, unguided chats could become awkward, as P22 said: "*when I noticed there was a significant difference regarding cultural taste between the partner and me (e.g., my partner's excitement on something that I actively against or don't like), I felt the chat was somewhat boring and tough.*"

This importance of similar beliefs in the unguided chats, contrasted with guided chats wherein sharing similar beliefs was not as important to achieving closeness to the chat partner or reducing troubling mood. P27 stated that she benefited from guided chat despite the fact that her and her chat partner had very dissimilar beliefs—he was a Republican religious man and she was an atheist Democrat woman distraught about the recent Republican win in the presidential election: "*I really liked and respected my partner, even though I sensed we were very different in some ways.*" She went on to explain that instead of chatting about politics she used the guided chat to focus on other issues: "*As I worked through other issues, however, I discovered a by-product was*

that I am feeling less terrified and more centered and strong about current affairs." P40 emphasized that the guided chat "*just encourages and guides friendly and supportive behavior and highlights when people have stuff in common or are understanding each other.*" Thus, the guided chat allowed chat partners to set differences aside and focus on supporting one another in constructive ways. The fact that the chat guidance helped participants to overcome their differences could partially explain why closeness improved significantly more in the guided chat condition, as compared to unguided chat that lacked any scaffolding.

7.6 DISCUSSION AND IMPLICATIONS

The results of this study suggest that guided chats can promote more closeness and relief from troubling mood over time, compared to unguided chats. The guided chat was more frustrating at first but improved more over time. In addition to these differences in chat session outcomes, the two types of chat were experienced differently as reported in the post-study feedback. Below, I discuss how the qualitative insights shed light on the longitudinal trends.

I found a notable qualitative difference between the two types of chat with respect to feelings of safety. Participants using Chatback reported feeling safe disclosing troubling issues, whereas participants using unguided chat reported feeling awkward or uncomfortable addressing troubles. This qualitative difference in safety may have contributed to greater post-mood score improvement over time for participants who used Chatback. The comfort with using Chatback to address troubling emotions may have enabled participants to genuinely relieve troubling moods over the course of the study. In contrast, participants using unguided chat who felt it was risky to open up, did not have as much opportunity to work through and relive troubles, resulting in a fairly flat line of post-mood scores over time.

Moreover, the sense of safety in using Chatback for genuine emotional support may have developed over time as chat partners got know each other. Quantitative results showed an increase in feelings of closeness between Chatback chat partners, that was significantly greater than for partners in unguided chat. The mutuality in disclosing sensitive topics to each other, that was enforced by Chatback, may have contributed to this growing closeness over the course of eight chat sessions. Being in the position to support their chat partner was perceived highly favorably by participants, and helped them to view their own troubles as less "crazy" and more similar to their new "friend."

Finally, the decrease in frustration over time for users of Chatback could reflect several processes. For example, as Chatback users improved in their troubling mood across sessions, they may have concurrently become less stressed in engaging in the chats. Or, as they became closer to each other, the chat partners may have felt less and less insecure in opening up. Yet another possibility is that, while the guidance may have introduced some upfront costs of having to cope with an unfamiliar set of prompts and style of interaction, it allayed frustrations over time as participants became accustomed to the framework. Overall, the relative qualitative importance of similarity in beliefs for the two types of chat, may have played a role in these statistical differences in frustration levels. With guidance, findings suggest that chat partners were able to set differences aside and focus on constructive feedback. However, without guidance chat partners had to rely on shared interests and experiences to chat easily with each other, which may not have been as reliable as guidance over time.

The potential role of regression toward the mean in the statistical analyses is an important consideration. Over the course of the sessions Chatback scores tend to start higher, then move downwards towards the control, and then perhaps ends a little bit below the control by session eight. One might argue that the reason Chatback scores start higher is due the randomized group assignments, and the only reason that it has a slope that is more negative is that the average value is moving back towards the population mean, such that the reason the slope is more negative is not because of Chatback but because those placed in the Chatback group happened to have higher values for mood and frustration to start with. If I was to repeat this experiment this concern would be alleviated if (a), the Chatback and control started with roughly the same values in session one, or (b), the subjects participated in more sessions, and after the Chatback values went below the control values, they stayed below. Despite these caveats in interpreting the quantitative results, my findings suggest the following design implications.

7.6.1 *Promote one-on-one supportive relationships over time*

Current online approaches to offering peer support for mental health involve many-to-one or one-to-many ratios of supporters to support seekers. For example, Panopoly [173] was a crowdsourcing platform for peer-based cognitive behavioral therapy wherein support seekers could post troubling

thoughts and get input from the crowd. The website 7 Cups of Tea[13], and Crisis Textline[14], train volunteers to give support to many people in need. These platforms do not yet have affordances for one-to-one relationships that can develop over time. My findings suggest that peers seeking emotional support can greatly benefit from sustained relationships and that chat partners grow in their feelings of friendship. Moreover, sustained one-to-one support can produce greater relief and closeness over time when facilitated by chat guidance that promotes perceived safety and mutuality in sensitive disclosures.

7.6.2 *Encourage mutuality in support-giving and receiving*

The aforementioned predominant approaches to online emotional support recreate the traditional support-giving paradigm of psychotherapy: one person plays the role of supporter while the other seeks support. However, peer support offers a unique opportunity to promote mutuality in supportive interactions. Participants who experienced the guided mutuality of Chatback expressed the importance of being in the position to both give and receive support. Mutuality encouraged closeness, safety, and a sense of empowerment in being able to help someone, that some participants contrasted to their experiences with counselors. The Chatback guidance encouraged mutuality by enforcing identical use of psychotherapy techniques by both partners as they each took turns disclosing and reflecting. The advantage of this approach was the complete transparency of the techniques used, and the complete equity in the use of those techniques. These constraints of transparency and equity in techniques could be important for future implementations of mutual emotional support.

7.6.3 *Provide real-time guidance to create a safe space*

The guided chat offered several advantages for encouraging emotional support between strangers. One of the most important advantages was that of the participant's perceptions of safety in using the guidance to discuss sensitive topics. Without the guidance, some participants reported feeling uncomfortable discussing all but the most mundane issues, and instead used the unguided chats to distract from distress. Thus, designers wanting to engage peers in emotional support may want to adopt a chat framework that guides supportive behavior and helps peers to establish trust in "non-

[13] https://www.7cups.com/
[14] https://www.crisistextline.org/

risk of being judged" as one participant put it. There is no certain way to design away judgmental behavior, but my findings suggest that even simple prompts can create a sense of safe space for emotional vulnerability. Such safety may play an important role in the efficacy of emotional support for reducing troubling mood and promoting closeness over time.

7.6.4 *Conclusion*

In this chapter, I reported on results from a linear mixed-effects analysis of improvements in post-mood score, closeness, and frustration over the course of eight chat sessions. I found that the guided chat condition resulted in greater improvements on these outcomes over time, compared to unguided chat. Using the post-study feedback from participants about their supportive chat experiences, I found that the mutuality enforced by the chat guidance helped participants to experience guided chat as a safe space to disclose concerns. The perception of guided chat as safe contrasted with the sense of risk in unguided chat, which could partially explain the greater improvements in closeness and reduced troubling mood scores over the course of the study in the guided chat condition. The following chapter builds on these findings of the value of chat guidance for promoting positive changes in feelings over time, by demonstrating the advantages of guided chat for promoting positive changes in thoughts and motivations.

Chapter 8. BEYOND MENTAL HEALTH: PROMOTING SHARED REFLECTION ON THOUGHTS AND FEELINGS TO MOTIVATE BEHAVIOR CHANGE

Chat guidance can help peers to develop supportive relationships that relieve distressing emotions and promote a sense of closeness over time. These benefits could be influential in contexts beyond mental health care, such as lifestyle and health behavior change. During behavior change, people face the burden of shifting their thoughts and emotions to align with target behaviors. However, behavior change technologies rarely provide explicit support for these cognitive and emotional needs. In this chapter, I demonstrate how *Chatback,* the guided chat tool I designed with psychotherapy techniques described in Chapter 5, helped peers to address thoughts and emotions for behavior change.

8.1 BACKGROUND

Technologists have approached behavior change in many domains, including health, sustainability, and productivity [2]. However, most behavior change systems emphasize support for action, rather than thoughts and feelings. For example, Consolvo et al. developed UbiFit [62] to support physical activity through weekly activity goals, rewards, and continuous feedback. These facets of the design explicitly supported taking action.

In contrast, other systems use social persuasion or pressure to encourage behavior change. For example, BinCam [238] captures and shares images from the inside of a kitchen trash can to encourage reflection and responsible food waste and recycling in young adults. In another example, [150] MAHI connects people newly diagnosed with diabetes to diabetes educators and encourages shared reflection on data that help them understand breakdowns in health and adjust their self-concepts. In the wellness space, Houston [61] allowed people to track and share daily step-counts with friends, but the social pressure combined with incomplete information sometimes discouraged healthy behavior. Research suggests that such systems over-emphasize sharing data often to the exclusion of thoughts and feelings [88]. They provide data to help people to reflect on their actions but only implicitly support the development of new thoughts, feelings, and rationales based on that data to pursue new behaviors. Explicit support for these cognitive and emotional

processes is so far lacking. This work points to a need to address this gap in supporting thoughts and feelings that shape motivation, adoption, and maintenance of new behaviors.

8.2 METHOD

I conducted a four-week within-subjects field experiment with a subset of participants from the between-subjects experiment described in Chapter 6. Twelve participants who used the unguided condition in the two-week between-subjects study agreed to participate for an additional two weeks to subsequently use the guided chat condition.

8.2.1 *Participants*

I recruited 12 participants—six pairs—from the unguided chat condition to use the guided chat condition for an additional two weeks. Note that all 20 participants from the unguided condition were invited to continue, but only 12 of them could commit to the additional eight chats over two weeks. Participants had a range of ages from 21 – 37 (M=27), gender identities (8 females, 2 males, 1 nonbinary, 1 trans male), and educational backgrounds, as shown in Table 8.2.1. The 12 participants remained with their same chat partners from the previous two weeks in the study.

Table 8.2.1 Participants. Race: W=White; A=Asian; H=Hispanic; MR=Mixed race; AA=African American.

P#	GENDER	RACE	AGE	EDUCATION
P01	Non-binary	W	25	Bachelors
P18	Trans M	MR	27	Bachelors
P10	M	A	35	Masters
P22	M	A	31	Masters
P16	F	W	25	Bachelors
P23	F	MR	24	Bachelors
P07	F	W	37	Masters
P31	F	W	28	Some college
P67	F	W	21	Associate's degree
P70	F	W	27	Associate's degree
P65	F	H	22	Some college
P72	F	W	21	Some college

8.3 MEASURES

After every chat, each participant privately submitted a feedback survey to record satisfaction, frustration, effort, and changes resulting from the chat. These were the exact same procedures performed in the between-subjects study. I describe each of my instruments below.

8.3.1 *NASA-TLX subscales: Frustration, Effort*

The NASA Task Load Index [115] measures workload on six dimensions; of these I measured two dimensions: *Frustration* and *Effort*. The *Frustration* measure asked users: "How insecure, discouraged, irritated, stressed or annoyed were you?" The *Effort* measure asked: "How hard did you have to work to accomplish your level of performance?" Users recorded their answers on a 7-point Likert scale, from "very low" to "very high".

8.3.2 *Satisfaction*

Additionally, I asked participants: "How satisfying was this chat?" on a 7-point Likert scale from "very low" to "very high."

8.3.3 *Chat session feedback*

After each chat, users were asked "*What, if anything, changed as a result of the chat?*" They were not asked about specific types of change (e.g., emotional, cognitive, or motivational) so that they could express change in personally meaningful and naturalistic terms. At the end of the four-week study, users were asked "*Which chat tool did you prefer? Why?*"

8.4 DESIGN AND ANALYSIS

This within-subjects field experiment had two conditions, control and Chatback. I collected a total of 92 feedback responses to the question, "What, if anything, changed as a result of the chat?" for 46 total chats in each condition (*i.e.*, two responses, one from each chat partner, for each chat). Of these responses, 24 were excluded from the Chatback analysis and 27 from the unguided chat analysis because they did not contain any mention of change. Thus, a total of 68 Chatback responses, and 65 unguided responses, were included in the analysis. Additionally, I collected 12 responses to the post-study question about which chat tool was preferred.

I coded these responses deductively, using previously validated types of cognitive, emotional, and motivational change talk [165]. I was not blinded to condition for this analysis, which is a limitation that I will remedy when I pursue publication for this work; I will conduct interrater reliability with coders who are blinded to condition using my standardized codebook (see APPENDIX V: Statements of change). After responses were coded for statements of change, I worked with my co-advisor, Prof. Jacob O. Wobbrock, to use exact binomial tests to analyze the counts of statements that indicated various types of cognitive, emotional, and motivational change.

A total of 92 ratings of satisfaction, frustration, and effort were also collected from 46 chats in each condition. For my analysis of chat *Time*, I used a linear mixed-effects model analysis of variance [101,202]. For my analysis of *Satisfaction*, *Effort*, and *Frustration*, as these responses violated the assumptions of parametric analysis of variance, I utilized the non-parametric Aligned Rank Transform procedure [121,216,253].

8.5 RESULTS

Overall, 8 of 12 participants preferred Chatback. About half the time, when asked, "What, if anything, changed as a result of the chat?" users reported positive emotional change in both types of chats. The major difference was that Chatback significantly increased statements of motivational change, and promoted more cognitive change. Chatback also provided these benefits without increasing the effort or time of chatting. Below, I present my quantitative results and draw upon qualitative data, where appropriate, to provide rich insight into the advantages and limitations of implementing these techniques for supporting behavior change.

8.5.1 *Encourages positive emotions and satisfaction*

For both conditions, positive emotional change was the most commonly reported change. Positive emotional change was stated in 29 of 68 Chatback replies (42.6%), and in 38 of 65 unguided chat replies (58.5%). This difference was statistically non-significant according to an exact binomial test. In the unguided chats, participants stated a reduction in negative feelings, like P01: "*I was feeling stressed out and that got better as the chat went on*," or positive feelings being strengthened, like P72: *"I felt fine, now I feel better!"* Positive emotional change was experienced similarly in Chatback, as P67 said: "*I feel more relaxed*" and P31: *"[I was] frustrated. [I'm] calmer now.*"

Satisfaction was relatively high in both conditions. On a 1-7 Likert scale where 1 was "very low satisfaction" and 7 was "very high satisfaction", Chatback was 4.8 (SD = 1.6). For unguided chats, it was 5.1 (SD = 1.4). This difference was statistically non-significant ($F_{1,86.4} = 2.5$, *n.s.*).

8.5.2 *Increases statements of motivational change*

Motivational change was stated in 12 of 68 Chatback replies (17.6%), compared to just 1 of 65 (1.5%) in unguided chat. This increase in expressions of motivational change was statistically significant according to an exact binomial test ($p < .01$). The motivational change statements resulting from Chatback implied greater self-liberation—feeling capable and committed to action—than unguided chat. The only motivational change statement found in unguided chat focused on planning travel to a place they are "*super into*," as P22 said: "*I'm very excited about it and I literally just started to plan to travel there*."

In contrast, statements from Chatback were directly targeted at solving a problematic behavior. For example, after using Chatback, P16 said, "*now I feel bolstered and supported, like I can go out and work toward fixing the problem*." P07 had a similar experience of self-liberation after using Chatback: "*I feel less stressed out and I have a strategy to go forward*."

The change from being overwhelmed to being ready for and committed to change was also expressed by P65 after using Chatback: "*I know what I should do to fix my current concern*," and by P23: "*I was feeling the need before this [chat] to check in and be better with my self-care regimen. All reinforced by the conversation today. I could certainly benefit from less stress and stop wearing myself so thin."* P23's attitude toward the benefits of changing her behavior was strengthened by the Chatback chat, which reinforced her self-belief that she needs to take better care of herself.

8.5.3 *Promotes more statements of positive cognitive change*

Positive cognitive change was stated in 13 of 68 (19.1%) Chatback replies, compared to 7 of 65 (10.8%) in the unguided chat. Although there was no statistically significant difference according to an exact binomial test ($p = .15$), the quality of the statements of positive cognitive change were strikingly different between the two conditions, and more data would likely bear out this trend statistically.

In response to Chatback, participants stated changes in their beliefs and judgments of themselves, a key aspect of self-reevaluation. P65 said after using Chatback, "*I feel less self-critical and more ready to tackle my problems.*" P18's use of Chatback promoted a change in her critical self-assessment as a "whiner": "*Apparently I am not whining. How interesting*." Positive cognitive change resulting from Chatback was also evidenced in statements of gaining a sense of control over problems, as P16 said, "*I am feeling much more relaxed and in control of my situation."*

These statements from use of Chatback contrast with statements made in unguided chat, which tended to focus on changes in feeling isolated. As P18 put it, "*Now I feel so relieved to know I'm not alone*." This statement was echoed by P07 in response to a control chat: "*I'm feeling better, knowing that I'm not the only one that has stuff to deal with.*"

When participants used unguided chat, they changed from believing they are alone to realizing their experiences are shared. In contrast to Chatback, this positive cognitive change made people feel better, but it did not help them to articulate specific plans to take action. For example, in P70's response to the Chatback condition, she expressed her new insight about herself and her situation that inspired her to take action: "*I think I'm starting to unpack what it is that keeps me from being productive. My chat partner gave me some insight into my situation, so after the chat I'm feeling inspired to play a little more music before I finish the rest of my homework.*" This statement shows the strong connection between use of Chatback and intentions to change behaviors. In contrast, the same participant's statement of cognitive change in the unguided chat did not reveal an explicit connection to behavior change: "*after chatting (and talking a little bit about feeling guilty about feeling bad), I enjoyed myself a lot, so I wasn't really thinking about that anymore*."

Neither Chatback nor the unguided chat always led to more positive cognitive change. There was negative cognitive change in 3 of 68 (4.4%) of statements in Chatback feedback, and 1 of 65 (1.5%) of statements in unguided chat. For example, P16 said after a Chatback chat: "*I was feeling happily distracted [before the chat]. I'm more stressed now because I'm thinking about how to actually change the things that worry me.*" After an unguided chat, P70 said: "*I feel less stressed about work and more stressed about my existence in the world*" because of certain politics that arose during the chat. However, overall, the cognitive change experience was positive in both conditions.

8.5.4 *Does not increase burden*

Burden on users can be defined by the amount of perceived effort, time, and frustration of using a system. The perceived effort of Chatback on a 1-7 Likert scale, with 1 being "very low effort" and 7 being "very high effort" was 2.5 ($SD = 1.5$). For unguided chat, it was 2.3 ($SD = 1.5$). This difference was statistically non-significant ($F_{1,87.0} = 0.7$, *n.s.*). Although such a non-detectable difference cannot be taken for equivalence, it seems plausible that the techniques employed in Chatback did not increase the effort of the task over unguided chats.

The perceived frustration in using Chatback and unguided chat was relatively low. Chatback on a 1-7 Likert scale, with 1 being "very low frustration" and 7 being "very high frustration" was 2.6 ($SD = 1.6$). For unguided chats it was 2.0 ($SD = 1.4$). This difference was statistically significant ($F_{1,86.9} = 8.6$, $p < .01$). This higher perceived frustration may be due to the fact that Chatback's prompts forced participants to think about a troubling concern, even when they were feeling positive prior to that moment. In other words, whereas unguided chats could allow participants to leave any troubling thoughts unaddressed, Chatback, by employing the psychotherapeutic techniques, *required* participants to address troubling thoughts and feelings. As P10 put it: "*it should be great if the chat tool also have some features for someone who doesn't have any trouble or doesn't think some difficulties as troubles he/she resolve*."

We also compared the burden of time on users. Chatback was 12.8% faster at 40.2 minutes on average ($SD = 12.7$), versus 46.2 minutes for control ($SD = 12.6$), which was statistically significant ($F_{1,13.8} = 26.7$, $p < .0001$).

Overall, these results suggest that supporting people to shape thoughts and feelings that drive behavior change can provide benefits without incurring undue burden on users in terms of time and effort. Moreover, further work is needed to evaluate more adaptive interfaces that enable flexible use of techniques according to users' in-the-moment needs.

8.5.5 *Chatback was preferred*

Eight of the 12 participants (66.7%) preferred Chatback to unguided chats. The qualitative feedback at the end of the four-week study revealed that of those who preferred Chatback, some did so because they were in a position to help their chat partner. Chatback put people in a position to help each other with prompts to listen empathetically (*e.g.*, "You're feeling…"), check the

accuracy of that empathy (*e.g.*, underlining accurate replies), and provide each other with strategies. P23 said, "*I think I ended up liking [Chatback] more because […] it offered the opportunity to offer advice to my partners, which may have happened in [Control], but was a guarantee here*."

P07 said: "*I also liked being validated and being able to validate my chat partner by explaining 'You're feeling …' and see what resonated with them*." Even P70, who voiced a strong preference for the unguided chat condition, mentioned the one benefit she found in Chatback: "*I think the one useful aspect from the other chat tool [Chatback] was that it prompted us to give each other suggestions.*"

Participants also preferred Chatback because the prompts helped them to disclose sensitive issues. P01 said, "*I am not so good at coping on my own or expressing my feelings to people around me. It helped to be able to express things to a stranger.*" Their chat partner, P18, said, "*Being able to talk to them in a manner that imitated some therapeutic methods was incredibly helpful*." However, the four participants who preferred unguided chat found the Chatback techniques to be a drawback rather than an advantage. For example, P22 said that the Chatback design, "*led me to feel annoyed and stressed a lot and eventually focus on finishing chat as soon as I can rather than provide more information or thoughtful feedback.*" His chat partner, P10, said, "*most the responses were just rephrased versions of my words […] it felt like I was chatting with an automated system*." Thus, P10's experience of automated feedback was because of his chat partner's negative association with the Chatback prompts. P72 said that the unguided chat, "*felt more natural and we were able to simply talk about what came up instead of being forced, in a way, to talk about distressing things*."

8.6 Discussion and Implications

The use of three psychotherapy techniques—cognitive restructuring, accurate empathy, and change talk—helped people share and analyze their internal thoughts and feelings in ways that led to constructive and actionable insights for behavior change. Chatback was just as satisfying as unguided chat, without increasing perceived effort. The participants in my study applied the techniques in real time, and reaped the benefits of cognitive, motivational, and emotional change without the cost of up-front learning.

Below, I discuss the implications of my work for future systems design, with a focus on relevance to behavior change systems that could be enhanced by providing support for cognitive and emotional change.

8.6.1 *Providing techniques for shared reflection*

Although peers often naturally help each other feel better, as I saw in unguided chat, they do not always address topics in a way that leads to changes in motivation or beliefs. Providing peers with cognitive, empathetic, and motivational techniques could increase the effect of peer-to-peer reflection for behavior change.

Techniques for individual reflection have been shown to help students learn math skills [252], relieve stress [188], and facilitate sense-making for managing chronic illnesses [150]. However, techniques for shared reflection are not as well-studied. Some systems support shared reflection on personal informatics data [24,108,110,193]. Systems like FitBit and *StepStream* [163] support people to track steps together for competitive or cooperative pursuit of change. I found that peers enjoyed using explicit scaffolding for reflecting together on their thoughts and feelings that were inhibiting change, and benefitted from sharing advice to overcome those cognitive and emotional barriers.

Slovak et al. [230] have emphasized the importance of providing explicit components to directly scaffold reflection and structure social interaction for socio-emotional learning. Embedding reflection in social interactions and dialogues is particularly powerful for reinforcing learning, as emphasized by [25,98,220,230,231]. Such explicit components for shared reflection on thoughts and feelings could support people to explore relationships between ideas and experiences and consider alternative points of view—a fundamental "level" of reflection that technology can support [98]. Moreover, providing explicit scaffolding for disclosing challenges, 'slip-ups,' and other more negative aspects of behavior change may help peers to feel safe in learning from each other's mistakes and set-backs. Online communities for health behavior change are often characterized by mostly positive statements of change, rather than revealing negativity or ambivalence [180]. Encouraging peers to be open about difficulties can help peers to share these lessons with each other [194] , and create new opportunities for peers to engage [177].

Psychotherapy techniques are well suited to facilitating shared reflection on troubles that leads to actionable outcomes. I see opportunities for encouraging the use of shared empathy,

cognitive restructuring, and motivational change talk, which can bolster people's sense of empowerment, and strengthen their awareness of their personally significant reasons for changing.

8.6.2 *Supporting cognitive and emotional needs during change*

Theoretical models of behavior change, such as the transtheoretical model [201] and the theory of planned behavior [3], highlight the role of thoughts and feelings in influencing behaviors. In these theoretical frameworks, thoughts and feelings precede behavior change outcomes—cognitive and emotional changes are emphasized early on as catalysts for progressing towards action. The psychotherapy techniques I analyzed could support people who are contemplating new behaviors, shifting self-beliefs, and articulating motivations.

Revising self-beliefs, and articulating one's reasons for changing early on, can be burdensome, especially when changing is unpleasant and marks a significant shift from prior identity and relationships [63,146]. I found that using cognitive restructuring, accurate empathy, and change talk within supportive chats helped people to achieve influential changes in beliefs and feelings, in very short time spans (*i.e.*, about 40 minutes) and with low perceived effort. These techniques have potential to reduce the burden of meeting cognitive and emotional needs during behavior change.

Providing explicit support for cognitive and emotional needs could strengthen users' abilities to generate actionable insights early on. For example, design work to encourage environmentally sustainable behavior has emphasized the need to target messages differently to people in early stages of change when they are still contemplating, and later stages of change when they are committed [119]. Ploderer et al. [194] showed that smokers who just started their change process provided and sought more emotional support than veterans of the peer community. Future work could explore whether adding explicit support for thoughts and feelings enhances health behavior change outcomes and engages people who are not yet ready to change, but would like to.

8.6.3 *Sequencing techniques for maximum benefit*

With Chatback, my participants used short prompts to apply expert psychotherapy techniques without prior training. However, in some cases, the tool should have provide guidance or nudges to improve user performance with the prompts. One participant felt "annoyed and stressed" using the prompts, and provided verbatim replies to his chat partner rather than more nuanced empathetic

statements. Chatback instructed users to underline text in each other's empathetic replies to provide implicit feedback on the helpfulness and accuracy of their chat partner's empathetic statements. A next step is to explore more explicit, system-generated, real-time feedback and *in situ* help for guiding the use of expert skills when users struggle. Such guidance could help users to progress through the prompts effectively, or fade the prompts when users master the techniques.

Progression with techniques could also be enhanced by sequencing prompts for maximum benefit. The sequence of techniques in Chatback could have been important for building trust and rapport between chat partners. The cognitive and emotional prompts at the beginning were targeted at problem setting—helping peers to establish mutual understanding of each other's concerns. The motivational prompts at the end were targeted at developing solutions to problems. Enabling peers to build shared understanding (*e.g.*, through empathizing with each other's thoughts and feelings), before offering each other advice, might have helped peers to give appropriate advice, and to be receptive to each other's advice. Prior work shows that attempts by supporters to change a person's feelings by minimizing the gravity of problems or immediately offering solutions can result in rejection of that support and increased distress [70,140,153]. Therefore, in designing emotionally supportive tools, we should scaffold nonjudgmental reflection skills in addition to more active problem-solving [32].

Furthermore, advice directly preceded the user's final statement of change talk, so that it could directly inform the user's personal commitment to change. I deliberately put this strong form of change talk—*i.e.*, personal commitments to change—at the end of the chat, because it is theorized to have the greatest influence on behavior change [7,175]. I encourage designers to use a progression of prompts that start with developing a shared understanding and build towards advice from supportive peers and change talk at the *end* of supportive encounters. I expect this approach to increase the influence of advice and change talk on behavior outcomes.

8.7 Conclusion

Given that changing behaviors can be a highly emotional journey that affects people's attitudes, identities, and lifestyles, supporting cognitive and emotional needs with technology could be an incredibly powerful, and complimentary approach to supporting people to plan, execute, and assess actions. Cognitive and emotional techniques from psychotherapy provide one way to expand design opportunities for supporting comprehensive dimensions of behavior change.

Chapter 9. CONCLUSION

The dominant medical model of mental illness diagnosis and treatment has biased technological approaches toward interventions that are self- or clinician-driven. However, peer interventions are an alternative approach that expand opportunities for technology designers to create new social practices for mental health. Peer support for mental health began in grassroots movements to take political action and establish alternatives to traditional psychiatric care [74,141]. However, technologists have not yet focused on enriching the experiences of peers coping together in supportive relationships. Such alternative approaches are needed to help people find connection, learn skills, and carry on with their lives.

In this work, I introduced a tool called *Chatback* for everyday emotional management that enables peers with mental illnesses to learn and practice psychotherapy skills with each other to relieve distress. Through the process of designing and researching Chatback, I have provided: (1) an **understanding** of how peers with mental illnesses use and envision technologies for emotional support, (2) a **conceptual analysis** of psychotherapy techniques for online consumption and use by peers, (3) the **design** of Chatback, that demonstrates the potential of low-barrier tools to build the capacity of peers to support each other online, and (4) an **evaluation** of Chatback that revealed an important role for chat guidance in promoting positive psychological change. I drew on several methods, both quantitative and qualitative, including: field interviews, co-design activities, prototyping, and surveys, to explore this design space and generate new knowledge. My major findings provide answers to the research questions that I set forth in the beginning of this dissertation, and I briefly summarize some highlights below.

9.1 SUMMARY OF RESEARCH FINDINGS

In answer to my first research question, "*What are the unmet needs of peers seeking technology-mediated support for mental health?*" I found that peers have many unmet needs in seeking emotional support online, most acutely, in mitigating risks such as stigma in disclosing sensitive concerns, engaging in accessible just-in-time support, and finding similarity beyond diagnoses. In their envisioned technologies, peers sketched ideas for mitigating risk through training and intervention such as a "Bipolar Bear" for de-escalating intensely negative emotions, and a certification of competency for vetting peer supporters. Peers also invented technologies that

allowed them to connect based on "shared feelings" and to access support through text, video, and audio.

My second research question, "*How can technology be designed to guide emotionally supportive interactions between peers?*" was answered in my design and evaluation of Chatback, wherein I found that peers desire flexible tools for positive and negative moods. Chatback offered support for troubling moods, yet peers experiencing "good days" wanted to leverage the tool to reinforce their positivity with their chat partners. I also found that simple prompts that guide the use of psychotherapy techniques are readily used by peers without any formal training, and are immediately applicable to a range of everyday situations. This promising finding suggests that everyday practice with psychotherapy techniques can be made accessible to broad audiences and help address mental health challenges at scale.

Research question three, "*What are the tradeoffs of guided versus unguided online emotional support between peers?*" had several answers, revealing that guided and unguided chats provide distinctive benefits. Compared to unguided chats, guided chats promoted more safety to focus on troubling concerns and resulted in greater improvements in perceived closeness and post-mood scores over time. Moreover, guided chats were experienced as more deeply insightful and promoted more actionable advice from chat partners. These findings suggest an important role for guidance in helping peers to develop meaningful and emotionally supportive relationships.

Finally, in answer to my fourth research question, "*In what ways do guided chats affect psychological change?"* I found that guided chats promoted more statements of positive cognitive and motivational change, than unguided chats. Overall, both guided and unguided chats reduced symptoms of depression and anxiety on average, with a significant effect on anxiety. Moreover, both types of chat resulted in clinically significant reductions in anxiety and/or depression for some individuals, including *remission* and *recovery.* One of the most exciting findings was that some participants who used Chatback reported integrating the psychotherapy techniques into their everyday emotional management, in the form of journaling, reciting the prompts, and reflecting on new thoughts and strategies received in chats. This finding suggests that chat guidance can be internalized and used to complement self-management of troubling emotions. Thus, tools like Chatback could facilitate capacity-building, one of the ultimate goals of my work.

9.2 LESSONS AND LIMITATIONS

Below, I reflect on lessons learned and limitations of my approach, and how I would address these issues in future work.

9.2.1 *Transdiagnostic approach*

In my research and design process, I recruited participants and analyzed my data across diverse mental illness conditions. Rather than focusing only on people experiencing depression, for example, I included people with and without self-reported mental illnesses. The reason for this choice was that many mental illness diagnoses have overlapping symptoms and treatments. Moreover, comorbidities with different mental health conditions, multiple diagnoses, and struggles with misdiagnoses are common among people with mental illness experiences [181,192]. For example, in a national survey of the prevalence of co-morbidity in Americans with mental illness, 45% had two or more diagnoses [181]. Also, social challenges such as stigma, withdrawal, and loneliness, as well as needs of peer support are common across mental health conditions.

In contrast to my work, the standard for designing and evaluating mental health interventions, including digital interventions, is to *exclude* participants with co-morbid conditions. Based on my findings, excluding these participants could negatively impact the usefulness, usability, and reach of technologies for mental health peer support. Other technology designers have raised this issue, notably Doherty et al. [79], who voiced concerns over the ecological validity of designing for unipolar depression. In contrast to previous approaches, I recommend developing tools that enable people to explore and self-organize into groups based on similar in-the-moment characteristics and pain points, in addition to broad illness diagnoses, such as depression.

I view this transdiagnostic approach as a strength of my work. It enabled me to observe similarities in needs for technology-mediated support across a range of illnesses. It also drew me toward psychotherapy techniques that would be broadly applicable to people experiencing distressing emotions, rather than specific techniques for a single diagnosis. I also found that being inclusive in my research aligned well with the ways in which peers organize online and offline—many peers reported seeking similarity with peers beyond diagnostic labels. Moreover, transdiagnostic approaches to treatment are emerging as a new paradigm based on neuroscientific insights that common underlying factors could contribute to a variety of diagnoses [92].

Transdiagnostic approaches are therefore likely to be more successful than diagnosis-specific treatments at scaling to mainstream audiences. Overall, working with peers across a range of mental illness experiences can be an ecologically valid research strategy and one that can open up exciting opportunities for building communities based on shared desire for emotional support.

9.2.2 *Ethics*

I anticipated and actively reduced many potential burdens and risks of my research through my choice of methods, study design, consent documents, data collection materials, and reports. I present the following lessons learned for strong ethical practice:

Participants must be given appropriate tools to express themselves and protect themselves from harm. People who have experienced mental illness, or are taking psychiatric medications, or have had traumatic experiences, are extremely susceptible to harm during the research process. It is imperative to take the utmost care in collecting data by giving participants appropriate tools to express themselves with agency, and to protect themselves from undue harm. I took several approaches to increasing the agency and safety of my participants—the following strategies pertain to interviewing; my safety procedures for the chat study are described above (6.2.4). Firstly, during interviews, I gave participants multiple ways to express themselves to increase their opportunities to drive the process. The design activity in my first study, based on Jill Woelfer's work with homeless young people [256], was meant to encourage people to express themselves visually and to drive the envisioning process. Secondly, I took care in designing my research instruments to have a very clear rationale for every question I asked, with an understanding that any question related to sensitive issues could cause undue harm. I only asked questions in so far as I could reasonably expect the answers to reveal something about experiences with technology. Thirdly, I carefully checked in with my participant throughout the interview to ask their permission to discuss a topic with them, especially when I observed or anticipated that a question was causing discomfort. My prior experience working with sensitive populations (e.g., [156]), taught me to also give space to people to tell stories or share experiences that they desire to tell as a form of catharsis or social connection.

Flexibility, transparency, and sensitivity are key in this research domain. Many people who experience mental illness are socioeconomically disadvantaged, and often have other functional impairments. Considering accessibility in all aspects of research can help researchers to

be inclusive. In conducting interviews at various stages of my research, I gave participants choices of where to conduct the interviews. I mostly visited people's homes, however, some people preferred phone calls, and some preferred to come to the university. I also went to peer support group meetings to conduct interviews where it was most convenient for people. I even conducted an interview over instant messaging at the request of a participant. When appropriate, I made other adjustments to my process, such as hiring an ASL interpreter to translate between English and ASL for an interview.

Societal stigma motivates strong confidentiality practices. Risk of disclosure of identifiable information can lead to participants with mental illness being stigmatized. Therefore, I refrained from listing participants' potentially identifiable details—such as illness, comorbid condition, age, and gender—in my summary tables; rather, I provide pooled data. In this dissertation, I used pseudonyms when reporting participant quotes. I also do not provide individual details of participant diagnoses and demographics in the quotes to protect the identity of my participants. However, I stayed true to the data pertaining to my research questions and describe technology use and symptoms experienced by the participant as context.

9.2.3 *Evaluating outcomes*

I observed outcomes on a very short time scale of two weeks. Moreover, my outcome measures focused on illness reduction, rather than wellbeing and functioning, which are important factors in mental health often overlooked in technology evaluations [240]. Quantitative ways of measuring such factors, such as observing changes in thoughts and feelings associated with specific skills, could further my design insight into the active mechanisms of guided chat, and allow me to test theories of change [135]. Another avenue for future work is to investigate long-term depression and anxiety outcomes, including at 3-, 6-, and 12-month follow-up times.

Evaluating skill acquisition over time might be particularly important because skills are an important factor in mental health treatment outcomes [125,127]. Future work can examine whether guided peer support chats could be designed as a "reflective practicum" [230] wherein peers master coping skills together in supportive chats, that they subsequently generalize to other contexts in everyday life. Such studies could also help us to understand whether and under what conditions chat guidance can be faded from chats.

Supportive peer interactions using psychotherapy techniques helped my participants to experience change when facing emotional distress. However, the short time span prevented me from observing actual changes in behavior that can take weeks or months. In the future, I would like to use longer-term methods for capturing behaviors, such as diaries or experience sampling, that could improve my understanding of how changes in beliefs and feelings influence behaviors.

9.2.4 *Mid-fidelity prototypes*

The current work demonstrates insights from mid-fidelity Google Docs prototypes. This type of prototype allowed me to quickly gather rich feedback on guided and unguided chats and to demonstrate challenges and opportunities of guidance. It also allowed me to deploy a networked, shared prototype quickly and iterate on it rapidly. However, it limited the extent to which I could enforce the guidance, and deliver it in engaging and flexible ways. Despite the limited prototypes, the Google Docs platform did not discourage participants from engaging in the chats, and therefore did not appear to substantially interfere with the research procedures or outcomes.

Working with mid-fidelity prototypes also limited the number of participants that I could engage in my field experiment due to logistical challenges of coordinating 20 pairs of peers over multiple time zones without any automated system support—I manually scheduled, coordinated, and reminded chat partners for the duration of the study. Future work using a chat application could further expand my insights by observing clinically and statistically significant outcomes for larger samples of people experiencing mental illness. In the future, I would like to develop a chat application for both desktop and mobile environments that explores a balance of guided and unguided chat, and appropriate mechanisms for delivering the guidance in real-time.

I have begun exploring both web and mobile application designs for future systems. In the web app implementation, I designed the chat guidance as suggested phrase buttons (e.g., “I’m thinking”) that can be selected by the user to begin their message (Figure 9.2.1). In this app, the prompts gently nudge users toward constructive use of psychotherapy techniques throughout the chat, and allow users to interpolate open-ended chat when desired. The display of these suggestions is choreographed by a simple if-then logic that sequences the suggestions and alternates between reflective and expressive suggestions depending on the last selection made by the chat partner. This web application is in the early prototype stage.

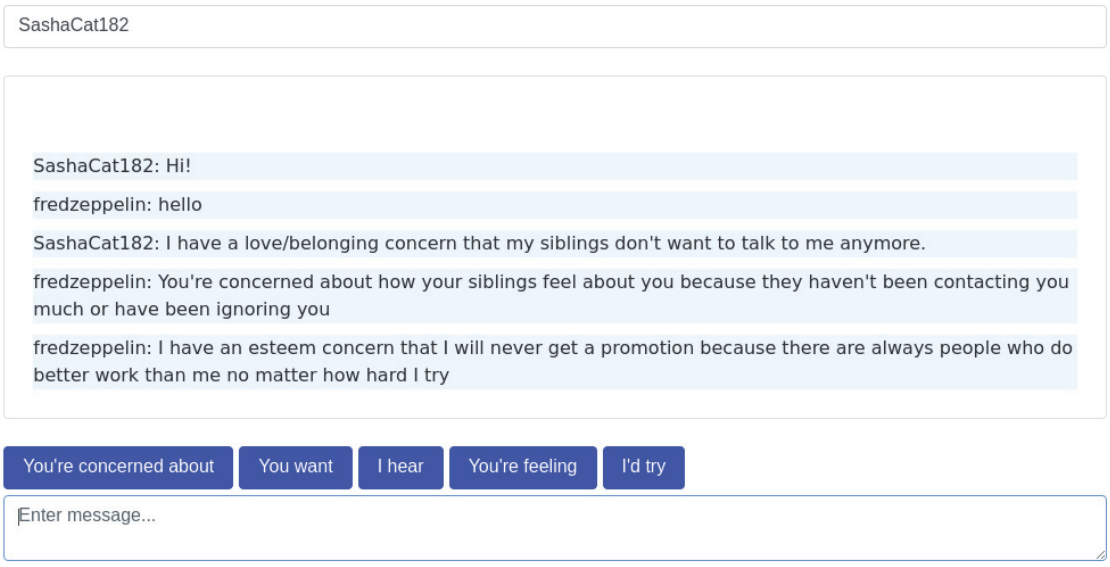


Figure 9.2.1 Chatback web prototype with chat guidance in dark blue suggestion buttons above text box.

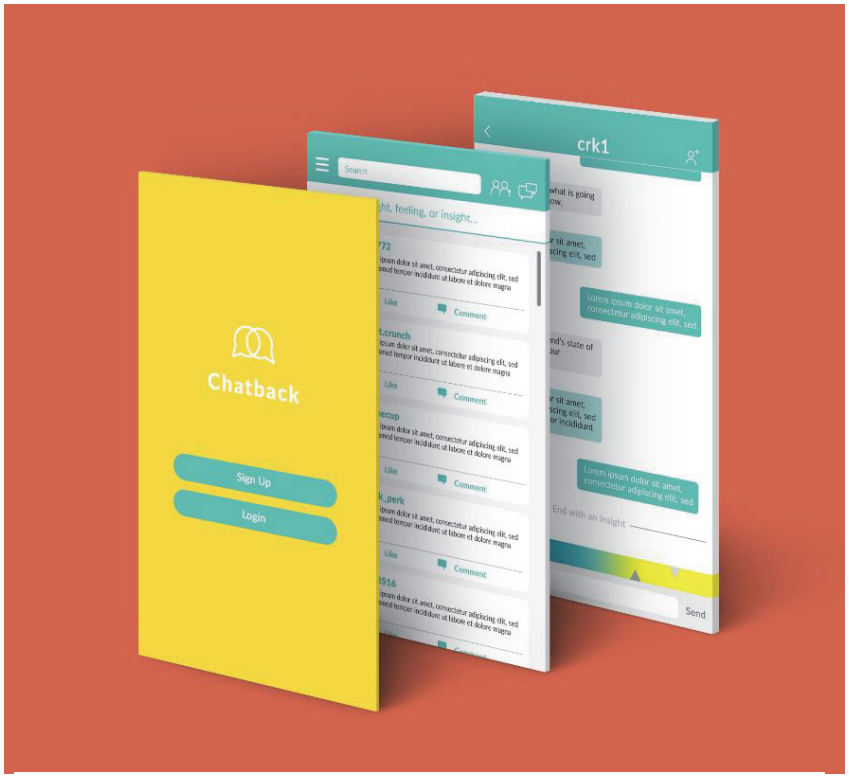


Figure 9.2.2 Chatback mobile application with chat guidance implemented as a conversational agent facilitating peer-to-peer chats. Mood meter shown at bottom of the screen furthest right.

In the mobile application, I designed the chat guidance as a conversational agent that delivers prompts to choreograph the chat between two peers (Figure 9.2.2). Rather than positioning the conversational agent as the entity whom the user queries for help (e.g., Woebot [97]), the agent is a third-party facilitator that guides the chat partners to use psychotherapy techniques with each other. I am also experimenting with ways to encourage mutual awareness of each other's mood throughout the chat by including a mood meter that users can adjust as their mood changes during the chat. I designed this feature as an alternative form of feedback on accurate empathy, in lieu of underlining replies that resonate, so that the partners can communicate the influence of their support on one another. I also designed onboarding, buddy lists, and chat archives to experiment with issues of scaling this application to broad audiences. This mobile application is in the mock-up stage.

As I move toward scalable implementations of Chatback, there are several unanswered questions that need to be addressed. One of the primary questions is how to balance **autonomy and fidelity**; that is, finding the appropriate role of chat guidance in promoting user autonomy to freely chat versus promoting fidelity to psychotherapy techniques in a theoretically based framework. Another question is how to balance **institutional authority and personal identity** in disseminating Chatback. There is exciting potential to partner with trusted institutions such as counseling centers on university campuses, cultural and community centers, and perhaps even health care organizations (e.g., Kaiser Permanente) to disseminate Chatback. Perhaps I could adopt a licensing model so that institutions could apply for a license to offer Chatback to their clients or community members. The advantage of licensing could be that users trust these institutions and feel safe knowing that the technology is integrated with professional care and/or matches their cultural values. However, it is unclear whether institutional oversight might detract from the radical roots of a peer intervention, and make users fearful of unwanted clinical intervention or other repercussions. Moreover, it is unclear what role institutions *should* have or *desire* to have in ensuring safety, matching chat partners, using chat data, and other areas of dissemination and use. Ultimately, the design solution must grapple with these questions—as prior efforts have demonstrated (e.g., [124]), digital mental health interventions face complex issues with scale. Understanding and perhaps *inventing* layers of institutional support for such interventions is crucial to their success.

9.2.5 *Community participation*

As a participant for the past three years in Mad Campus, the student-led support meeting for peers with mental health challenges on campus, I experienced first-hand the value of peer support. I also felt the tension between being a researcher in this domain, and a member of the community. I was transparent about my research and my peers supported me in continuing to take part in the group. To make a clear distinction between my personal and professional interests in peer support, I collected data from a different peer support group off-campus for my interview study. I am currently drafting a short book containing my participant's design work and stories to share back my knowledge to peer communities and general audiences. I have admired Jill Woelfer's dedication to building public awareness through her research [256], and I would like to do the same. Sharing my work to a general audience may also be an opportunity to connect my professional role as a researcher with my personal role as an advocate.

9.3 KEY CONTRIBUTIONS

I make three types of contributions to the field of human-computer interaction: conceptual, artifact, and empirical. According to Wobbrock and Kientz [254], **conceptual contributions** "consist of new or improved concepts, definitions, models, principles, or frameworks." My contributions of this type are discussed in Chapter 5:

1. An analysis of psychotherapy techniques that expand opportunities for designers to support peers and self-changers in addressing negative thoughts and feelings.
2. A framework for chat guidance that integrates the use of these psychotherapy techniques for collaborative problem solving of troubling situations.
3. Design goals for low-barrier mental health tools that facilitate everyday emotional management.

Building on these conceptual contributions, I make an **artifact contribution**. Wobbrock and Kientz describe these contributions as: "new systems, architectures, tools, toolkits, techniques, sketches, mockups, and envisionments that reveal new possibilities, enable new explorations,

facilitate new insights, or compel us to consider new possible futures" [254]. In this vein, I contribute:

4. Chatback, a tool that guides peers to help each other address in-the-moment negative thoughts and feelings to achieve positive psychological change (Chapter 5).

Distinct from artifact contributions, **empirical contributions** are "evaluated mainly on the importance of their findings and on the soundness of their methods" [254]. The following contributions from this dissertation are empirical:

5. An understanding of the needs and risks of peers using technology for mental health peer support, across a range of experiences of living with mental illness (Chapter 4).
6. Empirical insights into the tradeoffs of guided and unguided peer support chats for mental health, especially in terms of the qualities of supportive chats that should be balanced in design (Chapters 6, 7 and 8).
7. Evidence of the positive effect of peer support chats on experiences of depression and anxiety, troubling mood, perceived closeness to peers, frustration, satisfaction, and effort (Chapters 6, 7 and 8).
8. Evidence of positive psychological change, in the form of increased statements of cognitive and motivational change, promoted by the use of chat guidance (Chapter 8).

The contributions of this work are relevant in the domains of psychology and HCI. Within the HCI domain, I contribute new knowledge of the roles and risks of technology use for mental health peer support, and design considerations for peer-based mental health tools. I also contribute an analysis of psychotherapy techniques and a conceptual framework for delivering those techniques, which can inform the design of low-barrier mental health tools. I also demonstrated how my conceptual and artifact contributions could inform the design of behavior change technologies that leverage psychotherapy techniques beyond the mental health domain.

Within the psychology domain, I contribute to the growing research on peer-based interventions for mental health [14,15,22,23,122]. Specifically, I contribute insights into how to use technology to scaffold fidelity to evidence-based techniques in online chats, and how to

balance fidelity with flexibility in guiding emotional support. I also provide insight into features of peer support chats that promote deep connections, perceptions of safety, and positive change. Furthermore, I contribute insight into how technology design can empower peers to use expert psychotherapy techniques without the need for training or special coaching, which could change the way psychotherapy is delivered. These findings could inform dissemination and implementation scientists (e.g., [36]), especially those of whom are looking to scale care in underserved regions [132].

Another way in which my research may contribute to psychology is in advocating for a social justice orientation to the frontier of digital treatment innovation. I demonstrated that a social justice lens can open up new avenues for treatment innovation, especially for new social practices that promote positive psychological change. Adopting this orientation, I was able to engage with the values and perspectives of the peer support community, and their understanding of mental illness as a complex medical and social construction that needs to be addressed through multiple forms of change—**individual change** through healing the mind and behavior, **social change** through increasing participation in social and civic life, and **political change** through reducing inequities in power between people who receive and provide treatment. Within psychology, orienting mental health technology design toward social justice provides opportunities to achieve these forms of change by using technology to drive more equitable experiences of mental health support and treatment. Moreover, a social justice approach that focuses on strengthening communities, can steer mental health technologies toward "artful integrations" of peers, skills, and technology scaffolds, rather than monolithic interventions. In the next section, I share ideas for future work that can promote such artful integrations.

9.4 Future work: Toward "artful integrations" for mental health

Artful integrations—Suchman's term for situated integrations of technologies and social practices [236]—can provide alternatives to traditional mental health care delivery models that are to a large extent unsustainable. I consider Chatback one attempt at an artful integration for mental health that stitches together the knowledge and practices of peers, the science of evidence-based psychotherapy, and the flexibility of software. Such an integration could be designed in myriad ways, with different emphases and ingredients. For example, in designing Chatback, I de-

emphasized attention to a particular technology, and foregrounded the kind of social practice I wanted to support. Thus, I conceptualized a new framework for blending psychotherapy and peer expertise, rather than developing a particular system or form factor. This artful integration in some ways includes me—as a designer without strong technical expertise but with particular experiences with mental illnesses, my strengths, weaknesses, and biases are part of the fabric of what I envisioned. The future of technology design for mental health provides exciting opportunities to substantially expand the exploration of how to artfully integrate humans and machines for peer-based mental health. I outline a few of these opportunities below.

9.4.1 *Critiquing the teleology of medicine and machines in mental health*

Teleology is "explanation by reference to some purpose," [264] in which the *telos* (i.e., goal), is assumed a priori to be inevitable and in some sense "good." This type of argumentation has been particularly relevant to biological sciences wherein features of natural organisms are difficult to explain without reference to some purpose [4]. In contrast to natural phenomena, the artificial phenomena of medicine and machines are socially constructed, and therefore underspecified in terms of their ultimate purposes or aims. In constructing or designing medicine, for example, the *telos* may often be some notion of "health." In constructing machines, the ultimate *telos* "intelligence" is often sought. Not only are these goals of artificial phenomena underspecified, they have moral and ethical implications that have real consequences for the ways in which technologies intervene in people's lives.

For example, many current approaches to understanding and treating mental illness online involve machine learning techniques that scrape data from social media and online communities without people's consent or involvement [12,54–56]. Such automatic detection of depression, anxiety, and suicidality presents opportunities to use big data to understand digital phenotypes of mental health and to intervene. Yet, without the direct involvement of community members as stakeholders this work contends with complex ethical issues. For example, observing people's sensitive disclosures using machine intelligence does not give peers a chance to actively reject such observation. Machine learning may have unrealized potential to deliver personalized interventions, yet we need to proceed with caution and thoroughly investigate values, attitudes, and perspectives before deploying massive covert observation of these sensitive issues online. In

a recent example of the deployment of machine intelligence in mental health forums *without* community consent was published in The Verge. A prototype of Kokobot, an automated conversational bot trained to detect and intervene on distressed individuals in social networks, sent automated (and unsolicited) offers of help to people it detected were in distress. The experiment backfired, with community members outraged, and quoted saying: "I feel deeply disturbed that they would use a bot to do this" [197]. People must be made aware of the research and commercial products that use their data. Although such machine learning efforts pursue the *telos* of "intelligence" through detecting mental illness, they do so without critical reflection on the values at stake in deploying such intelligence. In particular, these approaches threaten to introduce psychological screening at scale without consent—exactly the type of agenda that psychiatric survivors have historically protested against as a violation of civil rights [141].

Another example is using artificial intelligence to deliver psychotherapy. Woebot[15] and other conversational agents are using natural language processing to detect emotions and psychological needs to deliver personal interventions. Such efforts strive to produce "health" usually narrowly defined in terms of the machine's—rather than human's—capacity for intelligence. When the *telos* of medicine and machines become intertwined, artificial health and intelligence become mutually constitutive in ways that may prematurely constrain sociotechnical futures. An opportunity for future work is to critique the teleology of medicine and machines—notions of health and intelligence—in ways that open up radically different futures for human-computer interaction. One might ask, "Whose notion of health?" or "Whose data shapes this intellegence?"

These questions are difficult because of their political and ethical complexity. In describing the normative function of health in society, Crawford [67] writes:

> "Medicine has assumed a pivotal role in normalizing social life, defining as healthy or unhealthy behaviors or conditions that fall on one side or the other of the boundaries of the constructed norm. From birth to death, medicine inserts itself as an agency of surveillance and intervention – and ultimately, an arbiter of those physical, mental and social properties of a healthy life."

When paired with artificial intelligence, the artifice of health and its use as an "agency of surveillance" could become even more pervasive and embedded in ubiquitous machines. With the

[15] https://woebot.io/

recent emergence of artificial intelligence and mental health projects (e.g., [12,97]), we are at a crucial moment for making visible notions of health and intelligence that drive technology design for mental health. Design methods like Value Scenarios [178], Critical Design [16,105], and Design Noir [82], might be especially helpful in unpacking teleological notions of medicine and machines that help inform more sustainable and ethical artful integrations of these two titans.

9.4.2 *Identifying value tensions*

As one potential avenue for critiquing hegemonic notions of health and intelligence, taking a Value-Sensitive Design [102] approach that identifies value tensions offers a promising starting point. Value tensions are noted in some of the current literature on online mental health interventions. Lederman et al. [139] give an example of foregrounding values in design, using social accountability as a way to frame appropriate moderator-client interactions. Doherty et al. [79] also accounted for values such as client agency and social connection. However, few explicit investigations of values focus on and address conflicts—a core tenant of social-justice oriented design [81] and Value-Sensitive Design [102]. For example, conflicts and tensions could shape how peer support systems reconcile discourse *anonymity*—the ability to change stories and imagine new selves [260]—and feelings of *comfort,* by building an archive of insightful chat transcripts or establishing rapport with a particular chat partner. Value tensions between traditional psychiatric care and alternative grassroots approaches will also shape how tools like Chatback are implemented in real-world contexts. Should such tools be offered and administered by clinics who validate the tool and brand it? Or, made freely available on the internet for anyone? How might values like trust, privacy, and agency be in conflict across these different forms of dissemination? Privacy in particular is understudied yet crucial in the domain of digital mental health.

9.4.3 *Understanding the information life cycle*

Peers within online mental health interventions will be creating, processing, sharing, and erasing information. How does attention to these information tasks influence recovery and everyday emotional management? Currently, we understand little of the information "life cycle" [99] within the mental health recovery process. Online systems present an unprecedented opportunity to observe the information behaviors that characterize mental health self-management. Previous

research on the information work of patients with chronic illness [134], and the social networks of people with depression [20], reveal insights about information management, disclosure, and emotional contagion. Some work has explored the impact of the persistence of information [129], the awareness of emotional state [172], and the speed of interactions [185] on emotions and memory. For example, Yarosh [260] found that *social interactions* were more important to recovery than *efficiency* of information gathering in the context of face-to-face fellowships. Therefore, interactions and time were maximized to provide benefits to people in recovery. These dimensions have different affordances in online versus offline environments—virtual time slows and speeds interactions in real time and asynchronously, virtual space collapses real geographies, and virtual interactions choreograph activities of humans and machines. How do these affordances of online information use shape the recovery journey? Future work can explore the characteristics of information and people's interactions with it that support mental health within online communities.

9.4.4 *Using design to explore the mechanisms of change in psychotherapy*

One of the barriers to innovation in mental health technology is the lack of evidence for why traditional psychotherapies are effective. If we knew exactly why therapies work, we could understand better how to design them. Unfortunately, the clinical community disagrees about the factors that influence patient outcomes [247]. For example, whether therapist style, types of questions, or psychoeducation are necessary for therapeutic change. This lack of consensus or evidence for the mechanisms that are necessary for people to experience change in their symptoms, is problematic for technology designers who must make informed design choices that strike appropriate tradeoffs in terms of user time and effort.

Part of the problem is that therapies like Cognitive Behavioral Therapies (CBT) are tested as complete packages in randomized controlled trials (RCTs). Typically, in the case of CBT, this package means 8 or 12 weeks of treatment delivered according to a standardized treatment manual. Outcomes are measured pre- and post-treatment with little or no indication of change over time, or of the components of treatment that influenced outcomes. This approach has provided overwhelming evidence that CBT works for a range of mental illnesses [47]. However, establishing the efficacy of a treatment with RCTs does not provide evidence of *how* or *why* they

work, only *that* they work. One solution to this problem is for technology designers to create new psychotherapy tools that help scientists observe the effects of different mechanisms on outcomes. We have an opportunity to develop new tools that leverage the "active ingredients" of traditional therapies, and provide evidence of their role in mental health outcomes.

Technology designers have begun to use design methods for understanding and innovating psychotherapies. For example, researchers in human-computer interaction have developed unique principles for designing mental health systems to promote community engagement and adoption in clinical settings [79,80,139]. Matthews and Doherty [154] used an iterative approach to designing a mobile mood diary for teenagers with mood disorders. Doherty et al. [79] have shown how designing more flexible online CBT packages can benefit patients. They demonstrated how design methods are especially important for understanding how to maximize engagement with online interventions. Moreover, the IntelliCare[16] suite of apps is a modular approach to disseminating mental health treatment that encourages frequent and brief engagement with components of behavioral treatments in ways that substantially improve symptoms and engagement [138,171]. The potential drawback is that using design to understand psychotherapy could lead to an overly mechanistic description of interventions, one that loses sight of the social and relational factors that have been shown to be hugely important in influencing mental health [247]. However, all these efforts present an exciting opportunity for technology design to make the components of psychotherapy more sharply observable and measurable.

9.5 Conclusion

This work has demonstrated the following thesis:

Online chat guidance can provide low-barrier access to psychotherapy techniques, help peers to form supportive relationships through deeply insightful chats, and promote positive changes in feelings, thoughts, and motivations.

As demonstrated in **Chapters 6 and 8**, the online chat guidance that I designed enabled peers to have meaningful practice with psychotherapy techniques without the need for prior formal training, coaching, or support from experts. The chat guidance successfully facilitated a "walk-up-

[16] https://intellicare.cbits.northwestern.edu/

and-use" experience for novices who readily applied the techniques within chats to achieve relief from troubling mood, and to change their self-beliefs and motivations. In **Chapters 6 and 7**, I demonstrated that the chat guidance can help peers, who first meet online as strangers, to form supportive relationships through deeply insightful chats that address each other's troubling emotions.

My work has shown that simple prompts based on psychotherapy techniques can enrich supportive chats between strangers, and in short time spans, lead to feelings of relief and friendship. More work is needed to understand how to implement, disseminate, and scale such prompts for everyday emotional management. However, I hope that this dissertation work will motivate future efforts to facilitate new forms of peer-based interventions online that can dramatically increase access to everyday emotional management skills, empower peers to support each other, and build communities of practice that sustain positive psychological change.

REFERENCES

1. Phil Adams, Eric PS Baumer, and Geri Gay. 2014. Staccato social support in mobile health applications. *Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14*, ACM Press, 653–662. http://doi.org/10.1145/2556288.2557297
2. Elena Agapie, Daniel Avrahami, and Jennifer Marlow. 2016. Staying the Course: System-Driven Lapse Management for Supporting Behavior Change. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems - CHI '16*, ACM Press, 1072–1083. http://doi.org/10.1145/2858036.2858142
3. Icek Ajzen. 1985. From Intentions to Actions: A Theory of Planned Behavior. In *Action Control* , Beckmann J. Kuhl J. (ed.). Springer, Berlin, Heidelberg, 11–39. http://doi.org/10.1007/978-3-642-69746-3_2
4. Colin Allen. 2009. Teleological Notions in Biology. *The Stanford Encyclopedia of Philosophy*. Retrieved from https://plato.stanford.edu/archives/win2009/entries/teleology-biology/
5. Tim Althoff, Kevin Clark, and Jure Leskovec. 2016. Large-scale analysis of counseling conversations: An application of natural language processing to mental health. *Tacl*, Section 5. Retrieved from http://arxiv.org/pdf/1605.04462v2.pdf
6. Mario Alvarez-Jimenez, S. Bendall, R. Lederman, et al. 2013. On the HORYZON: Moderated online social therapy for long-term recovery in first episode psychosis. *Schizophrenia Research* 143, 1: 143–149. http://doi.org/10.1016/j.schres.2012.10.009
7. PC Amrhein and WR Miller. 2004. Strength of client commitment language improves with therapist training in motivational interviewing. *Alcoholism: Clinical and Experimental Research* 28, 5. Retrieved May 18, 2015 from https://scholar.google.com/scholar?hl=en&q=Strength+of+client+commitment+language+improves+with+therapist+training+in+motivational+interviewing.&btnG=&as_sdt=1%2C48&as_sdtp=#0
8. G Andersson and P Cuijpers. 2009. Internet-based and other computerized psychological treatments for adult depression: a meta-analysis. *Cognitive behaviour therapy*. Retrieved January 6, 2015 from http://www.tandfonline.com/doi/abs/10.1080/16506070903318960
9. Gerhard Andersson and Nickolai Titov. 2014. Advantages and limitations of Internet-based interventions for common mental disorders. *World Psychiatry* 13, 1: 4–11. http://doi.org/10.1002/wps.20083
10. Timothy R. Apodaca and Richard Longabaugh. 2009. Mechanisms of change in motivational interviewing: A review and preliminary evaluation of the evidence. *Addiction* 104, 5: 705–715. http://doi.org/10.1111/j.1360-0443.2009.02527.x
11. Rita B Ardito and Daniela Rabellino. 2011. Therapeutic alliance and outcome of psychotherapy: historical excursus, measurements, and prospects for research. *Frontiers in psychology* 2: 270. http://doi.org/10.3389/fpsyg.2011.00270
12. Sairam Balani and Munmun De Choudhury. 2015. Detecting and Characterizing Mental Health Related Self-Disclosure in Social Media. *Proceedings of the 33rd Annual ACM Conference Extended Abstracts on Human Factors in Computing Systems - CHI EA '15*, ACM Press, 1373–1378. http://doi.org/10.1145/2702613.2732733

13. Liam J Bannon. 2011. Reimagining HCI: toward a more human-centered perspective. *Interactions* 18, 4: 50–57. http://doi.org/http://doi.acm.org/10.1145/1978822.1978833
14. Azy Barak. 2007. Emotional support and suicide prevention through the Internet: A field project report. *Computers in Human Behavior* 23, 2: 971–984. http://doi.org/10.1016/j.chb.2005.08.001
15. Azy Barak and Nili Bloch. 2006. Factors related to perceived helpfulness in supporting highly distressed individuals through an online support chat. *Cyberpsychology & behavior : the impact of the Internet, multimedia and virtual reality on behavior and society* 9, 1: 60–68. http://doi.org/10.1089/cpb.2006.9.60
16. Shaowen Bardzell, Jeffrey Bardzell, Jodi Forlizzi, John Zimmerman, and John Antanitis. 2012. Critical Design and Critical Theory : The Challenge of Designing for Provocation. *DIS*, 288–297.
17. David H. Barlow, Laura B. Allen, and Molly L. Choate. 2004. Toward a unified treatment for emotional disorders. *Behavior Therapy* 35, 2: 205–230. http://doi.org/10.1016/S0005-7894(04)80036-4
18. David H. Barlow, Todd J. Farchione, Jacqueline R. Bullis, et al. 2017. The Unified Protocol for Transdiagnostic Treatment of Emotional Disorders Compared With Diagnosis-Specific Protocols for Anxiety Disorders. *JAMA Psychiatry* 74, 9: 875. http://doi.org/10.1001/jamapsychiatry.2017.2164
19. Lisa J Barney, Kathleen M Griffiths, Anthony F Jorm, and Helen Christensen. 2006. Stigma about depression and its impact on help-seeking intentions. *The Australian and New Zealand journal of psychiatry* 40, 1: 51–4. http://doi.org/10.1111/j.1440-1614.2006.01741.x
20. LJ Barney, KM Griffiths, and MA Banfield. 2011. Explicit and implicit information needs of people with depression: a qualitative investigation of problems reported on an online depression support forum. *BMC psychiatry*. Retrieved May 18, 2015 from http://www.biomedcentral.com/1471-244X/11/88
21. H Baumeister, L Reichler, M Munzinger, and J Lin. 2014. The impact of guidance on Internet-based mental health interventions — A systematic review. *Internet Interventions* 1, 4: 205–215. http://doi.org/10.1016/j.invent.2014.08.003
22. Amit Baumel. 2015. Online emotional support delivered by trained volunteers: users' satisfaction and their perception of the service compared to psychotherapy. *Journal of Mental Health* 24, 5.
23. Amit Baumel and Stephen M Schueller. 2016. Adjusting an Available Online Peer Support Platform in a Program to Supplement the Treatment of Perinatal Depression and Anxiety. *JMIR: Mental Health* 3, 1: e11: 1–14. http://doi.org/10.2196/mental.5335
24. E. P. Baumer, S. J. Katz, J. E. Freeman, et al. 2012. Prescriptive Persuasion and Open-Ended Social Awareness: Expanding the Design Space of Mobile Health. *Proceedings of the ACM Conference on Computer Supported Cooperative Work (CSCW '12)*: 475–484. Retrieved from doi.acm.org/10.1145/2145204.2145279
25. Eric Baumer. 2015. Reflective Informatics : Conceptual Dimensions for Designing Technologies of Reflection. *Proceedings of the SIGCHI conference on Human factors in computing systems - CHI '15*, 585–594.
26. G. Beck, A. T., Rush, A. J., Shaw, B. F., & Emery. 1979. *Cognitive therapy of depression*. Guilford Press, New York.
27. Aaron Beck. 1963. Thinking and Depression. *Archives of general psychiatry*.

28. Aaron T. Beck. 1987. Cognitive Models of Depression. *Journal of Cognitive Psychotherapy*.
29. AT Beck. 2005. The current state of cognitive therapy: a 40-year retrospective. *Archives of General Psychiatry*. Retrieved January 6, 2015 from http://archpsyc.jamanetwork.com/article.aspx?articleid=1108411
30. Judith Beck. 1995. *Cognitive therapy : basics and beyond*. Guilford Press, New York.
31. Robert N. Bellah, Richard Madsen, William M. Sullivan, Ann Swidler, and Steven M. Tipton. 2008. *Habits of the heart : individualism and commitment in American life*. University of California Press.
32. Samantha L Bernecker, Kaitlin Banschback, Gennarina D Santorelli, and Michael J Constantino. 2017. A Web-Disseminated Self-Help and Peer Support Program Could Fill Gaps in Mental Health Care: Lessons From a Consumer Survey. *JMIR mental health* 4, 1: e5. http://doi.org/10.2196/mental.4751
33. Wendell Berry. 1987. Preserving Wildness. In *Home Economics*. North Point Press.
34. Timothy Bickmore, Amanda Gruber, and Rosalind Picard. 2005. Establishing the computer-patient working alliance in automated health behavior change interventions. *Patient education and counseling* 59, 1: 21–30. http://doi.org/10.1016/j.pec.2004.09.008
35. Nataly Birbeck, Shaun Lawson, Kellie Morrissey, Tim Rapley, and Patrick Olivier. 2017. Self Harmony: ethinking Hackathons to Design and Critique Digital Technologies for Those Affected by Self-Harm. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems - CHI '17*, ACM Press, 146–157. http://doi.org/10.1145/3025453.3025931
36. Deepika Bose, Karen Guan, Ryan M. Beveridge, Timothy R. Fowles, Amanda Jensen-Doss, and Bruce F. Chorpita. 2016. Graduate Clinical Training and Its Role in the Dissemination of Evidence-Based Practice: Expanding the Set of Opportunities. *The Behavior Therapist* 39, 2: 46–50. Retrieved May 28, 2016 from https://www.researchgate.net/publication/296332857_Graduate_Clinical_Training_and_Its_Role_in_the_Dissemination_of_Evidence-Based_Practice_Expanding_the_Set_of_Opportunities
37. Richard E. Boyatzis. 1998. *Transforming qualitative information: Thematic analysis and code development*. Sage.
38. Piet Bracke, Wendy Christiaens, and Mieke Verhaeghe. 2008. Self-Esteem, Self-Efficacy, and the Balance of Peer Support Among Persons With Chronic Mental Health Problems. *Journal of Applied Social Psychology* 38, 2: 436–459. http://doi.org/10.1111/j.1559-1816.2008.00312.x
39. Alain Brunet, Isabeau Bousquet Des Groseilliers, Matthew J. Cordova, and Josef I. Ruzek. 2013. Randomized controlled trial of a brief dyadic cognitivebehavioral intervention designed to prevent PTSD. *European Journal of Psychotraumatology* 4, SUPPL.: 1–11. http://doi.org/10.3402/ejpt.v4i0.21572
40. Richard Buchanan. 2000. Human Dignity and Human Rights : Toward a Human-Centered Framework for Design. 1–22.
41. Eduardo L. Bunge, Charlotte L. Beard, Taylor N. Stephens, Yan Leykin, and Ricardo F. Muñoz. 2017. Mood Management Effects of a Brief Behavioral Activation Internet Intervention. *Journal of Technology in Behavioral Science*: 1–8. http://doi.org/10.1007/s41347-017-0026-2
42. Eduardo L. Bunge, Rachel E. Williamson, Monique Cano, Yan Leykin, and Ricardo F.

Muñoz. 2016. Mood management effects of brief unsupported internet interventions. *Internet Interventions* 5: 36–43. http://doi.org/10.1016/J.INVENT.2016.06.001
43. Brian L. Burke, Hal Arkowitz, and Marisa Menchola. 2003. The Efficacy of Motivational Interviewing: A Meta-Analysis of Controlled Clinical Trials. *Journal of Counsulting and Clinical Psychology* 71, 5: 843–861. http://doi.org/10.1037/0022-006X.71.5.843
44. Moira Burke, Elisabeth Joyce, Tackjin Kim, Vivek Anand, and Robert Kraut. 2007. Introductions and Requests: Rhetorical Strategies That Elicit Response in Online Communities. In *Communities and Technologies 2007*. Springer London, London, 21–39. http://doi.org/10.1007/978-1-84628-905-7_2
45. D D Burns and S Nolen-Hoeksema. 1992. Therapeutic empathy and recovery from depression in cognitive-behavioral therapy: a structural equation model. *Journal of consulting and clinical psychology* 60, 3: 441–9. Retrieved September 18, 2017 from http://www.ncbi.nlm.nih.gov/pubmed/1619098
46. David Burns. 1980. *Feeling good : the new mood therapy*. Morrow, New York.
47. Andrew C Butler, Jason E Chapman, Evan M Forman, and Aaron T Beck. 2006. The empirical status of cognitive-behavioral therapy: a review of meta-analyses. *Clinical psychology review* 26, 1: 17–31. http://doi.org/10.1016/j.cpr.2005.07.003
48. P. Byrne. 2000. Stigma of mental illness and ways of diminishing it. *Advances in Psychiatric Treatment* 6, 1: 65–72. http://doi.org/10.1192/apt.6.1.65
49. John M. (John Millar) Carroll. 2000. *Making use : scenario-based design of human-computer interactions*. MIT Press.
50. Center for Behavioral Health Statistics and Quality. 2015. *Behavioral health trends in the United States: Results from the 2014 National Survey on Drug Use and Health*. Retrieved from http://www.samhsa.gov/data/
51. Judi. Chamberlin. 1988. *On our own : patient-controlled alternatives to the mental health system*. National Empowerment Center.
52. Stevie Chancellor, Tanushree Mitra, and Munmun De Choudhury. 2016. Recovery Amid Pro-Anorexia. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems - CHI '16*, ACM Press, 2111–2123. http://doi.org/10.1145/2858036.2858246
53. Yu Chen and Pearl Pu. 2014. HealthyTogether: exploring social incentives for mobile fitness applications. *Proceedings of the Second International Symposium of Chinese CHI on - Chinese CHI '14*, ACM Press, 25–34. http://doi.org/10.1145/2592235.2592240
54. Munmun De Choudhury. 2015. Anorexia on Tumblr. *Proceedings of the 5th International Conference on Digital Health 2015 - DH '15*, ACM Press, 43–50. http://doi.org/10.1145/2750511.2750515
55. Munmun De Choudhury and Sushovan De. 2014. Mental Health Discourse on reddit: Self-Disclosure, Social Support, and Anonymity. *Proceedings of the Eighth International AAAI Conference on Weblogs and Social Media, ICWSM*.
56. Munmun De Choudhury, Emre Kiciman, Mark Dredze, Glen Coppersmith, and Mrinal Kumar. 2016. Discovering Shifts to Suicidal Ideation from Mental Health Content in Social Media. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems - CHI '16*, ACM Press, 2098–2110. http://doi.org/10.1145/2858036.2858207
57. Henrik Bærbak Christensen and Jakob Bardram. 2002. Supporting Human Activities - Exploring Activity-Centered Computing. *Proceedings of the 4th international conference on Ubiquitous Computing (UbiComp '02)*, Springer, 107–116. Retrieved November 8, 2017 from

https://dl.acm.org/citation.cfm?id=741475&CFID=1003620544&CFTOKEN=31426523
58. Andrea Civan, David W Mcdonald, Kenton T Unruh, and Wanda Pratt. 2009. Locating Patient Expertise in Everyday Life. *Proceedings of the ACM 2009 international conference on Supporting group work - GROUP '09*, 291–300.
59. Andrea Civan and Wanda Pratt. 2007. Threading together patient expertise. *American Medical Informatics Association Annual Symposium proceedings: AMIA*, 140–4. Retrieved May 18, 2015 from http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=2655889&tool=pmcentrez&rendertype=abstract
60. Jane Clemensen, Simon B Larsen, Morten Kyng, and Marit Kirkevold. 2007. Participatory design in health sciences: Using cooperative experimental methods in developing health services and computer technology. *Qualitative health research* 17, 1: 122–30. http://doi.org/10.1177/1049732306293664
61. Sunny Consolvo, Katherine Everitt, Ian Smith, and James A. Landay. 2006. Design requirements for technologies that encourage physical activity. *Proceedings of the SIGCHI conference on Human Factors in computing systems - CHI '06*, ACM Press, 457. http://doi.org/10.1145/1124772.1124840
62. Sunny Consolvo, Ryan Libby, Ian Smith, et al. 2008. Activity sensing in the wild: A field trial of Ubifit Garden. *Proceeding of the twenty-sixth annual CHI conference on Human factors in computing systems - CHI '08*, ACM Press, 1797. http://doi.org/10.1145/1357054.1357335
63. Juliet M. Corbin and Anselm Strauss. 1988. *Unending work and care: Managing chronic illness at home*. Jossey-Bass.
64. David Coyle, Conor Linehan, Karen Tang, and Sian Lindley. 2012. Interaction design and emotional wellbeing. *Proceedings of the 2012 ACM annual conference extended abstracts on Human Factors in Computing Systems Extended Abstracts - CHI EA '12*: 2775. http://doi.org/10.1145/2212776.2212718
65. Susan E Cozzens. 2007. Distributive justice in science and technology policy. *Science and Public Policy* 34, 2: 85–94. http://doi.org/10.3152/030234207X193619
66. Michelle G. Craske, Timothy A. Brown, Elizabeth A. Meadows, and David H. Barlow. 1995. Uncued and cued emotions and associated distress in a college sample. *Journal of Anxiety Disorders* 9, 2: 125–137. http://doi.org/10.1016/0887-6185(94)00036-0
67. Robert Crawford. 2006. Health as a meaningful social practice. *Health:: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine* 10, 4: 401–420. http://doi.org/10.1177/1363459306067310
68. T. J. D'Zurilla and A. M. Nezu. 2010. Problem-solving therapy. In *Handbook of cognitive-behavioral therapies*. 197–225.
69. Gavin Daker-White and Anne Rogers. 2013. What is the potential for social networks and support to enhance future telehealth interventions for people with a diagnosis of schizophrenia: a critical interpretive synthesis. *BMC psychiatry* 13, 1: 279. http://doi.org/10.1186/1471-244X-13-279
70. G A Dakof and S E Taylor. 1990. Victims' perceptions of social support: what is helpful from whom? *Journal of personality and social psychology* 58, 1: 80–9. Retrieved September 19, 2017 from http://www.ncbi.nlm.nih.gov/pubmed/2308075
71. Meri Nana-Ama. Danquah. 1998. *Willow weep for me : a black woman's journey through depression, a memoir*. Norton.

72. Larry Davidson, Chyrell Bell Amy, Kimberly Guy, and Rebecc a Mill Er. 2012. Peer support among persons with severe mental illnesses: A review of evidence and experience. *World Psychiatry* 11, 2: 123–128. http://doi.org/10.1016/j.wpsyc.2012.05.009
73. Larry Davidson, Matthew Chinman, Bret Kloos, Richard Weingarten, David Stayner, and Jacob Kraemer Tebes. 1999. Peer Support Among Individuals With Severe Mental Illness: A Review of the Evidence. *Clinical Psychology: Science and Practice* 6, 2: 165–187. http://doi.org/10.1093/clipsy.6.2.165
74. Larry Davidson, Matthew Chinman, David Sells, and Michael Rowe. 2006. Peer support among adults with serious mental illness: A report from the field. *Schizophrenia Bulletin* 32, 3: 443–450. http://doi.org/10.1093/schbul/sbj043
75. Lennard J. Davis. 2013. *The disability studies reader*. Routledge.
76. Cindy-Lee Dennis. 2003. Peer support within a health care context: a concept analysis. *International journal of nursing studies* 40, 3: 321–332. http://doi.org/10.1016/S0020-7489(02)00092-5
77. Alan. Dix, Janet E. Finlay, Gregory D. Abowd, and Russell Beale. 2004. *Human-computer interaction*. Pearson/Prentice-Hall. Retrieved November 8, 2017 from https://dl.acm.org/citation.cfm?id=1203012
78. Roger Dobson. 1998. CD-Rom treats the blues. *The Independent*. Retrieved from http://www.independent.co.uk/news/cd-rom-treats-the-blues-1142258.html
79. G Doherty, D Coyle, and J Sharry. 2012. Engagement with online mental health interventions: an exploratory clinical study of a treatment for depression. *Proceedings of the SIGCHI conference on Human factors in computing systems - CHI '12*, 1421–1430. Retrieved January 6, 2015 from http://dl.acm.org/citation.cfm?id=2208602
80. Gavin Doherty, David Coyle, and Mark Matthews. 2010. Design and evaluation guidelines for mental health technologies. *Interacting with Computers* 22, 4: 243–252. http://doi.org/10.1016/j.intcom.2010.02.006
81. Lynn Dombrowski, Ellie Harmon, and Sarah Fox. 2016. Social Justice-Oriented Interaction Design. *Proceedings of the 2016 ACM Conference on Designing Interactive Systems - DIS '16*: 656–671. http://doi.org/10.1145/2901790.2901861
82. Anthony Dunne and Fiona Raby. 2001. *Design noir : the secret life of electronic objects*. August Birkhäuser, London . Retrieved March 19, 2013 from http://uwashington.worldcat.org.offcampus.lib.washington.edu/title/design-noir-the-secret-life-of-electronic-objects/oclc/48458070&referer=brief_results
83. Mattila E., Parkka J., Merilahti J., et al. 2008. Mobile diary for wellness management - Results on usage and usability in two user studies. *IEEE Trans Inf Technol Biomed IEEE Transactions on Information Technology in Biomedicine* 12, 4: 501–512.
84. Pelle Ehn. 1989. *Work-oriented design of computer artifacts*. Almqvist & Wiksell International, Stockholm. Retrieved March 19, 2013 from http://uwashington.worldcat.org.offcampus.lib.washington.edu/title/work-oriented-design-of-computer-artifacts/oclc/23236553&referer=brief_results
85. Ashley B. Elefant, Omar Contreras, Ricardo F. Muñoz, Eduardo L. Bunge, and Yan Leykin. 2017. Microinterventions produce immediate but not lasting benefits in mood and distress. *Internet Interventions* 10: 17–22. http://doi.org/10.1016/j.invent.2017.08.004
86. Robert Elliott. 1985. Helpful and nonhelpful events in brief counseling interviews: An empirical taxonomy. *Journal of Counseling Psychology* 32, 3: 307–322. http://doi.org/10.1037/0022-0167.32.3.307

87. Ellen A. Ensher, Craig Thomas, and Susan E. Murphy. 2001. Comparison of Traditional, Step-Ahead, and Peer Mentoring on Protégés' Support, Satisfaction, and Perceptions of Career Success: A Social Exchange Perspective. *Journal of Business and Psychology* 15, 3: 419–438. http://doi.org/10.1023/A:1007870600459
88. Daniel A. Epstein, Bradley H. Jacobson, Elizabeth Bales, David W. McDonald, and Sean A. Munson. 2015. From "nobody cares" to "way to go!": A design framework for social sharing in personal informatics. *Proceedings of the 18th ACM Conference on Computer Supported Cooperative Work & Social Computing - CSCW '15*, 1622–1636. http://doi.org/10.1145/2675133.2675135
89. A Etzioni. 1998. *The Essential Communitarian Reader*. Lanham: Rowman & Littlefield.
90. Gunther Eysenbach. 2005. The law of attrition. *Journal of medical Internet research* 7, 1: e11. http://doi.org/10.2196/jmir.7.1.e11
91. Gunther Eysenbach, John Powell, Marina Englesakis, Carlos Rizo, and Anita Stern. 2004. Health related virtual communities and electronic support groups: systematic review of the effects of online peer to peer interactions. *BMJ (Clinical research ed.)* 328, 7449: 1166. http://doi.org/10.1136/bmj.328.7449.1166
92. Todd J Farchione, Christopher P Fairholme, Kristen K Ellard, et al. 2012. Unified protocol for transdiagnostic treatment of emotional disorders: a randomized controlled trial. *Behavior therapy* 43, 3: 666–78. http://doi.org/10.1016/j.beth.2012.01.001
93. Joseph L Fava, Laurie Ruggiero, and Diane M Grimley. 1998. The Development and Structural Confirmation of the Rhode Island Stress and Coping Inventory. *Journal of Behavioral Medicine* 21, 6.
94. Jennifer Fereday and Eimear Muir-Cochrane. 2006. Demonstrating Rigor Using Thematic Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme Development. *International Journal of Qualitative Methods* 5, 1: 80–92. http://doi.org/10.1177/160940690600500107
95. David M Fergusson, Joseph M Boden, and L John Horwood. 2007. Recurrence of major depression in adolescence and early adulthood, and later mental health, educational and economic outcomes. *The British journal of psychiatry : the journal of mental science* 191: 335–42. http://doi.org/10.1192/bjp.bp.107.036079
96. Joseph Firth, Jack Cotter, John Torous, Sandra Bucci, Josh a. Firth, and Alison R. Yung. 2015. Mobile Phone Ownership and Endorsement of "mHealth" Among People With Psychosis: A Meta-analysis of Cross-sectional Studies. *Schizophrenia Bulletin* 42, 2: sbv132. http://doi.org/10.1093/schbul/sbv132
97. Kathleen Kara Fitzpatrick, Alison Darcy, and Molly Vierhile. 2017. Delivering Cognitive Behavior Therapy to Young Adults With Symptoms of Depression and Anxiety Using a Fully Automated Conversational Agent (Woebot): A Randomized Controlled Trial. *JMIR mental health* 4, 2: e19. http://doi.org/10.2196/mental.7785
98. Rowanne Fleck and Geraldine Fitzpatrick. 2010. Reflecting on reflection: framing a design landscape. *Proceedings of the 22nd Conference of the Computer-Human Interaction Special Interest Group of Australia on Computer-Human Interaction - OZCHI '10*, ACM Press, 216. http://doi.org/10.1145/1952222.1952269
99. Luciano Floridi. 2010. *Information a very short introduction*. Oxford University Press, Oxford ;New York.
100. Michel Foucault. 1988. *Madness and civilization : a history of insanity in the Age of Reason*. Vintage Books.

101. Brigitte N. Frederick. 1999. Fixed-, random-, and mixed-effects ANOVA models: A user-friendly guide for increasing the generalizability of ANOVA results. In *Advances in Social Science Methodology*, Bruce Thompson (ed.). JAI Press, Stamford, Connecticut, 111–122. Retrieved from http://eric.ed.gov/?id=ED426098
102. Batya Friedman, Peter H Kahn, and Alan Borning. 2003. Value Sensitive Design and Information Systems. 1–27.
103. Ruben Fukkink. 2011. Peer Counseling in an Online Chat Service: A Content Analysis of Social Support. *Cyberpsychology, Behavior, and Social Networking* 14, 4: 247–251. http://doi.org/10.1089/cyber.2010.0163
104. M Galanter. 1988. Zealous self-help groups as adjuncts to psychiatric treatment: a study of Recovery Inc. *American journal of Psychiatry*. Retrieved May 18, 2015 from http://ajp.psychiatryonline.org/doi/abs/10.1176/ajp.145.10.1248
105. William W. Gaver, John Bowers, Andrew Boucher, et al. 2004. The drift table. *Extended abstracts of the 2004 conference on Human factors and computing systems - CHI '04*, ACM Press, 885. http://doi.org/10.1145/985921.985947
106. Katrina Gay, John Torous, Adam Joseph, Anand Pandya, and Ken Duckworth. 2016. Digital Technology Use Among Individuals with Schizophrenia: Results of an Online Survey. *JMIR Mental Health* 3, 2: e15. http://doi.org/10.2196/mental.5379
107. Cesar Gonzalez-Blanch, Jose Manuel Rodriguez-Sanchez, Rocio Perez-Iglesias, et al. 2010. First-episode schizophrenia patients neuropsychologically within the normal limits: evidence of deterioration in speed of processing. *Schizophrenia research* 119, 1–3: 18–26. http://doi.org/10.1016/j.schres.2010.02.1072
108. Lisa Graham, Anthony Tang, and Carman Neustaedter. 2016. Help Me Help You: Shared Reflection for Personal Data. *Proceedings of the 19th International Conference on Supporting Group Work - GROUP '16*, ACM Press, 99–109. http://doi.org/10.1145/2957276.2957293
109. Kathleen M Griffiths, Alison L Calear, and Michelle Banfield. 2009. Systematic review on Internet Support Groups (ISGs) and depression (1): Do ISGs reduce depressive symptoms? *Journal of medical Internet research* 11, 3: e40. http://doi.org/10.2196/jmir.1270
110. Andrea Grimes, Martin Bednar, Jay David Bolter, and Rebecca E. Grinter. 2008. EatWell: sharing nutrition-related memories in a low-income community. *Proceedings of the ACM 2008 conference on Computer supported cooperative work - CSCW '08*, ACM Press, 87. http://doi.org/10.1145/1460563.1460579
111. James J. Gross and Oliver P. John. 2003. Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology* 85, 2: 348–362. http://doi.org/10.1037/0022-3514.85.2.348
112. G. Potter. H. Chung, C. Harding. 2016. Clinical severity of depression using machine learning among users of a digital mental health platform. *8th Scientific Meeting of the International Society for Research on Internet Interventions*.
113. Donna Jeanne. Haraway. 1991. *Simians, cyborgs, and women : the reinvention of nature*. Routledge.
114. Sandra G. Harding. 2006. *Science and social inequality : feminist and postcolonial issues*. University of Illinois Press.
115. Sandra G. Hart and Lowell E. Staveland. 1988. Development of NASA-TLX (Task Load Index): Results of Empirical and Theoretical Research. *Advances in psychology* 52: 139–

183. http://doi.org/10.1016/S0166-4115(08)62386-9
116. W. Hartzler, A., Taylor, M., Park, A., Griffiths, T., Backonja, U., McDonald, D., Wahbeh, S., Brown, C., Pratt. 2016. Leveraging cues from person-generated health data for peer matching in online communities. *Journal of the American Medical Informatics Association : JAMIA*. http://doi.org/10.1093/jamia/ocv175
117. Andrea Hartzler and Wanda Pratt. 2011. Managing the personal side of health: how patient expertise differs from the expertise of clinicians. *Journal of medical Internet research* 13, 3: e62. http://doi.org/10.2196/jmir.1728
118. Marc Hassenzahl. 2013. User experience and experience design. *Encyclopedia of Human-Computer Interaction, 2nd Ed.*, January 2011: 63–112. Retrieved from http://www.free-knowledge.org/encyclopedia/user_experience_and_experience_design.html
119. Ha He, Saul Greenberg, and Em Huang. 2010. One size does not fit all: applying the transtheoretical model to energy feedback technology design. *Proc. SIGCHI Conference on Human Factors in Computing Systems - CHI '10*, 927–936. http://doi.org/10.1145/1753326.1753464
120. J Hettema, J Steele, and WR Miller. 2005. Motivational interviewing. *Annual review of clinical psychology* 1: 91–111.
121. Suleiman Higgins, James J. Tashtoush. 1994. An aligned rank transform test for interaction. *Nonlinear World* 1, 2: 201–211.
122. Peter F Hitchcock, Evan M Forman, and James D Herbert. 2016. Best Learning Practices for Internet Treatments. Retrieved May 28, 2016 from https://www.researchgate.net/publication/286938330_Best_Learning_Practices_for_Internet_Treatments
123. Marcus AD. Hoch DB, Norris D, Lester JE. 1999. Information exchange in an epilepsy forum on the World Wide Web. *Seizure* 8, 1: 30–34.
124. Chris Hollis, Richard Morriss, Jennifer Martin, et al. 2015. Technological innovations in mental healthcare: harnessing the digital revolution. *The British journal of psychiatry : the journal of mental science* 206, 4: 263–5. http://doi.org/10.1192/bjp.bp.113.142612
125. Steven D. Hollon, Michael O. Stewart, and Daniel Strunk. 2006. Enduring Effects for Cognitive Behavior Therapy in the Treatment of Depression and Anxiety. *Annual Review of Psychology* 57, 1: 285–315. http://doi.org/10.1146/annurev.psych.57.102904.190044
126. Thomas K. Houston, Lisa A. Cooper, and Daniel E. Ford. 2002. Internet support groups for depression: a 1-year prospective cohort study. *American Journal of Psychiatry* 159, 12: 2062–2068. Retrieved May 18, 2015 from http://ajp.psychiatryonline.org/doi/abs/10.1176/appi.ajp.159.12.2062
127. Natalie E Hundt, Joseph Mignogna, Cathy Underhill, and Jeffrey A Cully. 2013. The Relationship Between Use of CBT Skills and Depression Treatment Outcome : A Theoretical and Methodological Review of the Literature. *Behavior Therapy* 44, 1: 12–26. http://doi.org/10.1016/j.beth.2012.10.001
128. International Association of Peer Supporters. 2012. National Practice Guidelines for Peer Supporters. Retrieved from http://inaops.org/national-standards/
129. Ellen Isaacs, Artie Konrad, and Alan Walendowski. 2013. Echoes from the past: how technology mediated reflection improves well-being. *Proceedings of the SIGCHI conference on Human factors in computing systems - CHI '13*, 1071–1080. http://doi.org/10.1145/2470654.2466137
130. Kay R. Jamison. 1996. *An unquiet mind.* Vintage Books.

131. Katy Kaplan, Mark S. Salzer, Phyllis Solomon, Eugene Brusilovskiy, and Pamela Cousounis. 2011. Internet peer support for individuals with psychiatric disabilities: A randomized controlled trial. *Social Science and Medicine* 72, 1: 54–62. http://doi.org/10.1016/j.socscimed.2010.09.037
132. Debra Kaysen, Kristen Lindgren, Goran A. Sabir Zangana, Laura Murray, Judy Bass, and Paul Bolton. 2013. Adaptation of cognitive processing therapy for treatment of torture victims: Experience in Kurdistan, Iraq. *Psychological Trauma: Theory, Research, Practice, and Policy* 5, 2: 184–192. http://doi.org/10.1037/a0026053
133. Alan E. Kazdin and Stacey L. Blase. 2011. Rebooting Psychotherapy Research and Practice to Reduce the Burden of Mental Illness. *Perspectives on Psychological Science* 6, 1: 21–37. http://doi.org/10.1177/1745691610393527
134. Predrag Klasnja, Andrea Civan Hartzler, Kent T. Unruh, and Wanda Pratt. 2010. Blowing in the wind: unanchored patient information work during cancer care. *CHI'10*, 193–202.
135. Predrag Klasnja, Eric B. Hekler, Elizabeth V. Korinek, John Harlow, and Sonali R. Mishra. 2017. Toward Usable Evidence: Optimizing Knowledge Accumulation in HCI Research on Health Behavior Change. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems - CHI '17*, ACM Press, 3071–3082. http://doi.org/10.1145/3025453.3026013
136. Kurt Kroenke, Robert L. Spitzer, and Janet B. W. Williams. 2001. The PHQ-9: Validity of a Brief Depression Severity Measure. *Journal of General Internal Medicine* 16, 9: 606–613. http://doi.org/10.1046/j.1525-1497.2001.016009606.x
137. Julian Lamont and Christi Favor. 2017. Distributive Justice. *The Stanford Encyclopedia of Philosophy*.
138. Emily G. Lattie, Stephen M. Schueller, Elizabeth Sargent, et al. 2016. Uptake and usage of IntelliCare: A publicly available suite of mental health and well-being apps. *Internet Interventions* 4, 2: 152–158. http://doi.org/10.1016/j.invent.2016.06.003
139. R. Lederman, G. Wadley, J. Gleeson, S. Bendall, and M. Alvarez-Jimenez. 2014. Moderated Online Social Therapy : Designing and Evaluating. *ACM Transactions on Computer-Human Interaction* 21, 1: 1–26.
140. Darrin R. Lehman and Kenneth J. Hemphill. 1990. Recipients' Perceptions of Support Attempts and Attributions for Support Attempts that Fail. *Journal of Social and Personal Relationships* 7, 4: 563–574. http://doi.org/10.1177/0265407590074012
141. Bradley Lewis. 2013. A Mad Fight : Psychiatry and Disability Activism. In *The Disability Studies Reader*, Lennard J. Davis (ed.).
142. Clayton Lewis. 2005. HCI for people with cognitive disabilities. *ACM SIGACCESS Accessibility and Computing*, 83: 12–17. http://doi.org/10.1145/1102187.1102190
143. Guo Li, Xiaomu Zhou, Tun Lu, Jiang Yang, and Ning Gu. 2016. SunForum: Understanding Depression in a Chinese Online Community. *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing - CSCW '16*: 514–525. http://doi.org/10.1145/2818048.2819994
144. Youn-Kyung Lim, Erik Stolterman, and Josh Tenenberg. 2008. The Anatomy of Prototypes: Prototypes as Filters, Prototypes as Manifestations of Design Ideas. *ACM Transactions on Computer-Human Interaction* 15, 2: 1–27. http://doi.org/10.1145/1375761.1375762
145. J. Long, K., Bakewell, L., McNaney, R., Vasileiou, K., Atkinson, M., Barreto, M., Barnett, J., Wilson, M., Lawson, S., & Vines. 2017. Connecting Those That Care:

Designing for Transitioning, Talking, Belonging and Escaping. *Proceedings of the 35th Annual ACM Conference on Human Factors in Computing Systems (CHI'17)*: 1339–1351. http://doi.org/10.1145/3025453.3025715

146. Kate R Lorig and Halsted Holman. 2003. Self-management education: history, definition, outcomes, and mechanisms. *Annals of behavioral medicine : a publication of the Society of Behavioral Medicine* 26, 1: 1–7. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12867348
147. Bernd Löwe, Kurt Kroenke, Wolfgang Herzog, and Kerstin Gräfe. 2004. Measuring depression outcome with a brief self-report instrument: sensitivity to change of the Patient Health Questionnaire (PHQ-9). *Journal of affective disorders* 81, 1: 61–6. http://doi.org/10.1016/S0165-0327(03)00198-8
148. Haley MacLeod, Kim Oakes, Danika Geisler, Kay Connelly, and Katie Siek. 2015. Rare World: Towards Technology for Rare Diseases. *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems - CHI '15*, ACM Press, 1145–1154. http://doi.org/10.1145/2702123.2702494
149. J MalouffF, E Thorstienssen, and N Schutte. 2007. The efficacy of problem solving therapy in reducing mental and physical health problems: A meta-analysis. *Clinical Psychology Review* 27, 1: 46–57. http://doi.org/10.1016/j.cpr.2005.12.005
150. Lena Mamykina, Elizabeth Mynatt, Patricia Davidson, and Daniel Greenblatt. 2008. MAHI: investigation of social scaffolding for reflective thinking in diabetes management. *Proceeding of the twenty-sixth annual CHI conference on Human factors in computing systems - CHI '08*, ACM Press, 477. http://doi.org/10.1145/1357054.1357131
151. M. a. Mancini. 2007. The Role of Self-efficacy in Recovery from Serious Psychiatric Disabilities: A Qualitative Study with Fifteen Psychiatric Survivors. *Qualitative Social Work* 6, 1: 49–74. http://doi.org/10.1177/1473325007074166
152. Lydia Manikonda and Munmun De Choudhury. 2017. Modeling and Understanding Visual Attributes of Mental Health Disclosures in Social Media. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems - CHI '17*, ACM Press, 170–181. http://doi.org/10.1145/3025453.3025932
153. Denise C. Marigold, Justin V. Cavallo, John G. Holmes, and Joanne V. Wood. 2014. You can't always give what you want: The challenge of providing social support to low self-esteem individuals. *Journal of Personality and Social Psychology* 107, 1: 56–80. http://doi.org/10.1037/a0036554
154. Mark Matthews and Gavin Doherty. 2011. In the Mood : Engaging Teenagers in Psychotherapy Using Mobile Phones. *CHI*, 2947–2956.
155. Mark Matthews, Stephen Voida, Saeed Abdullah, et al. 2015. In Situ Design for Mental Illness. *Proceedings of the 17th International Conference on Human-Computer Interaction with Mobile Devices and Services - MobileHCI '15*, ACM Press, 86–97. http://doi.org/10.1145/2785830.2785866
156. Tara Matthews, Kathleen O'Leary, Anna Turner, et al. 2017. Stories from Survivors: Privacy and Security Practices when Coping with Intimate Partner Abuse. *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems - CHI '17*, ACM Press, 2189–2201. http://doi.org/10.1145/3025453.3025875
157. K. (1995). Mayer, J. D., Allen, J., & Beauregard. 1995. Mood inductions for four specific moods: procedure employing guided imagery vignettes with music. *Journal of Mental Imagery* 19: 133–150.

158. John D. Mayer and Yvonne N. Gaschke. 1988. The experience and meta-experience of mood. *Journal of Personality and Social Psychology* 55, 1: 102–111. http://doi.org/10.1037/0022-3514.55.1.102
159. Joanna McGrenere, Jim Sullivan, and Ronald M. Baecker. 2006. Designing technology for people with cognitive impairments. *CHI '06 extended abstracts on Human factors in computing systems - CHI EA '06*, ACM Press, 1635. http://doi.org/10.1145/1125451.1125750
160. Susan R McGurk, Kim T Mueser, and Alysia Pascaris. 2005. Cognitive training and supported employment for persons with severe mental illness: one-year results from a randomized controlled trial. *Schizophrenia bulletin* 31, 4: 898–909. http://doi.org/10.1093/schbul/sbi037
161. Kateri McRae, Bethany Ciesielski, and James J. Gross. 2012. Unpacking cognitive reappraisal: Goals, tactics, and outcomes. *Emotion* 12, 2: 250–255. http://doi.org/10.1037/a0026351
162. B Melling and T Houguet-Pincham. 2011. Online peer support for individuals with depression: a summary of current research and future considerations. *Psychiatr Rehabil J* 34, 3: 252–254. http://doi.org/10.2975/34.3.2011.252.254
163. Andrew D. Miller, Elizabeth D. Mynatt, Andrew D. Miller, and Elizabeth D. Mynatt. 2014. StepStream: A School-based Pervasive Social Fitness System for Everyday Adolescent Health. *Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14*, ACM Press, 2823–2832. http://doi.org/10.1145/2556288.2557190
164. W. R. Miller and S. Rollnick. 2002. *Motivational interviewing: Preparing people for change.* Guilford Press., New York.
165. William R. Miller and Stephen Rollnick. 2012. *Motivational interviewing: Helping people change*. Guilford press.
166. WR Miller, RG Benefield, and JS Tonigan. 1993. Enhancing motivation for change in problem drinking: a controlled comparison of two therapist styles. *Journal of consulting and clinical psychology* 61, 3.
167. WR Miller, S Rollnick, and TB Moyers. 1998. *Motivational interviewing*. Retrieved January 6, 2015 from http://www.researchgate.net/publication/43348114_Motivational_interviewing/file/79e4150867f5b1cb3a.pdf
168. WR Miller and GS Rose. 2009. Toward a theory of motivational interviewing. *American Psychologist*. Retrieved January 6, 2015 from http://psycnet.apa.org/journals/amp/64/6/527/
169. G Mitchell and N Pistrang. 2011. Befriending for mental health problems: Processes of helping. *Psychology and Pscyhotherapy: Theory, Research and Practice* 84: 151–169. http://doi.org/10.1348/147608310X508566
170. David C Mohr, Pim Cuijpers, and Kenneth Lehman. 2011. Supportive accountability: a model for providing human support to enhance adherence to eHealth interventions. *Journal of medical Internet research* 13, 1: e30. http://doi.org/10.2196/jmir.1602
171. David C Mohr, Kathryn Noth Tomasino, Emily G Lattie, et al. 2017. IntelliCare: An Eclectic, Skills-Based App Suite for the Treatment of Depression and Anxiety. *Journal of medical Internet research* 19, 1: e10. http://doi.org/10.2196/jmir.6645
172. Margaret E Morris, Qusai Kathawala, Todd K Leen, et al. 2010. Mobile therapy: case

study evaluations of a cell phone application for emotional self-awareness. *Journal of medical Internet research* 12, 2: e10. http://doi.org/10.2196/jmir.1371
173. Robert R Morris, Stephen M Schueller, and Rosalind W Picard. 2015. Efficacy of a Web-Based, Crowdsourced Peer-To-Peer Cognitive Reappraisal Platform for Depression: Randomized Controlled Trial. *Journal of Medical Internet Research* 17, 3: e72. http://doi.org/10.2196/jmir.4167
174. C.T. Mowbray, D.P. Moxley, and M.E. Collins. 1998. Consumer as mental health providers: First person accounts of benefits and limitations. *The journal of behavioral health services & research* 25, 4: 397–411.
175. Theresa B Moyers, Tim Martin, Paulette J Christopher, Jon M Houck, J Scott Tonigan, and Paul C Amrhein. 2007. Client language as a mediator of motivational interviewing efficacy: where is the evidence? *Alcoholism, clinical and experimental research* 31, 10 Suppl: 40s–47s. http://doi.org/10.1111/j.1530-0277.2007.00492.x
176. Michael J. Muller. 2002. Participatory design: the third space in HCI. In *The human-computer interaction handbook*. L. Erlbaum Associates Inc., 1051–1068. Retrieved March 7, 2016 from http://dl.acm.org/citation.cfm?id=772072.772138
177. Drashko Nakikj and Lena Mamykina. 2017. A Park or A Highway : Overcoming Tensions in Designing for Socio - emotional and Informational Needs in Online Health Communities. *Cscw'17*: 1–16. http://doi.org/10.1145/2998181.2998339
178. Lisa P. Nathan, Predrag V. Klasnja, and Batya Friedman. 2007. Value scenarios: A Technique for Envisioning Systemic Effects of New Technologies. *CHI '07 extended abstracts on Human factors in computing systems - CHI '07*, ACM Press, 2585. http://doi.org/10.1145/1240866.1241046
179. National Alliance on Mental Illness. Mental health conditions. Retrieved from http://www.nami.org/Learn-More/Mental-Health-Conditions
180. Mark W Newman, Debra Lauterbach, Sean A Munson, Paul Resnick, and Margaret E Morris. 2011. It's not that i don't have problems, i'm just not putting them on facebook. *Proceedings of the ACM 2011 conference on Computer supported cooperative work - CSCW '11*: 341. http://doi.org/10.1145/1958824.1958876
181. M K Nock, I Hwang, N A Sampson, and R C Kessler. 2010. Mental disorders, comorbidity and suicidal behavior: Results from the National Comorbidity Survey Replication. *Molecular Psychiatry* 15, 8: 868–876. http://doi.org/10.1038/mp.2009.29
182. Donald A. Norman. 2005. Human-centered design considered harmful. *Interactions* 12, 4: 14. http://doi.org/10.1145/1070960.1070976
183. Kathleen O'Leary, Arpita Bhattacharya, Sean A. Munson, Jacob O. Wobbrock, and Wanda Pratt. 2017. Design Opportunities for Mental Health Peer Support Technologies. *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing - CSCW '17*, ACM Press, 1470–1484. http://doi.org/10.1145/2998181.2998349
184. D. Oaks. 2002. President Bush's position on people with psychiatric labels. *Mindfreedom Journal* Winter: 4–6.
185. William Odom. 2015. Understanding Long-Term Interactions with a Slow Technology. *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems - CHI '15*, ACM Press, 575–584. http://doi.org/10.1145/2702123.2702221
186. T P Oei and G J Shuttlewood. 1997. Comparison of specific and nonspecific factors in a group cognitive therapy for depression. *Journal of behavior therapy and experimental*

psychiatry 28, 3: 221–31. Retrieved September 18, 2017 from http://www.ncbi.nlm.nih.gov/pubmed/9327301
187. Michael Oliver. 1990. *The politics of disablement*. Macmillan Education.
188. Pablo Paredes, Ran Gilad-Bachrach, Mary Czerwinski, Asta Roseway, Kael Rowan, and Javier Hernandez. 2014. PopTherapy: Coping with Stress through Pop-Culture. *Pervasive Health '14*. Retrieved from http://bid.berkeley.edu/files/papers/PopTherapy1.pdf
189. Minsu Park, David W Mcdonald, and Meeyoung Cha. 2013. Perception Differences between the Depressed and Non-depressed Users in Twitter. *Proceedings of the 7th International AAAI Conference on Weblogs and Social Media (ICWSM)*: 476–485.
190. Jessica A Pater, Oliver L. Haimson, Nazanin Andalibi, and Elizabeth D Mynatt. 2016. "Hunger Hurts but Starving Works:" Characterizing the Presentation of Eating Disorders Online. *Proceedings of the 19th ACM Conference on Computer-Supported Cooperative Work & Social Computing - CSCW '16*, ACM Press, 1183–1198. http://doi.org/10.1145/2818048.2820030
191. GR Patterson and MS Forgatch. 1985. Therapist behavior as a determinant for client noncompliance: a paradox for the behavior modifier. *Journal of consulting and clinical psychology* 53, 6.
192. Eliseo J. Pérez-Stable, Jeanne Miranda, Ricardo F. Muñoz, et al. 1990. Depression in Medical Outpatients. *Archives of Internal Medicine* 150, 5: 1083. http://doi.org/10.1001/archinte.1990.00390170113024
193. Laura R. Pina, Sang-Wha Sien, Teresa Ward, et al. 2017. From Personal Informatics to Family Informatics. *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing - CSCW '17*: 2300–2315. http://doi.org/10.1145/2998181.2998362
194. Bernd Ploderer, Wally Smith, Steve Howard, Jon Pearce, and Ron Borland. 2013. Patterns of Support in an Online Community for Smoking Cessation. *Proc. Intl. Conf. on Communities and Technologies (C&T)*: 26–35. http://doi.org/10.1145/2482991.2482992
195. Ria Poole, Daniel Smith, and Sharon Simpson. 2015. How Patients Contribute to an Online Psychoeducation Forum for Bipolar Disorder: A Virtual Participant Observation Study. *JMIR mental health* 2, 3: e21. http://doi.org/10.2196/mental.4123
196. M. Popovic, D. Milne, and P. Barrett. 2003. The scale of perceived interpersonal closeness (PICS). *Clinical Psychology & Psychotherapy* 10, 5: 286–301. http://doi.org/10.1002/cpp.375
197. Ben Popper. 2017. The Empathy Layer: Can an app that lets strangers — and bots — become amateur therapists create a safer internet? *The Verge*.
198. John Powell and Aileen Clarke. 2007. Investigating internet use by mental health service users: interview study. *Studies in Health Technology and Informatics*: 129. Retrieved from http://www.scopus.com/inward/record.url?eid=2-s2.0-35748969613&partnerID=40&md5=6c13dccb2fe5ae91401868f8f5088bc8
199. Jenny Preece, Yvonne. Rogers, and Helen. Sharp. 2002. *Interaction design : beyond human-computer interaction*. J. Wiley & Sons.
200. Stefan Priebe, Serif Omer, Domenico Giacco, and Mike Slade. 2014. Resource-oriented therapeutic models in psychiatry: Conceptual review. *British Journal of Psychiatry* 204: 256–261. http://doi.org/10.1192/bjp.bp.113.135038
201. James O. Prochaska and Wayne F. Velicer. 1997. The Transtheoretical Model of Health Behavior Change. *American Journal of Health Promotion* 12, 1: 38–48.

202. and C. B. Ammerman Ramon C. Littell, P. R. Henry. 1998. Statistical analysis of repeated measures data using SAS procedures. *Journal of Animal Science* 76, 4: 1216–1231.
203. William C. Reeves, Tara W. Strine, Laura A. Pratt, et al. 2011. Mental Illness Surveillance Among Adults in the United States. *Center for Disease Control and Prevention* 60, 3: 1–132.
204. Julie Repper and Tim Carter. 2011. A review of the literature on peer support in mental health services. *Journal of Mental Health* 20, 4: 392–411. http://doi.org/10.3109/09638237.2011.583947
205. David A. Richards and Rupert Suckling. 2009. Improving access to psychological therapies: Phase IV prospective cohort study. *British Journal of Clinical Psychology* 48, 4: 377–396. http://doi.org/10.1348/014466509X405178
206. Rizwana Rizia, Zeno Franco, Katinka Hooyer, et al. 2015. iPeer: A Sociotechnical Systems Approach for Helping Veterans with Civilian Reintegration. *Proceedings of the 2015 Annual Symposium on Computing for Development - DEV '15*, ACM Press, 85–93. http://doi.org/10.1145/2830629.2830643
207. Mar Rivas Rodríguez, Roberto Nuevo, Somnath Chatterji, and José Luis Ayuso-Mateos. 2012. Definitions and factors associated with subthreshold depressive conditions: a systematic review. *BMC Psychiatry* 12, 1: 181. http://doi.org/10.1186/1471-244X-12-181
208. Carl Rogers. 1951. *Client-centered therapy : its current practice, implications, and theory*. Houghton Mifflin Co., Boston.
209. Carl Rogers. 1958. The Characteristics of a Helping Relationship. *The Personal Guidance Journal* 37, 1.
210. CR Rogers. 1957. The necessary and sufficient conditions of therapeutic personality change. *Journal of consulting psychology*. Retrieved January 6, 2015 from http://psycnet.apa.org/journals/ccp/21/2/95/
211. E Sally Rogers, Gregory B Teague, Carolyn Lichenstein, et al. 2007. Effects of participation in consumer-operated service programs on both personal and organizationally mediated empowerment: results of multisite study. *Journal of rehabilitation research and development* 44, 6: 785–799. http://doi.org/10.1682/JRRD.2006.10.0125
212. Stephen Rollnick, William R. Miller, Christopher C. Butler, and Mark S. Aloia. 2008. Motivational Interviewing in Health Care: Helping Patients Change Behavior. *COPD: Journal of Chronic Obstructive Pulmonary Disease* 5, 3: 203–203. http://doi.org/10.1080/15412550802093108
213. Sabirat Rubya and Svetlana Yarosh. 2017. Video-Mediated Peer Support in an Online Community for Recovery from Substance Use Disorders. *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing - CSCW '17*: 1454–1469. http://doi.org/10.1145/2998181.2998246
214. RS Ryback. 1971. Schizophrenics Anonymous: a treatment adjunct. *The International Journal of Psychiatry in Medicine* 2, 3: 247–253. Retrieved May 18, 2015 from https://scholar.google.com/scholar?q=Schizophrenics+Anonymous%3A+A+treatment+adjunct&btnG=&hl=en&as_sdt=0%2C48#0
215. MH. Sacks. 2000. *Manual for Supportive Therapy*. Cornell University, New York, NY.
216. K. C. Salter and R. F. Fawcett. 1985. A robust and powerful rank test of treatment effects in balanced incomplete block designs. *Communications in Statistics - Simulation and Computation* 14, 4: 807–828. http://doi.org/10.1080/03610918508812475

217. Mark S. Salzer, Nicole Darr, Gina Calhoun, et al. 2013. Benefits of working as a certified peer specialist: Results from a statewide survey. *Psychiatric Rehabilitation Journal* 36, 3: 219–221. http://doi.org/10.1037/prj0000016
218. Lori. Schiller and Amanda. Bennett. 1996. *The quiet room : a journey out of the torment of madness*. Warner Books.
219. Georg Schomerus, Herbert Matschinger, and Matthias C Angermeyer. 2009. The stigma of psychiatric treatment and help-seeking intentions for depression. *European archives of psychiatry and clinical neuroscience* 259, 5: 298–306. http://doi.org/10.1007/s00406-009-0870-y
220. Donald Schön. 1983. *The reflective practitioner : how professionals think in action*. Basic Books, New York. Retrieved March 19, 2013 from http://uwashington.worldcat.org.offcampus.lib.washington.edu/title/reflective-practitioner-how-professionals-think-in-action/oclc/8709452&referer=brief_results
221. Summer Schrader, Nev Jones, and Mona Shattell. 2013. Mad Pride: Reflections on Sociopolitical Identity and Mental Diversity in the Context of Culturally Competent Psychiatric Care. *Issues in Mental Health Nursing* 34, 1: 62–64. http://doi.org/10.3109/01612840.2012.740769
222. Beate Schrank, Ingrid Sibitz, Annemarie Unger, and Michaela Amering. 2010. How patients with schizophrenia use the internet: qualitative study. *Journal of medical Internet research* 12, 5: e70. http://doi.org/10.2196/jmir.1550
223. S. M. Schueller, R. F. Munoz, and D. C. Mohr. 2013. Realizing the Potential of Behavioral Intervention Technologies. *Current Directions in Psychological Science* 22, 6: 478–483. http://doi.org/10.1177/0963721413495872
224. Douglas Schuler and Aki Namioka. 1993. *Participatory design : principles and practices*. L. Erlbaum Associates, Hillsdale N.J. Retrieved December 11, 2012 from http://uwashington.worldcat.org.offcampus.lib.washington.edu/title/participatory-design-principles-and-practices/oclc/26723039&referer=brief_results
225. Irving Seidman. 2006. *Interviewing as Qualitative Research: A Guide for Researchers in Education and the Social Sciences*. Teachers College Press. Retrieved May 26, 2016 from https://books.google.com/books?id=pk1Rmq-Y15QC&pgis=1
226. Dave Sells, Larry Davidson, Chistopher Jewell, Paul Falzer, and Michael Rowe. 2006. The treatment relationship in peer-based and regular case management for clients with severe mental illness. *Psychiatric services (Washington, D.C.)* 57, 8: 1179–1184. http://doi.org/10.1176/appi.ps.57.8.1179
227. Bryan C. Semaan, Lauren M. Britton, and Bryan Dosono. 2016. Transition Resilience with ICTs. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems - CHI '16*, ACM Press, 2882–2894. http://doi.org/10.1145/2858036.2858109
228. P J Shannon and D L Morrison. 1990. Who goes to GROW? *The Australian and New Zealand journal of psychiatry* 24, 1: 96–102. Retrieved May 18, 2015 from http://www.ncbi.nlm.nih.gov/pubmed/2334393
229. Steve De Shazer and Insoo Kim Berg. 1997. "What works?" Remarks on research aspects of Solution-Focused Brief Therapy. *Journal of Family Therapy* 19: 121–124. http://doi.org/10.1111/1467-6427.00043
230. Petr Slovák, Christopher Frauenberger, and Geraldine Fitzpatrick. 2017. Reflective Practicum: A Framework of Sensitising Concepts to Design for Transformative Reflection. *Proceedings of the 2017 CHI Conference on Human Factors in Computing*

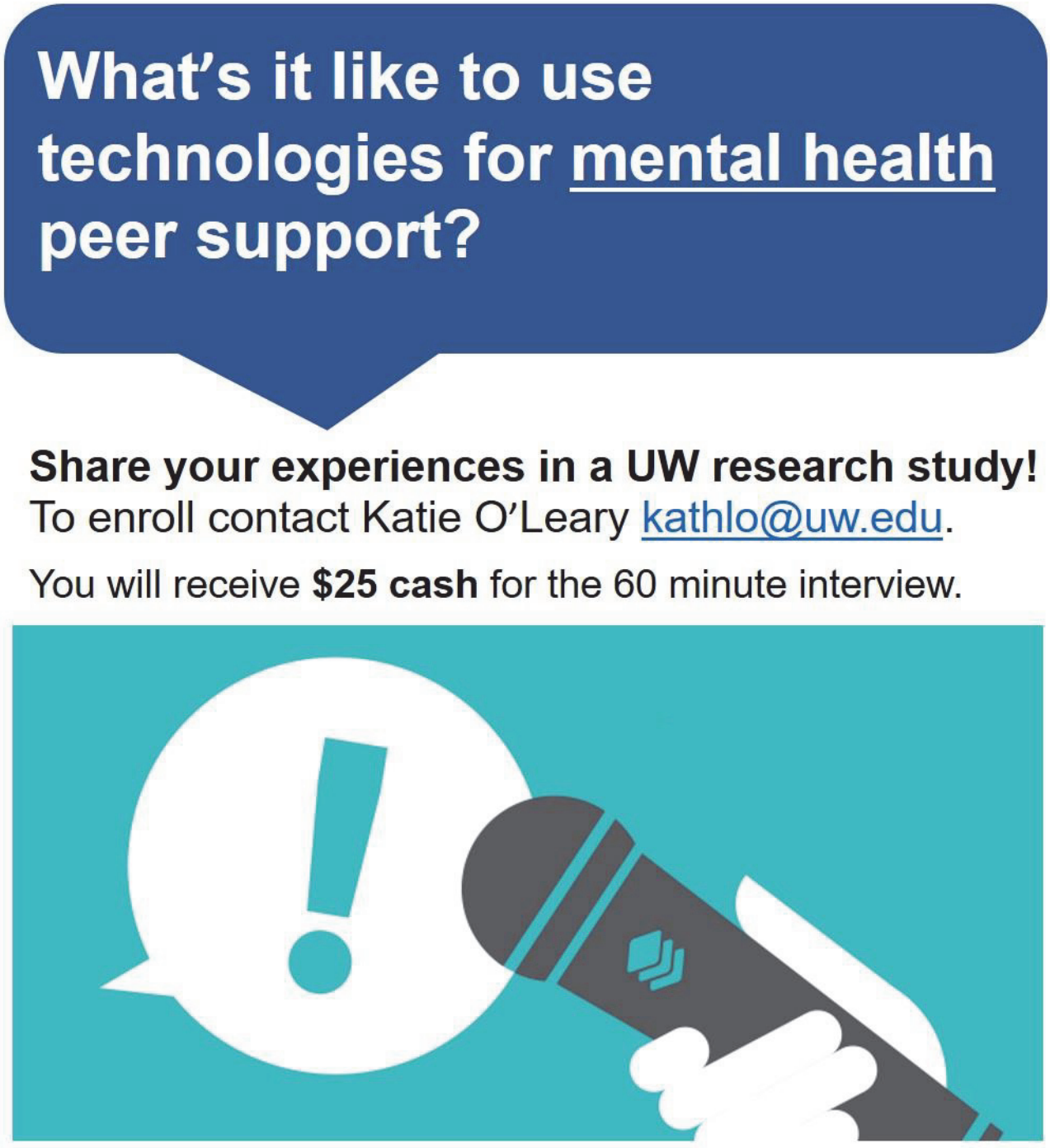
Systems - CHI '17, ACM Press, 2696–2707. http://doi.org/10.1145/3025453.3025516
231. Petr Slovak, Anja Thieme, Paul Tennent, Patrick Olivier, and Geraldine Fitzpatrick. 2015. On Becoming a Counsellor : Challenges and Opportunities To Support Interpersonal Skills Training. *Proceedings of the SIGCHI conference on Human factors in computing systems - CHI '15*.
232. Phyllis Solomon. 2004. Peer support/peer provided services underlying processes, benefits, and critical ingredients. *Psychiatric rehabilitation journal* 27, 4: 392–401. Retrieved February 11, 2015 from http://www.ncbi.nlm.nih.gov/pubmed/15222150
233. Robert L. Spitzer, Kurt Kroenke, Janet B. W. Williams, and Bernd Löwe. 2006. A Brief Measure for Assessing Generalized Anxiety Disorder. *Archives of Internal Medicine* 166, 10: 1092. http://doi.org/10.1001/archinte.166.10.1092
234. W B Stiles. 1980. Measurement of the impact of psychotherapy sessions. *Journal of consulting and clinical psychology* 48, 2: 176–185. http://doi.org/10.1037/0022-006X.48.2.176
235. Brian Still and Kate Crane. 2016. *Fundamentals of user-centered design : a practical approach*. CRC Press.
236. Lucy Suchman. 2003. Located Accountabilities in Technology Production. Retrieved from http://www.comp.lancs.ac.uk/sociology/papers/Suchman-Located-Accountabilities.pdf
237. Yoshimitsu Takahashi, Chiyoko Uchida, Koichi Miyaki, Michi Sakai, Takuro Shimbo, and Takeo Nakayama. 2009. Potential benefits and harms of a peer support social network service on the internet for people with depressive tendencies: qualitative content analysis and social network analysis. *Journal of medical Internet research* 11, 3: e29. http://doi.org/10.2196/jmir.1142
238. Anja Thieme, Rob Comber, Julia Miebach, et al. 2012. "We've bin watching you": Designing for Reflection and Social Persuasion to Promote Sustainable Lifestyles. *Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems - CHI '12*, 2337. http://doi.org/10.1145/2207676.2208394
239. Anja Thieme, Jayne Wallace, Paula Johnson, et al. 2013. Design to promote mindfulness practice and sense of self for vulnerable women in secure hospital services. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI 2013)*: 2647–2656. http://doi.org/10.1145/2470654.2481366
240. Anja Thieme, Jayne Wallace, Thomas D Meyer, and Patrick Olivier. 2015. Designing for Mental Wellbeing : Towards a More Holistic Approach in the Treatment and Prevention of Mental Illness. *BritishHCI'15*: 1–10. http://doi.org/10.1145/2783446.2783586
241. Peggy A. Thoits. 1995. Stress, Coping, and Social Support Processes: Where Are We? What Next? *Journal of Health and Social Behavior* 35: 53. http://doi.org/10.2307/2626957
242. Matthieu Tixier and Myriam Lewkowicz. 2016. "Counting on the Group." *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems - CHI '16*, ACM Press, 3545–3558. http://doi.org/10.1145/2858036.2858477
243. Carla Torrent, Anabel Martínez-Arán, Claire Daban, et al. 2006. Cognitive impairment in bipolar II disorder. *The British journal of psychiatry : the journal of mental science* 189, 3: 254–9. http://doi.org/10.1192/bjp.bp.105.017269
244. Center for Health Training. 2010. Oars Model - Essential Communication Skills - Motivational Interviewing. 1–4.
245. David L. Vogel, Nathaniel G. Wade, and Paul L. Ascheman. 2009. Measuring perceptions

of stigmatization by others for seeking psychological help: Reliability and validity of a new stigma scale with college students. *Journal of Counseling Psychology* 56, 2: 301–308. http://doi.org/10.1037/a0014903
246. Greg Wadley, Reeva Lederman, John Gleeson, and Mario Alvarez-Jimenez. 2013. Participatory design of an online therapy for youth mental health. *OzCHI 2013*: 517–526. http://doi.org/10.1145/2541016.2541030
247. Bruce Wampold. 2001. *The great psychotherapy debate : models, methods, and findings*. L. Erlbaum Associates, Mahwah N.J.
248. Yang Wang, Pedro Giovanni Leon, Alessandro Acquisti, Lorrie Faith Cranor, Alain Forget, and Norman Sadeh. 2014. A field trial of privacy nudges for facebook. *Proceedings of the 32nd annual ACM conference on Human factors in computing systems - CHI '14*, ACM Press, 2367–2376. http://doi.org/10.1145/2556288.2557413
249. David Watson and Lee Clark. 1999. *The PANAS-X Manual for the Positive and Negative Affect Schedule-Expanded Form*. http://doi.org/10.1111/j.1742-4658.2010.07754.x
250. Christian A Webb, Robert J Derubeis, Sona Dimidjian, Steven D Hollon, Jay D Amsterdam, and Richard C Shelton. 2012. Predictors of patient cognitive therapy skills and symptom change in two randomized clinical trials: the role of therapist adherence and the therapeutic alliance. *Journal of consulting and clinical psychology* 80, 3: 373–81. http://doi.org/10.1037/a0027663
251. HA Williams. 1995. There are no free gifts! Social support and the need for reciprocity. *Human Organization*. Retrieved May 18, 2015 from http://sfaa.metapress.com/index/W233493122Q420V7.pdf
252. Joseph Jay Williams, Tania Lombrozo, Anne Hsu, Bernd Huber, and Juho Kim. 2016. Revising Learner Misconceptions Without Feedback: Prompting for Reflection on Anomalies. *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems - CHI '16*, ACM Press, 470–474. http://doi.org/10.1145/2858036.2858361
253. Jacob O. Wobbrock, Leah Findlater, Darren Gergle, and James J. Higgins. 2011. The aligned rank transform for nonparametric factorial analyses using only anova procedures. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*: 143–146. http://doi.org/10.1145/1978942.1978963
254. Jacob O. Wobbrock and Julie A. Kientz. 2016. Research contributions in human-computer interaction. *interactions* 23, 3: 38–44. http://doi.org/10.1145/2907069
255. Jacob O Wobbrock, Shaun K Kane, Krzysztof Z. Gajos, Susumu Harada, and Jon Froehlich. 2011. Ability-Based Design. *ACM Transactions on Accessible Computing* 3, 3: 1–27. http://doi.org/10.1145/1952383.1952384
256. Jill Palzkill Woelfer. 2014. Tuned Souls: The Role of Music in the Lives of Homeless Young People. Retrieved May 26, 2016 from https://digital.lib.washington.edu:443/researchworks/handle/1773/26198
257. World Health Organization. 2004. *The global burden of disease: 2004*. Retrieved from http://www.who.int/healthinfo/global_burden_disease/2004_report_update/en/
258. World Health Organization. 2011. *World Report on Disability*. Retrieved November 8, 2017 from http://apps.who.int/iris/bitstream/10665/70670/1/WHO_NMH_VIP_11.01_eng.pdf
259. World Health Organization. 2014. *Social determinants of mental health*.
260. Svetlana Yarosh, Park Ave, and Florham Park. 2013. Shifting Dynamics or Breaking Sacred Traditions? The Role of Technology in Twelve-Step Fellowships. *Proc. CHI 2013*:

3413–3422. http://doi.org/10.1145/2470654.2466468
261. Svetlana Yarosh and Stephen Matthew Schueller. 2017. Happiness Inventors: Informing Positive Computing Technologies Through Participatory Design With Children. *Journal of medical Internet research* 19, 1: e14. http://doi.org/10.2196/jmir.6822
262. J Young and CL Williams. 1986. An evaluation of GROW, a mutual-help community mental health organisation. *Community health studies*. Retrieved May 18, 2015 from http://europepmc.org/abstract/med/3581779
263. S.E. Zemore and M.E. Pagano. 2008. Kickbacks from Helping Others: Health and Recovery. In *Facilitating involvement in twelve-step programs.*, Dennis M Donovan and Anthony S Floyd (eds.). 303–320. http://doi.org/10.1007/978-0-387-77725-2
264. 2016. Teleology. *Encyclopædia Britannica*. Retrieved from https://www.britannica.com/topic/teleology

APPENDICES

APPENDIX A: INTERVIEW STUDY RECRUITMENT CALL



APPENDIX B: INTERVIEW STUDY INFORMATION SHEET

University of Washington Research Study
Understanding Perspectives on Technology Use for Mental Health Peer Support

Description of the study
The goal of this study is to understand the perspectives of people using technology for mental health peer support. As part of this study, I will explore how a tool could be specifically designed to help people to participate in peer support for mental health.

Survey (2 mins)
- You will be asked to fill out a survey of the technologies that you use for support, and some demographic information.

Interview (25-30 minutes)
- We will talk about your experiences with using technologies for peer support
- Interviews will be audio recorded

Design activity (20-25 minutes)
- You will be asked to imagine a tool that could help people with mental illnesses participate in peer support. You do not need artistic skills!

Confidentiality
- Identifiable information (e.g., names, places) will be removed from the surveys, interview transcripts, and designs.

Risks
- It may be stressful for you to talk about your experiences seeking peer support, especially when that support failed to meet expectations. It might feel uncomfortable to sketch designs if you are not familiar with that type of activity.

Benefits
- By participating you are helping us to better understand the needs of people seeking support for mental health, and to design technologies that might improve access to and participation in peer support.

Incentives
- At the beginning of the interview, you will receive $25.00 in cash.

Your participation is voluntary. You may choose not to answer any question and withdraw from the study at any time. If you have questions, please contact the researcher: Katie O'Leary 206-390-4905 kathlo@uw.edu

APPENDIX C: INTERVIEW STUDY DEMOGRAPHIC QUESTIONNAIRE

Participant Sheet
Participant #:
These questions are optional. Your answers will help me to know if I am including the perspectives of different racial, ethnic, and gender identities.
What race best describes yours?

- ☐ White
- ☐ Black/African American
- ☐ American Indian or Alaska Native
- ☐ Asian Indian
- ☐ Chinese
- ☐ Filipino
- ☐ Japanese
- ☐ Korean
- ☐ Vietnamese
- ☐ Native Hawaiian
- ☐ Guamanian or Chamorro
- ☐ Samoan
- ☐ Another race:

What ethnicity best describes yours?

- ☐ Mexican/Mexican American/Chicano
- ☐ Puerto Rican
- ☐ Cuban
- ☐ Another Hispanic ethnicity

What is your gender identity?_____

APPENDIX D: INTERVIEW STUDY QUESTIONNAIRE ON PEER TECHNOLOGY USE

Survey of Technology Use for Peer Support

1. Who do you seek support from? Check all that apply.
   - Friends
   - Peers
   - Family
   - Counsellors/professionals
   - Other_____
2. Please list any tools you use for self-help. For example: types of books, apps, journals._____
3. What is your age?_____
4. What is your gender identity?_____
5. What pronouns do you prefer? For example: they/them, she/her, he/him._____

APPENDIX E: INTERVIEW PROTOCOL ON USES OF TECHNOLOGY FOR PEER SUPPORT

1. Can you tell me more about the tools you use for peer support?
   a. Which ones do you like best/least? Why?
   b. Which ones do you avoid? Why?
   c. Have you stopped using any of them? Why?

2. When did you start using technology for peer support?
   a. What did you like? Dislike?
   b. Do you feel like technology has been important? Why or why not?

3. Can you tell me about a time when you used a technology for peer support that felt **beneficial?**
   a. What did you like about it?

4. Can you tell me about a time when you used a technology for peer support that felt **disappointing**?
   a. What did you dislike about it? What happened next?

5. Has there ever been a time when you preferred not to seek support using technology? Why?
6. Have you ever used these tools to *give* peer support? What was that like?
   a. How is giving different than receiving peer support? Do you use the same tools?

7. Is there anything that you wished I had asked you?
8. Do you have any questions for me?

APPENDIX F: DESIGN ACTIVITY

Verbal preamble: Now I'd like to introduce the design activity. I have some markers and pens here and some paper. Don't worry, this is not a test of your artistic skills! It is a brainstorming activity that focuses on imagination. There are three parts to the activity: a sketch, a description, and a story. You can begin with the sketch.

Design prompt (sketch)
Note: participants were given a 8.5x11 sheet of heavy weight art paper.

Imagine a tool that could help people with mental illnesses participate in peer support. You can begin with the sketch, then fill out the questions below. There are no right or wrong answers.

Spec sheet (tool description)
Note: these questions were printed on a 8.5x11 sheet of paper to give room for writing responses

What would be the name of the tool?
Who would use the tool?
Who might not use the tool but would be affected by its use?
What would the people who use the tool think is important?
What would the people who use the tool be trying to accomplish?
How many years would a person use the tool?
How many people would have one of these tools?

Story prompt
Note: this prompt was printed on a 8.5x11 sheet of paper to give room for writing responses

Write a story about a situation where the tool would be used. The story can be long or short. It can be a fictional situation or can be based on a real situation. There are no right or wrong answers.

APPENDIX G: INTERVIEW STUDY CODING MANUAL

A. Perceived Risks
   I. Bullying and harassment
   II. Triggers
   III. Stigma
   IV. Consequences
      i. Avoidance
      ii. Censor
      iii. Relationship/Reputation Damage
      iv. Distress

B. Accessible Engagement
   I. Background listening/lurking
   II. Narrating experiences
   III. Supportive listening
   IV. Challenges with access & roles

C. Support Seeking
   I. Matching characteristics
   II. Timing of support
   III. Personal significance of support

APPENDIX H: SUPPORTIVE CHAT RECRUITMENT

Join a UW study of supportive chat tools to relieve stress and improve mood ☺

We're studying online supportive chat tools for peers. Receive **$40** for 8 chats, plus **$40 for pre/post surveys**.

The chat tools are online, text-based, and anonymous. Must be 21+ to participate.

To join, contact the researcher:
Katie O'Leary **kathlo@uw.edu,** PhD candidate,
Information School, University of Washington.

APPENDIX I: SUPPORTIVE CHAT ENROLLMENT QUESTIONNAIRE

Thanks for your interest in joining my supportive chat study! To get you enrolled, I need to ask a few questions to get you set up for your chats.

Enter your study ID (Included in the email. Do not enter a student ID.)

Indicate all the times you are available to chat. I will use this information to schedule chats for you with another study participant.

You must be available for at least one chat per day, 4 days per week. Weekends are off :) The chats take about 30mins, plus the feedback survey (5-7mins).

List the times you are available.

Monday:
Tuesday:
Wednesday:
Thursday:
Friday:

What time zone? PST, EST, Mountain?:
What study period are you available for? Feb 20-March 3, Mar 6-17 or both?

Question 3.
Please indicate your gender.

Question 4.
Which categories best describe you? You may choose more than one.
Required.

Hispanic, Latino, or Spanish origin (For example: Mexican or Mexican American, Puerto Rican, Salvadorian, Dominican, Columbian, etc.)
Black or African American (For example: African American, Jamaican, Haitian, Nigerian, Ethiopian, Somalian, etc.)
Asian (For example: Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese, etc.)
American Indian or Alaska Native (For example: Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Nome Eskimo Community, etc.)
Middle Eastern or North African (For example: Lebanese, Iranian, Egyptian, Syrian, Moroccan, Algerian, etc.)
Native Hawaiian or Other Pacific Islander (For example: Native Hawaiian, Samoan, Chamorro, Tongan, Fijian, Marshallese, etc.)
White (For example: German, Irish, English, Italian, Polish, French, etc.)
Other:

Question 5.
What is your age?

Question 6.
If you identify with having any mental health challenges (e.g., depression, bipolar), please list them here. This information will be used to help us understand the diversity among my participants.

Question 7.
Please indicate the education you have completed.
Required.

High school (grades 9-12, no degree)
High school graduate (or equivalent)
Some college (1-4 years, no degree)
Associate's degree (including occupational or academic degrees)
Bachelor's degree (BA, BS, AB, etc)
Master's degree (MA, MS, MENG, MSW, etc)
Professional school degree (MD, DDC, JD, etc)
Doctorate degree (PhD, EdD, etc)

Thank you for completing this enrollment questionnaire! I'll contact you soon with your chat schedule :)

APPENDIX J: SUPPORTIVE CHAT INFORMATION SHEET

University of Washington Research Study: Online Supportive Chat Tools

Researcher:
Katie O'Leary
PhD candidate
Information School
University of Washington
kathlo@uw.edu

Description of the study
We are studying prototypes for supportive chats that improve mood and social connection. my prototypes are designed for peers to practice thinking and listening skills by applying them in online, text-based chats.

Eligibility Criteria
To participate in this study, you must meet the following criteria:

- 21 years or older
- Have reliable access to a computer and high-speed internet
- Comfortable typing on a keyboard
- Available online for one chat per day (~30min), 4 days a week, for two weeks (8 chats total). Specific times will be arranged to suit your schedule.

If you have questions about these criteria, please contact the researcher Katie O'Leary.

Survey (20 mins)
You will be asked to fill out a survey about your sense of mental health, self-efficacy, and social support. You will complete this survey twice: once before and once after the study.

Test prototypes (30 mins per test)
You must be available to chat with a chat partner once per day, 4 days a week, for two weeks (8 chats total).
You will use a prototype for having a supportive chat. Prototypes may contain prompts for chatting, like: "I feel__," "You feel___," "I think___," "I want__."

Feedback (5-7 mins per test)
You will be asked to send feedback after each chat with a prototype. You will follow a survey link to submit your feedback online.

Confidentiality
The online prototypes automatically store your chats. The chats are linked to your study ID only. If you mention identifiable information during the chat (e.g., names, places) I will remove it from your chat transcripts. If you prefer a chat be deleted, I will delete it upon your request. The researcher has a private list that links your study ID to your email address so that she can contact you during the study. The link will be destroyed upon completion of the study.

Risks
It may be distressing to you to share thoughts and feelings. It may be stressful when prototypes fail to operate as expected or fail to meet your needs and expectations.

Benefits
It is possible that testing the prototypes may have a positive effect on mood and help you to relieve troubling emotions. By testing these prototypes you are helping us to make tools for people to find relief through socially supportive chats.

Incentives
You will receive $80 in cash incentives:

- $10 for completing the pre-study survey
- $5 for providing feedback after each chat ($40 total for 8 chats)
- $30 for completing the post-study survey

If you are selected for a follow-up interview, you will receive an additional $25. You will receive the total amount at end of the study. If you withdraw from the study at any time I will mail you a check for the incentives you earned.

Your participation is voluntary. You may choose to withdraw from the study at any time. If you have questions, please contact the researcher: Katie O'Leary 206-390-4905 kathlo@uw.edu

APPENDIX K: CHATBACK PROTOTYPE USED IN FIELD EXPERIMENT

Chat#:
Keep chats anonymous. Don't use identifiable information (e.g., name, address).

Open the **skills page** to use throughout the chat:
https://docs.google.com/document/d/1kCKY8duRSEoHLfFdLz5Zjx61suuS7JPeMP72Itz8I6w/pub
Follow the prompts together. **Type at the same time**. Move your cursor down when you're ready to move to the next prompt. ***Wait*** for each other and stay together, there's no rush.

Study ID: Enter the start time:	**Prompts**	Study ID:
	Rate how troubled you feel from 1 to 10. 1=not troubled; 10=very troubled.	
	Share a concern that is causing stress, anxiety, or low mood. Then, use the skills page to find your **main concern** and paste it.	
	Wait until they finish typing. Read their concern, and reply: **"You're concerned about…"**	
	Read their reply. Underline things they said that resonate with you.	

	Open up about how you want things to be different. Then, use the skills page to find a **desired feeling** and paste it.	
	Read their wants, and reply: **"You want…"**	

	Read their reply. Underline things they said that resonate with you.	

	Share your thoughts about the situation. Then, use the skills page to find a **distressing thought** you're having, and paste it.	
	Read their thoughts, and reply: **"I hear…"**	
	Read their reply. Underline things they said that resonate with you.	

	Describe your feelings related to your distressing thoughts. Then, use the skills page to find the **troubling feeling** you're experiencing and paste it.	
	Read their feelings, and reply: **"You're feeling…"**	
	Read their reply. Underline things they said that resonate with you.	

	Suggest one thing the other person can try: **"I'd try [in your situation]..."**	
	Read their suggestion. Underline things	

	they said that resonate with you.	

	Use the skills page to find a type of **strategy** that can help you, and say what you'll try next.	
	Read their strategy. Thank your chat partner.	
Enter the end time:	Re-rate how troubled you feel from 1 to 10. 1=not troubled; 10=very troubled.	

Submit the feedback survey (very important!) for $5. Click on this link:
https://docs.google.com/forms/d/e/1FAIpQLSdE7Y6GuRIIEM9VZ__YY4iSvEcrzJFqZ3J3nIl4kiX68xTmRA/viewform

APPENDIX L: CHATBACK SKILLS PAGE USED IN FIELD EXPERIMENT

About this skills page
Concerns often arise from loss of respect, love, safety, and opportunity. Thinking about concerns can lead to troubling feelings and reactions.
These skills will help you to find and share your concerns, thoughts, and feelings so that you can get relief.

Find your main concern

Use the table below -- copy a type of concern you're having, and paste it in the chat. Fill in the blank.
Example: "I have an esteem concern that I'm going to fail the assignment and lose respect."

I have a **self-actualization** concern that…
I have an **esteem** concern that...
I have a **love/belonging** concern that…
I have a **safety/security** concern that…
I have a **physiological** concern that…

Self-actualization: morality, creativity, acceptance, purpose, meaning, inner potential
Esteem: confidence, achievement, respect of others, need to be a unique individual
Love and belonging: friendship, family, intimacy, sense of connection
Safety and security: health, employment, property, family and social stability
Physiological: breathing, food, water, shelter, clothing, sleep

---

Find your desired feeling

Use the table below -- copy the root feeling you desire, and fill in the blank with the related feelings.
Example: "I want to feel peaceful, loving, trusting, secure."

I want to feel **peaceful**…
I want to feel **powerful**...
I want to feel **joyful**…

Peaceful: content, thoughtful, intimate, loving, trusting, nurturing, relaxed, pensive, responsive, serene, secure, thankful

Powerful: aware, proud, respected, appreciated, important, confident, discerning, valuable, worthwhile, successful
Joyful: excited, cheerful, energetic, sensuous, creative, hopeful, daring, fascinated, amused, playful, optimistic

---

Find your distressing thought

Use the table below -- copy a type of thought you're having, and paste it in the chat. Fill in the blank.
Example: "I have a personalizing thought, that if I fail this assignment it means that I'm personally a failure."

I have a **personalizing thought**...
I have a **worst case scenario thought**…
I have an **overgeneralizing thought**...
I have a **blaming thought**...
I have a **mind reading thought**...
I have an **all or nothing thought**...

Personalizing. Thinking a bad outcome results from a bad in you.
Worst case scenario. Believing the worst is going to happen.
Overgeneralizing. Thinking all incidents will be exactly like the one incident.
Blaming. Faulting a single source for all the trouble.
Mindreading. Assuming you know people's reasons or judgments.
All or nothing thinking. Simplifying into two extremes (e.g., either all good/all bad).

Find your troubling feeling

Use the table below -- copy the root feeling you're having, and fill in the blank with the feelings related to it.
Example: "I'm feeling scared, anxious and overwhelmed."

I'm feeling **scared**...
I'm feeling **mad**…
I'm feeling **sad**…

Scared: confused, rejected, helpless, submissive, insecure, anxious, bewildered, discouraged, insignificant, inadequate, embarrassed, overwhelmed
Mad: hurt, hostile, angry, selfish, hateful, critical, distant, sarcastic, frustrated, jealous, irritated, skeptical
Sad: guilty, ashamed, depressed, lonely, bored, tired, sleepy, apathetic, isolated, inferior, stupid, remorseful

Find your strategy

Use the table below -- copy a **type of strategy** you'll try, and paste it in the chat. Fill in the blank.

Example: "I'll try a mindful strategy of noticing when I'm linking my work to my self-esteem and thinking of other things that contribute to who I am."

I'll try a **mindful strategy** of...
I'll try a **physical strategy** of...
I'll try **a social strategy** of...

Mindful: noticing and/or changing your thoughts and attitudes in ways that help you.
Physical: noticing and/or changing the actions of your body, like breathing, exercising, moving in ways that help you.
Social: noticing and/or changing how you interact and communicate with people, or engage with places, in ways that help you.

APPENDIX M: CONTROL CONDITION INSTRUCTIONS FOR FIELD EXPERIMENT

Please read this document carefully before your first chat.
You have been matched with a chat partner!

Tips:
1. Be yourself and show tons of respect for each other.
2. Keep the chat anonymous - no names or emails.
3. Set reminders for your chats.

Important: If you have any concerns, call or email Katie O'Leary 206-390-4905 kathlo@uw.edu. I'm available 7am-10pm PST and will respond promptly and confidentially.

Before your first chat: complete Survey 1. You will receive **$10** for completing it.

	Date	Time	Chat link	Incentive*
1				$5
2				$5
3				$5
4				$5
5				$5
6				$5
7				$5
8				$5

After your last chat: complete Survey 2. You will receive **$30** for completing it.
*You must submit the feedback survey after each chat to receive the $5.

Instructions:
1. ****Sign out of your Google/Gmail accounts before entering the chat.****
2. Click the link to open the chat page.
3. Enter your Study ID, and use that column for the rest of the chat.
4. **Chat with each other.** Type on a new line to a begin a new reply or idea.
5. Submit feedback survey (click the link at the bottom of the chat).

About this Supportive Chat Tool
We're comparing two chat tools. You've been selected to test Supportive Chat Tool 1. You'll chat with each other by typing in a Google Doc. Here's what it looks like:

Have a supportive chat about concerns causing worry, stress, or low mood. Type on a new line to begin a new sentence or idea. The table will expand as you type, there is no space limit.

	Study ID: Enter the start time:	Study ID:
First, **rate** how troubled you feel from 1 to 10. 1=not troubled; 10=very troubled.		
Now, **chat** with each other. Type on a new line to begin a new reply.		
Re-rate how troubled you feel from 1 to 10. 1=not troubled; 10=very troubled.	Enter the end time:	

Remember: Be patient as you learn to use this new tool! If you run into challenges, it's my fault for bad design. You will click a link to give feedback at the end of every chat.

Incentives: You'll receive $80 for completing the study. We'll mail you a check at the end, after you submit Survey 2. If you withdraw from the study before 8 chats, I will pay you for whatever amount earned up to that point.

APPENDIX N: CHATBACK INSTRUCTIONS FOR FIELD EXPERIMENT

Please read this document carefully before your first chat.
You have been matched with a chat partner!

Tips:
1. Be yourself and show tons of respect for each other.
2. Keep the chat anonymous - no names or emails.
3. Set reminders for your chats.

Important: If you have any concerns, call or email Katie O'Leary 206-390-4905 kathlo@uw.edu. I'm available 7am-10pm PST and will respond promptly and confidentially.

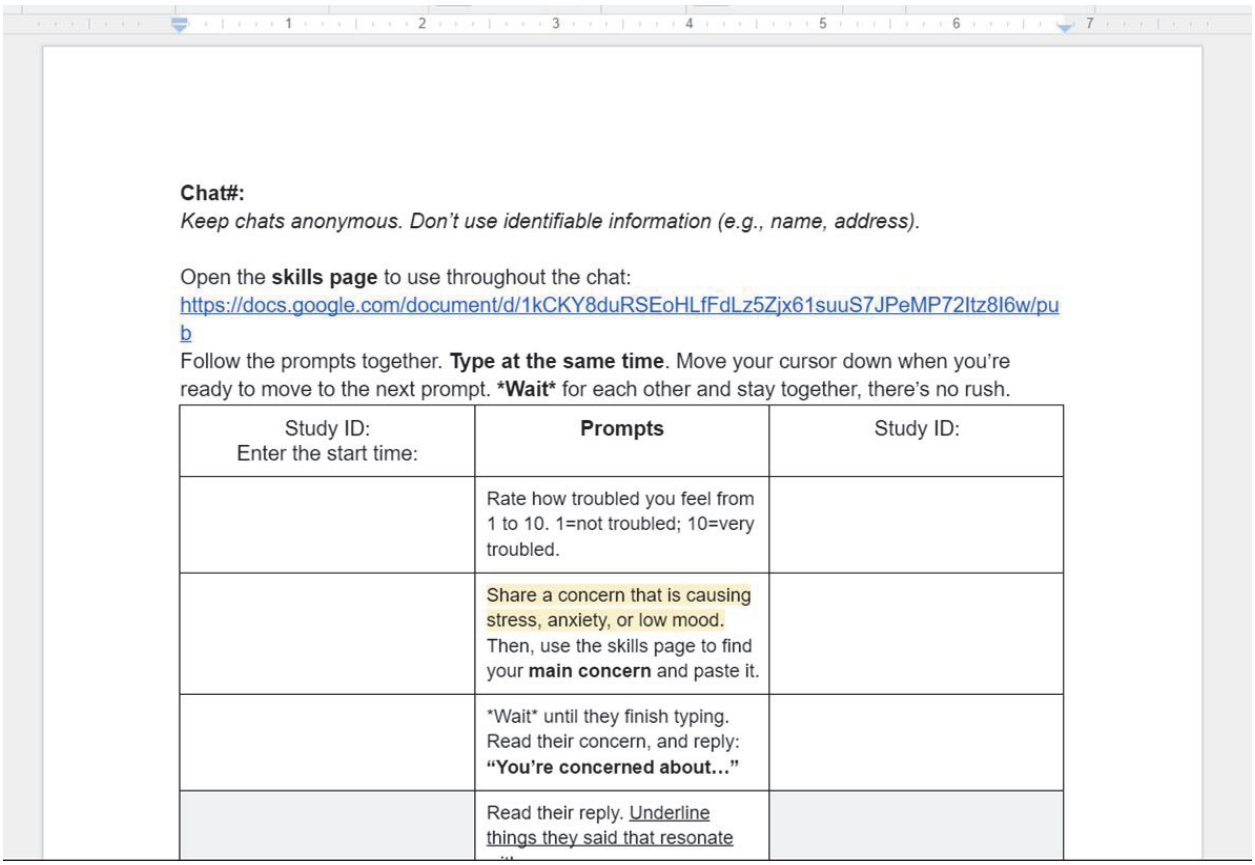
Before your first chat: complete Survey 1. You will receive **$10** for completing it.

	Date	Time	Chat link	Incentive*
1				$5
2				$5
3				$5
4				$5
5				$5
6				$5
7				$5
8				$5

After your last chat: complete Survey 2. You will receive **$30** for completing it.
*You must submit the feedback survey after each chat to receive the $5.

Instructions:
1. ****Sign out of your Google/Gmail accounts before entering the chat****
2. Click the link to open the chat page.
3. Open the skills page in a new tab (you'll need to reference it during the chat).
4. Enter your Study ID, and use that column for the rest of the chat.
5. **Type at the same time** following the prompts. Stick together.
6. Submit feedback survey (click the link at the bottom of the chat).

About this Supportive Chat Tool
You'll chat with each other by typing in a Google Doc. Here's what it looks like



Chat#:
Keep chats anonymous. Don't use identifiable information (e.g., name, address).

Open the **skills page** to use throughout the chat:
https://docs.google.com/document/d/1kCKY8duRSEoHLfFdLz5Zjx61suuS7JPeMP72Itz8I6w/pub
Follow the prompts together. **Type at the same time**. Move your cursor down when you're ready to move to the next prompt. ***Wait*** for each other and stay together, there's no rush.

Study ID: Enter the start time:	**Prompts**	Study ID:
	Rate how troubled you feel from 1 to 10. 1=not troubled; 10=very troubled.	
	Share a concern that is causing stress, anxiety, or low mood. Then, use the skills page to find your **main concern** and paste it.	
	Wait until they finish typing. Read their concern, and reply: **"You're concerned about…"**	
	Read their reply. Underline things they said that resonate	

Get familiar with the skills page:
https://docs.google.com/document/d/1kCKY8duRSEoHLfFdLz5Zjx61suuS7JPeMP72Itz8I6w/pub
These skills will help you to find and share your core concerns, thoughts, and feelings so that you can find relief. Watch a video demo here: https://youtu.be/66TaznNIcW8.

Incentives: You'll receive $80 for completing the study. We'll mail you a check at the end, after you submit Survey 2. If you withdraw from the study before 8 chats, I will pay you for whatever amount earned up to that point.

Remember: Be patient as you learn to use this new tool! If you run into challenges, it's my fault for bad design. You will have a chance to give feedback after every chat.

APPENDIX O: CHAT REMINDER EMAIL

This is a reminder that you have a chat today! Refer to your schedule for the exact time. It is not normally possible to reschedule chats. Please contact me immediately if you must reschedule, or if your partner is absent.

APPENDIX P: CHAT FEEDBACK SURVEY

Each time you complete a chat, you will receive $5.00 for submitting this feedback survey, up to a total of $40 for 8 chats. Contact the researcher with questions or concerns: Katie O'Leary kathlo@uw.edu

* Required

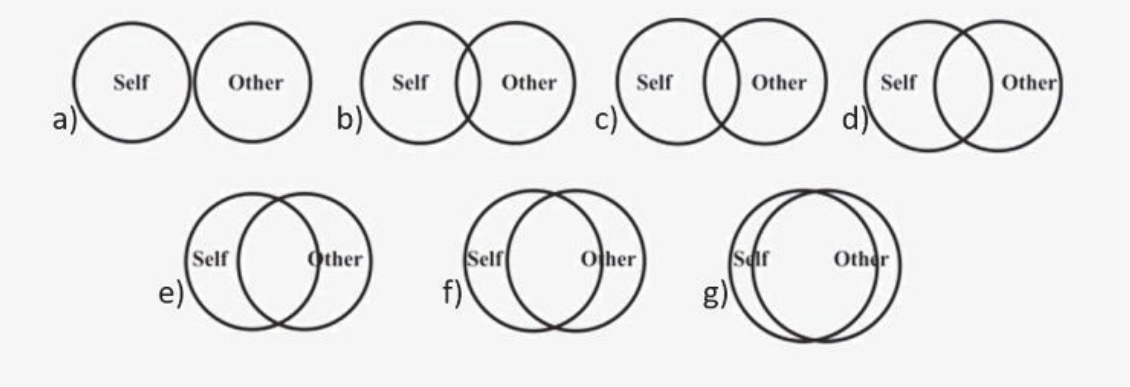
Enter the Chat# (copy and paste from the top of the chat doc) *

Enter your Study ID: *

How satisfying was this chat? *

	1	2	3	4	5	6	7	
Very low	○	○	○	○	○	○	○	Very high

Which picture best describes your feeling of closeness with your chat partner? *



- ○ a
- ○ b
- ○ c
- ○ d
- ○ e
- ○ f
- ○ g

How were you feeling before the chat? What, if anything, has changed? *

What did you like about the chat? *

What did you dislike, or find challenging? *

How insecure, discouraged, irritated, stressed, and annoyed were you during this chat? *

	1	2	3	4	5	6	7	
Very low	○	○	○	○	○	○	○	Very high

How hard did you have to work during this chat? *

	1	2	3	4	5	6	7	
Very low	○	○	○	○	○	○	○	Very high

APPENDIX Q: SUPPORTIVE CHAT TEST 1: OUTCOME MEASURES

UW Research on Supportive Conversations
Page 1 of 8
Thank you for taking this survey. Your answers are very important! This survey should take about 20 minutes. You will receive $10.00 for submitting the survey.

Question 1.
Enter your Study ID:

Question 2

These statements are related to feelings of stress[17].
In the last two weeks, how often have you felt this way? [1 = never, 2 = seldom, 3 = occasionally, 4 = often, 5 = frequently]

- I felt there was not enough time to complete my daily tasks.
- I felt I had more stress than usual.
- I took on more than I could handle.
- I felt overwhelmed.
- I was pressured by others.
- I felt stressed by unexpected events.
- I had no time to relax.
- I successfully solved problems that came up.
- I was able to cope with unexpected problems.
- I was able to cope with difficult situations.
- I felt able to meet demands.
- I felt able to cope with stress

Question 3.

These words represent different positive feelings[18].

Indicate to what extent you have felt this way during the **past two weeks** [1 = very slightly, 2 = a little, 3 = moderately, 4 = quite a bit, 5 = extremely].

- relaxed
- alert
- interested
- lively
- delighted
- confident

[17] Fava, J.L. et al. 1998. The Development and Structural Confirmation of the Rhode Island Stress and Coping Inventory. Journal of Behavioral Medicine. 21, 6 (1998).
[18] Watson, D. and Clark, L. 1999. The PANAS-X Manual for the Positive and Negative Affect Schedule-Expanded Form.

- inspired
- bold
- at ease
- energetic
- concentrating

Question 4.

These words represent different negative feelings[19].

Indicate to what extent you have felt this way during the **past two weeks** [1 = very slightly, 2 = a little, 3 = moderately, 4 = quite a bit, 5 = extremely]

- jittery
- irritable
- upset
- loathing
- angry
- ashamed
- fearless
- blue
- scared
- disgusted with self
- shy
- drowsy
- dissatisfied with self

Question 5.

These statements are about problems from feeling low[20].
Over the last 2 weeks, how often have you been bothered by any of the following problems?
[0=Not at all; 1=Several days; 2=More than half the days; 3=Nearly every day]

- Little interest or pleasure in doing things
- Feeling down, depressed, or hopeless
- Trouble falling or staying asleep, or sleeping too much
- Feeling tired or having little energy
- Poor appetite or overeating

[19] Ibid.
[20] Kroenke, K. et al. 2001. The PHQ-9: Validity of a Brief Depression Severity Measure. Journal of General Internal Medicine. 16, 9 (Sep. 2001), 606–613.

- Feeling bad about yourself — or that you are a failure or have let yourself or your family down
- Trouble concentrating on things, such as reading the newspaper or watching television
- Moving or speaking so slowly that other people could have noticed? Or the opposite — being so fidgety or restless that you have been moving around a lot more than usual
- Thoughts that you would be better off dead or of hurting yourself in some way

Question 6.
These statements are about problems from feeling anxious or worried[21].
Over the last 2 weeks, how often have you been bothered by the following problems? [0=Not at all; 1=Several days; 2=More than half the days; 3=Nearly every day]

- Feeling nervous, anxious or on edge
- Not being able to stop or control worrying
- Worrying too much about different things
- Trouble relaxing
- Being so restless that it is hard to sit still
- Becoming easily annoyed or irritable
- Feeling afraid as if something awful might happen

Question 7.
These statements are about how you manage your emotions[22].
Please read each statement carefully, and indicate to what extent you agree with it. [1=strongly disagree to 7=strongly agree.]

- When I want to feel more positive emotion (such as joy or amusement), I change what I'm thinking about.
- I keep my emotions to myself.
- When I want to feel less negative emotion (such as sadness or anger), I change what I'm thinking about.
- When I am feeling positive emotions, I am careful not to express them.
- When I'm faced with a stressful situation, I make myself think about it in a way that helps me stay calm.
- I control my emotions by not expressing them.
- When I want to feel more positive emotion, I change the way I'm thinking about the situation.
- I control my emotions by changing the way I think about the situation I'm in.
- When I am feeling negative emotions, I make sure not to express them.

[21] Spitzer, R.L. et al. 2006. A Brief Measure for Assessing Generalized Anxiety Disorder. Archives of Internal Medicine. 166, 10 (May 2006), 1092.
[22] Gross, J.J. and John, O.P. 2003. Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. Journal of Personality and Social Psychology. 85, (2003), 348–362.

- When I want to feel less negative emotion, I change the way I'm thinking about the situation.

Question 8.
Imagine you had a troubling issue that you could not solve on your own[23].
If you sought psychological help from someone for this issue, to what degree do you believe that they would...[1 Not at all; 2 A little; 3 Some; 4 A lot; 5 A great deal.]

- React negatively to you
- Think bad things of you
- See you as seriously disturbed
- Think of you in a less favorable way
- Think you posed a risk to others

[23] Vogel, D.L. et al. 2009. Measuring perceptions of stigmatization by others for seeking psychological help: Reliability and validity of a new stigma scale with college students. Journal of Counseling Psychology. 56, 2 (2009), 301–308.

APPENDIX R: SUPPORTIVE CHAT TEST 2: ADDITIONAL QUESTIONS

Next are some questions to better understand your experience of the chat tool. Thank you in advance for your thoughtful replies.

Question 9.
What was the most important takeaway from your supportive chat experience?

Question 10.
What was the most important difference, if any, that your supportive chat experience made in your life over the past two weeks?

Question 11.
What was the most negative aspect of your supportive chat experience?

Question 12.
If you were looking for another chat partner, what characteristics would you want them to have?

Question 13.
List all the devices that you used for your chats.

Question 14.
Rate how strongly you feel that it is important to have access to online supportive chats like this in your life? 1=strongly disagree; 7=strongly agree. Why?

APPENDIX S: SUPPORTIVE CHAT TEST 3: ADDITIONAL QUESTIONS

Next are some questions to better understand your experience of the chat tool. Thank you in advance for your thoughtful replies.

Question 9.
What did you like the most about supportive chat tool 2? Please explain why you liked that.

Question 10.
What did you dislike the most about supportive chat tool 2? Please explain why you disliked that.

Question 11.
Which supportive chat tool did you like best? Please explain why.

Question 12.
Rate how strongly you feel that it is important to have access to online supportive chats like chat tool 2 in your life? 1=strongly disagree; 7=strongly agree. Why?

APPENDIX T: SUPPORTIVE CHAT FOLLOW-UP INTERVIEW PROTOCOL

A few things to get started: This interview will last about 40 minutes, and is completely voluntary. You can withdraw at any time, and decline to answer any questions. There is a $25 incentive, that I'll send by check.

I'll audio record this interview, and keep a record of the transcript so I can use it in research -- I'll remove your name and other identifiable information. Is that okay with you?

Do you have any questions before I get started?

Great, thank you for sticking with this study for two (of four) weeks!! It was a lot of chats, and I'm really interested to hear about your experience.

1. Can you tell me about your supportive chat experience?
2. Tell me about a time you were frustrated by the format of the chat.
    a. How did you deal with that?
3. Can you tell me about a time when the format of the chat helped?
4. Was there ever a time when you felt like you couldn't share your concerns freely? Why was that?
5. Was there ever a time when you disclosed something and it felt beneficial?
6. What were some of the benefits of anonymity?
7. What were some of the drawbacks/challenges of anonymity?
8. How did this tool compare to other things you do to manage your mental health?
9. What was the most important thing you and your chat partner had in common?
10. If you could use this tool in your everyday life, how often would you use it? Why would that feel like a good amount?
11. When would you avoid it?
12. Is there anything you wished I had asked you? Or any questions for me?

Within-subjects additional questions:

1. Was there ever a time when you brought up an issue in the first chat tool, and then again in the second chat tool? How did it differ?
2. If these tools were available online, which one would you gravitate towards?

APPENDIX U: CHAT SESSION QUALITIES CODING MANUAL

Code		Definition
Helping characteristic	A	Aspects of a chat session that were positively perceived.
New perspective	A.i	New information, resulting in increased insight, awareness, or cognitive restructuring.
Problem solution	A.ii	Making progress toward solving the presenting problem by receiving alternative courses of action to consider or being helped to develop these on his or her own.
Focused awareness	A.iii	Helping the student to focus attention on topics he or she was avoiding or having trouble staying with.
Problem clarification	A.iv	Arriving at a clearer definition of what he or she was working toward.
Understanding	A.v	Feeling that the peer either accurately understood specific information about the them or was familiar and sympathetic with their situation.
Personal contact	A.vii	Experiences of a personal relationship with the peer or sense of shared experience.
Same person/continuity	A.viii	The quality of having the same chat partner throughout the chat sessions.
Reciprocity	A.ix	The characteristic of reciprocal support wherein both people give and receive support.
Nonhelpful characteristic	B	Aspects of the chat sessions that were negatively perceived.
Unwanted responsibility	B.i	Feeling burdened with more responsibility than was comfortable or reasonable.
Unwanted thoughts	B.ii	Discomfort caused by having to confront or discuss unpleasant thoughts or feelings.
Misperception	B.iii	Feeling misunderstood or inaccurately perceived.
DEPTH/VALUE dimension	C	Chat sessions that are insightful, valuable, full, special, and powerful.
SMOOTHNESS/EASE dimension	D	Good feelings of relaxation and comfort within the chat session; smooth, easy, pleasant, and safe.
New code needed	E	The utterance not covered by existing codes
None mentioned	F	No likes or dislikes about the session were noted.

APPENDIX V: STATEMENTS OF CHANGE CODING MANUAL

Code		Description	Example quotes
Cognitive change - Positive	CC-P	Positive self-insight, shift in focus of thoughts, sense of control, new beliefs, new perspective or outlook, realization.	"I had unfocused concerns. After the chat, I had **narrowed my worries** to a more manageable package." "Now I feel so relieved to **know** I'm not alone." "I am slightly more optimistic."
Cognitive change - Negative	CC-N	Negative self-insight, perspective, shift in focus, beliefs.	"The chat actually **made me think of other things I needed to be stressed out about."**
Emotional change – Positive valence	EC-PV	More positive feelings by the end of the chat	"I was a little anxious and then as I was typing **it got better** as I was unraveling my stress today."
Emotional change – Negative valence	EC-NV	More negative feelings by the end of the chat	"After- **felt a little concerned** for the person I was talking. Wanted to know how to support them- since they were going through a tough time."
Motivational change	MC	Statement of feeling more motivated to change. Apply this code in addition to any subset of motivational change.	**"I'm feeling motivated to do something** about it and my partner's encouragement helped."
Motivational change - Ability	MC-A	Statements about capability, what the person perceives as within their ability. Keywords: *can, could.*	"I have a bit more clarity around what I **can do** in the present and not worry so much about what the future holds for me."
Motivational change - Need	MC-I	Statements about imperatives for change. Keywords: *need, have to, should, must*.	"So I might **just need** to be more confident and believe in myself." **"reminded me that I need** human interaction even when I'm feeling like I want to isolate myself for a bit."
Motivational change - Commitment	MC-C	Statements that indicate a likelihood of change. Keywords: *will, plan to, hope to*, *try.*	"I **plan to** step back and take a look at what it means to the organization to be a high performer and set my expectations in line with that."

			"I'm **ready to actually do** the things I wanna do now."
No change	NC	Mention that nothing changed.	"Nothing special and no notable change."
No change in negative emotions	NC-N	No change in negative emotions, cognitions, or behaviors	"I feel anxious about disappointing a friend. I **still feel some anxiety**, because I hate to tell this friend "no.""
No change in positive emotions	NC-P	No change in positive emotions, cognitions, or behaviors	"I found myself calm before the session (might be an avoidance thing). **Nothing has changed** in the end"
No change in motivation	NC-M	No change in motivation.	"Nothing in particular as such, a bit low motivation, nothing has changed"
None Applicable	NA	No mention of change	"tired"