

“Suddenly, we got to become therapists for each other”: Designing Peer Support Chats for Mental Health

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ABSTRACT

Talk therapy is a common, effective, and desirable form of mental health treatment. Yet, it is inaccessible to many people. Enabling peers to chat online using effective principles of talk therapy could help scale this form of mental health care. To understand how such chats could be designed, we conducted a two-week field experiment with 40 people experiencing mental illnesses comparing two types of online chats—chats guided by prompts, and unguided chats. Results show that anxiety was significantly reduced from pre-test to post-test. User feedback revealed that guided chats provided solutions to problems and new perspectives, and were perceived as “deep,” while unguided chats offered personal connection on shared experiences and were experienced as “smooth.” We contribute the design of an online guided chat tool and insights into the design of peer support chat systems that guide users to initiate, maintain, and reciprocate emotional support.

Author Keywords

Health; peer support; mental health; behavioral interventions; psychotherapy; peer counseling.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (*e.g.*, HCI): Miscellaneous.

INTRODUCTION

More than a quarter of U.S. adults are affected by mental illness [36], and the majority of people affected never access care [18]. The largest barriers to accessing care include the lack of trained professionals to meet the demand, the stigma that mitigates help-seeking, and the high cost of treatment [35]. Thus, the demand for care is unlikely to be met by training additional professionals alone. Instead, new approaches are necessary that can dramatically expand the capacity of mental health care.

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One way to overcome these barriers is to provide training and mentoring to build the capacity of peers with mental health challenges to support each other. 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 [60,72].

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 for guidance [11]. However, few efforts scaffold peer supporters to use best practices, such as effective principles of talk therapy [62,63,64], in online settings. Peer supporters who offer online counseling are therefore typically trained and monitored in-person by clinicians (*e.g.*, [3,30]). Providing guidance to peers using online scaffolds could improve the quality, scalability, and efficacy of online counseling among peers. But we need insight into how to design guidance that is useful, appropriate, and effective.

To gain insight into how to design guidance for online, peer-supported chats, we conducted a two-week field experiment with 40 peers experiencing mental health challenges. We compared a guided chat tool, which we created in Google Docs, to an unguided tool, to help us explore the tradeoffs in using guidance. Our mixed-methods approach combined quantitative measures of mental health outcomes and in-depth qualitative data to help us understand users’ experiences. The unguided chat tool enabled free-flowing chats, without any prompts. The guided chat tool, that we designed, prompted peers to use evidence-based psychotherapy skills to address emotional concerns. We found that guided chats were perceived as valuable for generating solutions to problems and promoting mutual awareness of chat partners’ concerns, whereas unguided chats were perceived as pleasant distractions from troubles.

In this paper, we contribute the design of an online guided chat tool, and insights into the tradeoffs of guided and

unguided peer support chats for mental health. We present characteristics of chats that guidance should facilitate, such as reciprocity of giving and receiving help, solutions to problems, personal connection built on shared interests, and continuity of chat partners over time. We also contribute design implications for facilitating skillful chats between peers that complement traditional therapy and other forms of mental health self-management strategies.

RELATED WORK

In this section, we describe related work in peer support for mental health in offline and online settings, as well as issues related to training for online peer support.

Peer Support for Mental Health in Face-to-Face Settings

Peer support is effective in a wide range of mental health services [60]. 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 twelve steps of Alcoholics Anonymous programs [80,82], the six steps of Schizophrenics Anonymous [66], and the cognitive and behavioral guidelines of GROW [71,81] and Recovery Inc. [30]. Research on the benefits of such peer organizations shows that they reduce symptoms and rehospitalizations [22,23,70] and enhance peers' sense of mastery in managing their illnesses [43].

Importantly, people receiving help not only benefit, but people who provide support benefit as well [15,51,67]. In particular, acting as a supporter builds skills that improve social and occupational functioning and reduce dependence on other resources, such as Social Security [67]. Thus, helping peers to help each other is an important design opportunity for promoting many of the benefits of peer support online.

Peer-Based Digital Interventions and Online Settings

HCI researchers and technology designers are playing a growing role in shaping peer support for mental health. For example, Lederman *et al.* [2,38] developed the first Moderated Online Social Therapy, called *Horyzons*, which encourages peers with schizophrenia to learn about cognitive and behavioral strategies in a dedicated social network moderated by clinicians. Another example is *Panopoly* [50], a crowdsourced mental health intervention for peers to reframe each other's thoughts using therapeutic techniques. Other approaches leverage the co-design process for empathetic interventions among peers with mental health issues, such as the interactive objects *Spheres of Wellbeing* [76], or designs to reduce self-harm among peers at Hackathons for mental wellbeing [13].

HCI research has also expanded our knowledge of how people use unmoderated communities and social network sites to support their mental health. Peers with depression and other conditions seek information, emotional support, and

advice [7,21,25,39]. As such, social media provides an interesting glimpse into people's mental health [19,55]. From peer support platforms, we can also learn more about people's mental health needs such as when, why, and how people seek help [32,54]. People with mental health conditions often prefer going online for support because of the benefits of anonymity, empowerment, and access [33,45,56,57].

Despite these benefits, internet support groups have not been shown to be effective at providing mental health benefits [31]. Participating in online communities for mental health can be distressing and exacerbate symptoms, even when people report having positive experiences [34,68,75]. Evidence of online interactions between peers with depression show that people have negative experiences with unsupportive members, negative content, and conflict of beliefs [39]. Training peers and providing scaffolding could reduce the incidence and impact of negative experiences with emotional support online.

Training for Online Peer Support

To mitigate the negative effects of going online for mental health peer support, there is a growing trend in scaling effective peer support training online. For example, the *7 Cups of Tea* website¹ provides users with training on active listening techniques for supportive chats. These techniques have also been adapted for specific peer populations, such as mothers with postpartum depression [8]. *SAHAR*, an Israeli crisis service, trains its online counselors extensively during weeks of in-person training to handle supportive instant messaging chats [3]. *Crisis Textline* trains its volunteers online to provide effective text-messaging crisis interventions [1]. New approaches go one step further than training peers, and instead provide support through automated chatbots [27].

These efforts point to a need to investigate scalable peer support training and guidance to enable effective and engaging peer-based mental health care. Indeed, peers show a strong interest in learning counseling skills and accessing web-disseminated training programs to help one another online [11]. To address this need, we conducted a field experiment comparing two online chat tools—guided and unguided—for peers to relieve the symptoms of depression and anxiety. Below, we describe our prototypes, study, and findings and discuss the implications for designing peer support mental health chats.

PEER SUPPORT CHAT FIELD EXPERIMENT

We conducted a field experiment to compare peer support chats with and without guidance. We describe the two chat tool prototypes, and then describe the details of our experiment.

Guided and Unguided Chat Prototypes

We created and deployed our mid-fidelity chat tool prototypes in Google Docs. The chat partners opened a

¹ <https://www.7cups.com/>

unique link to a Google Doc that contained a chat template for each of their eight chat sessions together. Each partner entered the doc anonymously, but they were always paired with the same chat partner. We describe each of these chat tools below.

Unguided Chat Tool

The unguided chat template instructed users to “Have a supportive chat about concerns causing worry, stress, or low mood.” It did not contain any prompts, tips, or skills, or dictate which of the chat partners was seeking or providing support. Chat partners each typed in their own column, right and left, to have an open-ended chat (Figure 1).

Guided Chat Tool

We designed the guided chat tool based on a problem-solving framework, similar to problem-solving therapy and cognitive behavioral therapy [9,20]. We chose this approach to guidance because it involves the use of specific psychotherapy skills for identifying and reflecting on thoughts and feelings, which have strong evidence in treating a range of mental illnesses [17,42]. We based the guidance on skills with broad applicability because we wanted the chats to serve a diverse set of users. Furthermore, we wanted to align our 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 [4,5].

Chat partners using the guided chat tool followed a sequence of prompts based on established psychotherapy skills [10,47]. The guided chat featured six *expressive* prompts accompanied by six *reflective* prompts (Table 1). 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). They helped users to express their thoughts and feelings by using cognitive and

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: P18 Enter the start time: 5:30PM	Study ID: P01
First, rate how troubled you feel from 1 to 10. 1=not troubled; 10=very troubled.	1	3
Now, chat with each other. Type on a new line to begin a new reply.	Hi! What was your favorite part of your week? Right on! Mine was visiting my mom and her dogs. I, too, go to (a few) support groups. My main one is Thursday night. I help run it. Sometimes I'm still surprised by that. Eh. What about you?	I'm not too sure. I think maybe going to my support group. That's always a good thing. How about you? I remember you saying about visiting your mom and her dogs in the last chat :) That's cool you got to do that! That's also really cool that you go to a

Figure 1. Unguided chat tool.

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 just online jobs, but cannot
	"Wait" until they finish typing. Read their concern, and reply: "You're concerned about..."	
	Read their reply. <u>Underline things they said that resonate</u>	

Figure 2. Guided chat tool

emotional skills that are well-established in talk therapy [10,47]. To use the skills, users referenced the “skills page,” a separate doc created by the researchers that briefly described common types of thoughts, feelings, and strategies. Users applied the skills by identifying an appropriate type, copying it from the skills page and pasting into the guided chat template. Then they expressed how the type fit their current thought, feeling, or motivation.

	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.

Table 1. Prompts based on established psychotherapeutic techniques contained in the guided chat tool.

The *reflective* prompts helped users to reflect their understanding of their chat partner's thoughts and feelings. 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 [46]. Additionally, chat partners were instructed to underline text that resonated with them in each reflective statement they received from their chat partner. This act of underlining was meant to further promote feelings of mutual understanding. The use of nonjudgmental reflective listening is rated by peers as the most highly desired skill in a peer supporter [11]; thus, we deliberately promoted the use of this skill.

The guided chat prompted an ordering of the expressive and reflective prompts, in the following sequence: first an expressive prompt guided peers to open up to each other simultaneously, then a reflective prompt guided peers to read and reply to each other's disclosures. This sequence was repeated for each expressive prompt. Thus, chat partners alternated equally between using expressive and reflective prompts, typing responses to the prompts at the same time, and waiting for each other to finish typing before moving onto the next prompt together. This design choice was intended to facilitate reciprocity in support-giving, an important feature of peer support [15,48,82]. Moreover, the simultaneous typing was intended to enhance the efficiency of the chat, and again promote reciprocity between partners. The prompts were displayed in the guided chat template, which contained 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 (see Figure 2). Next, we describe our study comparing guided and unguided chat tools.

Participants

Forty participants were recruited on Facebook, online through the National Alliance for Mental Illness, and through flyers posted on a large university campus. 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. 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 2).

The severity ratings of participants' depression and anxiety were based on the 9-item Patient Health Questionnaire (PHQ-9)—a common measure of depressive symptoms [41], and the 7-item Generalized Anxiety Disorder scale (GAD-7)—a common measure of symptoms of anxiety [73]. Participant scores ranged from minimal to severe, based on the threshold norms for diagnosis: 5, 10, 15, and 20 on the PHQ-9 for mild, moderate, moderately severe, and severe depression; and 5, 10, and 15 on the GAD-7 for mild, moderate, and severe anxiety. Participants were assigned to a

		Guided chat participants (N=20)	Unguided chat participants (N=20)
Gender	<i>Nonbinary</i>	0	2
	<i>Female</i>	15	13
	<i>Male</i>	5	5
Race	<i>Hispanic</i>	1	2
	<i>African American</i>	1	0
	<i>Asian</i>	2	5
	<i>Mixed race</i>	1	2
	<i>White</i>	15	11
Age	<i>Range</i>	21-63	21-55
Education	<i>Bachelor Degree</i>	7	6
	<i>Some College</i>	5	5
	<i>Associates Degree</i>	2	3
	<i>Master's Degree</i>	6	6
Self-identified mental illnesses	<i>Depression</i>	12	7
	<i>Anxiety</i>	9	6
	<i>Bipolar disorder</i>	0	3
	<i>Autism</i>	0	1
	<i>Eating disorder</i>	1	0
	<i>ADHD</i>	1	0
	<i>Dissociative identity disorder</i>	0	1
	<i>None specified</i>	6	7
Depression severity (PHQ-9 scores)	<i>Minimal (0-4)</i>	2	9
	<i>Mild (5-9)</i>	8	3
	<i>Moderate (10-14)</i>	6	3
	<i>Moderately severe</i>	3	3
	<i>Severe (20-27)</i>	1	2
Anxiety severity (GAD-7 scores)	<i>Minimal (0-4)</i>	4	9
	<i>Mild (5-9)</i>	8	2
	<i>Moderate (10-14)</i>	6	4
	<i>Severe (15-21)</i>	2	5

Table 2. Participant demographic data. Some reported more than one mental illness. Depression and anxiety severity ratings are based on PHQ-9 and GAD-7 scores, respectively.

condition *prior to* completing these measures to avoid influencing condition assignment because peers with mental health challenges prefer to find similarity with each other beyond their diagnoses [54].

We matched participants based on similarity of age (within five years in age of each other), gender identity, and educational attainment, in that order. Similarity in age was prioritized over all other matching characteristics because we expected similarly-aged peers to have relatable emotional troubles. In cases where scheduling conflicts did not permit pairing by age, the researcher 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.

Procedures

Our procedures were approved by our institution's IRB 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 ($n=20$). Participants remained with the same chat partner for the duration of the study. The researcher scheduled chat partners for four chats per week over two weeks, and sent email reminders prior to each chat. Prior to and after all chat sessions were finished, all participants completed web-based versions of the PHQ-9 depression scale and GAD-7 anxiety scale. After each chat, participants submitted feedback on what they liked and disliked about that chat.

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. We employed a partial cross-over design with this subset of participants, rather than a full cross-over, because learning effects from using guidance first would have likely affected results in subsequent unguided chats. This partial cross-over helped us to investigate tradeoffs in adding guidance to typical unguided chats, and to deeply understand the perceived tradeoffs of guided and unguided chats from interviews with participants who had tried both conditions. We selected 8 participants to interview who completed this cross-over. Additionally, we selected 4 participants to interview from the 20 who completed only guided chat. We sampled for maximum diversity in outcomes, from poor to excellent changes in symptoms. This sampling rationale for the follow-up interviews allowed us to gather a range of perspectives on the tradeoffs of guided and unguided chat tools.

Safety Protocol

We took the following steps to ensure the safety of our participants, with special attention to signs of potential harm to self or others, worsening symptoms, and negative impacts of the chats. The first author read every transcript and feedback survey within three hours of its submission. She assessed potential risks within these transcripts and surveys 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, she contacted the participant 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. We engaged these safety procedures in response to exacerbation of symptoms three times throughout the study. In two cases, we 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.

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.

Quantitative Analysis of Outcomes

We analyzed the response data from the PHQ-9 and the GAD-7. Our experiment was a 2×2 mixed between-within-subjects design. Our between-subjects factor was *Chat Type*: guided chats or unguided chats. Our within-subjects factor was *Test Time*—pre-test or post-test. After exploring our data and determining it was suitable to parametric analysis of variance, we utilized a linear mixed-effects model to analyze our data. *Chat Type* and *Test Time* were fixed effects while *Participant* was a random effect [28,59]. Responses were either the *Score* on the PHQ-9 instrument, or the *Score* on the GAD-7 instrument.

Qualitative Data Analysis

We conducted both deductive and inductive coding of the feedback from participants on what they liked and disliked about each chat session. We used iterative stages of coding, as described in [26]. The first author applied structured codes *deductively*, using codes derived from qualities shown to influence client outcomes and evaluations of talk therapy: deep and smooth [74]. 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.

In addition to these two qualities of deep and smooth, studies have revealed helpful and non-helpful qualities of talk therapy sessions that are influential [24]. Helpful qualities—which refers to qualities that facilitate helpful sessions—include: Personal connection, Problem solutions, Focused awareness, New perspectives, and Understanding. Non-helpful qualities that can hinder the benefits of therapy sessions include: Unwanted thoughts, Unwanted responsibility, and Misperception. We deductively assessed participant's feedback for those codes. Additionally, we were sensitive to participant feedback that did not fit these predetermined, structured codes [14]. Through iterative, *inductive* coding of the feedback, we identified two additional Helpful qualities: Reciprocity of giving and receiving support, and Continuity of chat partners over time.

Using this qualitative approach, we 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 sessions 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 Non-helpful Quality, but each response could warrant multiple Qualities, or N/A when no quality was specified.

		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%)
NON-HELPFUL 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%)

Table 3. Qualitative analysis codes with frequencies of occurrence in each condition, guided and unguided chat.

FINDINGS

Below, we present findings from our mixed-methods analysis. First, we show our statistical results that reveal the effect of the two types of chat tools on the outcomes of depression (PHQ-9) and anxiety (GAD-7). Second, we present the qualitative findings from the chat feedback that shed light on the differences between guided and unguided chats. Third, we present results from our interviews with participants after they completed all chat sessions.

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 ($F_{1,38} = 0.87, n.s.$). However, *Test Time* showed a trend-level result ($F_{1,38} = 2.88, p = .098$), with the pre-test depression scores being slightly higher than the post-test scores averaged over both chat types, from 9.25 ($SD = 6.04$) to 8.00 ($SD = 5.74$). We found no significant *Chat Type* \times *Test Time* interaction ($F_{1,38} = 0.17, n.s.$).

For anxiety, as measured by GAD-7 scores, our 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* \times *Test Time* interaction was found ($F_{1,38} = 1.94, n.s.$), indicating that this reduction was not statistically significantly different for chat type.

Feedback on Qualities of Chats

In addition to these quantitative results, we 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.

Perspectives on Deep Chat Sessions

Depth is associated with valuable, powerful, and insightful sessions that lead to a sense of accomplishment [74]. 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 to 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 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 non-helpful 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.

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 [74]. 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 we 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 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 open-ended 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 non-helpful 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.

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,

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

Table 4. Interviewees' changes in symptoms. "Pre" and "Post" indicates the pre- 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.

P67, P70, and P72), had tried both chat tools; having completed their use of the unguided tool, they agreed to participate for two additional "crossover" 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 (see Table 4). More participants than were interviewed had clinically significant changes in symptoms: 4 more participants in guided chat and 3 more in unguided chat improved significantly, and 1 more worsened significantly in each condition. Our interview sample represents a maximally diverse subset of participants who substantially improved, worsened, or had minimal change in their symptoms. We present insights from these interviews.

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, we 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: '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 and applying them as a form of self-help 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.

DISCUSSION AND IMPLICATIONS

We present insights on the tradeoffs of guided versus unguided chats for peers with mental illnesses. Then we present design implications that we envision as next steps in technology for peer-based supportive chats: (1) Engage people during highs and lows; (2) Design beyond the “session”; and (3) Promote connection on shared interests.

Guided Versus Unguided Chats

Guided chats and unguided chats had distinct styles of interaction and appeared to confer unique benefits to the participants. Our findings suggest that guided chats promoted deep discussions that lead to self-insight. The ability to both give and receive valuable advice increased the perceived depth (*e.g.*, power and impact) of guided chats. The ability to chat openly about shared interests and experiences in unguided chats promoted a sense of personal connection that contributed to smoothness, which has also been shown to be an important dimension of success in traditional therapy sessions [74]. Both of these types of chats led to clinically significant changes in depression and anxiety for some individuals (see Table 4), facilitating *remission* (*i.e.*, dropping below the threshold for clinical intervention) or *recovery* (*i.e.*, improving by at least 50%) [37,61].

Although people in the guided chats reciprocated support, achieved new perspectives, and solved problems, they also discussed troubling issues, such as unwanted negative thoughts. Therefore, even when guided chats were deep and led to positive outcomes, participants could have experienced heightened distress in talking about troubling issues. In contrast, participants tended to focus on pleasant topics that distracted from troubles in unguided chats. This 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 [52], and peer support networks of caregivers [40], value the chance to chat socially and “off-topic” without necessarily addressing mutual concerns. Similarly, we 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 chats. These drawbacks exacerbated participants’ fears of being “intrusive” or “oversharing” when opening up about concerns. These findings highlight that people seeking emotional support typically make implicit rather than explicit requests for support [6,7], and experience tension between self-presentation and help-seeking online [53]. We found that guidance mitigates these tension in seeking emotional support by providing explicit scaffolding for sensitive disclosures.

Implication 1: Engage People during Highs and Lows

People with mental health challenges experience highs and lows: sometimes symptoms are particularly severe, and other times they lessen. Our 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 benefits *other than* direct application to 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, we encourage designers of mental health chat tools to design guidance that provides users with benefits during the lows of illness and the highs of remission.

Our 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 as chats turn to more positive or troubling topics, providing appropriate scaffolds. Such adaptive guidance could help peers to not only solve problems, as was the case with our guided chat tool, but also help peers to build social connection—an important preventive factor in mental health [78,79].

Our 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. Leveraging more resource-oriented approaches that focus on solutions and strengths [58] 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.

Implication 2: Design beyond the session

We found that chat partners used the eight chat sessions 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 (*e.g.*, 7 Cups of Tea, [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 [69].

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 that improves engagement in online mental health interventions [38,49].

Moreover, many participants used the guided chat skills beyond the confines of the chat sessions. Designs could help users to reflect between chat sessions on the skills, strategies, and perspectives that they gained during chats, and encourage them in moments of distress. 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 include providing users with trends in clinically and personally significant mental health outcomes. For example, feedback to the users about their PHQ-9 and GAD-7 trends, or their achievement of personal recovery goals. 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.

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 [54]. 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 (*e.g.*, trauma) [16] 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 [11]. Future work can investigate the role of chat

guidance within familiar pairs (*i.e.*, friends and family), in addition to the anonymous pairs we studied.

LIMITATIONS AND FUTURE WORK

This work demonstrates insights from mid-fidelity Google Doc prototypes. This type of prototype allowed us to gather rich feedback on guided and unguided chats and to demonstrate challenges and opportunities of guidance. However, it limited our ability to mimic typical chat structure because the Google Doc template lacked the familiar “send” button for messages, and enabled participants to view each other typing. We addressed this limitation by having participants follow the prompts *in unison* to avoid overly complicated instructions for “sending” and turn-taking. This design choice could have affected the depth of guided chats, and therefore further work is needed to investigate how a typical chat structure influences perceived tradeoffs. Moreover, further work can explore how different types of prompts (*e.g.*, strengths-oriented prompts) influence outcomes and broaden applicability to any guided peer support chat. Another avenue for future work is to investigate longer term depression and anxiety outcomes, and to focus more on wellbeing, which is often overlooked in technology evaluations [77]. Evaluating skill acquisition might be particularly important for understanding whether guidance can be faded over time.

We were limited in the number of participants that we could engage in our field experiment due to logistical challenges of coordinating 20 pairs of peers over multiple time zones without any automated system support—the first author manually scheduled, coordinated, and reminded chat partners for the duration of the study. Future work using a chat application could further expand our insights by observing clinically and statistically significant outcomes for larger samples of people experiencing mental illness.

CONCLUSION

In this paper, we designed an online guided chat tool with prompts based on psychotherapy skills and compared it to unguided chat. We found that guided and unguided chats reduced average symptoms of anxiety, but did so in qualitatively different ways. Guided chats were perceived as deeply valuable for gaining solutions and insights, but provoked unwanted focus on troubles in some cases. Unguided chats were experienced as smooth and easy-going, but tended toward distraction from troubles rather than emotional support. We hope that this work will motivate future digital peer interventions for mental health care.

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REFERENCES

1. 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.
2. 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.
3. Azy Barak. 2007. Emotional support and suicide prevention through the Internet: A field project report. *Computers in Human Behavior* 23, 2: 971–984.
4. David H. Barlow, Laura B. Allen, and Molly L. Choate. 2004. Toward a unified treatment for emotional disorders. *Behavior Therapy* 35, 2: 205–230.
5. 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.
6. 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.
7. 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*.
8. 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.
9. G. Beck, A. T., Rush, A. J., Shaw, B. F., & Emery. 1979. *Cognitive therapy of depression*. Guilford Press, New York.
10. Judith Beck. 1995. *Cognitive therapy : basics and beyond*. Guilford Press, New York.
11. 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.
12. 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.
13. 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.
14. Richard E. Boyatzis. 1998. *Transforming qualitative information: Thematic analysis and code development*. Sage.
15. 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.
16. 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.
17. 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.
18. 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*.
19. 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*.
20. T. J. D’Zurilla and A. M. Nezu. 2010. Problem-solving therapy. In *Handbook of cognitive-behavioral therapies*. 197–225.
21. 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.
22. 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.
23. 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.
24. Robert Elliott. 1985. Helpful and nonhelpful events in brief counseling interviews: An empirical taxonomy. *Journal of Counseling Psychology* 32, 3: 307–322.
25. 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.
26. 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.
 27. 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.
 28. Brigitte N. Frederick. 1999. Fixed-, random-, and mixed-effects ANOVA models: A user-friendly guide for increasing the generalizability of ANOVA results. In B. Thompson, ed., *Advances in Social Science Methodology*. JAI Press, Stamford, Connecticut, 111–122.
 29. 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.
 30. M Galanter. 1988. Zealous self-help groups as adjuncts to psychiatric treatment: a study of Recovery Inc. *American journal of Psychiatry*.
 31. Kathleen M Griffiths, Alison L Calcar, 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.
 32. 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*.
 33. 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.
 34. 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.
 35. 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.
 36. Ronald C. Kessler, Wai Tat Chiu, Olga Demler, et al. 2005. Prevalence, Severity, and Comorbidity of 12-Month DSM-IV Disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry* 62, 6: 617.
 37. 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.
 38. 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.
 39. 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.
 40. 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.
 41. 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.
 42. J Malouff, E Thorstiensen, 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.
 43. 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.
 44. 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.
 45. 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.
 46. W. R. Miller and S. Rollnick. 2002. *Motivational interviewing: Preparing people for change*. Guilford Press., New York.

47. William R. Miller and Stephen Rollnick. 2012. *Motivational interviewing: Helping people change*. Guilford press.
48. G Mitchell and N Pistrang. 2011. Befriending for mental health problems: Processes of helping. *Psychology and Psychotherapy: Theory, Research and Practice* 84: 151–169.
49. 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.
50. 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.
51. 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.
52. 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.
53. 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.
54. 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.
55. 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.
56. 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.
57. John Powell and Aileen Clarke. 2007. Investigating internet use by mental health service users: interview study. *Studies in Health Technology and Informatics*: 129.
58. 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.
59. 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.
60. 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.
61. 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.
62. Carl Rogers. 1951. *Client-centered therapy : its current practice, implications, and theory*. Houghton Mifflin Co., Boston.
63. Carl Rogers. 1958. The Characteristics of a Helping Relationship. *The Personal Guidance Journal* 37, 1.
64. CR Rogers. 1957. The necessary and sufficient conditions of therapeutic personality change. *Journal of consulting psychology*.
65. 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.
66. RS Ryback. 1971. Schizophrenics Anonymous: a treatment adjunct. *The International Journal of Psychiatry in Medicine* 2, 3: 247–253.
67. 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.
68. 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.
69. 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.
70. Dave Sells, Larry Davidson, Christopher 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.

71. P J Shannon and D L Morrison. 1990. Who goes to GROW? *The Australian and New Zealand journal of psychiatry* 24, 1: 96–102.
72. Phyllis Solomon. 2004. Peer support/peer provided services underlying processes, benefits, and critical ingredients. *Psychiatric rehabilitation journal* 27, 4: 392–401.
73. 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.
74. W B Stiles. 1980. Measurement of the impact of psychotherapy sessions. *Journal of consulting and clinical psychology* 48, 2: 176–185.
75. 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.
76. 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.
77. 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.
78. Peggy A. Thoits. 1995. Stress, Coping, and Social Support Processes: Where Are We? What Next? *Journal of Health and Social Behavior* 35: 53.
79. World Health Organization. 2014. *Social determinants of mental health*. .
80. 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.
81. J Young and CL Williams. 1986. An evaluation of GROW, a mutual-help community mental health organisation. *Community health studies*.
82. S.E. Zemore and M.E. Pagano. 2008. Kickbacks from Helping Others: Health and Recovery. In D.M. Donovan and A.S. Floyd, eds., *Facilitating involvement in twelve-step programs*. 303–320.