Attachment-Informed Design: Digital Interventions That Build Self-Worth, Relationships, and Community in Support of Mental Health

Gabriela Marcu
School of Information, University of Michigan
Ann Arbor, Michigan, USA
gmarcu@umich.edu

Jina Huh-Yoo
College of Computing and Informatics, Drexel University
Philadelphia, PA, USA
jh3767@drexel.edu

ABSTRACT

The design of digital interventions for mental health often overlooks the foundational belief in one's own self-worth and related ability to develop close relationships with others. Attachment theory explains these interpersonal aspects, which have long been associated with positive mental health outcomes such as resilience when faced with adversity. We report on generative interviews with mentors experienced in supporting youth, as part of design work initiated by community leaders concerned about the traumatic effects of gun violence and systemic racism on local youth. These community leaders wanted to extend their existing mentoring efforts through digital technology. We identified attachment theory as the best fit for helping us understand how mentors are addressing trauma among youth, in ways that can inform how we design in support of these relationships and communities. We introduce attachment-informed design as a set of design principles that represent a novel approach to digital mental health interventions.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in collaborative and social computing**; • **Applied computing** → **Psychology**; • **Social and professional topics** → **Geographic characteristics**.

KEYWORDS

Trauma; Social Support; Mentoring; Youth; Community Violence; Poverty; Geographic Communities

ACM Reference Format:
Gabriela Marcu and Jina Huh-Yoo. 2023. Attachment-Informed Design: Digital Interventions That Build Self-Worth, Relationships, and Community in Support of Mental Health. In *Designing Interactive Systems Conference (DIS '23), July 10–14, 2023, Pittsburgh, PA, USA.* ACM, New York, NY, USA, 16 pages. https://doi.org/10.1145/3563657.3596009

1 INTRODUCTION

> *Ms. Howard is a tireless advocate for youth in her community. After several decades working as a principal, she came to understand intractable challenges in the city's public schools and started her own non-profit organization to create the kind of youth programming she saw was needed. But she is concerned by the increasing gun violence in the city, which only adds to the traumas that youth experience within the socioeconomic context of their neighborhoods. Ms. Howard knows the impact that strong mentors can have in shaping the lives of youth, especially since she herself experienced it growing up in the city's public housing. She also knows that technology is a critical way to reach youth today. She wants to make sure the efforts of community leaders like herself, who are working to address the impact of trauma on youth mental health and development, extend to the digital spaces that make up so much of young people's social lives.*

This vignette is a composite based on real community members in the U.S. city of Philadelphia, who came together to initiate this project by reaching out to the authors. Philadelphia is going through a gun violence crisis — in 2021, there were 2,329 shooting victims, more than half of whom were under the age of 30 and 86% of whom were Black [95]. The trauma of community violence can have lasting effects on the development of youth [104, 109], including such adverse effects as anxiety, depression, post-traumatic stress symptoms, and substance use [4, 25]. Research shows that even hearing gun violence in their neighborhoods, without being directly involved, can result in psychological trauma for youth [116]. Young people's experiences with violence are further compounded by other trauma and adversity they face in their neighborhoods. Racism, segregation, socioeconomic distress, and community cohesion are deeply intertwined issues generating cycles of violence [115], which are difficult to disrupt:

> "Neighborhood crime is often used as a justification for **continued neglect and disinvestment in low-income communities of color**, contrasting with the massive mobilization of recent years to prevent gun violence impacting more affluent, White children. **Community gun violence feeds into cycles of violence by demoralizing youth**, inducing gun carrying, and fostering community disorder." [4]

Therefore, there is a critical link between a community's wellbeing and an individual young person's mental health and wellbeing. Youth are demoralized through repeated disruptions to their development, lack of safe spaces to cope with challenges or nurture their growth, and limited pathways for their future. Adverse effects on their emotional and behavioral development can manifest as

DIS '23, July 10–14, 2023, Pittsburgh, PA, USA

ACM ISBN 978-1-4503-9893-0/23/07.
https://doi.org/10.1145/3563657.3596009

difficulty regulating emotions, aggression, and disruptive behavior problems [4]. When these challenges arise, youth need the space, support, and compassion to heal from the underlying trauma [27]. However, youth are often dismissed or punished instead, facing academic difficulties and disengagement in school, including being suspended, expelled, or dropping out [25]. How their community responds to their challenges often further serves to demoralize young people, and especially affects youth of color [84].

Conversely, protective factors that facilitate adaptive coping when youth are exposed to community violence are self-worth and a sense of purpose for one's life [26]. Youth mentoring targets these factors and has been highlighted as an important approach to addressing the cycle of trauma and violence, by focusing on effects at both individual and community levels [27]. Mentoring youth in a way that addresses the trauma they have faced promotes self-awareness and healing from past experiences in order to prevent future violence and shift to ways in which they can contribute positively to their community [27].

Mentors themselves initiated a partnership with us out of a desire to incorporate digital technology (e.g., an app) into their efforts to better reach youth. However, we were not sure how to adequately meet this design challenge due to the need to account for trauma exposure and systemic issues in their community. A plethora of HCI research studies have investigated technology to support mental health including social support [3, 13, 17–19, 60, 63, 81, 89], but there is a dearth of research addressing the effects of trauma and socioeconomic distress in one's community. We therefore started by interviewing 11 youth mentors about existing efforts, with the aim of identifying evidence-based theory in which to ground our design work. Our interviews were guided by the following research questions: What can we learn from existing mentoring and other youth programs in the community that have shown success? How should HCI researchers approach design for mental health based on how community members are helping one another heal from trauma?

In our analysis, we compared trends in the interview data to various trauma-related theories. We found that attachment theory best described how youth were being affected by trauma, and what made mentoring effective at addressing this impact both individually and collectively. We consequently generated the approach of **attachment-informed design**, which allowed us to envision how design can support these mentoring relationships, and which we argue can improve the impact of digital interventions for mental health more broadly. Attachment-informed design fills a critical gap in the HCI literature by bringing a novel perspective to how we design for mental health: humans have a universal need to feel self-worth and form close relationships, and these help to form the foundation for mental wellbeing. We contrast this attachment-informed approach with existing perspectives that have been pervasive in HCI work, often centered around behavior change or illness. We outline four design principles through which attachment-informed design can be used beyond mentoring, to other types of mental health interventions.

2 RELATED WORK

We begin by reviewing the HCI literature on digital interventions for mental health, highlighting critical gaps in this literature (2.1). Then, we explain attachment theory and introduce how it can bring a novel perspective to inform the design of digital interventions (2.2). Finally, we define and discuss mentoring as a way of addressing trauma among youth, and how it might be supported in digital spaces (2.3).

2.1 Digital Interventions for Mental Health and Wellbeing

Various HCI researchers [14, 88, 114] have called for a greater focus on designing for mental wellbeing, rather than a clinical or objective focus on illness, by designing holistically for aspects such as a positive sense of self, self-advocacy, joy, pleasure, healing, and social wellbeing. An underutilized approach for designing more holistically is the biopsychosocial model (2.1.1), which encompasses the biological, psychological, and social aspects that shape mental health. Elements of a biopsychosocial approach are seen within the HCI literature's strengths in supporting mental health and wellbeing through social support and self-management (2.1.2). However, we highlight an important gap in this literature, regarding the need for balancing universal theory with cultural responsiveness (2.1.3).

2.1.1 Biopsychosocial Model. The HCI literature on mental health often conveys the medical model by centering work on treatment and management of illness — examples include depression and anxiety [21, 66, 68, 121], bipolar disorder [78, 80], and borderline personality disorder [113]. The alternative biopsychosocial model brings a holistic perspective to supporting an individual's mental health by considering biological, psychological, and social factors in one's experience of their own health [74, 118]. For instance, aggressive and antisocial behaviors exhibited by a young person, which may be pathologized as symptoms of mental illness under the medical model, are viewed under a different light when considering they are a natural response to the young person's exposure to the trauma of gun violence in their community. The behaviors of such a young person may very well match the symptoms of depression. But an associated intervention targeting those isolated behaviors (or moods or cognition) as treatment for depression will not help them cope with the complex societal issues surrounding gun violence in their community (e.g., racism, inequality, injustice, politics), or the grief and trauma that may be at the root of their behavior [77]. Moreover, in that young person's socioeconomic context, we must consider that poverty and associated chronic stressors affect childhood development across biological (e.g., brain development), psychological (e.g., emotional development), and social (e.g., family dynamics) dimensions [11]. With regard to the effects of racism, research with Black and Asian women has shown that the biopsychosocial model can be experienced as more helpful when interacting with services for mental health, whereas the medical model can be experienced as racially biased, neglectful, unsafe, and untrustworthy [87]. Thus, at the very least, mental health services and interventions need to avoid further harm to marginalized populations.

2.1.2 Social Support and Self-Management. Social support and self-management are interrelated areas within the HCI literature on

mental health. They have been studied especially in the contexts of depression and the mental health of university students.

Depression is one of the most common mental health conditions, and accordingly, it has been the topic of a range of HCI research studies. Burgess et al. highlight diffuse sociality — indirect social connection — as a component of self-managing depression by choosing how much social interaction an individual can handle at a given time in order to balance the benefits with the costs of human connection [18]. When engaging directly with others to collaborate on self-managing their depression, Burgess et al. found that individuals tend to choose between a variety of online and offline communication channels depending on their state and needs in the moment [17]. Similarly, Meyerhoff et al. describe how different kinds of social support are needed across different stages of one's mental health journey [81].

The mental health of university students, both undergraduate and graduate, is a critical area of research, although the amount of HCI literature in this area also underscores the dearth of work with less educated and privileged youth. Park [92] defined a mosaic of social support by which students self-manage their stressors with support, while navigating the limitations of each social group (parents, close friends, acquaintances, and anonymous individuals online). In line with the biopsychosocial model, Park et al. [93] found that there is a blurry line between mental illness and wellness, complicated by social stigma, and therefore recommend that interventions support self-reflection on one's mental well-being informally and positively, instead of from an illness perspective. They also argue for the involvement of an entire community in supporting the mental well-being of youth, rather than only designing interventions around self-management [93]. Similarly, Lattie et al. [69] identified opportunities for peers and university staff to provide information and resources related to mental health, while noting in their study "it became clear that digital mental health tools for college students should not focus exclusively on the online world, but also build positive connections with peers face-to-face, so that they might move from co-presence toward a sense of community."

Thus, work focused on social support and self-management has identified the importance of balancing online and offline interaction, providing indirect and informal opportunities for connection, and promoting connection to one's broader geographic community. HCI work has further shown that whether social support is provided by family, peers, clinicians, or educators, sometimes a close relationship must already be established in order for an individual to seek out and benefit from that person's support [93, 101]. However, limited design guidance has been produced to date for how digital interventions can help to facilitate such close relationships or a sense of community in promoting mental health.

2.1.3 Universal But Culturally Responsive. Commonly, design for mental health draws on universal theories and strategies, such as cognitive behavioral theory [21, 85, 89, 107], behavior change [33, 81], and emotional regulation [70]. But an understudied aspect of digital mental health interventions is how we can design them in culturally responsive ways. For example, centering the lived experience of Black Americans, Bosley et al. [14] propose a Healing Justice framework to address racial, generational, and systemic traumas and violence affecting marginalized communities. In their design work focused on police brutality, use of this framework led to design implications such as accountability towards the systems responsible for trauma, and promoting community, healing, and joy [14]. As with the literature on social support we summarized above, a core finding was the importance of the local community in promoting individual mental wellbeing: "workshop attendees demonstrated that Healing Justice could be imagined through programming and centering joy around the neighborhood. Black joy visualized in design was community put into practice" [14]. Parker and colleagues [47, 94] also propose the design of health interventions that are geographically bounded so as to be culturally relevant.

Parker has generated design implications from a study on healthy eating with low-income African American communities [46, 47], and drew on these when examining mental health, where there is a lack of attention to socioeconomic factors. Often, mental health interventions are designed and evaluated with individuals obtaining an undergraduate or graduate education [17, 18, 70, 81, 89], and without a focus on how contexts of socioeconomic distress affect mental health and the ability to obtain social support and resources. One rare example is Kaziunas et al.'s [62] work on the relationship between socioeconomic hardship and emotional hardship. Their study produced the concept of precarious interventions, which addresses how "design in a setting of systemic health disparities requires grappling with experiences of infrastructural brokenness that are not easily resolved or repaired, but routinely negotiated" [62]. Our study aimed to learn from how youth mentors negotiated infrastructural brokenness by creating programs and developing relationships to address unmet needs of youth in their community.

2.2 Attachment Theory

In developmental psychology, attachment theory ties interpersonal and psychological thriving to how early relational experiences with primary caregivers establish an individual's expectations and patterns for future relationships [15, 16].

2.2.1 Secure vs. Insecure Attachment. When attachment needs are met during childhood, a securely attached adult emerges. **Secure attachment** has been associated with positive self-image, self-reliance, managing difficult emotions, forming close relationships, help-seeking behavior, and self-managing chronic illness [6, 23]. Conversely, **insecure attachment** is characterized by difficulty managing emotions and lack of close relationships, and is correlated with adverse mental health outcomes including depression, anxiety, and personality disorders [16, 106, 111].

2.2.2 Internal Working Models. Attachment is comprised of two internal working models: a **model of self**, which is a positive or negative image of the self as worthy of support and love; and a **model of others**, which is a positive or negative image of others as trustworthy and reliable, including a perception of relationships as rewarding [6, 15, 48]. As working models, both of these can change over time [71], especially in response to different types of relationships with different people [48]. For example, when mentoring a young person with insecure attachment, a mentor can help reshape their self-image and their ability to trust others. According to Bucci et al. [16], the four qualities and functions through which a caregiver creates secure attachment can also be applied to the design

of attachment-informed mental health interventions: (1) creating a secure base; (2) continuity, availability, and flexibility; (3) sensitivity and responsiveness; and (4) providing emotional experiences that challenge and modify internal working models.

2.2.3 Applications of Attachment Theory. Attachment theory informs more than how to parent a child. Researchers in diverse areas (e.g., grief, psychotherapy, social work) have used "attachment-informed" approaches to consider the fundamental human need to be seen, listened to, and supported by others to internalize the sense of security that enables one to adapt to different situations and cope with inevitable challenges [7, 9, 52, 67]. Understanding the differences between secure and insecure attachment styles sheds light on relational dynamics that occur with romantic partners, friends, clinicians, coworkers, supervisors, and others. Attachment theory has therefore been applied to the design of mentoring programs for youth [122], organizational strategies for fostering mentoring relationships between adult employees [83], mental health services [16], and patient treatment in primary care [56]. Finally, attachment theory has been critiqued for historically being studied mainly in the context of middle-class American stay-at-home mothers, and promoting narrow Western ideals for meeting attachment needs [97]. In this work, we draw from broader, cross-cultural perspectives on attachment [42, 97].

2.3 Mentoring

DuBois et al. define youth mentoring as "a process in which a non-parental adult or older peer, acting in a non-professional capacity, builds and maintains a supportive relationship with a young person" [30]. Compared to formal, clinically-driven mental health care, fewer constraints exist in enabling mentoring in terms of dosage related to frequency, location, modality, or the content of activities and discussions. These unique characteristics of mentoring may help youth and mentors develop deeper personal relationships than formal care, representing greater opportunities and resources available for youth. Mentoring has been increasingly investigated as a way to address trauma and the various psychological and social challenges that youth face. According to the U.S. Centers for Disease Control and Prevention (CDC), mentoring programs that connect youth to caring adults in their communities are a key strategy for both preventing and addressing traumas [40].

However, mentoring as a mental health intervention has largely been absent from the HCI literature to date. Often, HCI research has explored online mentorship for learning contexts [2, 24, 37, 41, 75]. For instance, Evans et al. [36] studied how mentorship for writing emerged in fan fiction-focused online communities, showing evidence of the benefits of distributed mentorship [57]. Similarly, in online commenting practices on Scratch, Fields et al. [37] found benefits to some forms of mentorship online to help others acclimate to the community. Hong et al. [53] designed and evaluated SocialMirror, an online social network to support the independence of autistic young adults using existing close social networks (e.g., family). HCI literature on technology to support mentorship for economically disadvantaged populations has mainly been for adults [29].

3 METHODS

Below we describe how we conducted this work as community-based research (3.1), details about our interviews with 11 community mentors (3.2), and how we analyzed the resulting data (3.3). Finally, we outline our epistemology and positionality (3.4), and discuss methodological limitations (3.5).

3.1 Community-Based Research and Recruitment

This project was initiated by community leaders concerned about an increase in local gun violence, and its traumatic effects on the youth with whom they work. Looking to reach and support youth in as many ways as possible, they wanted to explore the potential for technological solutions. After these community leaders reached out to the research team, we invited them for interviews and then used snowball sampling to identify similar community members who are focused on the wellbeing of local youth. The purpose of snowball sampling was to tap into an informal network of organic and fluid connections, built through word of mouth, years of relationship-building via participation in local church communities, and personal friendships such as growing up in the same neighborhood. At this initial stage of community-based research, random sampling of individuals would hinder generating a coherent understanding of the community needs. Furthermore, it was important that we first understood the focused opinions of the network of community leaders, who would be the ones who act upon and lead in enabling any resulting solutions.

3.2 Interviews and Participant Information

We conducted interviews over Zoom with 11 community mentors. Interviews lasted 60 minutes, with the last three mentors participating as a focus group. The interviews and focus group were audio recorded and transcribed in full for analysis. Mentors all volunteered their time mentoring youth, though some also had primary occupations focused on youth (e.g., principal, director of non-profit for youth) or leveraged their professional expertise, networks, and resources in their volunteering (e.g., police officer, religious leader, social entrepreneur). Participants had experiences growing up in the same community themselves, working with youth in schools, supporting after-school programs, serving their community through church, and becoming founders of non-profit organizations to fill gaps in support for youth. Table 1 shows the demographic information of the community mentor participants. We note that a majority of the self-selected participants are Black women over 40, reflecting the phenomenon of these women historically playing a strong leadership role in their communities [50, 54]. Our sample is not meant to be representative of all mentors, but to leverage the long-term experiences of the most highly engaged community leaders, and understand challenges and successes involved in finding mentors and other resources to build and sustain mentoring programs. Their wisdom therefore represents (a) some of the most attuned and effective approaches to meeting the needs of local youth through mentoring, and (b) the work required to build up their communities by developing youth mentoring programs.

Table 1: Information about community mentor participants

P#	Gender	Ethnicity	Age	Primary Occupation(s)
P1	F	Black	70s	A retired teacher, school director
P2	F	Black	40s	Principal (grades 5-12)
P3	F	White	60s	Director of a health organization
P4	F	Black	50s	Police staff inspector
P5	M	Black	N/A	Director of a non-profit organization
P6	F	Black	40s	Principal (grades K-5)
P7	F	Black	N/A	Principal (grades K-8)
P8	F	Black	80s	Reverend, community advocate
P9	F	Black	40s	Social entrepreneur
P10	M	Black	40s	Construction field worker, Community educator
P11	M	Black	40s	Sales manager, Community educator

3.3 Analysis

We conducted iterative open coding on the transcripts to understand common themes and potential frameworks that might give us insights to answer our research questions. We alternated between coding the transcripts, talking to the community mentors, and seeking literature on trauma-related theories that would inform our analysis. The two authors first separately read and coded the transcripts through open coding. The two authors then met after having coded three of the transcripts, shared the discoveries, and continued to repeat the process on a weekly basis, discussing what literature might be able to capture and best describe the patterns in the data. During this process, we explored existing frameworks focused on youth and trauma as well as relevant community-based technological design, such as resilience [117], racial trauma [103], critical race theory [64, 91], Black feminist thought [35, 98], social-ecological model [59, 82, 112], trauma-informed design [20, 77], attachment theory [7, 9, 52, 67, 122], community-based participatory research [28], online activism [45, 100], and online health communities [43]. From this iterative, exploratory process, we identified attachment theory as the best fit to describe the strengths and challenges that the community is facing. Therefore, our analysis combined inductive coding with deductive coding that drew from the characteristics of attachment theory described in the Related Work (section 2) — e.g., secure/insecure attachment, models of self and others).

3.4 Epistemology and Positionality

We take an interpretivist approach in this work, viewing reality as subjective and socially constructed, thereby focusing on the meaning that people attribute to their experiences rather than seeking objective truth. In addition, the authors come from a different socioeconomic background than the participants of this research. This paper is therefore a product of our work at the outset of this project to educate ourselves about the racial, economic, and class factors affecting the community with which we are partnering. Our intention was to do this without burdening others with the effort of educating us, and by reflexively focusing on power dynamics and anti-racism throughout our activities. Following the lead of the community mentor who initiated this project with us out of a desire to incorporate digital technologies into their existing efforts, we asked to begin with an exploratory interview study so that those interested could share their experiences, concerns, and desires for their community. We viewed these participants as the experts in what their community needs, and we expected solutions to come from within the community rather than from outside of it. We viewed ourselves as interpretivist, humanist scholars whose role was to document their experiences and knowledge so that design can be better informed by the interpersonal relationships that uplift communities — in this case, the transformative role of youth mentors, who are often Black women. Our analysis of the interview data then drew upon material already created by Black women about relevant issues and communities, for example, by viewing our data through the lens of a long history of Black feminist scholarship, including Black women within HCI.

3.5 Limitations

We used snowball sampling to recruit mentors, resulting in some self-selection bias. To build transferability, we draw on literature describing citywide trends and attachment theory rather than attempting to generalize to broader populations. Future work will verify and extend the findings with other community members.

This work does not yet include the important perspective of youth themselves regarding their challenges, needs, and desires. One concern is the potential harm of asking youth to discuss their lived experiences, which are likely to include traumas. Because we began this project with the knowledge that there are systemic failures in meeting the needs of youth, we wanted to gain an understanding at the community level of resources, constraints, strengths, and what has or has not worked in the past. By focusing the first stage of this project on community mentors who have been dedicated to supporting youth through building thriving long-term programs, our aim was to learn from them what has worked, what barriers they face, and how they see technology playing a role in supporting their work. The expertise of these community mentors gave us an understanding of the history and context of the community, so that in the next stage of the project, we may find appropriate and trauma-informed approaches to engage youth in the design process. At the same time, the field of HCI often lacks the perspectives of older adults in technology design, therefore the age group of the mentors in our study fills an important gap together with emerging work in this area [49].

4 FINDINGS: SECURE ATTACHMENT IN COMMUNITY-BASED MENTORING

We found that what made mentors effective in addressing the unmet needs of local youth was their secure attachment styles. Our analysis identified that they exhibited a secure attachment style in their engagement with youth because they had strong skills in emotional self-regulation, communication, empathy, setting boundaries, and building close relationships. Participants also described what made some youth-oriented efforts more impactful than others in their community, and we identified attachment as a key differentiator. Two mentors used the phrase "pour into" when describing how they view the intention and impact of mentoring youth. This phrase encompassed the role of attachment in shaping youth development and resilience:

> *"We... taught [children] that we were a school that brought out the best in you, and that everybody has excellence in them. ... We like to get our children from the preschool because we were able to* ***pour that into them****. Thinking of them like a plant, you know, or having a garden, and you kind of put the seeds into the children, and this is what we attempted to do from preschool up."* (P1)

P1 here describes forming children's positive model of self, as well as creating an environment in which they can experience a positive model of others, through supportive interactions with both teachers and peers. Meanwhile, P2 shared a perspective of being on the receiving end of such mentoring. She reflected on what a mentor poured into her in her own youth, and how much that relationship shaped her, especially as a survivor of childhood trauma:

> *"As a person who as a child was abused, I had a- I didn't even realize she was going to become a mentor, but it was one of my sixth grade teachers. She realized I was really smart, she realized that there were things going on, and while she'd never addressed what was going on in my house, when I was in school, she was on me. And she would always encourage me and say things like, 'you know you're definitely smart, you know you're definitely going to do this, you know you're going to college.' And as a sixth and seventh grader I was just like, 'What is this lady talking about?' But to this day I stay in contact with her. And I didn't even realize the type of relationship that- I didn't even realize what she was* ***pouring into me****."* (P2)

P2's mentor was encouraging and provided a consistent and responsive safe space from which P2 could explore her own future, take risks, and build her independence. Their relationship also demonstrates that trauma does not need to be directly addressed for a securely attached mentor to help a young person cope with that experience.

But what exactly do mentors pour into youth, and how? We draw from how attachment theory has been applied to the design of services [16], which indicates four ways that mentors and mentoring programs foster a secure attachment: (1) creating a secure base; (2) continuity, availability, and flexibility; (3) sensitivity and responsiveness; and (4) providing emotional experiences that challenge and modify internal working models. Below we show how each of these pillars of attachment theory was enacted by community mentors.

4.1 Creating a Secure Base

For mentors to create a secure base from which youth can feel confident in exploring the world, they need to set boundaries, define roles and expectations, and balance dependence with independence [15, 16]. P2 described this as a mentor who can be nurturing but firm, often providing a secure base that is missing in the home:

> *"The student that was removed from the home, I believe that she needs a person, preferably a woman, who she can see success with because* ***she's not seeing success with her mother****. ... I believe that when you don't find success with the parent, that actually trickles into your personal relationships, your professional relationships. Because what you hear from the person who is supposed to [be] the first person to provide love and support, you hear 'you're no good' you hear 'you're dumb' you hear 'I will put you out right now.' ...* ***She may need a nurturing but firm adult female to say 'hey, I'm gonna come along, I'm going to help you,*** *let's talk about these things, I'ma teach you to save yourself.' Like, how can I build these skills up and* ***how can I build that resiliency?****"* (P2)

If the relationship with the mentor is secure because there are clear boundaries and expectations, then the mentor is able to provide structure and accountability:

> *"Sometimes it becomes more about 'okay* ***here's what's needed*** *versus what you desire.' Because a part of our program is, it's the mentorship, but it's also the understanding ... of young people ... they rarely say it,* ***they like discipline and structure too****. So, if your grades are not good, no ... I'm calling your parents, I didn't see you today, you get on and get your homework done. But* ***because of the relationship, they can deal with that*** *type of structure as well."* (P5)

On the other hand, mentors sometimes nurture autonomy by affording youth the opportunity to make their own choices. For example, when parents are interested in enrolling their children in P1's school, she encourages them to bring their child to the interview. As she speaks with the parents, she allows the child the freedom to either listen to their conversation or get up and interact with the other children. She then advises the parents on whether their child would be a good fit with the school based on the extent to which she saw them comfortably blending in.

As another example of balancing dependence with independence, even when they were intervening mentors took an approach of facilitation to help youth work through conflicts themselves:

> *"Some of the things that would cause them to become violent or show violent behavior, I was able to talk or work through them ... we try to make sure we get training in violence intervention, peer mediation, and resolution where ... we intervene with the children,* ***but we kind of let them work their way through it themselves****.*

> *You know, do a lot of listening and facilitate more so than drive them. We want to give them questions or something to provoke them to think and in doing so I found that the kids were really pretty open and they were able to discuss, 'Well, I really get angry about this,' or 'this type of thing makes me angry' and, over time, it helped us to understand these are some things that we could focus on."* (P1)

By listening, mentors took cues from the youth about how they could help. This approach not only allows a mentor to get to know a young person, but it allows a young person to get to know themselves. P7 explained this as going deeper than a mentoring program that organizes activities, but rather nurturing authenticity and identity by providing a safe place with caring adults that can help them navigate the world and grow:

> *"When you're able to provide ... some **authentic opportunity for them to learn self**, and this is maybe like trained people ... whatever activities, but I think something deeper than that. Where children can explore their identity, their growing and becoming. But in safe places with adults, caring adults, who have that expertise and knowledge that can help them knowing sort of **everything that's going on in the world, and how to help them to navigate that** ... it would not just be this adult but also a peer opportunity to grow and work together."* (P7)

The caring and secure base that mentors are working to create allows youth opportunities to learn about themselves in community with others, so they can navigate the world and grow together. Accordingly, mentoring is not just a dyadic relationship, but involves interactions with peers and their broader community.

In addition to dismantling the messages a young person receives in her home, mentors were also concerned with dismantling the messages youth internalize from the education system. P6, in advocating for the importance of the arts, discussed the tendency of schools to focus on weaknesses rather than strengths:

> *"Part of the ways that we can help students cope with the trauma is through music, the arts. Those teachers have been trained in how to help students cope with trauma and use those things as an outlet. Also, I think that minority students, Black and Brown students, are very talented but **sometimes we don't really know how to build upon students' strengths**. What we have is kind of a system that assesses students and those assessments are really good with identifying the areas where students have weaknesses: they don't read well, they don't do mathematics well. And **if our program is built entirely on deficits** that students have, what part of the day are we able to really build students' self esteem and say 'you do this really well, let's build upon this'? **If you spend the entire day focusing on things that kids don't do well, kids don't feel good about themselves and they don't want to participate.** They don't want to be in school and sometimes those behaviors, the acting out or being distracted or disruptive, are **a result of them not feeling adequate or not feeling like they belong**."* (P6)

Knowing that many of the youth had histories of interpersonal trauma and insecure attachment in the home, mentors recognized the importance of creating an environment in which the youth could feel a sense of security and belonging.

4.2 Continuity, Availability, and Flexibility

Any young person needs stability to feel a sense of security as they grow. Mentors can help provide this security by being a continuous presence in their lives over time, making themselves available, and showing flexibility in enabling diverse ways for them to engage [16]. Developing a securely attached relationship takes time: *"You don't want it to be like a two-month situation. You want somebody to be able to commit for a longer period of time to be able to grow and develop with the students"* (P6). Facilitating a mentoring program therefore means requiring a time commitment from mentors, while keeping the commitment manageable in order to engage a higher number of mentors. Several mentors struggled with the challenges of getting reliable time commitment from volunteers, and suggested that incentives may help improve consistency:

> *"**Volunteerism is great ... the reality is it's not often reliable** and when you have children ... I steer away from try them necessarily a volunteer unless they're truly able to commit to a certain time every day. And it's hard to require someone who wants to give the time, but then it's also kind of unfair to kids to wait. ... [Volunteer commitment could] impact the success of the program. I just think [we need to] find a way for mentors to truly commit. Whether that is through some level of employment or incentive ... Not everybody needs a financial commitment, but they do need ... something that actually **keeps them grounded in the work that they're doing with children**"* (P7).

Continuity was highlighted by mentors as one of the most challenging factors in sustaining an effective mentoring program. P5 named continuity as the top challenge along with not having their own building for reliable meeting space. To address this, he took the approach of a mentoring program providing consistency, rather than an individual mentor:

> *"What does help is that **our programs become the mentors, and not always the individual**. Because when you have a program itself as a mentor then that child will always feel like they're part of something. If you only tie their child into another individual, if anything happens with that individual [then that child is] at a loss. ... Long as we're consistent, very consistent, if we say we're meeting every week and we give them something to look forward to ... **If we as adults are not consistent, then the kids are generally not that consistent**. ... In fact, some of our parents' children are now part of [the community program]. ... Once you join [the program] we tell them you're always a part of [the program], no matter what."* (P5)

Again, we found that mentoring was often nurtured beyond a one-on-one relationship. In this case, relying on a collective effort could allow for youth to experience more consistency, without necessarily requiring an individual mentor to be solely responsible for providing continuity and availability.

P5's approach also demonstrates flexibility in engaging youth, as the priority was to be consistently present and available to them each week over the long term, regardless of the activity through which they connected. As a result, this puts a program in the position to be flexible in their activities based on either youth preferences and needs, or any logistical limitations that may prevent a certain activity. P6 similarly highlighted that flexibility in providing activities tailored to the interests of youth, from sports to art, is critical in keeping them engaged and reducing the possibility that they become drawn to more detrimental activities to which they are exposed in their community:

> *"You're constantly trying to integrate new programs and work on student's strengths and teaching from a child-centered perspective. ... And they're involved in programs, they're coming to school because they have basketball at the end of the day, or they're coming to school because they love playing a flute, or they're coming to school because they have an art program. And [as they grow up, their next school]* ***might not have those same types of things or programs*** *[as their old school]. You become worried, because you realize that time between 11 to 14 years old, is when students are you know rapidly developing in there,* ***they could be exposed to things that could possibly change their trajectory****."* (P6)

P6's concerns speak to the challenges of ensuring that youth are supported and engaged continuously because even a brief gap can open a window for alternate influences that lead them down a different path. Consequently, we found that mentors work to fill gaps in youth programming by coordinating their efforts, seeking out additional opportunities available in the community, pursuing funding to create new opportunities, and identifying us as partners to find ways they can reach youth through digital technology.

4.3 Sensitivity and Responsiveness

Mentors also show sensitivity and responsiveness through warmth, empathetic listening, being attuned to the young person, and being sensitive to their distress however they may express it [16]. P2 and P7 described the responsiveness of a mentor as someone who will sit down and talk about their report card, reach out to their school if they are struggling, talk them through conflicts they are having with a parent, help with homework or filling out job applications, find local camps that match their interests, listen to their stressors, or proactively address a potential crisis. Moreover, P7 explained that a community mentor is sometimes better suited to showing sensitivity and listening without judgment, compared to a parent:

> *"[Parents] don't always have the luxury to just listen and spend time,* ***they don't always have the capacity to listen and be non-judgmental****. ... We have lots of children struggle with trying to identify themselves as whether they are lesbian or if they are gay and that's not something they talk to their parents with when they struggle. They might go to the school counselor with me or they might tell me about a struggle that they're having."* (P7)

Through the qualities of sensitivity and responsiveness, P1 learned to uncover the root causes of youth's challenges, such inadequate reading support leading to peer conflict in the classroom and ultimately school expulsion:

> *"Some of those cases, somebody had written [them] off. I had quite a few kids that had been expelled from the school district, matter of fact, that ended up coming to our grade school. And as a result of that we were able to work with them and find out what some of the challenges were. Something as simple as* ***not getting the proper phonic training that they might have needed so that they could read, so they were teased****. ... It might seem too simple, but these basic simple things we really found have worked through the years."* (P1)

She pointed to the small size of her program in explaining how they were able to be responsive to the individual needs of children, whereas in her past experience working for the school district, with larger class sizes she saw that it was more difficult for teachers to build rapport and practice empathetic listening: *"I found that when it's small, children feel like they have your full attention and they can confide in you."* The small ratio of mentors to youth within a program relates to the challenges of volunteerism we previously mentioned, in that there must be an adequate number of mentors available, even if distributing mentoring responsibilities collectively within a program.

An individual mentor's attachment style is critical, to ensure they have the skills to practice sensitivity and responsiveness in meeting the needs of youth. Mentors emphasized that not anyone would make a good mentor for youth and alluded to mentor attachment style, for example suggesting that one of the criteria be: *"do they build relationships well?"* (P2). Mentors must also understand how trauma affects youth in their socioeconomic context:

> *"One of the biggest challenges is just on positive social interactions, students not having their fight or flight type mentality. ...* ***Knowing what students have been through and having people in the building that can work with students around trauma is just really important****. ... In more affluent communities, once parents see that there is a learning need or traumas happen, quickly children are put into therapy or they have access to counseling. But many of our students, like it's* ***mind boggling to me that a seven-year-old child could have witnessed a homicide and has never had any type of counseling*** *or never had any type of therapy for that particular trauma, but we expect that student to come to school and work, to behave like all of the other children, not to show emotion about what he has been through. And I think it's an unfair expectation to put that kind of stress, you know, on a child,* ***but that's what happens in communities where people don't have access to things.*** *... When you have communities that are void of arts programs*

> *and healthy eating and other types of resources, then, you know,* ***the trauma just builds****."* (P6)

Understanding how to help youth who have had trauma exposure may call for appropriate training. Mentors mentioned a range of training types they had either undergone or requested, including mental health first aid, cultural responsiveness, de-escalation, violence intervention, and peer mediation. However, they reported that training is often not adequately provided. Further complicating matters, some mentors, especially teachers, tend to come from different socioeconomic backgrounds and live in different parts of the city while commuting to the youths' neighborhoods to engage with them. These differences created a greater divide that some mentors needed to bridge to build relationships with youth and approach their challenges with compassion and understanding:

> *"The majority of the teachers live nowhere near here. Then they have* ***no connection or understanding of what's really taking place in the city****, except what they see on the news. So without that connection, or without the trainings that I've been afforded just as a clergy person, there's still a disconnect. So no matter what they do they're kind of, there's like this pull and tug, 'what do I do? what don't I do?' and that ends up making a person say 'forget it' and they throw their hands up in disgust. Or they're just really upset, or they come to me and say 'you know this just isn't working,' not realizing that a part of building relationships is the ebb and flow, the storming and norming. ... But then* ***I'm working that through with almost 40 staff members.*** *... You know you end up trying to train a group of people when you're the one person to train them and then you become everybody's resource and then at the end of the day,* ***I end up saying I can't be the resource anymore****, you know, so it's definitely a cycle that is pretty sad."* (P2)

P2's experiences suggest that training can help mentors to bridge socioeconomic and cultural gaps to be sensitive and responsive, but there are not enough training resources available. Those who have the means to volunteer and support are overwhelmed by the amount of responsibility they have to take on as a result, making the support unscalable and unsustainable, and also challenging the continuity needed as discussed in 4.2.

4.4 Providing Corrective Emotional Experiences

Mentors help modify youths' internal working models of themselves and others by providing corrective emotional experiences [16]. That is, they can provide non-contingent positive interaction rather than interacting with them only when problems arise, persevere in efforts to connect even if the young person may not always engage with them, view conflict within their relationship as a learning opportunity, and intervene to help solve problems when needed [16]. In her 30 years of experience, P1 had learned that positivity and praise were transformative for youth:

> *"One of the things that I found to really work with kids that are prone to violence, because of their environment, was to* ***make sure that they felt a part of what was going on****. To give them praise and to let them know that 'you better than this,' that 'you got a lot of hidden talents, you just need to tap into them.' And in doing so I found that* ***kids that you would think that seemed hopeless, really was not hopeless,*** *they was really full of a lot of gifts and talents and abilities and were able to become leaders."* (P1)

What P1 "poured into" youth was a sense of belonging and worth that they were able to internalize as a more positive sense of self. P5 exemplified positive interaction and persistence in his description of enveloping youth in a program they enjoy so that when problems arise they will have "hidden help" available, with lower barriers to disclosing that they need help or having to seek it out:

> *"One of the challenges, when we talk about violence, is that it's easier to get to those you can get to. But when you're talking about those who have mental health issues ... We know it's relatively easy to get help for those who want help, but... with people who don't really want to help ... you can't really force it down their throat so that's the challenge. ... When you're part of a program like ours, and you become a part of that family, these are things that just naturally happen, so we're always growing with each other. ...* ***We're giving them help, but they don't look at it [that way] so ... it's kind of a hidden help*** *... It goes back to having to bait them in, because your average young person, [you ask them] 'hey how you doing today' [and they say] 'I'm okay,' even if they're not okay. ... But if you're happy to give them things that they enjoy and they have to grow in it, then it tends to work itself out."* (P5)

Building relationships and environments that keep youth engaged with them allows mentors to look for opportunities to intervene and provide help. Often, these opportunities come in the form of interpersonal conflict with others or with the mentor themselves. When a securely attached mentor finds themselves in conflict with a young person, rather than feeling discouraged, they see it as a chance to shape the youth's internal working model or reinforce the secure base they are providing for them. P4 reflected on her mother giving her this type of emotional experience, which she characterized as respect and fear, and how it helped her to confidently make her own decisions under peer pressure:

> *"I wanted to go to school. There was pressure to cut class, and I said, 'no, I can't cut class.' And they were like, 'why not?' And I was like, 'my mother will kill me, so I'm not cutting class.' So,* ***it's good to kind of have that respect and fear at the same time*** *of the guardian at home that– which was, at the time was my mother. ... But not everyone has the luxury of a stay-at-home mom, and if they do have a stay-at-home mom, eh, they probably didn't have the mom that I had. My mom was great growing up. ... For me, honestly, I didn't listen to my peers. I listened to my mother. I listened to the adults in my life."* (P4)

Both P4 and her mother viewed their conflict as constructive, cultivating a healthy fear of consequences, which P4 was able to internalize within her model of herself (as someone who does not cut class), as well as her model of others (adults with authority

Table 2: Defining Attachment-Informed Design Through Four Design Principles

	Attachment-Informed Design
Design Principle 1	Target fundamental human needs in which many behaviors and life challenges are rooted
Design Principle 2	Acknowledge that there is a continuum from social support to mistreatment
Design Principle 3	Address an individual's internal models, of self and others, which are foundational to mental health
Design Principle 4	Engage a target population in a mental health intervention without requiring them to directly discuss their mental health

are to be trusted)—both of which helped her not succumb to peer pressure toward choices that would have been less beneficial for her future. Similarly, P3 discussed the need for more mentors in the community who can intervene and shape a young person's path by (a) being firm in preventing them from making poor choices, while also (b) acknowledging with compassion how their past is leading them to those choices, and helping them learn to make more positive ones:

> *"My husband taught in [a nearby city], and the reason he wanted to teach there was there are not that many positive male role models. And so kids who end up on the street, a lot of times don't have that positive male role model to sit on them and say:* 'You're not going out at 10 o'clock at night. You're in eighth grade. There is nothing out there for you. Your butt is in the house.' *...* ***That kid that is angry and is in a gang and is who you're targeting has probably lived through more shit in his 18 years than I ever could imagine****. And so, if you start with:* 'Your journey has been this. And appreciate your journey for what it was, and for the man that it made you be today. But tomorrow let's try to make a different path. Let's take everything that you learned in your journey through today, and try to make a different tomorrow for your younger brother or sister, or for your children.' *... So, I think that has to be the conversation."* (P3)

Across all of these examples, we see that corrective emotional experiences can be more subtle or overt. However, they are always grounded in a positive and trusting relationship, so the mentor is ready to intervene and the young person can receive the help. P2 highlighted the need for youth to have the space to be vulnerable and learn that they can depend on others, given that their past experiences have necessarily hardened them so they could survive:

> *"Introducing children to mentorship opens up the idea and the possibility of, 'I have a lot to learn.' It also softens that harder exterior. ... I think one of the things that we miss with mental health and especially with violence [is that]* ***sometimes people are looking for somebody to be vulnerable with, they're looking for somebody that they can, even when their egos rear up, that somebody can say 'that's not it' or 'oh no you won't.'*** *I feel like that's that intrinsic need of, 'I need somebody to guide me, I want somebody to guide me, but nobody will guide me, I'll do this myself, but if there's somebody that can assist me along the way.'"* (P2)

The "intrinsic need" that P2 describes matches what is known about the need for secure attachment, including the importance of understanding self-reliance ("I'll do this myself") together with the ability to build trusting and rewarding relationships with others ("I want somebody to guide me").

5 DISCUSSION: ATTACHMENT-INFORMED DESIGN

Our findings show that mentors' secure attachment style was the key to understanding how to design for these transformative relationships in support of youth mental health. In summary, applied to our context of youth mentoring, the aim of attachment-informed design is to: (1) fortify a long-term mentoring relationship as a **secure base** from which a young person can grow and explore; (2) improve **continuity, availability, and flexibility** of dyadic and collective mentoring to meet the needs of a young person; (3) increase the capacity of mentors to be **sensitive and responsive** to youths' distress as well as interests; and (4) enable **corrective emotional experiences** that shape youths' understanding of themselves and others, including approaching interpersonal conflict as a learning opportunity.

We now demonstrate the transferability of our findings beyond youth mentoring, to mental health and wellbeing more broadly, by defining attachment-informed design using four design principles (see Table 2).

5.1 Target fundamental human needs in which many behaviors and life challenges are rooted

Behavior change is a popular approach to designing interventions in HCI [51], and mental health has become the second most popular application domain after physical activity [33]. This approach typically involves tools for self-tracking of personal data for the purposes of supporting change through reflection on one's behavior, and sometimes sharing or discussing it with others (e.g., clinicians, caregivers, family, peers). But reducing a person's health and quality of life to quantifiable behavioral data may lead to harmful rumination [32], and may not account for emotion, values, relationships, culture, trauma, inequity, and other biopsychosocial factors surrounding a person's behavior [8, 22, 38, 61, 77, 79, 86]. A related critique has been that quantifying the behavior of youth in school contexts can lead to surveillance, control, and inequity rather than understanding or caring for the underlying causes of behaviors [72, 73, 76].

Attachment theory enables us to interpret certain problematic behavior as an indication of insecure attachment, which is a rare

approach to supporting mental health — in fact this is how mental health is often overlooked, for example by criminalizing substance use, homelessness, or disruptive behavior in schools [12, 84]. As experienced youth mentors shared with us during interviews, youth are commonly either written off or punished for their negative attitudes, violence, and other behavior. Similarly, designers of digital interventions could easily fail to look at the root cause of such behaviors, and create interventions that intentionally or unintentionally take a blaming, punitive, coercive, or controlling approach. Self-tracking places the responsibility on the individual to change their behavior regardless of how they may have been harmed by other individuals or systems, and tracking by others can place them in a removed position of power or judgement without necessarily sharing the burden of responsibility or even lived experience. Therefore, this principle is similar to Bosley et al.'s [14] argument in favor of designing for healing from systemic trauma, individually and collectively, while rejecting carceral design-based solutions — i.e., those focused on social control through power, surveillance, and punishment.

An attachment-informed approach to design addresses immediate concerns — such as preventing harm to others through violence, or harm to oneself through substance use — while simultaneously prioritizing long-term healing and resilience to address the underlying psychological causes of these behaviors. These longer-term goals require the space for people to develop relationships and psychologically process their experiences, which may be antithetical to the design affordances and opportunities of technology that are often touted around efficient, immediate, and concrete solutions. Any one tool cannot accomplish these challenging goals, so this principle is about understanding the priorities and how a particular tool may (or may not) meaningfully support them. As Strohmayer et al. [110] describe, digital technologies that deal with violence and trauma must be part of a broader ecology that prioritizes humanity and trusted relationships.

We can learn from how the mentors in our study created programs and activities as an immediate way to prevent youth from getting involved with gun violence and other problems in their neighborhoods. In addition, these programs enabled them to form trusting relationships with youth, and provide continuity in relationships with individuals and community, through which they were able to address needs and skills that were being neglected. Although we were designing an intervention to help youth, we found design opportunities focused on identifying, training, and supporting mentors in order to improve the lives of youth — thereby targeting how youth are neglected and their needs are unmet, framing the issue as a deficit of their environment rather than the youth themselves. As another example, to approach interpersonal conflict as a learning opportunity through which to develop skills toward secure attachment such as emotional regulation, communication, and boundaries, we can design using frameworks such as restorative justice, which focuses on repair, reconciliation, and rebuilding of relationships instead of punishment [58, 120].

5.2 Acknowledge that there is a continuum from social support to mistreatment

Reflecting a popularly held misconception, HCI researchers and participants have a tendency to overestimate how common it is to grow up in a stable home with parents who adequately meet all of one's needs across biopsychosocial dimensions. For example, in an interview study with college students about their sources of social support, by default parents were discussed as sources of "unconditional love and belief in their child," speaking more to this ideal than accurately acknowledging the prevalence of parental shortcomings [92]. Mental health professionals, meanwhile, have long understood and applied attachment theory, and are therefore better equipped to face the reality: "If one entire generation of children were unconditionally loved, most psychiatrists ... would be out of work. That prospect seems unlikely" [5]. It is estimated that more than 1 in 7 American children a year experience abuse or neglect, with rates five times higher for children with low socioeconomic status [39]. That mothers can themselves be perpetrators or bystanders of abuse is a significant taboo, which is still rarely discussed [44].

In this study, our awareness of attachment theory enabled us to appreciate and learn from the wisdom of youth mentors who freely acknowledged that not all parents are able to meet the attachment needs of their children. They viewed their role intrinsically through the lens of attachment, knowing that if there was no parent or caregiver in the home who was able to adequately meet those needs for a young person, then it was important that others in the community step in to fill that role. As designers, we do not need to be experts in attachment theory (though we can of course collaborate with such experts), but an awareness of secure vs. insecure attachment enables us to observe and identify these attachment styles as a key aspect of mental health — including being capable of receiving the wisdom offered by our participants.

Attachment theory provides a neutral framework for acknowledging universal needs, making it more accessible for those who are not mental health professionals to investigate whether or not they have been met, without having to directly broach the topic of mistreatment (the overarching term for abuse or neglect). Bartek et al. propose that "mistreatment could be considered on a continuum at the opposite pole from social support" [5]. Given the prominence of social support in the HCI literature, especially in relation to mental health, we encourage the HCI community to shift to this more balanced and realistic view of our users' social lives. For people of any age, we may strive to design digital technology for the positive pole of social support, but in order to do so we need to understand the reality of how often mistreatment happens — from child mistreatment, to intimate partner violence among adults, to elder abuse. A more balanced approach using this continuum to understand our users' lives will help us more effectively meet their needs, including the potential to prevent mistreatment, by starting with acknowledging that it happens.

5.3 Address an individual's internal models, of self and others, which are foundational to mental health

The HCI community is well-versed in understanding users' mental models — the conceptualizations humans internalize about how things work in the world, which continually frame perceptions and interactions. Attachment theory encompasses two internal working models that are foundational to mental health: a model of self, which is the positive or negative sense of self-worth, and a model of others, which is the positive or negative perception of others (and relationships with others) as reliable and trustworthy. These are both *working* models, meaning they are initially formed in early childhood based on relationships with caregivers, but continue to be shaped by experiences throughout the life course. Therefore, attachment-informed interventions can be designed for any stage of life to target these models.

Negative models of self and others (i.e., insecure attachment) are correlated with adverse mental health outcomes such as depression, anxiety, and personality disorders [16, 106, 111]. An attachment-informed approach to design therefore provides an alternative way of addressing these types of problems while avoiding the medical model — the need to diagnose, treat, and focus on illness. Moreover, positive models of self and others (i.e., secure attachment) are the foundation without which other strategies may not be as effective. Digital interventions have been designed for self-management of a diagnosis like depression, but a positive model of self is needed to self-manage one's illness. Digital interventions have been designed for social support, but a positive model of others is needed to seek help, trust others, and reap the benefits of social support. Digital interventions have been designed for emotional regulation, but secure attachment is key to developing this skill.

Our study of youth mentoring provides one example of how digital interventions might be designed to address internal models of self and others. In this case, we found that mentors were challenging and changing these models among youth through their interactions with them, which made us look for design opportunities focused on how digital technology might support and enhance these interactions. We believe there are many other potential avenues for designing attachment-informed interventions that target these internal working models, and that we can uncover them if we attend to this aspect of mental health when learning about, and from, our target population. For example, instead of screening for symptoms of depression or anxiety, we might use validated measures of adult attachment [99] to identify attachment style. Instead of asking people about what kind of social support they need or receive, we might ask them about how many close relationships they feel they have and their beliefs about how much they can rely on others. Instead of studying the concrete and visible practices of self-management, we might find creative ways to help people explore their own self-image and sense of self-reliance. Lee et al.'s MindTracker [70], for instance, goes beyond traditional self-tracking to engage people in exploring and expressing their emotions using clay. Similarly, Snyder et al. used visual elicitation methods, including drawing and selecting photographs, to explore experiences of living with bipolar disorder [108]. Such expressive approaches could be used to elicit people's internal working models, either during the design process or as part of an intervention itself.

5.4 Engage a target population in a mental health intervention without requiring them to directly discuss their mental health

The participants of this study demonstrated two ways mental health can be addressed indirectly, to bolster the recipient's mental health regardless of whether they are ready to directly discuss their mental health: "pouring into," which refers to the acceptance and love that one person can give to another within a trusting, secure relationship; and "hidden help," which is the sense of belonging and the sensitivity to one's emotions that can be provided by an individual or a collective community.

Such an indirect approach to mental health gives us a new perspective on the core value and best practice in HCI of engaging the target population in the design process, and designing an intervention around their stated needs and wants [88]. We raise an important caveat, that mental health is often not well understood or easily discussed, especially when it comes to looking inward and reflecting on one's own limitations and life challenges. Across age groups and cultural contexts, research shows that barriers to help-seeking for mental health include not identifying the need for help, not believing that others can help, and fear of social stigma against mental health issues [1, 102, 119]. Critically, these barriers have not adequately been addressed by digital interventions within the HCI community. The HCI mental health literature has largely focused on individuals who are willing to discuss their mental health, for example by actively seeking support on social media [55, 90, 105], or opening up to researchers about their concerns through interviews, co-design, or technology use studies [10, 18, 65, 81, 85, 89, 107, 121].

To understand HCI's blind spot regarding barriers to help-seeking, consider the transtheoretical model of behavior change, one of the most widely applied models in the design of digital interventions [33, 34, 51]. According to the transtheoretical model [96], an individual goes through five stages to change their behavior: precontemplation, contemplation, preparation, action, and maintenance. The first stage of precontemplation encompasses an individual either not being aware that their behavior is problematic for their health, or not being ready to change their behavior. Interventions from the HCI community commonly skip past this stage and target the behavior change journey starting at the stage of contemplation, when an individual is seeking information and help to better understand their behavior and whether they should make a change (followed by the remaining stages of preparing to take action, taking action to make the change, and maintaining the change) [33, 34, 81].

For an example of the precontemplation stage, we can look at one type of behavior change that could help many people: improving their ability to recognize and regulate their emotions. Digital interventions have been designed specifically for improving emotional regulation [70, 85, 107]. However, there are myriad reasons a person may not identify their problem as emotional regulation or put effort into addressing this aspect of their mental health — thus remaining in the precontemplation stage. They may be struggling with wanting to change related problems in their life such as mood swings, interpersonal conflict, getting into trouble at school/work,

or interactions with the criminal justice system. But they could easily attribute these problems to other people, unjust systems, or even a character trait of their own that they cannot change about themselves. In order to move from precontemplation to the contemplation stage, there is a level of self-awareness required, as well as education about the skill of emotional regulation, to identify that this is something one can work on within themselves as a way of shaping their experiences and interactions with those around them. Moreover, when an individual's mental health challenges are related to, or exacerbated by, the violence of others or systemic issues (e.g., as with intimate partner violence, racial injustice, or ableism), focusing on changing their own behavior or regulating their emotions to the point of suppressing them would likely not be an effective or supportive approach [31].

Secure attachment is associated with all of the abilities mentioned above: help seeking, self-management, and emotional regulation [6, 23]. Therefore, identifying insecure attachment and making it the aim of an intervention can help whether or not someone is knowledgeable about or motivated to change a specific behavior. Instead of focusing on one behavior or requiring people to openly discuss their mental health, using attachment as the lens through which we engage a target population can enable us to focus on whatever problems may be concerning to them in their lives (e.g., gun violence in their community, interpersonal conflicts) and connect those problems to elements of attachment (e.g., their own positive self-image despite what they see in their community, their ability to set boundaries and navigate conflict with others). This connection could be made explicitly, or as the mentors in our study demonstrated, the focus can instead be on activities, relationships, and community instead of mental health. When youth were resistant to discussing their mental health or answered "I'm okay" despite mentors suspecting they were not, mentors were persistent in developing a relationship, building trust, and being a consistent presence to help shape that young person's growth. P5 described this as providing "hidden help" for mental health to youth who would not seek it out but could benefit from being part of a mentoring program and growing together. Along the same lines, P1 explained the need to teach youth "how to act and how not to act — but subliminally," because they do not like to be told what to do. In her experience, whether or not youth ask for help or demonstrate openness to receiving it, mentors can be more effective through social modeling, teaching by example, and engaging youth in learning through activities they enjoy — all of which can be central to the design of digital interventions.

6 CONCLUSION

Attachment-informed design brings a novel perspective to HCI for the design of digital mental health interventions. First, it represents the biopsychosocial model of health, which continues to be underutilized in research and practice due to the dominance of the medical model. Second, attachment theory is about enabling healing or recovery from psychological wounds, and building coping skills and resiliency, as opposed to targeting behavior change (though changes in behavior are likely to be a byproduct). Third, attachment theory addresses critical limitations with the HCI best practice of engaging the target population in the design process, as applied to mental health. Lastly, attachment provides an evidence-based theory that is universal but also compatible with being culturally responsive in the design of interventions.

Our work contributes to expanding the reach and impact of digital technologies for supporting mental health and wellbeing, by starting with how we understand and frame the goal of mental health. We generated attachment-informed design by learning from the lived experiences and culturally-embedded practices of community mentors, who play an important role in addressing trauma and unmet needs among youth. The development of many young people is being shaped by the ways they must respond to and survive in environments affected by violence, poverty, systemic racism, and other traumas. Through the lens of attachment, we can design interventions by learning from how mentors powerfully influence youth's internal working models of themselves and others. Where other adults may "write off" youth, becoming frustrated with their attitude or punishing them for their behavior, securely attached mentors are able to sense that attachment needs have not been met. Mentors "pour into" youth messages of self-worth, belonging, compassion, and unconditional positive interaction. Mentors also model stability, security, and consistency in their relationships with young people, helping them to open up, be vulnerable, manage their emotions, and build trusting relationships with others.

ACKNOWLEDGMENTS

This work would not have been possible without the community leaders who conceived of the idea for this project, initiated a partnership with us, and facilitated the interview study. We are grateful for the willingness of our participants to share their knowledge and experiences with us. We thank Mark Ackerman, Mark Newman, and anonymous reviewers for feedback on earlier drafts. This material is based upon work supported by the National Science Foundation under Grant Nos. IIS 1816319 and 2144880.

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