Social Connectedness as a Focus for Designing Technologies in Support of Mental Health

Gabriela Marcu and Jina Huh-Yoo
University of Michigan, Drexel University
gmarcu@umich.edu, jh3767@drexel.edu

Abstract. Technologies designed for mental health often target an individual user’s behavior change, social support, or clinical treatment. However, there are limits to the impact of interventions focused on the individual when mental health challenges are intertwined with broader, systemic issues. This paper describes a complementary approach for digital mental health: designing for the critical ties between individual and collective wellbeing, by understanding the subjective experience of social connectedness. We report an interview study focused on youth mentors in the city of Philadelphia, which was initiated by their desire to incorporate digital technology in reaching and supporting youth in their community. We analyzed youth programs as a form of promoting social connectedness to address mental health in response to the traumatic effects of community gun violence and socioeconomic distress. We identified five interrelated layers of social connectedness: intrapersonal, interpersonal, small group, large group, and cultural.
Introduction

In 2023, the U.S. Surgeon General released two advisories on social connectedness as a pressing public health issue due to an “epidemic of loneliness and isolation” (2023a). A core pillar of the national strategy outlined for advancing social connectedness was to reform digital environments: “We must critically evaluate our relationship with technology and ensure that how we interact digitally does not detract from meaningful and healing connection with others” (2023a). The Surgeon General particularly urged more research into how young people’s social connectedness and isolation are impacted by digital social interactions such as those on social media (2023b), echoing the Centers for Disease Control and Prevention’s alert of a national mental health crisis among youth (CDC, 2023).

Despite this urgency, social connectedness is understudied in the design of technologies for mental health. Technology design tends to reduce mental health to behavior and states that can be objectively tracked, detected, and analyzed – even more so as we increasingly integrate artificial intelligence into these technologies. Yet social connectedness is an aspect of our health and wellbeing that is distinctly human, subjectively experienced, and not possible to automate. Technology design also frequently centers the diagnosis and treatment of mental illness, but mental health is more than just preventing or treating illness, it also includes well-being and thriving. For instance, we note how the World Health Organization defines mental health without a focus on illness:

“Mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community. It is an integral component of health and well-being that underpins our individual and collective abilities to make decisions, build relationships and shape the world we live in.” (WHO, 2022)

This definition also highlights the strong interdependency between individual mental health and collective wellbeing. The better our individual abilities to connect with others, develop relationships, and work together, the better we each are at contributing to healthier communities and an equitable social world, which in return provide environments that nurture the mental health of each individual. Digital technologies have long been touted for their promise to connect people as a part of this interdependency, and yet Americans are feeling more disconnected, isolated, and lonely (Office of the Surgeon General, 2023a).

We report on interviews with youth advocates concerned about the mental health of young people in Philadelphia neighborhoods affected by gun violence. These youth advocates had extensive experience creating youth programs (e.g., after-school activities, mentoring, clubs) to counter violence and community disintegration with social connectedness. Based on their own experiences growing up, living, and working in the same socioeconomically distressed neighborhoods, they worked to fill gaps in the community and meet the social connectedness needs of youth. The interviews we conducted were part of a larger project initiated by the youth advocates to incorporate digital technology (e.g., a mobile app) into these
efforts. Our analysis aimed to learn from how interviewees designed youth programs in their communities, to inform how we might approach designing technologies that can similarly promote social connectedness in support of mental health.

Related Work

Digital Mental Health

Among scholars focused on how digital technologies can be designed to promote mental health, there is concern that the dominant medical model, which centers on diagnosing and treating mental illness, can overlook the efforts needed to prevent illness and promote different types of healing. Thieme et al. (2015) characterized an emergent holistic focus on mental health through four general areas for technology design: pleasure; a positive, strong sense of self; mental balance or mindfulness; and social wellbeing. Nunes et al. (2015) argued for a shift from clinically-oriented technologies to those that support everyday life experiences, such as daily decisions for self-care. Medicalization of mental health can also uphold inequities and fail to meet the needs of those whose mental health has been undermined systemically, even by those institutions meant to support them. Pendse et al. (2022) urged a shift from treatment to healing due to the colonial history of how mental illnesses are classified and diagnosed, calling for designers to consider lived experience, power relationships, and structural factors. Similarly, Bosley et al. (2022) discussed the importance of joy, self-advocacy, and healing to address systemic traumas experienced individually and collectively in Black communities.

This focus on healing through positive, everyday social connectedness for mental health is still nascent in the human-computer interaction scholarship, and there is limited guidance for designers about what alternatives there are to the dominant quantified, objective, and medicalized approaches in mental health – or how to put them into practice during design. Additionally, the role of social connectedness within everyday community contexts is often missing from existing approaches to designing digital technologies. Some relational aspects of mental health have been addressed in human-computer interaction (HCI) and computer-supported cooperative work (CSCW), through research focused on designing technologies for social support and collaboration around mental health – e.g., Burgess et al. (2022); Meyerhoff et al. (2022); Park (2018). But less is known about how social connectedness is experienced through and with digital technology, and how we can design for the subjective experience of social connectedness, which is different from social support (e.g., sharing information, providing diagnosis-specific emotional support), or group collaboration (e.g., online community formation, data aggregation, crowdsourcing).
Defining Social Connectedness

In recent years, social connectedness has been highlighted as a critical public health issue linked to physical health, mental health, emotional well-being, as well as living longer (Holt-Lunstad, 2022; Martino et al., 2017; CDC, nd). The absence of social connectedness is social isolation and loneliness (Holt-Lunstad and Steptoe, 2022; Office of the Surgeon General, 2023a). Psychologically, social connectedness can be understood as a perception existing cognitively within the self, regarding oneself in relation to others and the social world as a whole (Lee et al., 2001). A person’s low sense of social connectedness has been linked to interpersonal problems such as avoiding social situations, being aggressive or controlling, and being either distrustful or too trusting of others — which in turn lead to psychological distress (Lee et al., 2001).

At the population level, CDC defines social connectedness as “the degree to which people have and perceive a desired number, quality, and diversity of relationships that create a sense of belonging, and being cared for, valued, and supported” (CDC, nd). Public health scholarship has only recently conceptualized social connectedness as a “unifying umbrella term” that explains how social relationships, through an interrelated set of factors, bring both risks and protections for health (Holt-Lunstad, 2022):

- **Structural:** A quantitative component that measures the size of a person’s social network, the diversity of group memberships and roles, the frequency of interactions, and whether they live alone.
- **Functional:** The extent to which a person’s individual needs (emotional, physical, tangible, informational, belonging) are met by the functions of social relationships, based on how they perceive and receive support.
- **Quality:** The positive and negative qualities of relationships, such as satisfaction, cohesion, intimacy, closeness, strain, conflict, inclusion, and exclusion.

Social Connectedness Compared to Social Support

Social connectedness differs from social support, which has been studied extensively in the HCI and CSCW literature. Social support is one of multiple related factors, and therefore does not provide as comprehensive of a framework for understanding how social relationships affect health and wellbeing. Public health scholarship and policy have shifted to the umbrella concept of social connectedness because it accounts for social support alongside other factors (e.g., social interaction, living arrangements, sense of loneliness), and also accounts for social support along a continuum (e.g., from meeting needs to not meeting needs, from emotional support to conflict, from belonging to exclusion) (Holt-Lunstad, 2022; CDC, nd).

Further, social connectedness links the health of individuals to the health, safety, and resilience of their communities (e.g., school, workplace, neighborhood) (CDC,
nd). That is, the higher each individual’s sense of social connectedness, the more they provide support to those around them, form a variety of relationships, and contribute to an inclusive community. Conversely, the lower each individual’s sense of social connectedness, the more they avoid social interaction, experience conflict with others, and contribute to violence and the deterioration of cohesion in their community.

Within HCI and CSCW, a significant body of work has focused on online social support and online communities. When the term social connectedness appears in this literature, it refers to online interaction (Wang et al., 2022; Hirsch et al., 2023; Deighan et al., 2023), providing a sense of co-presence for those living alone (Davis et al., 2016; Jeong et al., 2018), or otherwise maintaining relationships at a distance (Mills et al., 2023; Xing et al., 2023; Biemans et al., 2009). We note that all of these studies used different measures of social connectedness (e.g., intimacy, cultural integration, co-presence, awareness), and to our knowledge the present study is the first within HCI/CSCW to apply the umbrella conceptualization of social connectedness (which encompasses structural, functional, and quality factors).

Due to the above focus on how we socialize online and at a distance, the sense of social connectedness within local communities has been understudied, especially in support of mental health. A notable exception is studies of people with refugee backgrounds, which have focused on how this population uses mobile phone applications to help them integrate and feel socially connected in their host country (Vuningoma et al., 2021), and have identified design implications such as focusing on community organizations and other collective local experiences, including technology use and non-use, rather than centering individuals or technologies (Ayobi et al., 2022). We build on this nascent literature by studying how youth programs are designed to give young people a sense of social connectedness in socioeconomically distressed neighborhoods, to draw insights for designing mental health technologies that promote social connectedness.

Methods

In this study, we used the public health concept of social connectedness – defined as structural, functional, and quality factors of social relationships – to ask the following research questions:

- RQ1: How are youth programs designed to **structurally** promote social connectedness within one’s local community?
- RQ2: How are youth programs designed to promote the **functions** and **quality** of social relationships within one’s local community?

To answer these questions, we conducted a secondary analysis of data from an existing interview study (Marcu and Huh-Yoo, 2023). In the original study, we had recruited eleven community leaders of Philadelphia’s youth advocacy using the following criteria: (1) aged 18 and older, (2) have experience with programs
supporting youth, (3) speak English, and (4) live in Philadelphia. The larger project is co-led by community collaborators, who provided a list of interviewees to contact, and we sent a questionnaire that consisted of the informed consent form and the screening questionnaire. The recruitment and the interviews were conducted after receiving approval from Drexel University’s IRB #2010108219A001.

Interviews were conducted over Zoom, lasting 60 minutes, with the last three participants together as a focus group. Interviews were recorded, transcribed in full, then deidentified. The second author imported the deidentified transcripts to NVivo for secondary analysis.

The first author performed open coding focused on various types of social relationships within the community, and their positive and negative impacts on youth. This was followed by axial coding, during which the layers of connection were identified, originally as a set of four (intrapersonal, interpersonal, small group, large group). The first author then presented the codes to the second author, regularly discussing interpretations of the data, and iterating on the coding process until all transcripts were coded. At this point, the concept of the layers was selected as a key finding from among other themes — some of which were reported in a previous publication (Marcu and Huh-Yoo, 2023). The first author separated all of the data related to the layers and led a process of affinity diagramming to ensure a fit between the codes and data, with the second author providing feedback as the affinity diagram developed into the final set of five layers (adding cultural).

Finally, the authors returned to the literature to compare this analysis to relevant theory on social connectedness, identifying the definition and the structural, functional, and quality factors described by Holt-Lunstad (2022) as the best fit for explaining our empirical findings. As we wrote and interpreted our findings, we therefore used this definition, referring to the layers as structural layers, and explaining the factors we found within and across each structural layer as the functional and quality aspects of social relationships.

Table I shows the reported gender, ethnicity, age, and occupation(s) of recruited participants. The participants were part of youth programs that supported various aspects of mental and physical health and well-being as well as education. Some examples include volunteer organizations supporting teens’ extracurricular activities after school, such as basketball, music, and tutoring. Others included health outreach organizations that educate teens on sexual health, protective sex, and public health (e.g., HIV). Others regularly invited adults who grew up in the neighborhood and are now famous celebrities, such as basketball players or successful business owners, to share tips for career development.

Findings

Our analysis identified five structural layers (RQ1) across which youth programs were designed to address young people’s needs for social connectedness: (1) intrapersonal, (2) interpersonal, (3) small group, (4) large group, and (5) cultural.
We describe each of these layers below, to illustrate how social connectedness is enacted in different aspects of social life, enabling a range of influences that one’s local community can have on an individual, and conversely the influences that an individual can have on their local community.

Within each structural layer, we describe examples of the function and quality of social relationships (RQ2) that influenced youth mental health and well-being within their community context. In particular, we highlight how these factors exist on a continuum from positive to negative effects. As a result, these influences are often in tension with one another, such as when a young person experiences violence in their neighborhood, and feels written off by their school, but feels cared for and supported by a basketball coach. The youth advocates we interviewed demonstrated how such tension between influences can present opportunities for an individual to learn new ways of being and connecting with others. We suggest that understanding these opportunities and accounting for tensions across layers can open up design opportunities for technologies that promote social connectedness.

### Intrapersonal

To design for social connectedness, we first need to consider that connecting with others begins internally with one’s sense of self-worth, willingness to trust people, and capacity for developing relationships (Marcu and Hub-Yoo, 2023). Interviewees explained the range of traumatic experiences to which youth are exposed, and the fight-or-flight response that they develop as a result — a well-established phenomenon in trauma theory (van der Kolk, 2015).

Interviews revealed how youths’ past experiences may not only have lacked critical positive functions and qualities of social relationships, but also continue to impede their ability to connect with others. P6 described how she had observed these challenges within the school context as a principal:

<table>
<thead>
<tr>
<th>P#</th>
<th>Gender</th>
<th>Ethnicity</th>
<th>Age</th>
<th>Occupation(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>F</td>
<td>Black</td>
<td>70s</td>
<td>Retired teacher, school director</td>
</tr>
<tr>
<td>P2</td>
<td>F</td>
<td>Black</td>
<td>40s</td>
<td>Principal (grades 5-12)</td>
</tr>
<tr>
<td>P3</td>
<td>F</td>
<td>White</td>
<td>60s</td>
<td>Director of a health organization</td>
</tr>
<tr>
<td>P4</td>
<td>F</td>
<td>Black</td>
<td>50s</td>
<td>Police staff inspector</td>
</tr>
<tr>
<td>P5</td>
<td>M</td>
<td>Black</td>
<td>N/A</td>
<td>Director of a non-profit organization</td>
</tr>
<tr>
<td>P6</td>
<td>F</td>
<td>Black</td>
<td>40s</td>
<td>Principal (grades K-5)</td>
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<tr>
<td>P7</td>
<td>F</td>
<td>Black</td>
<td>N/A</td>
<td>Principal (grades K-8)</td>
</tr>
<tr>
<td>P8</td>
<td>F</td>
<td>Black</td>
<td>80s</td>
<td>Reverend, community advocate</td>
</tr>
<tr>
<td>P9</td>
<td>F</td>
<td>Black</td>
<td>40s</td>
<td>Social entrepreneur</td>
</tr>
<tr>
<td>P10</td>
<td>M</td>
<td>Black</td>
<td>40s</td>
<td>Construction field worker, Community educator</td>
</tr>
<tr>
<td>P11</td>
<td>M</td>
<td>Black</td>
<td>40s</td>
<td>Sales manager, Community educator</td>
</tr>
</tbody>
</table>
“Students, in their community, have had several traumas – between loss of income with parents and having to move, you know, transients, being at multiple schools, sometimes in the same school year, single parent households. Sometimes students have been abused themselves or they witness abuse at the hands of a parent, we have some students who have witnessed homicides. So just a lot of factors that contribute to students not being able to fully engage, you know, with learning. One of the biggest challenges is just on positive social interactions. Students not having their fight-or-flight type mentality. Inside of a school, when you know you have a student who drops the pencil when it gets too close to this other student or reaching to pick it up and that other student who has been exposed to trauma, who has an issue with personal space, is now agitated and that could turn into a conflict. So you know, knowing what students have been through and having people in the building that can work with students around trauma is just really important.” (P6)

The traumas that P6 describes in Philadelphia are largely caused by socioeconomic distress. As interviewees explained, young people’s behaviors and attitudes are a natural response to their environment. Their aim, through social connectedness, was to help youth cope with that response. For example, P8 described mentoring activities such as workshops to create vision boards, which are designed to address the hopelessness and lack of possibilities that youth internalize:

“And when they do vision boards, they do an intense workshop, just to give them an opportunity to share the vision for their lives... careers... hope for the future. And these are impoverished youth that live in low socioeconomic communities and so sometimes their dreams and abilities are not believable. And so we have to help them believe that they can achieve, and that there are possibilities to utilize their gifts and talents to become what they want. And one of the young males, I’m going to never forget that he wanted to be an archaeologist and other youth never even knew what an archaeologist was. And so to find out that some of them have great artistic, professional dreams, and some of them don’t even believe that they can achieve... because they feel hopeless. And because they look at all of these videos and they see other people achieving and they are frustrated. It is my belief that poverty breeds violence and depression and so, my burden right now is how many youth are shooting each other and killing each other... because they feel hopeless. That’s a lot, but that, that’s kind of just where we are.” (P8)

Interpersonal

At the interpersonal layer of social connectedness, individuals develop one-on-one relationships with people who play different roles in their lives — parents, elders, teachers, employers, colleagues, peers, friends, romantic partners, etc. As discussed above, such relationships are dependent on the intrapersonal layer because the individual must have the social and emotional skills to build relationships.

In our study, interviewees viewed their role within the ecosystem of various other relationships that youth should ideally be able to rely on. For example, they built youth programs that not only enabled young people to form relationships with caring adults, but also to form relationships with their peers and mentor one another:
“I think the peer mentors work really well. I do. Because they listen to one another. They respect the opinion of one another. So, you have, you know— if you’re going through something, you have the option of talking to your peer, or you have the option of talking to maybe your mom, or your dad, or an older adult.” (P4)

Interviewees emphasized that interpersonal relationships best develop organically, without necessarily assigning mentors. Therefore, youth programs organized activities that allowed youth the time and space to get to know a variety of people within small group contexts. We discuss this layer of social connectedness next.

Small group

Youth programs represent a small group context that allows for members to get to know one another interpersonally. Other examples of small groups include households, classrooms, and offices. At this layer, an important aspect of social connectedness is the sense of being welcome and included in the group. Interviewees explained that they addressed the need for continuity in a young person’s life by providing it in part through the small group (e.g., program, sports team, chess club), so that even if one mentor in their lives got busy, the collective would still be there to provide continuous connectedness. In this way, mentoring was provided across the interpersonal and small group layers:

“All of our people, whether they’re adults or children, we’re all considered mentors and you may not necessarily be matched with with any individual. It just maybe according to, you know, what you enjoy so you may end up having a basketball mentor because you’re in the basketball program. But you may also end up, if you’re in a chess club, that means you also have whoever’s running the chess program becomes your mentor also. So it’s not a one-on-one mentorship, it’s more an extended family, and we all play a part in that mentorship.” (P5)

One of the reasons that small group connections were powerful forms of providing mentorship was that they took place within the geographic context of specific Philadelphia neighborhoods, in which residents had the same lived experiences. This broader neighborhood context is in the large group layer, which we will explain next.

Large group

At the large group layer of social connectedness, individuals may not get to know each other personally. Instead, they connect to what is unique about everyday life within a social group as large as a city, neighborhood, or school. Interviewees explained how the context of their Philadelphia neighborhoods, especially the prevalence of community gun violence, was having adverse effects on the wellbeing of local youth. Their own lived experience within these neighborhoods enabled them to connect with youth through understanding and compassion. In contrast, they noticed that teachers who lived farther away struggled to connect
with local youth because they did not have that connection to the geographic community:

“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... 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.” (P2)

The “disgust” felt toward large group challenges such as gun violence can therefore transfer onto interpersonal relationships like those with students. When teachers have an external perspective of the large group, it is easier to turn away from their challenges. Whereas interviewees lived alongside youth in the same neighborhoods, and having faced the same challenges, were better equipped to help young people cope. For instance, P8 drew on the large group context to explain how youth seem to approach planning for their careers:

“It’s amazing, some of them really wanted businesses. These young people are more oriented towards owning their own businesses as opposed to college degrees. And having a limo service, or touring service, or even real estate development, or some tangible possible vocation... that, we find, is more inviting and encouraging to them as opposed to eight to ten years in school to become a doctor or a lawyer. And they could be, could have the potential to do that. But they look at... vocations that are hands on as opposed to educational careers, unfortunately, because of the environment. And I truly think that they don’t think they’re gonna live long. I mean if you’re involved in a neighborhood where people are getting killed, five and six a day, and people are shooting into neighborhoods. If you’re having a 4th of July outing and somebody just ran, come and shoot. That’s kind of depressing and discouraging that they think that ‘Oh, I could die any day’ so I think that that deters their longevity of planning, in terms of a career.” (P8)

Expanding beyond a large group that is connected through place or geography, the next and final layer of social connectedness that we will discuss is cultural.

Cultural

Finally, individuals can feel connected to a culture, which can give them a general sense of belonging while also influencing how they connect to people through the other layers. For example, connecting to basketball culture can lead an individual to passionately follow games and wear jerseys (intrapersonal), make friends who share this hobby (interpersonal), play on a team (small group), and attend games to cheer on the local professional team (large group). The interviewees discussed how they tap into the popularity of sports culture in how they organize events and programs to engage youth.

We therefore define the cultural layer as a sense of belonging based on interest or identity that allows an individual to connect broadly with people with whom they may never interact. Specific to our context of youth programs, cultural relevance has for example been described as an important approach to supporting
urban African American girls (Lindsay-Dennis et al., 2011). Social connectedness that draws from shared experiences of oppression—such as those faced by Black women and girls at the intersection of race, gender, and class—“can create opportunities to understand personal and community advocacy as well as constructive techniques to navigate problems within social and educational settings” (Logwood, 2020). Much of the shared understanding and collective advocacy that stems from this kind of social connectedness can extend beyond present and local circumstances, because experiences such as racism can reach far back across past generations and ancestors, or serve as a lived experience that is shared around the world — which is why the Black Lives Matter movement began from local protests over the police murder of George Floyd in Minneapolis, but spread globally within weeks (Gaines, 2022; Shahin et al., 2021).

Interviewees also referenced young people’s generational culture, at times comparing it to the culture in which they themselves grew up, and highlighting the unique experience of being a young person today:

“I grew up under the understanding that only a fool hates reproof... no one loves to be rebuked or reproofed at all, however, when it’s done in a loving way, when someone is teaching you and guiding you, I definitely think that mentorship would be amazing. Especially at the time we’re in right now, children are angry. They’re angry because they’re stuck in their houses [during the pandemic], they’re angry because of social justice issues... there’s environmental issues, there’s so much. I think having someone to help steer them in the right direction, or a better direction, will be helpful.” (P2)

P2 notes the function of relationships with adults to help young people channel their anger into productive paths, while P5 describes how peers can serve a different function due to their ability to connect around their shared generational culture, including an interest in video games and engagement with social media:

“It’s a tutoring program, which doesn’t sound like much of a mentorship program because it’s academic, but we have our peers tutoring other peers. And it’s much more effective in some senses, some instances, than it is with the adults. Because they can go over academic work, but then they may be talking about gaming, for example. So their conversations can go in different areas or they can use social media examples that I might not be able to use. So the peer-to-peer mentorship, as well as long as we’re training our mentors on how to be an effective mentor as well because we want to make sure that our mentors understand that you are partly responsible for your mentee, and so you have to be mindful of what you do, you say, and in how you represent yourself as well.” (P5)

Discussion

We have used the umbrella concept of social connectedness to describe the structural, functional, and quality factors of social relationships that impact the well-being of individuals as well as communities. We articulated five distinct but interrelated structural layers across which interviewees had designed youth
programs to address the social connectedness needs of local youth: intrapersonal, interpersonal, small group, large group, and cultural. We also explained, within and across these layers, how the functions and qualities of social relationships were affecting the mental health and well-being of young people in socioeconomically distressed communities. Peer and inter-generational mentoring were examples of how relationships could serve different functions across various structural layers. Meanwhile, qualities of youths’ social relationships enabled them to feel a sense of belonging, co-develop their shared interests and identity, and connect around common lived experiences.

In this section, we discuss how social connectedness provides a novel approach to designing technology in support of mental health and well-being. We highlight two design implications: design across structural layers of social connectedness; and foster community advocacy to build both individual and collective resilience.

Design across structural layers of social connectedness

When designing technologies to support mental health, we recommend looking across the structural layers of social connectedness to identify community assets, sources of social support or belonging, and the potential influence of various types of relationships.

We initially entered this project with a more simple relational view, expecting that youth programs were facilitating primarily one-on-one mentoring relationships. We therefore anticipated we might ultimately design technologies for facilitating one-to-one mentoring matches or communication between a young person and their assigned mentor.

However, our analysis of how these programs were addressing the traumas experienced by youth revealed a more complex and layered approach to facilitating social connectedness. Understanding the tensions between these layers helped us gain a better understanding of what challenges youth were experiencing, and the role of social relationships in helping them face these challenges. In other words, we improved our problem definition before beginning to design a technological solution to address it. For example, youth did not always have the intrapersonal skills to avoid conflict and connect with others, but had opportunities to work on these skills through interpersonal relationships with peer mentors and adult mentors, who were available to give them guidance in the absence of positive influences among large group connectedness within their neighborhoods, where they were often exposed to violence. A small group activity such as a basketball team enabled youth to connect with each other through close and repeated interactions, as much as through a shared culture, whether related to the sport or their common generation with peers.

The way we have conceptualized layers of social connectedness bears some similarity to what Park (2018) called a “mosaic of social support.” In her study of college students, she found that their mental wellbeing was supported by a mosaic
made up of three groups: close friends, parents, and acquaintances or anonymous online connections:

“These social groups were somewhat structured, but also adaptable, meeting the different needs of each individual at different times. This flexible but tightly intertwined form of social support was crucial in maintaining the students’ mental wellness.” (Park, 2018)

We noted a similar ebb and flow to different sources of social connectedness, such as mentors’ willingness to step in and provide guidance to a young person when they could see that the parents, teachers, or other adults in their lives were not able to meet these needs. However, our structural layers of social connectedness differ from the concept of the mosaic in that they represent how individual and collective well-being influence one another. Rather than a mosaic of multiple groups that surround an individual at its center, the individual is a part of the collective, and their subjective perception of how they connect to others across various layers is what contributes to their sense of self and their mental well-being. In turn, their sense of connectedness to others is what enables them to contribute to the wellbeing of their community and of those around them.

Unlike the direct social interactions making up the mosaic, the layers of social connectedness can also involve a sense of connectedness to one’s ancestors, or to people across the world with whom one may never directly interact. Yet this sense of connectedness can have real tangible benefits to an individual’s motivation and sense of self, and to a collective sense of identity and power. Here, our findings also relate to Burgess et al.’s (2019) concept of diffuse sociality, which they define as being proximate to others but focusing on one’s own activities without directly interacting – such as studying at a coffee shop full of strangers, or playing an online game while seated next to a friend who is engaged in a different activity. In their study of self-managing depression, Burgess et al. found that diffuse sociality was useful when individuals felt they were not able to handle direct social interaction but could still benefit from feeling connected to or in community with others. Designing across the structural layers of social connectedness can help to identify opportunities for enabling diffuse sociality. For instance, technologies could help individuals realize how many other people around them share a certain interest, whether or not they directly interact with those people online or offline. Technologies could also help to organize or amplify community events, so that those who engage with them can feel a part of something bigger than themselves, regardless of how much they interact directly with others at the event.

Target factors where individual and collective well-being are intertwined

*When designing technologies to support mental health, we recommend understanding how the individual and the collective influence each other’s well-being, to identify opportunities for supporting both.*
The public health concept of social connectedness is also novel and informative for design because it explains how the well-being of individuals is intertwined with the well-being of their communities. Many of our interviewees grew up in the same socioeconomically distressed neighborhoods where they were now creating programs to support the next generation of young people. From their lived experience and earned wisdom, we learned how these neighborhoods were (a) causing harm to youth, for example through the prevalence of gun violence and lack of opportunities, but also (b) providing an important source of relationships with people who can relate to them, care about them, and guide them. Having witnessed a rise in gun violence especially among youth, the interviewees described how they were aiming to disrupt these cycles by shaping young people’s belief in themselves, how they socialize with one another, and how they view themselves as part of a larger community. In our approach to technology design, we were influenced significantly by understanding these efforts to support the mental health of youth, both individually and collectively, via promoting social connectedness.

For HCI and CSCW, social connectedness thus provides an evidence-based set of interrelated factors (structural, functional, quality) for understanding how social relationships across an entire community influence health. Social connectedness is a more comprehensive approach than social support, which is commonly discussed in the literature, yet without any agreed-upon definition or factors. We also build on the smaller number of studies that name social connectedness as their goal, but use various metrics such as intimacy, cultural integration, co-presence, or awareness – e.g., Biemans et al. (2009); Davis et al. (2016); Deighan et al. (2023); Jeong et al. (2018); Mills et al. (2023); Xing et al. (2023). We provide a unifying definition and set of factors to guide future work and enable our field to build evidence for how technologies can be designed to promote social connectedness. For example, designing for people who live alone Davis et al. (2016); Jeong et al. (2018) addresses one of the structural factors of social connectedness.

The design of technologies for mental health often focuses on the individual, and takes a clinical approach to treating or managing their symptoms or diagnosed illness. In contrast, the concept of social connectedness extends beyond the individual to situate their subjective experience in relation to the community around them. As such, our contribution with this approach aligns with increasing calls in the HCI and CSCW community to design for mental health more holistically, preventatively, and relationally (Bosley et al., 2022; Marcu, 2022; Nunes et al., 2015; Pendse et al., 2022; Thieme et al., 2015). Given also the challenges of engaging individuals directly about their mental health (Marcu and Huh-Yoo, 2023), designing for social connectedness can be a way to frame technology around a less stigmatized topic, which is no less important for one’s mental health. For example, our findings demonstrated how youth programs and group activities were designed to address trauma and mental health. Although individual mentors must maintain continuity to have an impact on a young person’s life, group activities such as sports or consistent events and locations can
provide continuity at the programmatic level. Over time, the combination of the group context and one-on-one interactions work together to give a young person a sense of belonging that contributes to their belief in their self-worth. Youth advocates were also interested in guiding youth toward contributing to their community to help them feel a sense of purpose. Supporting these important social interactions requires technologies that strategically leverage local geographic information to bring users back to connecting locally.

Finally, in these findings, we saw strong similarities to Parker and colleagues’ work with healthy eating among low-income African American communities, where they identified the value of collectivism for designing technologies for health (Parker et al., 2012; Parker and Grinter, 2014). They describe collectivistic systems as digital health interventions that focus on: the value of collectivism as a sense of communal responsibility, sensitivity to cultural uniqueness and local expertise, and collective action for the pursuit of systemic change (Parker et al., 2012; Parker and Grinter, 2014). Using social connectedness can help designers to design these types of systems for any type of health, by focusing on the structures that enable relationships to form, the functions that relationships serve, and the qualities that make relationships so transformative for mental health, physical health, and longevity.

**Conclusion**

In summary, the five layers of social connectedness expand our focus beyond social support — or lack thereof, including mistreatment and harm — that explain how people either feel a sense of belonging and worth in relation to others, or feel demoralized, isolated, and hopeless. Importantly, this type of social support concerns a person’s subjective experience of connectedness to others, regardless of how tangible or quantifiable connectedness to others may be from an external, objective perspective. This kind of social support also has less to do with problem-solving (e.g., information seeking, symptom monitoring) than it does with a fundamental sense of human connection that enables building relationships and contributing to one’s community. The layers of social connectedness also demonstrate how individual and collective well-being are intertwined. The absence of social connectedness leads not only to an individual’s adverse mental and physical health outcomes (Office of the Surgeon General, 2023a), but also to antisocial behavior, violence, and the disintegration of neighborhoods — as reported by our youth advocate interviewees, who observed how local youth were being drawn into gun violence due to cycles of trauma and neglect.
Acknowledgments

We thank our community partners and interviewees for making this work possible. This material is based upon work supported by the National Science Foundation under Grant Nos. IIS 1816319 and 2144880.

References


World Health Organization (WHO) (2022): *Mental Health [Fact Sheet]*.
