Transgender People's Technology Needs to Support Health and Transition

TEE CHUANROMANEE, University of Notre Dame
RONALD METOYER, University of Notre Dame

Health and well-being are integral parts of the human experience, and yet due to numerous factors are inaccessible for many communities. The transgender community is no exception and faces increased risk for both physical and mental illness. This population faces many unique challenges before, during, and after transition. To gain a deeper understanding of the trans community's health and well-being needs, we conducted twenty-one interviews with transgender individuals to determine how they navigated their identities and transitions. From our interviews, we examine and highlight the unique needs of the trans population with respect to health, well-being, identity, and transition. We discuss how designers can better understand and accommodate the diversity of this community, give suggestions for the design of technologies for trans health and well-being, and contribute open areas of research.

CCS Concepts: • **Human-centered computing** → **HCI theory, concepts and models**; *Social navigation*; *Empirical studies in HCI*.

Additional Key Words and Phrases: transgender health, wellness, inclusive design, information management, gender dysphoria

ACM Reference Format:
Tee Chuanromanee and Ronald Metoyer. 2021. Transgender People's Technology Needs to Support Health and Transition. In *CHI '21: Conference on Human Factors in Computing Systems, May 08–13, 2021, Yokohama, Japan.* ACM, New York, NY, USA, 21 pages. https://doi.org/10.1145/1122445.1122456

1 INTRODUCTION

Multiple systemic and structural factors affect trans health, including the healthcare system, the criminal justice system, income inequality, and the paradigms that shape them. For instance, accessing healthcare may be easy for a relatively wealthy white cisgender person who has a home, a job, and reliable transportation. In comparison, someone who is visibly transgender without a stable job may have to worry about being discriminated against, being harassed, or being targeted by those in power, whether that is in law enforcement or healthcare providers. Note that this person would have many compounding factors preventing them from receiving appropriate healthcare. Thus, the challenges faced by the community in accessing proper healthcare are not simply at an individual level.

Furthermore, the trans community is such a diverse community that we cannot make broad generalizations about what the goals are for trans healthcare, or even what is feasible and accessible within the current system. As we will demonstrate, each trans individual has their own experiences of their gender, their immediate community, and their needs in terms of health and transitioning.

CHI '21, May 08–13, 2021, Yokohama, Japan

ACM ISBN 978-1-4503-XXXX-X/18/06…$15.00
https://doi.org/10.1145/1122445.1122456

However, before proceeding, we will introduce some basic terminology used when discussing transness.

A *transgender* (or *trans*) person is someone whose gender identity does not match the gender they were assigned at birth. The term transgender is used as an umbrella term, with many distinct (and overlapping) identities included. Examples of transgender identities include *trans man* and *trans woman*, which is a person who is assigned female at birth (AFAB) but whose gender is male, and a person who is assigned male at birth (AMAB) but whose gender is female, respectively. *Nonbinary* (or non-binary) identities are transgender identities that do not fall solely under male or female. The term nonbinary is also an umbrella term with many subcategories including those that are *genderfluid* or *genderqueer* or those that do not include male or female at all, or those that are both male and female. A *cisgender* or *cis* person is someone whose gender identity matches the gender they were assigned at birth. Finally, *questioning* people are those who are unsure whether they are cisgender or transgender, or people who are transgender but are not sure of their exact identities.

Dhejne et al. found that in the United States, a disproportionate number of the transgender population suffers from mental illness compared to the general population [12]. They also suffer from a higher level of poor general, physical, and mental health than the cisgender population [23]. Furthermore, navigating the healthcare system in the United States presents a challenge for the American trans population, as a disproportionate number of people in this population do not have healthcare coverage or a personal care provider, and are more likely to not be able to afford healthcare costs [23]. Another obstacle to receiving healthcare is discrimination, with over 20% of transgender people experiencing gender-based discrimination and harassment when trying to access healthcare [21].

Transitioning has been found to improve mental health. Dhejene et al. found that post transition, the rates of mental illness were significantly reduced, and in many cases, reached "normative values" [12]. There is more than one type of transition that transgender people can go through. The most well-known is *physical* or *medical* transition, in which a trans person will alter their body using hormone replacement therapy (HRT) or surgical procedures so that it matches their gender. Another type of transition is *social transition*, where the trans person will "come out" to others. This can be done in person or remotely, using technology such as social media or email. This often, but not always, involves changing physical presentation, name, and pronouns. The third type is called *legal transition*, where the trans person will change gender markers and/or their name on legal documents such as passports, birth certificates, and driver's licenses. Legal transition may be categorized under social transition. It is important to note that not every trans person necessarily desires to undergo all available forms of transition [28], and not every trans person goes through the same milestones in the same order [10].

Gender dysphoria is defined as a feeling of "discontent with the assigned gender" [4]. However, not all transgender people experience dysphoria [13].

Here, we use the term *dysphoria management* to refer to the ways that trans people reduce or eliminate their dysphoria. Dysphoria management can be used to refer to the ways trans people manage their physical presentation, their thought patterns, or their actions in order to avoid the negative feelings associated with their dysphoria.

An example of a dysphoria management method is chest binding, which involves flattening the chest using a variety of methods including commercially made binders, layering shirts or sports bras, using bandages, and using duct tape [27]. This results in an improvement in self-reported mood in *transmasculine* people (i.e., trans people who prefer to present as more masculine) [27]. Yet, the majority of people who bind reported adverse physical symptoms [27]. Even commonly recommended safety measures for binding such as not binding for more than 6-12 hours a day, are based on anecdotal evidence and there is still a lack of studies that more fully investigate

the effectiveness of these recommendations [27]. While such information may be available from healthcare professionals and the Internet, trans people still are not able to easily find trustworthy, substantive, and non-anecdotal information on dysphoria management methods.

There are a number of ways that trans people utilize technology before, during, and after different kinds of transition. These include doing research about gender and transition, managing dysphoria, finding community, and finding resources and care. Thus, we sought to investigate the role technology plays in trans health and look at this community particularly through a human-centered lens with respect to interaction design. Our interviews are exploratory, and thus our research questions are as follows:

What are the ways that technology can better help trans people navigate their gender dysphoria? While previous work has been done in the realm of relieving gender dysphoria through transitioning, an understanding of the ways that trans people experience and manage gender dysphoria from a technological standpoint has yet to be presented.

What are the important considerations when designing for the transgender population's health needs before, during, and after transition? Trans people encounter difficulties in the healthcare system more so than their cisgender counterparts and relate to their bodies in different ways. How can we move towards a system that is flexible enough to accommodate the differing health needs of such a diverse population?

Our contributions enable us to better understand the transgender community and how they approach the physical and social transition process. This is important when considering the increasing number of technologies geared towards this population. We contribute the following:

- An investigation of trans people's dysphoria experience: how trans people experience dysphoria, how they manage it, and how technology can play a role in this.
- An understanding of the extent to which being transgender is a part of one's identity and how technology (beyond social media as discussed in previous works) can accommodate changing and shifting understandings of trans selves.
- A reexamination of the traditional teleological and linear transition narrative which is widely perpetuated.
- An understanding of how technology is utilized for different types of transition and where there are opportunities for investigation and innovation for this community.

In the following sections, we present previous work in the CHI and CSCW communities on transgender technology needs. Then, we describe our series of interviews and approach to analysis. We separated our results into three main themes: identity, transition, and dysphoria. Within each theme, we describe each finding and discuss its takeaway for the research and design community.

2 BACKGROUND AND RELATED WORK

Technology plays a crucial role in the transgender community, as it enables members of the community to find and access resources, access an online community, and socially transition. In this section, we provide a brief overview of previous research in the HCI community on the needs of the transgender population and some technologies currently available specifically for this population.

2.1 Trans people and technology needs

Haimson et al. define trans technologies as "technology that allow[s] trans users the changeability, network separation, and identity realness, along with the queer aspects of multiplicity, fluidity, and ambiguity, needed for gender transition" [17]. In a series of participatory design workshops, Haimson et al. [18] introduce four classifications of trans technologies: for changing bodies, for

changing appearances/gender expressions, for safety, and for finding resources. They envisioned the development of trans technologies both immediately feasible and as a vision for the future.

Trans technologies contrast with the current technological infrastructure that reinforces a cisgender-centered perspective. Automatic gender recognition systems are an example, and Keyes [22] shows how the structures of such systems exclude trans people and subject them to additional unnecessary risk. Gonzales and Fritz [15] interviewed 20 transgender men to determine how they navigated crowdfunding infrastructure. They found that this population are "particularly sensitive to their need to maintain agency over their identities while reaching out to others for support" [15]. We investigate how transgender people navigate the current infrastructure in finding and accessing information and resources.

Safety is one of the most well-known needs of the transgender population in regard to technology. Starks et al. found three ways that transgender people manage their safety: using technology for communication with trusted people, managing their presentation, disclosure, or movement for survival, and minimizing contact with law enforcement. [32] Scheuerman et al. interviewed 12 transgender adults to investigate their technology needs with regards to safety and found that all of their interviewees were concerned with safety both online and in real life. They also found that trans users experienced technology as "reflected solely cisgender perspectives" [30] which reinforces the need for a re-design of technologies to better serve the trans populations. We continue to investigate the trans experience in managing presentation and disclosure.

Harms also exist within the LGBT community. Walker and DeVito investigated the existence of intracommunity power dynamics and harms in LGBTQ online spaces. While these harms certainly exist in offline environments, the consequences of online harms can be more isolating when compounded with a lack of real-life support systems. These harms are also exacerbated by preexisting tensions regarding race, class, sexuality, and body size [37]. We investigate the relevant narratives present in the transgender community as well as factors that affect one's inclusion in the community.

Ahmed presented the concept of trans competent interaction design in her study of the use and role of voice training apps. Through ten interviews of transgender people, she found that several participants felt an external "pressure to conform to a singular style of gender expression" which was "potentially debilitating" [1]. Thus, trans competent interaction design should not be prescriptive and make assumptions about users or their goals. Instead, it should understand that gender is not dependent on anatomy and is not immutable [1]. Ahmed extends her work in the design of a voice training app that puts into practice trans competent interaction design and gives precedence to the trans community in its design [2]. She also notes even though current "technologies of transition" may be designed for the transgender population, they may reinforce cisgender- and hetero-normative paradigms [2].

Our study extends these works by providing more insight into the transition and dysphoria experiences while centering trans perspectives on technology.

2.2 Apps for transgender people

Several apps have been developed or investigated for the feasibility of supporting trans people's safety. Goedel et al. found that it is feasible to use GPS tracking to support trans safety, particularly in the realm of sexual health [14]. U-Signal is a wearable that has a corresponding smartphone app with safety features designed for transgender women and nonbinary people of color. The app's main feature is alerting a friend or trusted person with a message containing a voice recording and the user's GPS coordinates [32].

GotYourBack [6] is a mobile app developed to aid trans and gender nonconforming people when using gendered restrooms. The app provides real-time updates on the status of public restrooms

and alerts users to the presence and number of supporters and other people currently using the facilities. Other features include a toilet locator and user ratings of the facilities.

There are also a few apps available on the market for transgender people that have not been developed in a research context. These tend to focus more on the physical aspect of transition such as binding [20], voice training [36], or on finding resources [25, 29].

However, an emerging kind of app being developed is referred to as the transition-tracking app [3, 8, 11, 34]. These apps vary in scope, from keeping track and visualizing the dates to take hormones [8], to comparing before and after pictures in physical transition [3, 34], to goal setting for different kinds of transitions in the short and long term [11]. These kinds of apps have not been studied in detail, and currently it is not yet clear that tracking apps are a solution at all. However, because of the trend in development of these apps, our work provides a preliminary look at them, pointing out potential problems and raising a few suggestions on their design.

While we do not focus on developing and testing a piece of technology, we focus on the potential of technology to support trans health. We aim to better understand the trans population and their use of technology to aid dysphoria management and transition, and identify open areas for research and design to support the development of such technologies. Our findings are applicable to the design and development of transition tracking and resource finding technologies.

3 STUDY

To further investigate the role that technology plays in identity, transition, and dysphoria, we interviewed 21 transgender people. This research was approved by the University of Notre Dame's Institutional Review Board.

3.1 Participants

We recruited 21 participants from the local transgender community, word of mouth, and Research-Match, an online volunteer database. Participants came from a wide variety of ages, ranging from 19 to 57 years old. The mean and median ages were 34.3 and 28.5 years, respectively, with a standard deviation of 13.6 years. We interviewed 9 trans men, 5 trans women, and 8 nonbinary people. One participant identified as a nonbinary trans woman and was counted in both categories. Here, nonbinary genders we saw include agender, unspecified, genderqueer, transmasculine, and simply "nonbinary." Of the participants, 16 were white, 2 were Black, 1 was Middle-Eastern, 1 was Latino, and 1 was mixed race. Occupations included unemployed, student, tax accountant, healthcare worker, and information technology. Education levels ranged from high school graduate to Masters degree.

In screening participants, our criteria were simply that the participant cannot be cisgender. Participants can be binary or nonbinary transgender or questioning their gender (however, we did not interview anyone who was questioning). We intentionally set loose criteria to capture the diversity of the community. Because of the potential sensitive nature of the discussions in the interviews, [Author 1] conducted all interviews, as participants would likely be more comfortable with talking to another member of the community about transness. Participants were compensated with a $10 Starbucks gift card.

3.2 Procedure

We conducted the interviews in person (if the participant lived in the local area) or using videoconferencing software (Skype or Zoom). Each interview lasted approximately one hour. Interviews were audio-recorded and all participants were given the option to choose a pseudonym they wanted us to use to refer to them here. After obtaining informed consent, a pseudonym for the participant, and their pronouns, we started the audio recording and began the interview.

To get a broad overview of trans people's health and the potential avenues for technology, we partitioned the interview into five discrete sections. We took a diverse view of health, defining it as the integration of physical, mental, social, and spiritual health. To help participants feel at ease and more open to talking about their experiences, we employed a form of the life history method and asked them specifically about the periods of their lives where they experienced the most dysphoria and when they physically, socially, and/or legally transitioned [16].

In the first section, we sought to understand how participants experience their gender and transitions (if applicable). We asked participants to describe their gender and how it has evolved over time. We also discussed the resources they used to aid their physical and/or legal transition, how they planned and went about their transitions, and the state of their transition currently.

The second section involved investigating dysphoria in more detail. Recall that gender dysphoria is the feeling of incongruity between someone's gender and their sex assigned at birth. We wanted to discover how the interviewees experienced gender dysphoria, how it impacts their lives, what triggers the dysphoria, and how they deal with it. At this point, it is important to remember that not all transgender people experience dysphoria [13]. However, all our participants reported feeling dysphoria currently or at some point in their lives.

The third section dealt with community. In asking these questions, we wanted to examine the roles that society and the immediate community play in participants' experience of health and transition. We asked them about their transgender community, both online and offline, and about their social transitions. We also talked about their disclosure status and whether they considered themselves "stealth" (i.e., taking steps to live as a cisgender person, and not disclosing their trans identity [5]). Contrary to a predominant transition narrative, most trans people do not desire to go stealth.

The fourth section focused on physical health. We asked participants how they managed their physical health and about their relationships with their primary care providers and specialists. We also inquired about the way they received transgender or transition-related care from these providers, and if appropriate, their experience with the healthcare system in other contexts such as the emergency room. However, our focus was not as much on the participants' experience of discrimination from unknown doctors as much as how they utilized their providers to support their transitions. We also asked them how they worked with insurance in the (American) healthcare system and their relationships with past and current doctors.

The fifth and final portion of the interview was about technology use. We asked them what kinds of technology they used to manage their health, both physical and mental. We gave them some examples of apps and websites to remind them of the ones they have tried. We then probed with more specific questions about how they used these apps and what they liked or disliked about them. Then, we solicited their opinions on technology in the trans experience. Finally, we recorded their demographic information.

4 ANALYSIS

After we completed the interviews, we transcribed them and used open coding to identify salient themes that emerged. By briefly going over the interview transcripts, we identified areas of interest and generated a codebook. Two members of our team coded two interviews independently with a resulting inter-rater agreement level of 67%. One team member then coded the rest of the interviews independently.

We iterated over the codebook again and performed axial coding. The resulting codes fit into seven broad themes: identity, transition, dysphoria, accessing information, health management, community, and technology. Because the discourse surrounding identity, transition, and dysphoria were most prevalent and provided the most insight, we decided to perform axial coding around

these three groups. We reexamined the data and the codes assigned to these groups, reassigned codes, and added new ones as needed. Some codes were also pulled from other categories.

5 RESULTING THEMES

We extracted main themes and organized them into three relevant categories: participants' self-perception of their identities, how they navigated (or plan to navigate) their transitions, and their experience with gender dysphoria or euphoria. We found that while the ways in which people find and manage information vary, it is difficult to locate and access resources for many of our participants. Furthermore, we also found that online intracommunity dynamics affected the way participants experienced their identities. In each subsection, we first summarize findings from our participants, then introduce takeaways for the HCI and design community.

5.1 Identity

We asked participants about their identities and their experience with discovering and living with their trans identities. We found that some participants experience their trans identities differently in different spaces. We also discussed the medicalization of trans identities with those who felt comfortable talking about it, and introduce the concept of transmedicalism as a form of sensemaking.

5.1.1 Fluidity of gender identity. Seven respondents remarked that their identity as fluid versus static. When asked how she would describe her gender, Marisa said that her identity is *"very fluid"*. She can go from *"masculine butchy"* to *"very cute and sexy."* For her, this includes her gender presentation and the way she carries herself: *"I can step up and be assertive but not super aggressive, can be all over the place, one end of gender spectrum to the other."* While fluidity of gender is most associated with genderfluid or nonbinary individuals, Marisa describes herself as female. There are also other binary trans people who consider their identity to be fairly flexible as well.

On the opposite side, there are participants who have a fixed view of their identity. Mari describes herself as *"solidly, solidly female."* Victoria agrees, saying *"I am a very kind of binary sort of trans person for myself. I'd never voice that onto anyone else...But I consider myself very in the binary and I am okay with that and I do kind of like that. But at the same time it's very difficult to accept certain parts of myself. I don't consider myself entirely traditionally feminine which is a struggle."* She feels comfortable in the binary, yet she separates her concept of femininity from the notion of being a woman.

Takeaway: Designers should not assume that all transgender people experience a fixed sense of gender. If designers so choose to include a gender option in an interface, they should remember that the possibilities of gender experiences and presentation are diverse. Thus, an open area of research could be determining whether enabling users to quickly and easily change their gender is useful, or even if such features are necessary. If gender is an explicit and salient part of a piece of technology, the ability to switch gender markers multiple times a day could especially aid genderfluid people.

Furthermore, designers can also introduce more fluid forms of interaction (e.g., using a slider or using other forms of positional encodings) as a selection mechanism instead of discrete methods such as checkboxes. However, it is important to note that while fluidity and evolution are constant themes in our findings, we do not want to imply that cis identities are stable and trans identities are in flux. Our findings suggest many open areas for research, and suggestions should be validated to determine how our findings can be put into practice.

5.1.2 Evolution of gender identity. Many participants remarked that their concepts of themselves have changed through their lives and transitions. Chris, a trans man, sees himself as fairly fluid. He said, *"Firstly I was transitioning to a position that was male, kind of more masculine, then I prefer to stay more in the middle."* In contrast, others have genders that have changed before physical

transition starts. For example, Emmett initially started identifying as nonbinary, then during the next five years shifted to different identities before realizing that he is a binary trans man.

Most participants did not view being trans as a qualifier of their gender. Aeden states, *"I identify as male. If I'm checking boxes and I'm given the option to also do trans male, I'll do trans male as well...but in my normal life, I don't identify as trans male."* However, a few are like Victoria who states that, *"I like to acknowledge at least that I am trans. I think that there is a certain difference between a natal female and someone like me. However, I never force that onto anyone else. I never think that someone else who is considered trans should not be considered fully female, it is just a separator for myself."*

As they learn more about their identities, the extent to which they identify transgender as an identity often shifts. For many, being transgender was very important to their sense of self but became less so over time. However, it is still an important part of their identity as Tommy says: *"There's no way I could live my life without having some type of reminder, even if it was to something as basic as every time I take off my shirt, I see scars. So I'm forever in this fight."* Alex put it well when he said, *"I think being trans is part of my experience. It's part of why I am in a sense. But it's not who I totally am."*

Being "trans enough" was also a prevalent topic of discussion. This feeling can be common for those who have claimed multiple different identities over time. For example, Emmett, who used to identify as nonbinary but now is a trans man, says that *"I've had an imposter syndrome about being like fake trans for the longest time, especially since my identity, as is common, waffled back and forth for a while.'* For Tommy, a black trans man, external judgment of his trans identity comes from occupying his racial identity: *"With colored, black and brown people the mantra is, 'you're too trans.' To people of color, I'm too trans because I might say I'm trans and I might have a trans flag somewhere. 'You're too trans. Put that away.' But if I'm in another one, I'm not trans enough. 'Where's your flag?'"*

Takeaway: Another difficulty that trans, especially nonbinary, people face is invalidation. This is "associated with higher levels of depressive and social anxiety symptoms" [33]. Invalidation exists within the community as well, as participants like Emmett and Tommy experienced. Our findings correlate with the intracommunity harms seen by Walker and DeVito [37].

Developers can better support the evolution of their users' gender identities and prevent invalidation by not making it difficult (e.g., requiring documentation or wait times) to change names, genders, and pronoun preferences on websites and apps, as this can reinforce the gatekeeping infrastructure [31] and reinforce the notion of being "trans enough." Being "trans enough" also depends on other intersecting identities, and comes with its own expectations.

Designing solutions for this can be challenging as there are multiple identities that co-exist with "trans" such as race, socioeconomic status, and body shape [37]. One way to address this is through the user model. If developers are using predictions based on user information, they should not make assumptions about the user's behavior or desires from demographic or gender info. As an example, when creating a user model, designers should avoid assuming that all transgender people are interested in activism or intend to transition.

Technologies for trans people should also allow room for unknowns for people who are still questioning their gender. Designers should not assume that everyone (cisgender or transgender) knows everything or has a fixed idea about their identity or expression. Technology should allow for fluidity in gender identity and expression by not restricting certain features or artifacts to a single gender option.

5.1.3 Medicalization of trans identity. Medicalization of trans identities is often the subject of online debate among the trans population. It is a double-edged sword as its premise excludes people who are not "trans enough" and therefore do not deserve gender-affirming care, while providing a way

for transgender people who "qualify" to access care through the usage of a normative transgender narrative [35].

Transmedicalism is the belief that being transgender depends on the dysphoria experience, and that any person who does not experience dysphoria, even if they do not identify with the gender they were assigned at birth, is not transgender. In other words, gender dysphoria is a (required) symptom of the condition of being transgender [31]. Colloquially, transgender people who subscribe to this school of thought are called *transmeds*.

Most of our participants are against transmedicalism due to their personal experiences. Andy said of their transition: *"I never saw it as this medical thing, although there are medical aspects to it."* Chainsaw expressed concern about transmedicalism, saying that *"the transmed thing is getting really big now and it scares me because all the kids are getting into it like a cult."* Other participants noted that this ideology is linked to the feeling of not being "trans enough."

However, for Tommy, looking at his transness as a medical condition provides a framework for disclosure: *"I always consider my transness as a medical condition. There is this issue I have, and now I take medications for it. I treat it as like I'm diabetic. I don't tell people I'm diabetic because what happens when you tell somebody diabetic? Now they're looking at everything that you eat. They're inserting themselves into your life where you fight them. So that's the thing about when you offer that information. Now they invite themselves into asking, "Oh, did you have this surgery?" This is when I will not disclose this. It's a very private disclosure."*

Takeaway: Transmedicalism is another example of intracommunity harm [37] as it reinforces gatekeeping and excludes much of the transgender population from accessing gender-affirming care. While it is a controversial topic, it is a form of sensemaking in that it provides a guide for transgender people for disclosure, seeking care, and understanding their identities. However, this is not the only form of sensemaking that transgender people can use. The use of narratives and viewing their growth as an evolution are other forms of sensemaking that our participants used as a form of identity construction [7]. More work is needed to fully understand the processes through which transgender people understand their identities and how it affects their care-seeking and decision-making processes.

In the meantime, designers should support sensemaking in identity construction, but should take care to avoid medicalizing trans identities when doing so. For example, while users such as Tommy may not mind this, if developed, transition-tracking apps should differ in aim and scope from apps that are designed for users to treat and manage diseases to better accommodate users like Andy and Chainsaw, who may be more focused on the social and legal side of transitioning and less (if at all), the physical and medical aspect. In addition, a way to support sensemaking could be to provide a map of potential actions a trans person could take, or to show a visualization that encourages reflection on the past but show an indefinite end as the user continues to evolve.

5.2 Transition

Our participants described multiple kinds of transition and how they approached them. We also discussed their technology usage and the way they find and manage information for their transitions.

5.2.1 Different kinds of transitions. Participants commonly distinguished between three types of transition: physical (or medical), social, and legal. Not all participants used the same terms, and not all participants pursued all three types. In addition, when participants used the term "transition," they may be referring to one type or all three together. Physical or medical transition refers to changing one's physical body. This can be done using HRT or surgery but may include other physical signifiers such as dress or binding one's chest. Social transition refers to the process of disclosure of one's transgender identity, of "coming out" to people in their lives. Legal transition

refers to the process of changing one's name and gender marker in official documentation such as passports, drivers' licenses, and birth certificates.

These types of transition do not move at the same pace. For example, Emmett started his social transition before his physical transition, since he came out to his friends and family before he started HRT: *"[I am] Pre-everything in physical transition, but [I have] social transitioned in every area where it's safe...All of my professors know me as Emmett... So do all of my friends and classmates who are aware of the fact that I'm trans."* However, it may be hard to quantify progress in social transition as opposed to physical transition.

Takeaway: Designers and researchers should not assume that transition is a single, simple process that, once completed, will never occur again. Instead, they should differentiate between different kinds of transition and keep in mind that not all transgender people aim to transition in all forms or at all. If designers wish to create a transition-tracking app, they should be mindful that this requires flexibility, departing from the traditional model of "living full-time" as one's gender before physical transition. Instead, designers should allow for users' transition goals even when they may seem unconventional. In the realm of tracking social transition, while there has been work done in quantifying social transition in the form of sequence of disclosure [19], more work is needed to investigate whether there is a correlation between the timing of different forms of transition in order to better understand the needs of this population.

5.2.2 Managing Information. We also asked participants how they managed transition- and gender-related information. This includes asking them about how they received such information, how they determined which pieces of information were reliable or not, and how they organized their documentation.

Marisa was very thorough in her quest for information when researching about surgery: *"I basically hunted down every article I could, went on an interview with a whole group of surgeons all up and down, east and west coast, read all I could find on transitioning and reached out to people I knew who had been transitioning, and asked for their opinions."* Chainsaw went a different route: *" I did a lot of research on YouTube because there used to be, there is less of it now, a really cool community of trans folks on YouTube — unfortunately a lot of them tended to go stealth and wiped everything and it's like that friend you have been talking to for 5 years and then you don't know where they are ever again."* For them, finding information on Youtube was not only about accessing information but also like checking on a friend's progress.

Many other participants utilized social media and online communities in their search for information. Six of the participants turned to academic sources. However, the method and purpose for approaching these sources and for what purpose varied. For Chris, Google Scholar was his first source for looking at the outcomes of transition to make sure his "investment" would pay off. Kieren, a graduate student, looks at meta-analyses because *"One or two studies are really not going to tell me much about the big picture. Usually what I'll look some sort of systematic review or something that will give me a bigger picture as to what's going on."* Toby comes from a medical research background, so they are able to access articles that are hidden behind paywalls. They said, *"I know the lingo and the jargon, so I would do things like read the standards of care from WPATH [World Professional Association for Transgender Health]. Like all other trans people, I had to teach all of my providers about trans care, even when I'm like 'Guys, it's actually not that complicated.'"*

Because there is often conflicting information presented from word of mouth or from online sources, we asked participants how they determined whether a piece of information was reliable or not. Our participants relied on multiple different methods. For instance, Keegan waited until he was able to get "strong recommendations" from people he knew before trusting a piece of information. For Chris and Victoria, the rigor of peer-reviewed articles were enough for them to

trust the information provided. If Chris could not find the information he needed, he refers to established websites such as ftmguide.org because it is an "actual organization." However, Chainsaw also references the same website and said that they do not trust the information provided from it due to personal experience. Victoria expressed concern over pseudoscience in the trans community, especially surrounding the effects of HRT, and Violet will try things herself to test the veracity of the claims she hears from her community if academic sources are not available.

Goose is the only participant who views his doctor as an ultimate authority. He asks his doctor to verify things he reads online. Emmett may ask his doctor, but he does not approach evaluating information in the trans healthcare context in the same way he does in other contexts. He says, *"Trans healthcare is one area where I'm more inclined to listen to anecdotal evidence than necessarily the mainstream medical documentation, because, for example, when it comes to something like damaging tissue prior to going into top surgery, advice from top surgeons would be medical stuff that I would absolutely find to be reliable because they do this all the time. I would still like to hear more from people who specialize in trans medicine because I find that trans people, including myself, are often reluctant to share more details about what they're doing regarding their transition if they don't think that their doctors are accepting."*

Kieren looks specifically for the opinions and experiences of people who are like him in terms of needs. For him, because he is 30 years old, physical transition affects him differently. For example, he speaks about the effects of HRT: *"Whenever I talk to somebody who started T [testosterone] later, usually the people that I have the same issues I have are older. You do voice training because T is not dropping my voice and I think that has to do with my age, because most people I talked to who had that issue are like in their late 20s or above. That's just anecdotal, but it's based on what I've seen...It honestly makes me feel bad about myself because all I can see out there is just this assumption that all you need to do is take testosterone or drop your voice. And for me, that's not the case is dropped my voice to a certain extent...You can go on the Internet and not find very much information at all about people saying they have to voice train on testosterone at all."*

Gabe also approached it similarly. For information on top surgery results, he was skeptical of the results he found in online forums: *"On forums, a lot of times I feel like in the trans community white trans people are kind of the pinnacle of it all, so everything's based on white people's results. And that's obviously not the case for the rest of us. I ran into this a lot on forums where people were mostly getting the keyhole surgeries. Because they were like 5'2 and one hundred and ten pounds and had zero breast tissue. So they didn't need to get surgery at all. These are the people that I was mainly seeing and this is not representative of any of us. So with someone like me who had tons of breast tissue and all these things, I know I can't get keyhole surgery or just exercise my pecs to not get surgery. So, yes, I feel like that was just unrealistic. So that's why I took it with a grain of salt because it just like wasn't representative of the majority of us."*

We also asked participants how they organized and tracked information for physical and legal transition. We purposely worded the question vaguely so that "information" can mean documents, record-keeping, or simply remembering to take HRT. Tobey organized information for their legal transition themselves: *"I ended up actually making a chart. Okay, these things are connected to what things? You have two state IDs and two federal IDs because you have Social Security and your passport, which is federal. And then you have driver's license and birth certificate, which is state based. And then, well, if you change your passport, does that mean that you have to change your gender marker with your insurance company? I figure out what benefits are attached to what I.D. and when I can change them."* Mari was also similarly very organized: *" I had a folder that I kept the relevant things in, like the notarized legal name change that I can send out or provide as needed. A lot of things like a passport or a driver's license and birth certificate were just kept in certain places. That was simple enough to go pull them out of the drawer they were in."*

However, Chainsaw commented that the way they organize information is impacted by their finances: *"I stay at one place until things are bad and that never lasts very long — planning doesn't really work in my life as I am too poor for it. I got a good idea of the next month and then who knows. In my pocket — I found my healthcare card today because I put on this jacket for the first time in a year."*

Takeaway: The transgender community lacks a centralized, reliable source of information with most community members performing their own research from a variety of sources. While researchers can aim to improve this by making their trans-related research more available for open access, more work is needed to investigate the role of grassroots information collection and barriers to successfully implementing a repository of centralized and reliable information for the transgender community. Other avenues for future work include investigating how to support the ways transgender people organize documents information for transition, and what attributes of this are shared or unique to this population.

5.2.3 Transition Timelines. Our participants' lived experiences challenge the normative transition narrative, whether that is about desire for certain aspects of transition, the notion that transition can be completed, and temporalities of transition.

Participants had various factors that they considered when deciding whether or not to pursue a particular part of transition. For Kieren, his life situation, finances, and emotional preparedness were the main factors: *" I want to get top surgery eventually, but it's not the biggest priority right now, because my wife is going to get pregnant soon. So I feel like I don't really have the emotional strength to deal with that kind of stuff...It's also stressful and gross for me...I'm just not emotionally or financially prepared to deal with that."*

For Violet, it was a matter of balancing her feelings of dysphoria with the risks of insurance denial and side effects: *"I definitely still have dysphoria. And I wish that I could do something about it, but it's a combination of trying to figure out what my insurance will cover. It will not cover every surgery out there. And like and even if it did, are the risks of side effects worth it? It's kind of just a huge cost-benefit analysis."*

Alex, similar to Violet, considered his dysphoria. However, for him it was more about personal comfort. He also took finances and his career trajectory into consideration: *"I've had top surgery and I want to eventually get bottom surgery. I understand that this is where I'm going to be for a while, but I'm working on that. And so I'm very comfortable where I'm accepting of the situation I'm in...So I want to get bottom surgery. But I understand now, like me going to school, me working, I don't have the financial stability or the resources right now to get bottom surgery or I'm not comfortable enough with how bottom surgeries we've got at the moment."*

External difficulties impacted many participants who experienced inconsistent access to hormones. Out of the eighteen participants who have taken HRT, 6 of them have experienced this difficulty. This can be for many reasons. One includes working with existing providers who did not provide hormones either in the proper dosage or at all (such as Chainsaw, Victoria, Kieren, and Violet), inability to get to pharmacies due to transportation difficulties (Chainsaw) or inability to take time off work (Keegan), finances (Keegan and Alex), and inaccessibility of a provider (Victoria).

Dee, when deciding whether they should take low dose T, considered how they would be perceived as a result of the physical changes: *"I don't really necessarily feel like I want to super be read as as male and questionably all the time. I don't feel like I want a beard and I don't necessarily feel like I need that sort of social messaging around my presence."* However, their reasoning was different when they decided whether or not to pursue top surgery. Instead of taking external perceptions into consideration, they considered their own perception of their body: *"I didn't feel upset by the sight of an un-flat chest...I just liked how my body looked better when it was flat."*

We also saw multiple conflicting viewpoints on whether transition can be completed. One narrative is that transition cannot be completed, expressed by Marisa: *"I don't think I will ever stop transitioning. I am a human and I will never stop transitioning, changing, growing"*. Marisa and others who agree with her see transition as part of a larger journey as a human which will not stop until death.

Tommy calls his transition a gender evolution: *"It's not something that starts and ends...I don't have any list of surgeries that I want to say I'm complete. No, I don't think of it that way...I feel like every single day I become."*

Hunter's notion of his transition is that it cannot be really finished. He says, *"I feel like I'm not going to progress anymore. Kind of unlike this medical scale where it's like, 'Are you finished yet?' What do you mean? Let's talk about that. But I feel like I'm kind of in a good spot. Like emotionally and physically to where it's like I'm comfortable with my body. And the only thing that we're kind of changing now is like we just changed my T dose because I've been on the same dose for like five years. So it's like that's the only thing. But I feel like I'm not done because you don't just finish being a person."*

However, other participants categorized their transitions as completed. Clay described his transition as *"basically complete. I haven't had bottom surgery and I don't intend to at this point. But I'm on testosterone and I've had top surgery and I'm pretty happy with that."* Note that Clay has not "fully transitioned" in the sense that he has not pursued all possible medical options for physical transition. Yet, he feels that his transition is complete by the virtue that he is satisfied with his body.

We caution against viewing transition as a series of discrete processes as this is not a universal narrative. Toby talked about their presentation as so: *"I don't really see it as being a linear process necessarily."* The lived experiences of trans people cannot be neatly categorized into a narrative of "I always knew I was trans" then seeking medical, then social transition, then legal transition, then blending in to the community. While it is true that many of our participants have gone through similar steps, this narrative relies on socioeconomic privilege to physically and legally transition, an accepting family, a large support network, and the ability to "pass" enough to "go stealth." However, most transgender people do not necessarily desire to go stealth.

Similar to this teleological narrative is the narrative that paints transgender people as a homogeneous population even within a single identity. An example is the narrative of being a "woman trapped in a man's body" [24]. Kimberly tells us how she was impacted by this narrative: *"[Learning that I was trans] was hard because I would see news reports or read articles about 'transgender' and none of their stories ever fit how I felt. The bulk of the types of stories are people that would be presented in the media of trans women who wanted to be June Cleaver. We're attracted to men and I wasn't attracted to men, and I thought maybe I'm just an effeminate male."* It was only when she joined an LGBTQ group at her workplace that she was able to access resources that allowed her to have a different understanding of trans identities.

Takeaway: We urge designers to challenge normative transition narratives. For example, if transition-tracking apps were to be designed, instead of operating with a linear process in mind, designers should make changes reversible and not force a specific sequence of stages. Furthermore, highlighting diversity in backgrounds and goals encourages different narratives and counters prevalent narratives that may be harmful to the community. Researchers should recruit more than a few participants of the same gender to ensure that diversity within that sub-population is more fully captured.

While it may be easier to design with a homogenous transgender population who aim to take clear, discrete, and sequential steps toward transition, the reality is that financial, socioeconomic, and racial differences result in a disparity in access to healthcare. For instance, when designing

transition-tracking technology, designers should keep in mind that HRT can stop and start, and that if someone has access to HRT, it does not mean that they will be able to stay on it even if they wanted to. Moreover, apps should be able to enable users to keep track of details such as dosage in order to enable users to track changes that they want to see. Furthermore, the goals for people who take HRT differ, and for users like Dee who want to take low-dose testosterone, more obvious physical changes are not desirable.

Our findings raise questions on what it means to track and manage data regarding transition if it is not a discrete process with a clear beginning and end. Designers of transition-tracking apps should consider what goals their users have in mind, whether that is to track specific and measurable milestones such as surgical procedures or legal name changes, or capture an overall transition process that may continue indefinitely.

5.2.4 Technology Usage. Twenty of the participants used apps to manage their health. However, the usage and diversity of these apps vary widely. For instance, Google Calendar was commonly cited because it allows users to set reminders for which days they were supposed to take hormones. Another popular group of technologies consist of health portals and telemedicine apps. Fitness apps were also commonly used.

However, only three participants used trans health-specific apps and all used voice training apps. Kimberly was part of a pilot test for a software program that would eventually become EvaApp, a voice training app [36]. According to many trans users of EvaApp, the costs of the voice lessons were prohibitively high. This especially impacts a number of users who are minors living in unaffirming households.

Chainsaw was the only participant who did not use any kind of health management technology: *"I have just never known of something that is applicable to me, I was thinking about using a period tracker for a while when I was getting period again and then I forgot about it until the period kept happening and then they stopped again so now they just need to stay gone."*

All participants are open to the idea of a trans health app, however. When asked for what they wanted to see, participants gave largely overlapping answers. The main features desired were information on where they can receive care, recommendations on which doctors are trans-friendly, a "trans Yelp" (Chainsaw), a trans-friendly business directory, information about transition and transition tracking (e.g. hormone levels, or a "command center" as Goose put it, or a place to view next steps in transition (Alex)), and a social support space for trans people to connect with each other

We also asked participants what concerns they had with using such an app, if it existed. Violet expressed concerns over privacy: *"One of my biggest concerns about technology and about apps is privacy from the government especially. I wish that platforms like Twitter and Facebook would care about protecting my information from government agencies who might request it, because currently the government in the US is pretty opposed to trans people. I worry about that a lot".*

Toby also discussed previous attempts to launch an app: *"It seems like every year or two there's some kind of grassroots attempt at creating a registry or a list of providers. But it's so scattered and very specific to a lot of areas...And because insurance changes for everybody, it also is really complicated."* These challenges are common, and are barriers to developing a comprehensive database of resources for the transgender population.

Takeaways: Participants explored and envisioned technologies to aid with information management and transition tracking. Many were open to new technologies, but some expressed apprehension that such attempts will not be followed through. This illustrates the self-help nature of navigating gender transition and healthcare. Designers can leverage participatory design and other methods in community informatics to promote community-based connections and work

towards a sustainable, comprehensive technology. If developers wish to release such applications, it is important to gain the trust of the trans population with a focus on security and personal agency in information management. Crowd-sourcing is a viable approach to creating a database of resources, but care should be taken to ensure the quality of the information.

Cost and access are also important factors especially for those who do not live in supportive households and for minors. Designers should also consider safety issues and take measures to prevent the release of sensitive information to those who might harm the user.

5.3 Dysphoria

We also discussed with participants about their experiences with dysphoria and how they mitigated it. While not all trans people experience dysphoria, all our participants have dealt with dysphoria in the past or the present.

5.3.1 Dysphoria experience. While an interoceptive, personal, and emotional experience, we narrowed down the dysphoria experience into six main categories based on our interviews. These experiences can be co-occurring or happen individually. Furthermore, a person can experience dysphoria differently depending on their circumstances or over time.

The first and most common dysphoria experience is the range of generality of sensations. Dysphoria can be experienced on a scale from "general discomfort" to a feeling of hyperfixation on a certain body part. Seven participants described feeling fixated on a body part and being unable to pull away their attention to something else.

Universally a negative experience, participants used different language to express their experiences. For Victoria, it manifested as more of an internal sensation *"like crawling out of my skin."* Participants also reported more explicit manifestations of negative emotions such as hopelessness, disgust, shame, and fear. Kimberly describes a particularly intense feeling: *"It's a really fundamental feeling of this is all wrong, I cant deal with this, this is terrible, I just want to cry and rip every hair out of my face and do something destructive. This thing somehow needs to change and I don't know how that is going to happen."*

Yet, these sensations cannot be labeled as simply depression or other illnesses although they can co-occur. The reason why many of our participants realized that they were transgender was because they sought out treatment for mental illness but did not experience relief from their dysphoria (e.g. Mari). In addition, others did not realize that their feelings were abnormal. For Clay, when he got his period, *"I would just be angry and depressed, but I thought that was normal."* Even after he sought treatment for premenstrual dysphoric disorder, the feelings did not go away.

The experience of dysphoria varies over time and can be episodic or constant. For example, Kieren experiences dysphoria *"pretty much every every day. But [it was] not as bad as it used to be, because I used to be really depressed to the point where I was having problems and getting out of bed before I was on testosterone...The severity isn't as bad, but I would say at least at some point throughout the day, I experience it."*

Takeaway: While often co-occurring with mental health issues, our participants consider dysphoria as a separate phenomenon. Designers of mental health tracking applications for transgender people must differentiate the two when asking for information about mental health.

5.3.2 Dysphoria triggers. Triggers can be separated into two main sources: physical or social. Bodies can be a source of dysphoria whether that is from one's body or another's body. Put another way, things associated with having a body such as menstruation, voice pitch and timbre, facial hair (or lack thereof), weight changes, or even looking in a mirror and noticing a body part can trigger dysphoria. For Chris, it manifested as a type of fixation: *"If I am feeling bad about that part of my*

body, I will look in the mirror and I feel like oh my God, I am seeing myself like having bigger breasts and I do actually have."

Social experiences that can trigger dysphoria include being misgendered (i.e., others using the wrong pronouns to refer to a trans person), not receiving social support, and invalidation. For Chris, even being in his hometown can be a trigger that caused him to *"feel like a girl."* For Aeden, noticing the differences in behavior between himself and cisgender men would trigger his dysphoria.

For Kieren, Emmett, and Dee, being misgendered felt worse when it came from someone whom they have disclosed their pronouns to. Kieren explains, *"Another thing about being misgendered that is important, is it almost confirms anything I already feel about myself. So it's like not only do I look at myself and think that I look a certain way, everybody else in society is confirming that it's actually true. That can make me feel even worse about myself."*

Emmett agrees and explains it like so: *"It's especially disheartening when someone already knows and misgenders me unintentionally but honestly at this point. I feel like I'm getting fed up with my dysphoria and it's pretty constant everywhere. The level of distress I feel when someone misgenders me. And it's like there's that huge misconception that trans people are super offended when you misgender them, when it's just discomfort. Like I get very uncomfortable and I really appreciate it when people correct themselves instantly."*

Takeaway: There are a few ways that designers can avoid misgendering users as it may trigger or worsen dysphoria. The type of dysphoria designers should focus on is social dysphoria, which can be triggered by misgendering or by grouping the user with a gender which they do not identify. For example, designers should avoid using pronouns or suggest gendered products to users. This can be done for all users, whether cisgender or transgender. Designers should also give users more agency to be able to filter out potentially triggering contents in social media feeds (such as the ability to avoid transphobic content).

5.3.3 Dysphoria relief/management. The vast majority of our participants used mental coping skills to manage their dysphoria. Nineteen participants described using some mental techniques to alleviate their dysphoria. Self-talk was the most popular coping method with ten participants mentioning that they used it. Keegan used self-reassurance as a stopgap measure when he was not able to have top surgery immediately *"Even if I am not where I imagine I am at, I am man enough for me, and happy enough with where I have gotten. [This] helps me be patient for top surgery."*

Six participants mentioned that they have tried distraction and ignoring their dysphoria. For Chainsaw, however, this did not prove to be very effective. They said *"I try to not think about it until there is something I can do about it but it just goes on for a while until nothing ever gets resolved."* For Toby, conversely, distraction via exercise works: *"Probably the best way for me was to find ways to move my body because I was like, 'Oh, right, my meat suit has a purpose.' It goes places. It moves me places. It can be strong and take me from here to there. It can lift things and put them down. Having a purpose for it made it feel a little bit less like a cage."*

Other mental dysphoria relief methods include therapy (5), social support and validation (5), mindfulness/recognizing and accepting dysphoria for what it is (4), and seeing representations of other trans people (2).

A sense of agency can also help dysphoria relief. For Aeden, who has made the decision to not have bottom surgery, reminding himself of the choices he have made helps relieve bottom dysphoria: *"Because I've made the choice that there's nothing that I want to do about it. It makes the default dysphoria a little bit easier to manage just because I made the choice that I don't want to change that. And so it's usually relatively short lasting."*

Fourteen participants discussed physical means to reduce their dysphoria. Here, we define physical means as temporary or permanent changes to the body. Note that we only included means such as transition and HRT when they are explicitly mentioned as tactics to reduce dysphoria.

Along the methods that align with physical transition, seven participants noted that the physical changes from HRT reduced or eliminated their dysphoria. However, not all changes affected each person equally. For instance, for one trans man, the loss of his menstrual cycles reduced his dysphoria, while for another nonbinary person, it was the fat redistribution associated with testosterone. Another three participants mentioned that surgery partially or completely reduced their dysphoria. Finally, another two participants mentioned "medical transition" in general as being beneficial for dysphoria management.

Other physical means of reducing dysphoria include using packers or stand-to-pee (STP) devices (4), binding and chest compression (3), presenting as their gender (2), hair removal (2), self-harm (2) exercise (1) and voice training (1).

Not all physical means were helpful. For example, both Keegan and Alex self-harmed in the past as a way to cope with dysphoria. However, they were able to stop after getting therapy and obtaining another outlet for their feelings.

Other dysphoria management methods such as binding and chest compression can also come with dangers. For instance, Keegan used to bind with duct tape, which is not recommended by health professionals or most of the trans community. Chainsaw, although they used commercially produced chest binders, also struggled: *"I lately have been going 12 hours or more because I got used to never really taking off the tape so then I am like ohh that pain I am feeling — hey remember to breathe."* Members of the community who have pre-existing health problems may not be able to safely manage their dysphoria using these methods even when executed safely.

We also asked participants how they navigated safety and harm in their dysphoria management methods. Participants talked about how they determined whether a particular method of coping with dysphoria was safe. Their answers followed a common theme, with asking themselves questions such as: *Does it worsen my condition? Does it cause physical harm? Does it minimize negative consequences and maximize positive consequences?* Some participants such as Alex had coping methods that they knew to be dangerous, such as drugs and alcohol.

When dysphoria management is effective in the long term, it can help bring gender euphoria. We followed up with Emmett a few months after his initial interview. He had started taking testosterone for the past few months and said, *"I feel fantastic and I'm already having rapid changes. I truly feel like I'm experiencing something I missed out on at thirteen or so. It is hard to describe, but incredibly fulfilling."* The most effective way to reduce dysphoria is through transitioning, as any other approach is a short-term solution.

Violet also learned to appreciate trans bodies in her quest to manage her dysphoria: *"The other thing that has helped a lot is learning how to admire other trans people's bodies and see other trans people and be like, 'Oh, that person actually looks cool,' even though they look trans. They look like someone who I could be happy being. Basically having trans role models and not necessarily like celebrities or anything like that. But just like even just like trans friends who I think have a lot of confidence or who love themselves."*

Takeaway: Dysphoria management can be a part of health management for transgender people who experience dysphoria. Here, we provide suggestions for designers who wish to support transgender people's dysphoria management. These dysphoria management methods vary with each individual, and some methods that prove to be helpful for one can be harmful for another. In designing technologies that help with dysphoria management, designers should give users control over what kind of content they wish to see. However, not all dysphoria management methods are beneficial, and some are actively harmful. Such forms may include digital [26] or physical self-harm.

In addition, physical dysphoria management methods, while the most well-known, are not the be-all-end-all and can come with risks, such as binding for too long. Thus, dysphoria support cannot rely on physical dysphoria relief alone, particularly with disparate accessibility to medical transition. Although many methods of managing dysphoria include changing the person's physical features or presentation, it is important to note that not all methods of altering physical appearance are necessarily for dysphoria management.

It is important that trans users are presented with multiple customizable options for dysphoria management and not just physical methods. Furthermore, presenting multiple options would help users feel a greater sense of agency over their ability to manage their health.

While we introduce a few categories of dysphoria management, an open area for investigation is the development of a framework that takes into account the different types of dysphoria experiences. This framework could account for the difference between (or overlaps with) physical methods of dysphoria management and physical presentation and how it relates to safety and harm, both online and in real life. It could investigate physical presentation online (such as in social media) versus in real life, and the role that technology can play in preventing or mitigating digital self-harm. Another facet could be gender euphoria and its relationship to dysphoria management or the presence of dysphoria or lack thereof.

6 DISCUSSION

Our results show the lived experiences of our participants and illustrate many concepts found in transgender studies. However, our suggestions should be validated to determine how our findings can be put into practice. In the following sections, we note some of the more prevalent intersections between our work and transgender studies, especially regarding Eli Clare's, Dean Spade's, and Evan Vipond's works. We also further discuss the themes of gender fluidity and gender evolution, and our limitations and positionality.

6.1 Medicalization and Transnormativity

Spade notes for a trans person, whether they are trying to do an everyday task such as using a public restroom or something less common such as going to court, medical evidence determines the extent of their rights. Medicalization creates a false dichotomy of "trans" and "not trans", as if such categories can be so discretely defined. It poses the end goal of transitioning as entering "real manhood" or "real womanhood". Spade calls for self-determination, demedicalization, "deregulating gender", an "end to practices that coerce people into expressing gender identity through a narrowly defined binary", and "a commitment to gender self-determination and respect for all expressions of gender."

Eli Clare similarly addresses medicalization by situating both trans and disabled experiences, and notes that for both communities, the current system focuses on "cure" rather than addressing the lack of accessibility or the structures that affect this access. He explores multiple models of making sense of transness, from the prevalent medical model that transness or even dysphoria is a disease to be cured, gender dysphoria as a disability, to transness as a "nonpathologized body-mind difference" [9].

Clare poses that dysphoria is not a symptom or a disease in a transgender person, but an indicator of a world that makes it a problem by denying and invalidating trans realities. He also recognizes the temptation of the promise of "cure" from the medical-industrial complex makes, as it assures that there will be complete wholeness even in the face of current transphobic society is unrealistic and often untrue. The very system that creates the sense of shame, "hooks us" into cure [9].

Much of our work echoes Vipond's concept of transnormativity, especially when our participants expressed their feelings of not being "trans enough." Essentially, transnormativity is the standard, or the assumption that there is one, of transness. Those who achieve that standard, which conforms to society's expectations of what it means to be of a certain gender, can access medical and legal transition, while those who are not, cannot. Transnormativity can benefit those who fall within its limits, but for those who may not be "acceptably trans" (i.e., those who do not conform to these standards due to their race, class, gender variance, disability, or a combination of these and other factors), transnormativity is harmful because it "delegitimizes" their experiences and removes access to care.

Spade's, Clare's, and Vipond's work greatly overlap in that they all explore the paradigms of transness and what it currently means to be trans, and what it could mean in the future. In applying their work, we urge designers to ask themselves whether the technologies they aim to develop, no matter how well-meaning, reinforces medicalization or the system that it depends on. For instance, designers should ask whether it is even necessary to collect information about gender or to classify certain features based on gender. Designers should question their own assumptions on what "counts" as trans, and what "counts" as something that belongs to a certain gender. Self-determination is one of Spade's praxes when it comes to resisting medicalization, thus, designers can ask themselves how are they supporting users' self-agency when using these apps.

Designers should also shift from the medical model when approaching transness, and think about what it means for a piece of technology to be a "cure" or not, and what the promises they may be making are. Because of the prominent paradigms of disease and cure in the current society, designers should be aware of any preconceptions they may hold about transness even if they are transgender themselves, and seek to challenge or at least question them.

6.2 Limitations

While we have attempted to center trans experiences in our work, we do have some limitations that may reduce the impact of our work. Our primary limitation is geographic. All of our participants are located in America, and thus navigate American systems. Thus, our results are Ameri-centric and not all findings will apply to the international transgender community, or to those with genders beyond "trans/nonbinary" categorizations. While we made steps to capture the diversity of trans experiences when it came to age and class, because the majority of our participants were white and all were American, we did not fully address the experience of the trans community of color, nor the international trans community.

6.3 Researcher Positionality

This research is motivated by improving trans lives and access to health. The first author is a nonbinary transgender person and uses they/them pronouns. They are in the process of physical transition and have been involved in the trans community for over 6 years. This is their first research project involving the trans community. Both authors aim to represent trans issues to the best of our abilities while rejecting the notion of exclusionism and transmedicalism and operating from an inclusive, intersectional framework. However, the authors and participants are based in the United States and thus our views are American-centric and do not necessarily reflect transnational perspectives.

7 CONCLUSION AND FUTURE WORK

Through interviews with 21 transgender people, we have expanded current knowledge and gained insights about trans people's self-concepts, transition, and dysphoria management. These insights are useful for healthcare professionals and those who are developing health-related technologies for the transgender population. From our findings, we cannot endorse a one-size-fits-all approach to transition and dysphoria management. However, we do highlight major areas of overlap and contention regarding transition.

We have also focused on gender dysphoria and dysphoria management. However, not all trans people experience dysphoria, hence a potential avenue for future work is exploring the needs of nondysphoric trans people, and how gender euphoria factors into transition. For instance, the difference between dysphoria management and things that elicit gender euphoria can be investigated. We have introduced a physical/mental dysphoria relief categorization, but work remains to refine this into a more comprehensive framework that takes into account social context more fully.

ACKNOWLEDGMENTS

We would like to thank Thomas Malley, Sophia Abraham, Jianing Li, and Bhakti Sharma for providing feedback on the formation of the study. We would also like to thank Sophia, Jianing, and Bhakti for assisting with the transcription and coding of the interviews, and The LGBTQ Center of South Bend for allowing us to use their space for interviews. Finally, we are grateful to the reviewers and chairs for their time and effort.

REFERENCES

[1] Alex Aslam Ahmed. 2017. Trans Competent Interaction Design: A Qualitative Study on Voice, Identity, and Technology. *Interacting with Computers* 30, 1 (2017), 53–71.
[2] Alex Aslam Ahmed. 2020. *Community-based Design of Open Source Software for Transgender Voice Training*. Ph.D. Dissertation. Northeastern University.
[3] Dr. Boo Apps. 2019. *TransTracks*. TransTracks.
[4] American Psychiatric Association et al. 2013. *Diagnostic and statistical manual of mental disorders (DSM-5®)*. American Psychiatric Publishing, Washington, DC.
[5] Toby Beauchamp. 2019. *Going stealth: Transgender politics and US surveillance practices*. Duke University Press, Durham, NC.
[6] Diana Beirl, Anya Zeitlin, Jerald Chan, Kai Ip Alvin Loh, and Xiaodi Zhong. 2017. GotYourBack: An Internet of Toilets for the Trans* Community. In *Proceedings of the 2017 CHI Conference Extended Abstracts on Human Factors in Computing Systems*. ACM, Denver, CO, 39–45.
[7] Shelley Bird. 2007. Sensemaking and identity: The interconnection of storytelling and networking in a women's group of a large corporation. *The Journal of Business Communication (1973)* 44, 4 (2007), 311–339.
[8] Chrysalide. 2020. *Trans Memo*. Trans Memo.
[9] Eli Clare. 2017. *Brilliant imperfection: Grappling with cure*. Duke University Press, Durham, NC.
[10] Aiden Collazo, Ashley Austin, and Shelley L Craig. 2013. Facilitating transition among transgender clients: Components of effective clinical practice. *Clinical Social Work Journal* 41, 3 (2013), 228–237.
[11] Crowdbotics. 2020. *Solace LGBT*. Crowdbotics.
[12] Cecilia Dhejne, Roy Van Vlerken, Gunter Heylens, and Jon Arcelus. 2016. Mental health and gender dysphoria: A review of the literature. *International review of psychiatry* 28, 1 (2016), 44–57.
[13] Jack Drescher and Jack Pula. n.d.. Expert Q & A: Gender Dysphoria. https://www.psychiatry.org/patients-families/gender-dysphoria/expert-q-and-a.
[14] William C Goedel, Sari L Reisner, Aron C Janssen, Tonia C Poteat, Seann D Regan, Noah T Kreski, Gladyne Confident, and Dustin T Duncan. 2017. Acceptability and feasibility of using a novel geospatial method to measure neighborhood contexts and mobility among transgender women in New York City. *Transgender health* 2, 1 (2017), 96–106.
[15] Amy Gonzales and Nicole Fritz. 2017. Prioritizing Flexibility and Intangibles: Medical Crowdfunding for Stigmatized Individuals. In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*. ACM, Denver, CO, 2371–2375.

[16] Ivor Goodson. 2001. The story of life history: Origins of the life history method in sociology. *Identity: An International Journal of Theory and Research* 1, 2 (2001), 129–142.
[17] Oliver L Haimson, Avery Dame-Griff, Elias Capello, and Zahari Richter. 2019. Tumblr was a trans technology: the meaning, importance, history, and future of trans technologies. *Feminist Media Studies* 0, 0 (2019), 1–17.
[18] Oliver L Haimson, Dykee Gorrell, Denny L Starks, and Zu Weinger. 2020. Designing Trans Technology: Defining Challenges and Envisioning Community-Centered Solutions. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. ACM, Honolulu, HI, 1–13.
[19] Oliver L Haimson and Tiffany C Veinot. 2020. Coming Out to Doctors, Coming Out to "Everyone": Understanding the Average Sequence of Transgender Identity Disclosures Using Social Media Data. *Transgender Health* 5, 3 (2020), 158–165.
[20] Ipkearns. 2019. *Binder Reminder*. Binder Reminder.
[21] Shanna K Kattari and Leslie Hasche. 2016. Differences across age groups in transgender and gender non-conforming people's experiences of health care discrimination, harassment, and victimization. *Journal of Aging and Health* 28, 2 (2016), 285–306.
[22] Os Keyes. 2018. The misgendering machines: Trans/HCI implications of automatic gender recognition. *Proceedings of the ACM on Human-Computer Interaction* 2, CSCW (2018), 88.
[23] Ilan H Meyer, Taylor NT Brown, Jody L Herman, Sari L Reisner, and Walter O Bockting. 2017. Demographic characteristics and health status of transgender adults in select US regions: Behavioral Risk Factor Surveillance System, 2014. *American journal of public health* 107, 4 (2017), 582–589.
[24] Joanne J Meyerowitz. 2009. *How sex changed*. Harvard University Press, Cambridge, MA.
[25] MyTransHealth. 2019. *MyTransHealth — What's right for you*. MyTransHealth.
[26] Jessica Pater and Elizabeth Mynatt. 2017. Defining digital self-harm. In *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*. ACM, Portland, OR, 1501–1513.
[27] Sarah Peitzmeier, Ivy Gardner, Jamie Weinand, Alexandra Corbet, and Kimberlynn Acevedo. 2017. Health impact of chest binding among transgender adults: a community-engaged, cross-sectional study. *Culture, health & sexuality* 19, 1 (2017), 64–75.
[28] Katherine Rachlin. 2018. Medical Transition without Social Transition: Expanding Options for Privately Gendered Bodies. *Transgender Studies Quarterly* 5, 2 (2018), 228–244.
[29] Refuge Restrooms. 2019. *Refuge Restrooms*. Refuge Restrooms.
[30] Morgan Klaus Scheuerman, Stacy M Branham, and Foad Hamidi. 2018. Safe spaces and safe places: Unpacking technology-mediated experiences of safety and harm with transgender people. *Proceedings of the ACM on Human-Computer Interaction* 2, CSCW (2018), 155.
[31] Sarah L Schulz. 2018. The informed consent model of transgender care: an alternative to the diagnosis of gender dysphoria. *Journal of humanistic psychology* 58, 1 (2018), 72–92.
[32] Denny L Starks, Tawanna Dillahunt, and Oliver L Haimson. 2019. Designing Technology to Support Safety for Transgender Women & Non-Binary People of Color. In *Companion Publication of the 2019 on Designing Interactive Systems Conference 2019 Companion*. ACM, San Diego, CA, 289–294.
[33] Rylan J Testa, Janice Habarth, Jayme Peta, Kimberly Balsam, and Walter Bockting. 2015. Development of the gender minority stress and resilience measure. *Psychology of Sexual Orientation and Gender Diversity* 2, 1 (2015), 65.
[34] Tobey Tozier and Elden Seropian. 2020. *Transcapsule Transgender Transition Tracking App*. Pronounced[Human] LLC.
[35] Evan Vipond. 2015. Resisting Transnormativity: challenging the medicalization and regulation of trans bodies. *Theory in Action* 8, 2 (2015), 21–44.
[36] Exceptional Voice. 2020. *EvaF*. Exceptional Voice.
[37] Ashley Marie Walker and Michael A DeVito. 2020. "'More gay'fits in better": Intracommunity Power Dynamics and Harms in Online LGBTQ+ Spaces. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*. ACM, Honolulu, HI, 1–15.