Bushwhacking Through Expectations: A Critical Analysis of Body Inclusivity in the Hiking App AllTrails

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Abstract

Technology for outdoor recreation, like the hiking app AllTrails, can improve access and safety for hikers. However, these tools can also negatively impact hikers on the trail, for example, by distracting them from experiencing nature. Using the walkthrough method, we critically evaluate the hiking app AllTrails to uncover implicit values underlying the app's design and features, using a body-inclusive lens inspired by the community group Fat Girls Hiking. We found that AllTrails subtly nudges users towards a more fitness-oriented approach to hiking. This orientation may negatively impact novice hikers and those who are already marginalized in the hiking industry and we suggest alternative designs that could promote greater inclusivity.

CCS Concepts

• **Human-centered computing** → **Walkthrough evaluations**; **Field studies**; **HCI theory, concepts and models**.

Keywords

Hiking, Outdoor Recreation, Outdoor Computing, Mobile Applications

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1 Introduction

In the domain of outdoor recreation, and hiking specifically, HCI research has considered how technology can best assist hikers (e.g., wayfinding, activity tracking, etc.) without distracting them from experiencing nature on the trail [5, 24, 30]. AllTrails is a leading mobile application for hiking, with over 75 million reported users [2, 32]. Founded in 2010 in Silicon Valley, AllTrails markets itself as a tool for hikers of all levels to "find your outdoors" [32]. However, its design features and public statements from company leaders hint at a view of hiking that is more aligned with health and fitness than connecting with nature [11, 32]. For example, its interface has been compared to that of fitness apps Peloton and Strava [32] and in 2018, then-CEO of AllTrails, Jade Van Doren, said of his role at the company "I enjoy waking up in the morning and knowing what we are building is helping people live healthier and more active lifestyles" [11]. Indeed, the "health culture" of Silicon Valley may influence the app's underlying values [14].

In this work, we conducted an analysis of the AllTrails app, informed by Light et al.'s [23] walkthrough method, to understand how the app's design embeds certain values and expectations of its users, thereby shaping users' experience on the trail. In this research, we aim to explore how AllTrails makes individuals feel while engaging with nature. To anchor our analysis and uncover how standardized norms of hiking, athleticism, health, and bodies are articulated within AllTrails' infrastructure and design, we began to introspect on three overarching questions:

(1) What is a successful hike according to AllTrails?
(2) What kinds of people and bodies are included in the narrative of hiking?
(3) What norms regarding hiking, athleticism, health, and bodies does AllTrails reinforce?

These questions guided our walkthrough and analysis, helping us draw out embedded sociocultural narratives and evaluate AllTrails as a sociotechnical artifact. We analyzed the AllTrails app's interface, features, and user flows, including use of the app's navigation feature on six hikes across three different trail ratings (easy, moderate, hard). We surface how the app's design enforces expectations of fitness and athleticism, subtly pushing users to complete challenging hikes at a fast pace.

We close by drawing from the theoretical lens of body inclusivity based on the ideology of *Fat Girls Hiking (FGH)*, a movement rooted in values of inclusivity and accessibility in the outdoors for people

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of all body types, ages, races, ethnicities, religions, classes, abilities, genders, and sexual identities [26]. Specifically, FGH was founded to "create a space where fat and marginalized folks can come together in community to create safer spaces in the outdoors" [26, p.23] and state that their goal with hiking is "to connect with ourselves, with each other, and with nature" [26, p.48]. Drawing from FGH, we suggest an alternate ethos that may inform future, more accessible and inclusive, hiking applications.

2 Background: Hiking and Outdoor Recreation in HCI

HCI researchers have long concerned themselves with how and why people use interactive computing devices for outdoor recreation, and how these technologies can aid engagement with the outdoors, rather than distracting from it [5, 6, 17, 18, 24, 30]. Early work in HCI on location-based navigation systems for hiking identified the following key features prioritized by users in app design: hiker location; actual route taken; route planning; adding interesting places to map; weather info; friends' location, routes, and points of interest; and common routes and attractions [36]. Later work in HCI has explored hiking and outdoor recreation technology design grounded in values such as motivation [12, 18], performance improvement [9], body awareness [9], safety [12, 13, 18, 19, 22], community [20, 24], reflection [10, 27, 31], experience [7, 18, 31, 37, 38], well-being [6], emotional impacts [33], solitude [30], education [21, 31], and sustainability [5, 15, 34, 37]. Prior work has also explored the role that experience level plays in hiking and outdoor recreation technology, leveraging experts' data for trail curation [12], characterizing the changing expertise of hikers embarking on extensive thru-hiking [20], and designing for specific needs of novices to outdoor recreation with the aim of lowering barriers to entry [9]. Hiking is sometimes categorized in HCI research as sport, with associated values of exercise, fitness, and physical performance as a goal or motivation for hiking [25].

Prior work in HCI has considered designs for hiking and outdoor recreation that use personal data tracking for aims other than self-improvement and fitness. [27, 30]. For example, Odom et al.'s Capra hiking camera and personal tracking designs center "open ended (versus goal directed) experiences — moments of noticing, revisiting, contemplating, and exploring — and how these kinds of experiences might cumulatively shape a person's orientations to hiking in nature" [27, p.2]. These designs were also grounded in an ethos of slow technology, a design orientation that counters traditional, neo-liberal goals of technology such as efficiency [16, 27]. Instead, slow technology is oriented around encouraging reflection [16]. Similarly, Posti et al.'s HOBBIT app centers around solitude, helping users to avoid encounters with other hikers on the trail [30]. In their survey of hiker motivation, they found that the top motivation respondents gave for hiking was enjoying nature (47%), followed by physical exercise (38%), relaxation (25%), and fun (14%), challenging views of hiking that center the experience primarily around exercise and fitness [30].

Researchers have also considered technology for outdoor recreation with a focus on accessibility [3, 4, 6, 29]. For example, research focused on accessibility has developed mobility aids for outdoor recreation [3, 29]. Others have imagined alternate approaches, like point-of-view camera feeds of outdoor recreation for those unable to physically engage [6]. Some have highlighted how outdoor recreation poses unique challenges for accessibility, due to the unpredictability and risk inherent to this context [4]. In a study with blind and partially sighted people, Bandukda et al. [8] identified challenges for engaging with outdoor recreation throughout all stages, such as planning, access, engagement, and sharing. For example, limited information posed challenges to planning while poor navigation systems created barriers for access and engagement. From these findings, Bandukda et al. [8] developed a framework for understanding leisure experiences of blind and partially sighted people, termed PLACES, incorporating all of these stages (PLanning, ACcess, Engagement, Sharing). By using theory embedded in the FGH movement, we reflect on the current practices promoted by apps for hiking to study the ideas of accessibility from a body-inclusive perspective, taking into account different body sizes and neurodivergent needs. We align our work with this intersection of outdoor recreation and accessibility as we examine how AllTrails perpetuates body expectations and norms that may impair disabled hikers' experience, and suggest alternate designs that center accessibility and inclusivity.

3 Methods

Our methodology employed a modified **walkthrough method,** inspired by Light et al. [23], focusing on step-by-step observation and documentation of the app's interface, features, and user flows. This work further draws upon O'Neill et al.'s implementation of the walkthrough method for critical analysis of food tracking apps [28].

The walkthrough method consists of understanding the app's "environment of expected use" and then conducting a technical walkthrough of the app's interfaces for registration, daily use, and suspension of use. The environment of expected use is defined by Light et al. as "how app provider anticipates it will be received, generate profit or other forms of benefit and regulate user activity" [23, p. 883]. As O'Neill et al. describe, establishing the environment of use "positions an app within its socio-economic and cultural context" [28, p. 4] by evaluating its vision, operating model, and governance. To establish the environment of use, we began by documenting user flows of the app (Figure 1), paying attention to the organization of the app's interface as well as its features, textual content, tone, and symbolic representations. We then conducted the technical walkthrough of the app through first-hand use of the app to identify, navigate, and reflect on hikes. In our work, we focus on the technical walkthrough of the application during daily use, including during hikes. The first and second authors each took three hikes, one in each difficulty rating established by AllTrails: easy, moderate, and hard. We took screenshots of relevant interfaces, recorded voice memos, and wrote fieldnotes to document the experience of use.

We analyzed screenshots, voice memos, and fieldnotes recorded during the technical walkthrough using an inductive thematic analysis approach. We uploaded screenshots and fieldnote/voice memo transcripts into the virtual whiteboard platform FigJam and annotated the data to iteratively code and construct emergent themes.

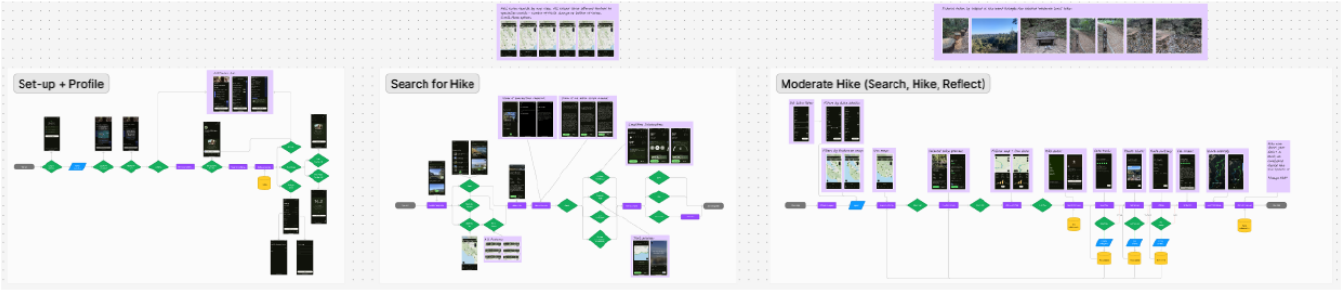

Figure 1: We mapped the AllTrails user flow as part of our analysis of the app's environment of expected use

The research team acknowledges the importance of positionality in shaping the analysis. Each researcher's background and lived experiences informed the study's framing. The researchers conducting this work have a wide range of experience with hiking and have different accessibility needs. These accessibility needs range from neurodivergent needs to mobility impairments such as chronic pain. As FGH's work understands the multiple accessibility needs of users through its body inclusivity framework, we include both neurodivergent needs and physical needs in our analysis.

4 Findings: Analysis of Trail Experience With AllTrails

The two researchers who completed technical walkthroughs during hikes hold a variety of experiences, disability needs, and alternative strategies while engaging in hiking. Author 2 has multiple years of experience, hiking at least once a month for the last five years. Author 1 is a novice hiker who has begun hiking over the past few months. Each has developed hiking strategies for their individual needs, with author 2 preparing for hikes in ways that accommodate and reflect her anxiety disorder, and author 1 engaging in hikes based on her ADHD needs and physical limitations (breathlessness, physical fatigue). Thus, we see divergent approaches to hiking in their field notes. Author 2 has more clarity regarding her preferred distance, time estimates, and overall expectations of the hike experience. Author 1's lack of experience and limited access to transportation meant she depended on the trail details provided by AllTrails based on her location and transportation needs. Despite their differences, both researchers noted some similar difficulties navigating the AllTrails interface. Below, we unpack these issues across stages of hiking, including trail identification, experience, and completion.

4.1 Trail Identification: Rating Systems vs Reviews

Both researchers relied on AllTrails to choose trails, often informed by the rating systems of AllTrails. Author 1 and 2 prioritized different aspects of the hike during the selection process. On one hand, author 2 used filters (Figure 2) to narrow down her options based on her needs regarding distance and time estimates. She explains, *"I know how I feel at the 6-mile, 8-mile, or 10-mile mark. I know what 500 feet of elevation gain feels like when it's condensed into a .5 mile stretch, or spread out across 4 miles."* - Author 2's field notes. On the other hand, author 1 trusted AllTrails' ratings and hadn't noted her preferred distance or times in her previous hikes, instead choosing trails based on transportation needs. For example, *"Since I could not plan a hike with friends, I decided to navigate the app by gauging which trek could be hiked using public transportation and was easy so I could also travel back."* - Author 1's field notes. Author 1 often selected a hike the night before with transportation considerations in mind. However, due to the app's dynamic algorithm for trail recommendations, author 1 often could not find the selected hike when searching again at the bus stop, forcing her to start from scratch to identify another trail and bus route at the last minute. Additionally, author 1 did not expect to complete trails, while author 2 used AllTrails' time estimates (Figure 3) because she wanted to complete the trails—to summit and see the views. Both researchers felt the easy and moderate trail ratings were hard to gauge; easy trails could range from 1–20 miles according to the app. Similarly, moderate trails did not appear to take important geographic features into account in the rating, like water bodies and detours. Due to this, while the ratings were intended to be a helpful feature, they often misdirected the users when they selected a trail for their hikes.

Both researchers found reviews to be valuable in choosing and preparing for a hike. Reviews were most valuable when they would explain problems with a route like a closure, fallen trees, or other variables that the app could not update in the trail description immediately. Author 1 and 2 noted that reviews on easy or moderate trails often described how easy the trail was, bringing children on the trail, or how it was good to break a sweat or get their steps in. Author 2 noted one, "*If you're in good shape, this shouldn't be too too bad of a hike.*"- Trail review quoted in author 2's field notes. Yet, such reviews were misleading for users across a divergent set of needs. For example, author 1 noted while walking on an "easy" trail that the route was heavily used for commuting to different IT companies in the city, leading to bikers dominating the trail, thereby providing little space for walking at a pace she found comfortable while dodging bikers.

The hard trails, in contrast to the moderate and easy trails, were easier to gauge accurately using the provided rating systems and reviews. Both researchers found the long distance and extreme elevation metrics of trails logically mapped to the ratings. Similarly, while reviews under easy or moderate ratings seemed to have a disregard for hiker comfort, reviews for challenging trails seemed more accurate, describing how steep the inclines would be or how water was essential, and explaining how hikes could be used to

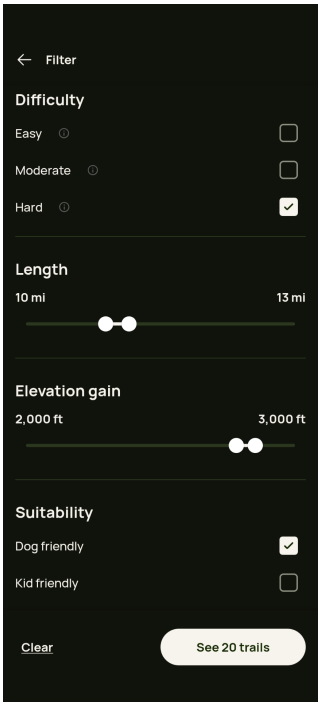

Figure 2: Filters in AllTrails.

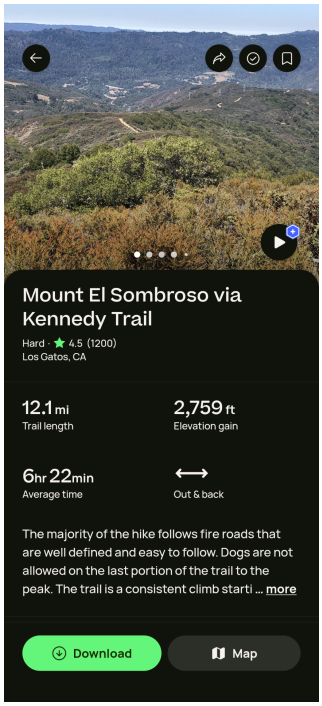

Figure 3: A trail listing in AllTrails.

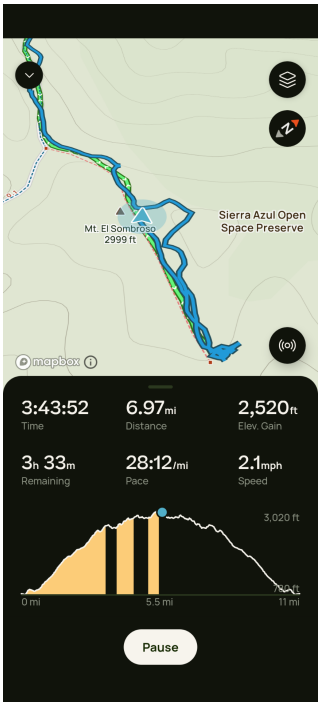

Figure 4: The navigation tool in AllTrails. As a user completes the hike, distance, elevation, and time estimates in the navigation tool update in real time.

train for longer hikes. The reviews did not focus on minimizing the difficulties of the hikes but provided suggestions to help users prepare for the hike. This shift in description and expectations helped author 1 and 2 more effectively prepare themselves when attempting hard trails.

4.2 Trail Experience: Navigation Tools vs Trail Realities

Once the researchers identified the hikes and reached the trails, they were aided by AllTrails' navigation tool (Figure 4) to complete them. AllTrails' navigation tool loads a map of the planned trail and uses the user's location data to map their actual route, estimated elevation gain, and distance traveled thus far. Unfortunately, while the navigation tool was valuable for the researchers to stay on the trail, it also led to increased anxiety, panic attacks, and physical difficulties for both researchers. Due to the promotions in the interface for AllTrails+ (AllTrails' paid premium offering), both authors initially assumed that the navigation tool could only be accessed by purchasing the pro version, leading author 1 to spend one hike lost on the trail with her friends. Author 2 learned from a friend that the navigation tool was accessible for free and told author 1. As an individual with ADHD, author 1 had relied on physical signs on the route and had chosen routes in the moment that seemed comfortable for her needs; she prioritized engaging with nature during this period. In fact, before this study, she had never attempted to complete a trail and had enjoyed the experience of hiking organically from the trailhead.

Both authors were initially quite happy to use the navigation tool. The tool lists the elevation and distance completed while hiking on a trail (Figure 4). However, these estimates were often inaccurate, misleading both authors to think that they had traversed more or less distance and elevation than they actually had. This led them to continually brace themselves for more descent or elevation gain than anticipated in the hike. By relying on the app, both researchers were in a state of heightened anxiety in preparation for the next leg of the trail, leading them to be ill at ease or to turn back and not complete the trail.

While the navigation tool adapted to detours, this would only happen once one was already embedded in the original hike, with no clarity on whether the new detour would be the same difficulty level or achieve the original goals set by the hikers like summiting or completing a certain distance. Hence, while the navigation tool was useful, it placed substantial pressure on the hiker to stay on the original path, irrespective of on-the-ground realities, while also not showing accurate distance covered or elevation metrics. This added to further discomfort on the trail and disengagement with nature for both the researchers, especially during trails with steep elevations or descents.

4.3 Trail Completion: Time Estimates vs Experience

Time estimates were valuable to both researchers for different reasons. Unlike author 1, who went on hikes without a clear goal of trail completion, author 2 found value in reaching the peak and

completing the trail. Therefore, when she began identifying hikes, she often considered the time estimates highlighted by the app (Figure 3) to determine when to begin the hike to ensure she would be done before sundown. While author 1 had no intention of completing the trail, she did use the time estimates to help her plan and coordinate hikes with her friends. For example, this was helpful if some in a group hike wanted to head back early while others wanted to continue.

Unfortunately, the time estimates also caused confusion for both researchers. For author 2, identifying routes based on time estimates was frustrating because they were based on a pace that was too fast or slow for her. In some cases, this forced an expectation of fitness that could be intimidating or discouraging. For example, after completing a moderate hike that author 2 had found quite challenging, she saw that her completion time was 20 minutes longer than the AllTrails estimate, muddling her feelings of accomplishment with feelings of insufficiency. Author 1 picked trails with shorter time estimates when she went on hikes with friends, which sometimes led to confusion. For example, she chose a hard trail with a 3-mile distance that had an estimated time of less than three hours—she had successfully hiked an easy four-mile hike in an hour and a half and felt that the short distance of the trail would balance the elevation. Unfortunately, this was not the case; she and her friends took much longer than anticipated as the elevation posed a challenge, forcing her to leave the trail early. Similarly, while author 2 often completed hikes, the time estimates led to increased anxiety on the trail by misguiding her into thinking that she was not on track to finish the hike before sunset: "*For some reason, the time remaining estimate also always seems to be wildly inaccurate, but in the other direction. It will estimate that a hike will take much longer than it actually will, and doesn't seem to factor in current pace or historical data at all. Sometimes this means I get anxious that I am going too slowly and hurry up, exhausting myself unnecessarily.*"- Author 2's field notes

After completing trails, both researchers felt inadequate and overwhelmed. Time estimates also set a base expectation of athleticism and fitness with little room for variance, despite the fact that individuals' fitness levels are diverse and dynamic. These base expectations nudge individuals to go at a prescribed pace while hiking, further adding stress and inhibiting a broader range of accessibility needs.

5 Discussion

From our findings, we observe that the experience of hiking using AllTrails has ramifications for users who fall outside of certain body and fitness norms. Additionally, the information provided by the interface regarding trails can be confusing for new users. Overall, while AllTrails is valuable for individuals to find trails and routes when hiking in new places and is portrayed as a valuable tool to integrate more individuals into nature, the actual experience promoted by the app resorts to metrics reflective of constrained fitness, accessibility, and mobility norms.

5.0.1 Access Intimacy and AllTrails. Both researchers experienced frustration while engaging with AllTrails during hikes. They often felt confused by the rating systems, particularly for easy and moderate trails, which caused confusion regarding expectations surrounding fitness during a hike. In *Fat Girls Hiking*, Michaud-Skog [26] highlights the experience of **Access Intimacy** during a hike, especially for individuals who are often marginalized in these spaces like people of color, fat individuals, disabled individuals, or queer individuals. Access intimacy involves ensuring that hiking is a safe space for individuals without pressure to perform at a certain pace, aggressively complete a trail, or perform the "right" level of discomfort during a trail to appease the larger group. We find the AllTrails interface is antithetical to access intimacy with its expectations of users. Such standards alienate users from marginalized backgrounds, especially newer hikers with identities that are often underserved in hiking spaces. AllTrails enforces these standards by providing a specific expectation of trail completion, the pace expected by hikers (often specified through time estimates), and wide variance within ratings. For example, while author 2, who is an experienced hiker could easily use the app to identify the accurate metrics for her comfort level, author 1—who had no such insight—fully accepted the ratings as accurate which negatively impacted her experience on the trail. In this way, the AllTrails app denies access intimacy for users, especially novice users who may not be aware of hiking practices or alternative mechanisms to maneuver these newer experiences.

AllTrails, with its fixed expectations, is thus an extension of contemporary, mainstream hiking culture. Michaud-Skog [26] highlights how the hiking economy prioritizes straight sized and able bodied individuals with limited production of tools and clothing for individuals who are larger sized. When fat people are unable to find appropriate gear to hike in, it alienates them further while hiking, with some straight-sized or mainstream hikers judging fat hikers for not performing the hiking aesthetics promoted by the community. Similarly, AllTrails may subliminally be projecting expectations of speed and fitness onto users, and associated judgment when users fail to meet the expectations set by the app. These expectations can be particularly harmful to novice hikers, a target audience of the app which describes itself as "driven by the desire to share the outdoors with as many people in as many places as possible" [1]. Some hikers may hike at a much slower pace than AllTrails estimates, or end a hike before the listed completion point, and then must face stats and design features that tell them they have engaged with hiking incorrectly or insufficiently. Alternatively, Michaud-Skog [26] advocates for hikers to combat these expectations by hiking at their own pace and providing their own resources (like foldable chairs) to combat expectations of continuous hiking, and to feel comfortable turning back whenever the hiker is feeling tired, irrespective of trail completion. These practices prioritize the individual comfort for the hiker. Aligning with this perspective, we suggest that AllTrails engages with greater access intimacy in its design, shifting focus from expectations around trail completion and time to advocacy for hiker comfort and engagement with nature. For example, AllTrails may highlight trail features like waterfalls and seasonal plants in its trail listings and add recommendations for hiker comfort such as suggested water intake or availability of benches on the trail.

5.0.2 Invalidating Experiences. Due to the lack of information regarding ADA accommodations, appropriate packing expectations, or even the hike experience provided by AllTrails, users may rely on user comments for this information. Here, we observe that

trails marked easy or moderate often had comments describing how "easy" the trail was. Such comments create a precedent for commenting practices on the app, often focused on metrics that reinforce expectations of fitness. These expectations regarding the ease or access of a trail subtly invalidate the difficulty individuals may face while attempting to complete it. On the other hand, comments on hard trails were more useful because they contained information regarding the appropriate packing requirements, fitness expectations, and difficulties of the route. These were lacking in comments for easy or moderate trails, which are relied upon by novice hikers attempting to get into the activity. For example, both authors encountered unexpected natural disturbances on easy and moderate trails, such as a stream that passed through the trail or the dense undergrowth of bushes, that were unaccounted for in trail descriptions and comments.

Both researchers also felt increased anxiety while using navigation tools provided by AllTrails. This anxiety stemmed from pressure to adhere to the original trails and incorrect estimates regarding distance covered and elevation completed. Both researchers felt unease over the elevation metric specifically, as the researchers were led to believe they covered more or less distance and elevation than was accurate. These experiences further invalidated the efforts the researchers had undertaken while hiking, leading them to feel at a loss over what to expect next or how much further they could continue on a trail. In research surrounding pedestrian navigation, researchers highlight that individuals require alternative design interfaces due to the multiple activities they conduct while walking [35]. This is also true of the hiking experience, yet AllTrails' navigation tool often resorts to map strategies geared towards car-centric mobility practices (a single route and expected destination). Further, our findings show that elevation metrics in AllTrails are inaccurate and cause fatigue. Similarly, other physical obstacles due to undergrowth or natural disturbances are not shown despite comments on the trail page. Therefore, the navigation tool might have more success if it used pedestrian-centered navigation tools like landmarks and visual symbols for crossings or signs rather than the current navigation tool. AllTrails might also consider an option to allow users to hide certain metrics in the navigation tool display. This would afford users agency to prioritize engagement with their physical surroundings and determine which metrics are meaningful and useful to them.

Overall, we observe that, despite being promoted as a tool to enable further participation in the hiking community, the interface of AllTrails normalizes body expectations of users, with potential harm to those who are already marginalized in outdoor recreation. AllTrails describes itself as an app where "all are welcome," and emphasizes "spending time in nature" over fitness or exercise [1], potentially leading to further shame and alienation for individuals who do not meet the hiking expectations built into the app's interface design and features. Therefore, it is valuable to incorporate alternative interface designs to promote the idea underpinning the Fat Girls Hiking philosophy, *"Despite what narratives might try to tell us, there is no "right" way to be a hiker"* [26, p.66].

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