The Motivations and Experiences of the On-Demand Mobile Workforce

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ABSTRACT

On-demand mobile workforce applications match physical world tasks and willing workers. These systems offer to help conserve resources, streamline courses of action, and increase market efficiency for micro- and mid-level tasks, from verifying the existence of a pothole to walking a neighbor's dog. This study reports on the motivations and experiences of individuals who regularly complete physical world tasks posted in on-demand mobile workforce marketplaces. Data collection included semi-structured interviews with members (workers) of two different services. The analysis revealed the main drivers for participating in an on-demand mobile workforce, including desires for monetary compensation and control over schedules and task selection. We also reveal main reasons for task selection, which involve situational factors, convenient physical locations, and task requester profile information. Finally, we discuss the key characteristics of the most worthwhile tasks and offer implications for novel crowdsourcing systems for physical world tasks.

Author Keywords

Mobile workforce, physical world tasks, crowdsourcing services

ACM Classification Keywords

H.5.3 [Group and Organization Interfaces] Computer-supported cooperative work

General Terms

Human factors

INTRODUCTION

An emerging class of services connects workers to a variety of physical and virtual world tasks. These on-demand workforce services are often based on a simple model, where an individual or an organization ("requesters")

creates tasks, which are offered to one or more participants in the system who can then accept the task based on its description and payoff. We refer to the workers who complete *physical* world tasks as the "on-demand mobile workforce," as they can choose when and where to work beyond the constraints of traditional office workspaces. We refer to workers who complete *virtual* tasks as the "on-demand virtual workforce," as their work occurs exclusively online.

On-demand mobile workforce services fall within the category of "crowdsourcing" [22], which connects large groups of workers with distributed micro-tasks that combine into a greater result. Crowdsourcing has received significant attention in the research community. Several methodological papers [35, 36] and reviews [32, 39] have covered crowdsourcing and human computation systems as a topic of research and as tools for research. In particular, Amazon's Mechanical Turk (AMT) [3] is potentially the most studied virtual crowdsourcing platform. While some services like Fancy Hands [12] allow more elaborate virtual tasks, at AMT most tasks do not require special skills and the market dynamics usually follow a model of very small payments for a large number of very simple tasks. Many studies describe how AMT can be used for automating online tasks such as object and image labeling and user studies [10, 20, 24, 27, 29, 33, 45]. The motivations of workers on AMT have also been studied extensively [23, 27, 37, 43], as we discuss later.

Increasingly, on-demand workforce services are leveraging the power of mobile workers operating in the *physical* world, often tied to specific locations. For example, services like TaskRabbit [49], Gigwalk [16], Field Agent [14], and Zaarly [54] facilitate the completion of physical world tasks that are location-dependent such as Ikea furniture assemblies, deliveries, basic house chores, price checks, and store audits.

Unlike their virtual counterparts, mobile workforce services depend on both virtual and location-dependent features. On-demand mobile workforce services must therefore carefully consider the productivity and sustained participation tradeoffs inherent in a distributed group of workers that operate online and offline. The complexity of the tasks

offered through different mobile workforce services varies. Services like EasyShift [11] and Gigwalk mostly support low complexity tasks that require little time and cognitive effort to complete, comparable to AMT. Other services like TaskRabbit and Zaarly cater to more complex, multi-step tasks that require more cognitive effort.

Only recently, studies have begun to uncover the characteristics that make mobile workforce markets unique. For instance, Musthag and Ganesan [38] found that a small fraction of mobile workforce platform users—who they refer to as "super-agents"—perform more than 80% of the tasks and receive more than 80% of the total earnings. The authors show that these users were more willing to travel farther distances, incur larger travel costs and spend more time searching for jobs to complete. However, the authors do not provide insight into the motivations or considerations users make when initially joining a service, and electing to complete tasks. Understanding these user motivations and considerations is important for the development and improvement of on-demand mobile workforce services and tools [28].

In our study, we address this gap and provide an in-depth examination of the socio-technical factors contributing to worker participation in an on-demand mobile workforce service, including the motivations for signing up, and for accepting and completing physical world tasks. Improved understanding of these factors can encourage and sustain active participation in mobile workforce services.

The key research questions addressed in this study are thus:

1. What are the main motivations for *joining* on-demand mobile workforce services? (RQ1)
2. What are the main motivations for *selecting* certain tasks over other tasks? (RQ2)
3. What task characteristics did workers find more or less enjoyable and worthwhile? (RQ3)

To answer these research questions, we conducted semi-structured interviews with twelve on-demand mobile workforce workers from two distinct services: TaskRabbit and Gigwalk. Both services facilitate physical world tasks, but differ in many ways (as detailed below)—most prominently in terms of typical task complexity, worker application process, and worker profiles.

BACKGROUND AND RELATED WORK
In this section, we clarify the scope of the study and then review the previous work on on-demand workforce services, crowdsourcing physical world tasks, and the different motivations for completing tasks and following through with certain behaviors. We also describe the theoretical framework related to the study.

On-Demand Workforce Services
To outline the scope of this study, we offer an on-demand workforce services categorization based on the nature of

tasks within the different services. We consider two dimensions: (1) the location of the tasks and (2) the complexity of the tasks.

The first dimension considers the extent to which tasks in the service occur within virtual or physical spaces. Virtual tasks occur within computer-based environments and often allow users to work from anywhere with an Internet or phone connection. Physical tasks occur outside of computer-mediated settings and in actual neighborhoods and offline locations. Still, the nature of whether requested tasks are completed in virtual or physical spaces varies depending on the service and requester expectations.

The second dimension reflects the complexity of tasks. Low complexity tasks require less time and cognitive effort to complete, whereas high complexity tasks require more time and higher levels of skill or expertise from users. For example, pet sitting or researching hotel costs require more time and steps than snapping a photo of a product while at the store. In this way, high complexity tasks often require individuals to use their own discretion when completing a task, compared to low complexity tasks that require little to no personal judgment for task completion.

Figure 1 graphically depicts the categorization and includes the dimensions of task location and task complexity on two intersecting continuums. Based on marketplace reviews, user testimonies, and our informal observations of the services, we placed four main on-demand workforce services to exemplify the quadrants of the categorization: Fancy Hands, Mechanical Turk, TaskRabbit, and Gigwalk. We note that services often offer a mix of tasks, where the general nature of tasks on a service is related to the service's affordances.
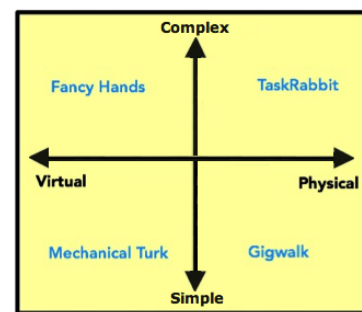
Figure 1. Categorization of on-demand workforce services.

Representing the top left quadrant, Fancy Hands is an on-demand workforce service of virtual assistants who fulfill requests from virtual locations and are capable of fulfilling recommendation-based complex tasks, which require discretionary practices, judgment calls, and needs assessment (more effort). Mechanical Turk, in the bottom left quadrant, also puts requesters in touch with virtual workers, but mostly serves as a micro-task market in which a large number of users complete minor tasks for small monetary or non-monetary compensation [27].

TaskRabbit and Gigwalk represent the top right and bottom right quadrants, respectively. These two quadrants represent the physical world tasks that require varying degrees of effort expenditure. Common requests posted in TaskRabbit include deliveries, furniture assemblies, and house chores. For Gigwalk, common tasks or "gigs" include store audits, price checks, customer interviews, and field photography. These gigs are often done while workers are already out and near the task locations. We again note that despite the general categorization, occasionally virtual tasks are offered in both these services, and tasks in both can vary in complexity. We focus on TaskRabbit and Gigwalk in this study.

Motivations and Crowdsourcing Systems

There is an abundant and long line of research on incentives and motivations, from psychological studies [4, 8, 53] to economic theory [13, 15, 17] to business and management research [18, 31]. At a high level, this body of research shows that people will work harder for the goals that they are rewarded for, but also provides clear evidence that a truly unified vision of the interactions between incentives and motivations in human behavior is unsettled.

Extrinsic motivations and intrinsic motivations have different implications for crowdsourcing systems. AMT, for instance, was originally designed for crowdsourcing human computation tasks, but has been since been appropriated for behavioral [37] and user studies [27]. Downs et al. [10] found that younger men (under 25) were more likely to try to game the system for monetary rewards while men over 30 and women of any age were more likely to take tasks seriously.

In AMT, Mason et al. [37] found that Turkers typically did more work when paid more but did not deliver better results. Mason et al. also found that the design of the compensation scheme can affect the quality of work considerably. Research suggests that when people are intrinsically motivated by desires to explore and learn, they will find the activity inherently interesting and pleasant, and will extend their capacities [8, 9, 44]. Kittur et al. [27] found that including quantitative and verifiable questions to experiments on AMT increases the quality of crowd work. Ross et al. [43] and Ipeirotis [23] conducted surveys of the motivations of Turkers, and in general they found that while money was cited as a reason for doing work—only 10-12% said money was irrelevant to their work—enjoyment of the task was necessary as well. This was captured by the fact that 69% of U.S. respondents in Ipeirotis' study indicated that "Mechanical Turk is a fruitful way to spend free time and get some cash." Choice, acknowledgement of feelings, and opportunities for self-direction work better to increase motivations.

Taken together, there is a need to examine what extrinsic and intrinsic factors contribute to the quality of work conducted especially with respect to physical world tasks.

The Theory of Planned Behavior

In this work, we mostly build on the theory of planned behavior (TPB) [1] to contextualize and analyze our findings. TPB considers the less active or visible factors that influence a person's intention to enact a certain behavior. Because members of the mobile workforce actively engage in the search for, implementation of, and completion of physical world tasks, TPB helps explicate a person's intention to engage in a specific behavior at a specific time and place.

Specifically, TPB considers the following constructs: (1) *attitude toward the behavior* (i.e., belief that the behavior leads to certain outcomes, evaluation of the outcome), (2) the *subjective norms surrounding the behavior* (i.e., belief referent or significant others think the behavior is preferred), and (3) *perceived behavioral control* (i.e., beliefs about control, likelihood of occurrence). These three factors ultimately predict and explain (4) *behavioral intention* and (5) *behavior*. Behavioral intention refers to the motivational factors or extent to which people try to perform a behavior while behavior refers to the actual actions an individual performs.

When applied to this study, TPB acknowledges that people's evaluations of the task and expected outcomes can and will drive behavior. As such, the heavy and sustained uses of mobile workforce services likely occur among individuals who have both the motivation (intention) and ability (behavioral control) to complete the requested tasks. The theory also suggests that users will likely complete tasks in line with normative beliefs or social acceptance regarding the task.

METHODS

This study seeks to understand mobile workforce members' motivations and considerations for completing physical world tasks. To uncover these motivations, we conducted twelve semi-structured interviews with experienced and active users of two mobile workforce services. In this section, we describe the sites for recruitment, the characteristics of participants interviewed, and the interview approach. We then discuss the themes that emerged from a qualitative analysis approach of interview transcripts.

Selecting the Recruitment Sites

With our categorization in mind, this study focuses on services that offer predominantly physical world tasks, and span the range between simple and complex task offerings. We selected TaskRabbit and Gigwalk as the main study sites based on popularity, diversity of physical world tasks, and geographic coverage. In the next sections, we briefly describe these on-demand mobile workforce services, their features and nuances, and the process of becoming a member.

TaskRabbit

TaskRabbit, located in the upper right corner in Figure 1, typically involves complex physical world tasks that require

a substantial amount of effort, such as deliveries, pet sitting, and household chores. In TaskRabbit, individuals known as "TaskPosters" can simply signup and list errands or jobs they need completed. Then, prescreened helpers or "TaskRabbits" can bid on, negotiate, or accept the compensation for the task made by the TaskPoster. TaskRabbit describes their on-demand mobile workforce service as "neighbors helping neighbors" and a form of "service networking." As of May 2013, TaskRabbit claims to have over 4,000 Rabbits across nine different cities [48]. In order to become a TaskRabbit and before even bidding on tasks, applicants must go through a video interview, criminal background check, and pass a quiz about the TaskRabbit marketplace. Once accepted as a TaskRabbit, workers maintain profiles about themselves, which include their photos, bios, and any TaskPoster reviews about their previously completed tasks.

Gigwalk

Gigwalk, located in the bottom right corner of the categorization, usually involves micro (simple) tasks conducted in the physical world such as store audits, product reviews, and responses to client interviews. With a self-reported presence in 6,500 cities and four countries, Gigwalk boasts that people can turn their smartphone "into a second paycheck" and that businesses can leverage their very own "on-demand smartphone army" called "Gigwalkers." Gigwalkers' profiles include a small photo, first name, last name initial, and hometown. Gigwalkers must use a smartphone mobile phone app with GPS technology to find nearby "gigs" or posted tasks. The GPS location also helps clients verify where a gig was completed. Unlike TaskRabbit, any person can sign up and become a client or Gigwalker straight from his or her smartphone and post or complete gigs.

To summarize, TaskRabbit and Gigwalk facilitate physical world tasks but differ in terms of typical task complexity, task assignment and worker application process, and worker profiles. TaskRabbit tasks are usually personal requests from nearby individuals while Gigwalk gigs are usually generic requests from companies who need product or display checks among several distributed locations.

Recruitment Process

We recruited twelve participants organically, by posting a task or job in the respective systems for users to either bid on or accept. The task simply asked workers to participate in a phone interview with a researcher. Sample text from the task/recruitment notices read, "Are you at least 18 years of age? Do you use [mobile workforce service name]? Do you complete tasks of jobs that people post on mobile phone apps? If you answered YES to these questions, you may be eligible to participate in a phone interview." All participants, six from TaskRabbit (TR1-6) and six from Gigwalk (GW1-6), met a set of predetermined criteria. Participants are at least 18 years old, English-speaking, and familiar with and currently using an on-demand workforce

mobile phone application or service. Table 1 depicts the characteristics of the participants interviewed.

	Sex	Age	App Name	Membership Length (Approx.)	Occupation
TR1	M	46	TaskRabbit	4 months	Electrician
TR2	F	25	TaskRabbit	9 months	Freelance graphic designer
TR3	F	21	TaskRabbit	1 year	Photographer, Personal assistant
TR4	F	27	TaskRabbit	1 year	Career advisor, graduate student
TR5	F	23	TaskRabbit	3 weeks	Micro-entrepreneur
TR6	F	27	TaskRabbit	1.5 years	Student
GW1	M	27	Gigwalk	1 year	Graduate student
GW2	F	26	Gigwalk	3 weeks	Unemployed, Special ed teacher
GW3	M	29	Gigwalk	9 months	Marketing professional
GW4	M	55	Gigwalk	5 months	Distribution manager
GW5	F	35+	Gigwalk	7 months	Management professional, Unemployed
GW6	F	36	Gigwalk	1 year	Homemaker

Table 1. Characteristics of interview participants.

Participants varied in terms of how they learned of the service. Seven of our participants found out about the service through friends or family (TR1, TR2, TR4, TR5, TR6, GW1, GW6). Meanwhile, others learned about the services through other companies (TR3), the app store (GW2, GW3), or online articles (GW4, GW5).

Overall, we interviewed eight women (75%) and four men (25%), ranging from 21 to 55 years old, who live in the United States. Their length of membership in the mobile workforce service ranged from novice (three weeks) to experienced (1.5 years). Subjects received $20 for participating in the interview, paid directly through the respective service.

Interviews

One of the authors conducted the semi-structured phone interviews with the mobile workforce service users. The interview questions inquired about workers' motivations for joining the on-demand mobile workforce services, job selection decision-making, and the factors contributing to the acceptance or denial of a task. All interviews were audio recorded and transcribed.

After completing the interviews, we reviewed the transcripts, annotated them for patterns, and extracted key themes. With this method, we closely examined, qualitatively assessed, and highlighted the critical features of the interview responses. This method is unconstrained and unbiased by pre-existing categories and uncovers the candid attitudes and behaviors of the mobile workforce members.

FINDINGS

Several themes emerged from the interview transcripts pertaining to participants' motivations and appealing task characteristics. We discuss first the main motivations for

joining the on-demand mobile workforce, then the reasons behind task selection, and finally the characteristics that make jobs enjoyable and worthwhile.

Motivations for Joining On-Demand Mobile Workforce

The main motivations for joining mobile workforce services include, perhaps expectedly, monetary compensation, combined with personal control over one's schedule and actions.

Monetary Compensation: 'I do it for the money.'
Participants overwhelmingly listed monetary compensation as their main motivation for joining the on-demand mobile workforce services in the first place. Despite their different financial situations, many workers completed tasks for the purpose of supplemental income (Quotes 1, 2, 3).

"I am a stay-at-home mom so I would like to be able to make money but I cannot go out and get a job where I have to be some place at a specific time. I need to be flexible so I can take care of my family." - Quote 1 (GW6)

"I like having supplemental income… good experiences and having a little bit extra money." - Quote 2 (TR3)

"My main motivation is the compensation. I actually had surgery and wasn't released to go back to work… I ended up looking for something to keep me a little busy and also bring a little bit of money." - Quote 3 (TR4)

Some participants maintained full-time jobs (e.g., TR2, TR3, GW3, GW4) while others chose to complete tasks as they waited for full-time work (GW2, GW5), had free time outside of work and school (TR4, GW1), and/or looked for something to do (TR6, GW2, GW6). Others, more specifically in TaskRabbit, used the on-demand mobile workforce services as a way to build their clientele (TR1, TR5). The financial motivations for the on-demand mobile workforce parallel those of workers in the virtual crowdsourcing platforms like AMT [24], though it is clearly not the workers' only motivation.

Regarding the financial incentives, several suggestions for how to improve the compensation process emerged as subthemes from the interviews. While some workers appreciated not having to coordinate payments awkwardly in-person or worry about never getting paid (Quotes 4, 5), most workers expressed a desire for more payment regulation.

"I like not having to handle the money. So when I'm done with the task, it's not like they hand me [the money], 'Ok, here is the $20.' It's digital… I just mark it as complete and it goes through [TaskRabbit]." - Quote 4 (TR6)

"You have PayPal. If, let's say you completed a job, and somebody is not paying you I think it automatically pays you…it's regulated is what I mean." - Quote 5 (TR2)

According to interview responses, task requesters are very much "in the driver's seat" in terms of payment. They can view workers' task completion history, leave a positive or negative comment on a completed task, endorse or tarnish

their worker reputation, and ultimately decide to compensate the workers or not. Requesters can delay (Quotes 6, 7) and even deny payments (Quote 8), offering very little support or payment protection for workers.

"One [disadvantage] comes to mind is the companies are in control of their payouts. Some companies will pay you right away, which is safe. Other companies don't." - Quote 6 (GW4)

"I would change the amount of time that a TaskPoster has to close a task. 72 hours is three days, I would make it into 48 hours." - Quote 7 (TR5)

"You go to places and you can't find what they're looking for. Then you don't get paid for that. It was all for naught." - Quote 8 (GW2)

Personal Control
All participants mentioned a desire for personal control as a main motivation for joining a mobile workforce service. Participants valued the ability to set their own schedules from any location, select what jobs they wanted to do, and negotiate rates based on the difficulty of the task and previous experiences (Quotes 9, 10). GW1, for instance, integrated gigs with her already planned shopping errands (Quote 11). GW2 and GW3 specifically cited not having a boss or a required time and place in which to report as a main motivation for completing these physical world tasks for compensation.

"If I'm out somewhere, if I have free time, I can look through the app and see what's available for tomorrow. I can do that anywhere." - Quote 9 (TR3)

"I can accept the job if I want to or I can just ignore it and not do it so I have a lot of control. So if the job is interesting, if it's local, if it looks like 'oh, I can do this,' then I can just accept it." - Quote 10 (GW6)

"I have told [my friends], sometimes you have a gig in Wal-Mart or in other stores that you go to all the time… spend few minutes shopping and you can get $7." - Quote 11 (GW1)

Additionally, the on-demand mobile workforce services allowed participants to personally control when and where they wanted to access the service. Overall, then, workers joined the mobile workforce to obtain income by completing jobs under one's personal control and convenience.

Motivations for Selecting Mobile Workforce Tasks

The desires for freedom and flexibility afforded by on-demand mobile workforce services allowed for the occurrence of some unique task selection practices. According to the interviews, the main motivations driving task selection over other tasks involved cost-benefit analysis regarding (1) situational factors, (2) physical location, and (3) the worker's evaluation of the task requester profile.

Situational Factors

Participants listed several situational or external reasons for selecting certain tasks over other tasks. Situational factors include the availability of time a person has (Quote 12), the timing of the task (i.e., completion due date, Quote 13), and even weather conditions (Quote 14). These situational factors are not directly related to the task itself, but influences whether or not a task is selected.

"Weekends, I'm off. I have more time. When I go on vacation and I travel a lot, I don't deal with it. I don't even like checking it." - Quote 12 (GW2)

"Saturdays are the only days I can spend with my husband. Those are the gigs that give you a lot of money, like between $20-$35 but those I do not take because those are times I spend time with my husband." - Quote 13 (GW1)

"I got drenched in the rain doing a task couple days ago. So I try to watch the weather to make sure I can go out and get something done. Otherwise I don't go out, and do a virtual task." - Quote 14 (TR5)

Convenient Physical Locations

Confirming existing literature [2], all participants cited the preference for completing nearby tasks or gigs. Participants consider the costs, benefits, and conditions associated with completing the physical world tasks, such as time spent traveling, gas, familiar/safe locations, and potential payout (Quotes 15, 16, 17).

"I look for the ones that are towards me, more accessible, either virtual job or job on a location. I want [the tasks] close by in my area. I like work that I can find work is not far away because I live in Los Angeles." - Quote 15 (TR3)

"I do not want to drive that far. If a gig is 10 miles away from my house, that's a lot of time and gas that I put into a $5 to $7 gig." - Quote 16 (GW1)

"If it's something that's close [I'll select the gig]. Not a lot of money for drive time and I don't have to worry about distance. It's my local area." - Quote 17 (GW4)

Evaluating the Task Requester

Generally, participants expressed preferences for tasks posted by requesters who have pictures and information verifying their identity on their profiles. TaskRabbit participants, who frequently complete tasks that require face-to-face contact with TaskPosters, stated that viewing a profile and immediately exchanging personal contact information helped alleviate their safety concerns about meeting TaskPosters in-person for the first time (Quote 18).

"I always favorably take [tasks] with the picture. Especially if I'm going to someone's house… Oh, I already know what you look like and you're waiting for me outside. I know who you are." - Quote 18 (TR3)

In line with online trust literature [47, 48], participants perceived requester profiles with pictures and other online memberships as more credible and trustworthy. TR5

compared TaskRabbit to Craigslist, a longstanding website for local classifieds and other forums. She described TaskRabbit as more "verifiable" versus the "kind of sketchy" proceedings in Craigslist (Quote 19).

"I like TaskRabbit because, most of the time, TaskPosters have their picture of their face so you can actually get an idea of who you are going to see…versus Craigslist, it's a long anonymous number that you're emailing." - Quote 19 (TR5).

If the requester's profile did not reveal identifying information, many of the participants admitted to completing small "investigations" of the TaskPosters or clients. TR4, for example, accepted a task to care for a woman's dog for five days while she was at a conference. Before arriving at the woman's home, TR4 searched for the TaskPoster on LinkedIn, a social networking site for professional networks, to verify her occupation and employment history (Quote 20). TR5 described similar practices: she frequently obtained TaskPosters' email addresses and used social media sites to find out some more information about the TaskPoster (Quote 21). GW5 also looked for additional information outside of the mobile workforce service based on information posted in the gig description. He eventually learned to question the vagueness of certain gigs and practice more discretion about selecting those gigs (Quote 22). Even GW6, who dedicated little research into verifying the identity of the gig client, said she certainly questioned the identity and legitimacy of the client and factored this into her ultimate decision to accept or deny a gig (Quote 23).

"I definitely looked her up on LinkedIn, because you know, she says, 'I'm going out of town for a conference' and I looked up her bio and she works for a company..." - Quote 20 (TR4)

"I'll email anonymous, I'll get their email back, search for anything I can find like Facebook." - Quote 21 (TR5)

"I learned to [investigate the clients]. Before I didn't care, particularly because [gig description] will just say 'the company'… but sometimes, who are these other guys?" - Quote 22 (GW5)

"There was a job that was posted anonymous and my husband said don't do that job because…I don't know if that's an actual business or an individual and we don't know if they're actually going to pay." - Quote 23 (GW6)

Workers discovered creative ways to learn about requesters. For example, TR4 evaluated task descriptions before placing bids on tasks (Quote 24). Specifically, she used the TaskPoster's attention to detail and assessment of a realistic deadline to gauge whether or not they could have a good professional relationship. TR2 and TR5 also factored task descriptions into their final decisions for task selection (Quotes 25, 26).

"The TaskPoster definitely plays a big role so I'll pretty much bid if only they have clearly written the description of

what they want and they seem to understand what is involved." - Quote 24 (TR4)

"There's this feeling of legitimacy versus something like Craigslist." - Quote 25 (TR2)

"Look at the way they write… For example, I need cleaning. It can be a cleaning of anything. I need organizing. It could be organizing 500 boxes. I'd like to have people that have details." - Quote 26 (TR5)

Workers wanted to learn about or implement a verification process for task requesters. More than half of the participants knew very little about requester verification (Quote 27) or did not know that requesters simply had to sign up with an email address, provide basic contact information, and a credit card in order to post a job. For the most part, participants trusted task requesters and assumed they went through some form of background check or verification process (Quote 28).

"I don't know what it takes to be a TaskPoster." - Quote 27 (TR1)

"I trust people a lot and not have a reason to not trust people on TaskRabbit yet. That (people not being who they say they are) hasn't crossed my mind." - Quote 28 (TR3)

Considerations for Task Characteristics
In addition to the motivations for task selection described above, task experiences might also affect workers' opinions on other tasks and influence their likelihood of choosing a similar task in the future. To investigate RQ3 (What task characteristics did workers find more or less enjoyable and worthwhile?), we asked participants to reflect on their most "memorable" task experiences and explain reasons for why that is. The wording of this question was intentionally neutral so that participants were free to compare task characteristics across positive, negative, and/or neutral tasks uninfluenced by the interviewer. Three themes emerged related to the appealing characteristics of jobs or tasks: (1) knowing the person behind the task, (2) knowing the reason or "story" behind why the task is needed, and (3) attaining experience.

Getting to Know the Person Behind the Task
Many participants expressed that getting to know more about the person posting the task made their experience more memorable and more enjoyable (Quotes 29, 30).

"I don't mind socializing at all… When I'm cleaning, I start a conversation. Like "Did you see that movie?" or " Where are you from" kind of thing." - Quote 29 (TR3)

"That one was a task to organize and clean a place in Brooklyn couple days ago… Next thing you know 'Hey, want to try fresh juice?' I'm like, 'Yeah, sure.' It was really awesome. It was fun." - Quote 30 (TR6)

Although participants generally understood and ultimately completed the objectives of the tasks (e.g., Ikea furniture assembly, package delivery, and grocery pickup), they appreciated getting to know the "person" behind the task

(e.g., who is the requester, what is their background). Knowing this information was a common characteristic among memorable tasks as it lifted even if only slightly some amounts of uncertainty.

Knowing the Story Behind the Task
Participants sought to learn more about the "story" or agenda behind the posted task. This includes narratives surrounding why help was solicited in the first place.

The most fulfilling types of tasks involved learning about a TaskPoster's background and goals and obtaining positive reviews afterwards (Quote 31). For one task, a man hired TR6 to purchase flowers and deliver them while he and his girlfriend were on a bridge. During the delivery, TR6 said, "This is from someone who just adores you." TR6 highly regarded the thoughtfulness behind this task and subsequently selected several other surprise delivery tasks. TR1 recalled a task in which he rode his bike to a grave plot to ensure it was well maintained (Quote 32). According to TR1, tasks like this this had "meaning" and "made the world better."

"For the guy I delivered flowers for, how do you not like a guy like that? ...I learned a lot about [TaskPoster] and how long they have been dating, when they first started dating, and the long distance." - Quote 31 (TR6)

"I did drive my bicycle out to New Jersey to take a picture of somebody's parent's cemetery plot…I just thought it was just completely interesting that somebody would just take the trouble to do that." - Quote 32 (TR1)

In both TaskRabbit and Gigwalk, workers sometimes questioned the intentions and moral implications of the job postings, which contributed to them less likely to bid on or accept the job posted. GW5, for instance, became very selective and distrustful about the job postings after a client misled him into interviewing a competitor's customers. Other questionable tasks include payment for homework answers (TR2), pictures of private property for real estate companies (GW2, GW3, GW5), and a gig to mail lost cell phones to a company (GW4, GW5). Participants seemed to actively avoid what they perceived as more unethical types of jobs.

In analyzing our results, TaskRabbit and Gigwalk workers differed in their general impressions of the requesters and their intentions for learning more about the requesters. In TaskRabbit, participants were generally very positive about the TaskPosters and had few negative experiences to share. Several TaskRabbits described the experience of completing tasks similar to "helping a friend" or "helping a neighbor" (Quotes 33, 34).

"Everyone is super trusting in the site. Some people might see it as a bad thing. One of the things about TaskRabbit is that it's very much a community, people helping out other people. It's like doing odd jobs for your neighbor." - Quote 33 (TR3)

"I meet the TaskPosters, they're kind of more like a friend. It's what happens when I go out and meet TaskPosters. It's like helping out friends." - Quote 34 (TR5)

Gigwalk workers expressed more indifference towards virtual employers and referenced them as "companies" or "customers" (Quotes 35, 36), confirming the more corporate, for-profit nature of Gigwalk (Quote 37).

"You start to learn the companies and some are very particular… ultimately you don't have the last say. I'm pretty selective about who I work with." - Quote 35 (GW2)

"Whenever I complete a gig, you can actually send a message right to the customer. I always do that. That way, I can tell them about my experience, I can tell them I actually went into the store." - Quote 36 (GW1)

"I always have this assumption that they're white collar workers and they're just trying to find information like… it's cheaper for them to find out information if they have non-employees doing the work than to have paid employees." - Quote 37 (GW6)

Although workers' overall experiences in Gigwalk were positive, they proceeded more elusively (especially as mystery shoppers) and sometimes feigned interest in products or store displays to obtain information and mark tasks as complete. Unlike TaskRabbit, Gigwalkers assumed that requesters were companies checking in on their employees and products. In fact, those Gigwalkers that did express desires to learn about the persons and story behind the tasks did so because they questioned the legitimacy of the requesters and ethical nature of the tasks themselves (Quotes 38, 39).

"We all know what's really going on. People are stealing [these lost cell phones]." - Quote 38 (GW2)

"There are tasks that I won't do because it's unethical. People asking you to leave a positive review online, grading papers for teachers, writing student papers." - Quote 39 (TR2)

Defining Job Experience
There emerged a distinction between tasks providing *experience* or learned skills, versus tasks providing *an experience* or interesting memories. Only one participant (TR5) mentioned increased job experience as an end goal (Quote 40), but others described the appeal of learning and experiencing new and different things as an unintended consequence of completing their tasks.

"[TaskRabbit] is something I'm interested in doing because I'm starting a business of my own. I've been getting a lot of experience, more clientele." - Quote 40 (TR5)

For example, during a gig GW6 spent hours watching the Olympics with her family (Quote 41). TR6 purposefully bid on odd jobs so that she can experience something new and exciting and later tell others about them (Quote 42). Others recall the value of a job post hoc and cite positive

experiences of meeting new people and animals (Quote 43), having novel ways to learn their city (Quotes 44, 45), and doing something different (Quote 46).

"Normally I don't watch the Olympics that much… it started out as a job and wound up being this really fun memory my kids will remember." - Quote 41 (GW6)

"Someday, I'll be a little old lady telling stories somewhere on a porch." - Quote 42 (TR6)

"One of the favorite things about the job is people who have pets. I love getting to meet animals." - Quote 43 (TR3)

"It's a good way for me to learn the city, different places, different stores, different neighborhoods all that kind of stuff. They really helped me that way." - Quote 44 (GW2)

"I just moved here to Houston. [Gigwalk] shows me a different side of the city that I wasn't familiar." - Quote 45 (GW1)

"Barbacking experience… I had a great time." - Quote 46 (TR2)

DISCUSSION
Interviews with our participants revealed several key themes about on-demand mobile workforce membership, task decision-making, and key job characteristics. To summarize the main findings with respect to our research questions:

- The main motivations for joining on-demand mobile workforce involve desires for monetary compensation and personal control over one's schedule and freedom to opt into or out of tasks. (RQ1)

- Situational factors such as the day of the week and weather conditions influence worker's task selection practices. Convenient physical locations and unambiguous profile information of task requesters also influence task selection practices as well. (RQ2)

- On-demand mobile workforce participants preferred knowing background information about task requesters and the original purposes for tasks. Workers also appreciated the non-financial incentives of new and different experiences that occurred as byproducts of task completion. (RQ3)

These results highlight similarities and differences among physical and virtual mobile workforce systems. Users of TaskRabbit, Gigwalk, and Amazon's Mechanical Turk mostly join the systems originally for monetary reasons, and as Silberman et al. [46] state, "are vulnerable to the whims of employers." If a task is not completed correctly as determined by the requester, the worker potentially receives poor reviews, a lower reputation, and ultimately less work and little to no money. As others [28, 46] have also observed, no matter the physical or virtual nature of the tasks, users want to secure the safety of their personal information and compensation.

One significant difference between the platforms is the risks associated with personal information and actual physical harm in the physical and virtual domains. In AMT, the personal risks of requesting and completing work are minimal; requesters and Turkers do not engage in an interpersonal exchange and are otherwise invisible to each other [25]. For TaskRabbit, however, users frequently need to reveal personal information. Rabbits can learn of work or home addresses, deliver sensitive packages, and care for living things such as pets and children. Thus, TaskRabbit requesters and workers have a much higher level of vulnerability than do requesters and workers from AMT and Gigwalk.

Also, unlike AMT or Gigwalk where both requesters and workers are anonymous, the TaskRabbit infrastructure minimizes risks for requesters by only completing background checks of workers and not requesters. Similar to the recommendations of Bederson and Quinn [5], the anonymity of requesters should be limited as this can create an imbalance of power in which requesters can post unethical tasks, refuse to pay, and create unfair reviews.

Theoretical Implications
This study offers implications for the theory of planned behavior, and the design of mobile workforce services, including future services that do not necessarily rely on monetary compensation (e.g. community volunteering marketplaces or time-banking).

In TPB, the constructs of attitude, subjective norms, and perceived behavioral control are predictive of behavioral intention and actual behaviors. In the context of this study, participants' attitudes towards the tasks and evaluations of their moral acceptability contribute to the likelihood of task selection and completion. Similar to the AMT findings of Kaufmann et al. [26], although we found support for extrinsic motivations as strong indicators for completing tasks, intrinsic motivations such as feeling enjoyment or solving challenges are important to task completion. This finding confirms the debatable role of monetary compensation as the main motivator, but highlights how attitudes towards tasks and requesters can outweigh the appeal of money, and affect behavioral intentions and outcomes.

Our study also provides support for a construct not included in TPB called "anticipated regret" [6, 34]. Anticipated regret involves the process of comparing the outcomes of the decision made with the outcomes of the decision not made. However, unlike previous studies [41], the anticipated regret in our study seemed to originate from worker evaluations of *sources* (i.e., task requesters, background stories) rather than evaluations of attitudes towards target behaviors (i.e., feelings towards the tasks), affective reactions (i.e., feelings towards performing the tasks), and anticipated affective reactions (i.e., feelings about having performed the tasks). Our findings also suggest that participants scrutinized the details of tasks and

gauged the social acceptance of task completion. This tendency can tentatively suggest that volunteer- and exchange-based mobile workforce task can build on better familiarity with the person and their needs (e.g., in the style of micro-lending site Kiva [30]). This attitude may be a point of leverage for the execution of non-monetarily driven workforce services.

Implications for Design
We draw a few implications for designers and users of such platforms, based on the discussion above.

Requester Rating, Warranting
Our findings suggest that on-demand mobile workforce services should be more considerate of workers' attitudes and perceived norms and behavioral control surrounding the requested tasks. Extending the recommendations of previous AMT research [27, 46] and in line with TPB, on-demand mobile workforce services should notify both workers *and* task requesters that authentic profiles and requests will impact the quality of work given and received. Individuals prefer tasks with benefits that match their primary motives [21]. Because physical world tasks introduce a different set of risks compared to virtual world tasks (e.g., physical harm, deception), identifying information (social transparency) can ease workers' concerns with performing tasks and foster a community environment built on shared interests, a sense of belonging, and familiarity among members (i.e., develop positive attitudes and norms). In fact, platforms such as Turkopticon [25, 51], and TurkerNation [50] have emerged as ways to avoid exploitation and fraudulent tasks in AMT, but on-demand mobile workforce services could benefit from more robust, built-in evaluation systems that provide reviews for task requesters. In particular, internal rating systems of the task requesters, or any other form of vetting requesters supported by external social cues, might help workers manage expectations, prevent regret, and increase likelihood of task selection and completion.

Streamline Compensation Process
The findings on monetary compensation and personal control suggest a desire to maximize control over financial negotiations while relinquishing the responsibility for obtaining the compensation. On-demand mobile workforce service designers should consider automating requester-to-employee payments and procedures. TaskRabbit and Gigwalk currently require linking a credit card to the requester's account, but do not charge requesters until tasks are completed and evaluated. Timely payments can prevent payments from pending for long periods of time and ultimately sustain the membership of on-demand mobile workforce users.

Recommendations for Task Requesters
From the interviews with the workers there are some clear recommendations for requesters. Our analysis revealed the

importance of communicating to the worker information about the task requester, and about the purpose for the task.

Reveal the Person

Not only does the practice of providing background information engender trust with the worker, it also provides additional motivation by creating a sense of purpose behind the task. The perceptions of the requesters were clearly very different between TaskRabbit and Gigwalk. On TaskRabbit, workers generally seemed less skeptical and more trusting of TaskPosters and the intentions of requests compared to Gigwalk. Gigwalk clients were perceived as more corporate and the workers clearly felt less regard for the clients and the jobs. This effect may have a number of implications, for example, to the cost or price offered for otherwise-equivalent jobs (e.g., what a worker is willing to do for a good cause), and is something to explore in future research. The desire to know the requester aligns our work with the theoretical framework of social transparency [48], which suggests that profile information increases credibility. This is in contrast to earlier studies by Riegelsberger and Sasse [40] on web sites listing staff photos, which were considered "manipulative."

Reveal the Context

As noted above, providing the workers with requester information and the context of the task can increase the workers' motivation to pick and complete the task. This implication supports findings on how task meaningfulness [7, 52] and fostered learning can improve labor supply in online crowdsourcing platforms [6, 28]. According to Hackman et al. [19], three "critical psychological states" describe factors that should enhance internal motivation to complete jobs: (1) experienced meaningfulness of the work, (2) experienced responsibility of the work, and (3) knowledge of results. First, the experienced meaningfulness of the work refers to when a person feels a task is worthwhile and important. If a person feels that his efforts are not important, he will likely feel unmotivated to complete the job. Work can be experienced as meaningful when there is (a) a clear cycle of perceived closure (beginning and ending of transformation process), (b) high visibility of the transformation, (c) high visibility of the transformation of the finished product, (d) transformation of considerable magnitude [52]. Second, the experienced responsibility of the work considers an autonomy dimension, where the work conducted by a person is one's own, and people feel their efforts are significant to accomplishing the task at hand. Lastly, having knowledge of results is a critical psychological state for motivation to complete a task. This means that a job must provide feedback about what is accomplished. Feedback can come from doing the task itself, or in the form of performance feedback from another worker or supervisor. Taken together, physical world tasks should capitalize on task features that promote these three critical psychological states.

We also saw that workers judged the potential trustworthiness and reliability of the requesters on the basis of their task descriptions, clearly favoring well-written tasks with unambiguous descriptions. Finally, providing workers with a bigger picture that contextualizes the task in a broader project can convey the sense that the worker is contributing to something greater and increase motivation to produce more and higher quality results [43]. All these factors can help requesters get jobs executed faster and perhaps completed quicker, and would be critical for volunteer-based mobile marketplace systems.

LIMITATIONS

This study has the following limitations. Our recruitment methods are of course biased due to availability and willingness of the workforce members to participate in a research task. Additionally, all of the participants demonstrate a high proficiency in terms of technological skills – all participants owned smartphones and PayPal accounts, for instance. While these demographics are probably common for current on-demand mobile workplace services in developed countries, the findings may not extend to other socio-economic groups and geographic regions. At the same time, our participants represented more than seven different states across the US and varied in terms of professional experience (mobile workforce or otherwise), age, and length of membership.

SUMMARY

We conducted interviews of mobile workforce service users to learn about their motivations, concerns, and practices. We found that individuals joined on-demand mobile workforce services for monetary reasons and sought personal control over their schedules, tasks, and compensation negotiations. Situational factors and convenience factored into a person's task selection process. Workers also preferred knowing information about the task requester and the purposes of the task. This study has broader implications for the ways in which people in local areas can leverage an effective, practical, novel and well-reasoned social and technical crowdsourcing application that organizes help and support in the physical world. Our findings could inform future development of mobile workforce services that are not strictly monetary, a challenge we intend to pursue next.

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