Exploring Cognitive Benefits as an Alternative Motivation for Engaging Older Adults in Crowdwork

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Abstract

Older adults are not frequent crowd workers on general purpose crowd work platforms. Prior work suggests they are not motivated to complete crowd work with existing motivational frameworks. As an alternative, we explore the cognitive benefits of online work as a potential way of engaging older adults in crowdwork. As a first step, we present survey results from experts in aging and cognitive training to assess whether common crowdwork tasks might offer cognitive benefits as currently structured.

Introduction

Older adults (over age 60) are not frequent workers on crowd work sites. On Amazon's Mechanical Turk (AMT), the average age of a crowd worker is 30 years old (Ross, Irani, Silberman, Zaldivar, & Tomlinson, 2010), while only 2.8% of workers are over the age of 60 (Ipeirotis, 2010b). Some work has explored why this is the case, suggesting older adults' motivations to complete crowd work tasks may not be supported on multi-purpose crowd work sites (Kobayashi, Arita, Itoko, Saito, & Takagi, 2015)

Our goal is to explore an alternative motivation for older adults completing crowd work tasks – cognitive benefits. Cognitive benefits, derived through exercising certain cognitive functions (e.g., memory, spatial reasoning), may be preferred over other incentive mechanisms because such activity can mitigate age-related cognitive decline. The potential cognitive health benefits may provide more meaning than financial benefits typical of crowdwork, which could help better engage older adults in online work.

To begin investigating whether common classes of microtasks might offer cognitive benefits as currently structured, we conducted a survey with experts in aging and cognitive training fields to familiarize them with crowd work so that they could assess the potential of such tasks for cognitive training.

Methods

We recruited experts in aging and cognitive training by canvassing to complete an online survey. We compiled a list of 75 experts from the list of contributors to a leading book in brain fitness (Fernandez & Elkhonon, 2009) and snowball sampling from their research groups and/or collaborators. Each person was contacted twice by email and invited to take a 30-minute Qualtrics survey. Respondents were given a $50 Amazon gift card as a gratuity for their participation.

After answering demographic and expertise questions, participants watched seven videos of crowdwork tasks on AMT and tagged them with cognitive training attributes listed on the popular brain fitness website, Lumosity (lumosity.com), (e.g., this task incorporated remembering patterns and locations, associating names with faces, keeping track of multiple pieces of information. Respondents rated skills on a 5-point Likert scale based on the extent that the skill was exercised by the task in the video (1=not at all, 5=a great extent). The seven tasks were chosen based on popular crowdwork tasks identified in prior work (Ipeirotis, 2010a). Each video was approximately one minute in length (tasks taking longer than one minute were shown in full via fast playback) and was narrated by a researcher describing the instructions of each task and how the task was being completed. Respondents were then asked to complete free-response questions describing their perspective on the benefits and disadvantages of crowd work and the potential of crowd work tasks to motivate workers through cognitive training.

Results

Fifteen experts began the survey with twelve completing all questions in the survey (20% response rate). All respondents had obtained doctoral degrees with most self-reporting as experts in psychology. Nine participants indicated being

familiar with crowd work while only two had ever completed crowd work tasks. Eight people considered themselves to be experts in cognitive training.

Tagging Crowd Work Tasks with Cognitive Skills.
Twelve participants categorized all seven videos. The first video showed a task where a worker was required to navigate to a website and answer what color the header was on the site. Participants generally agreed (mean Likert rating ≥ 3.0) that this task required *attending to key information within a large area* (M = 3.07, SD = 1.03). In task two, the video showed a worker completing a task that required searching for a keyword on Google, choosing the most relevant result, and copying and pasting the URL of that result into the HIT on Mechanical Turk. Participants agreed that this task required *attending to key information within a large area* (M = 3.23, SD =1.09). In the third video, a crowd worker was shown transcribing contact information on a business card. Participants agreed that this task exercised *keeping track of multiple pieces of information in one's mind* (M = 3.15, SD = 0.98) and *attending to key information within a large area* (M = 3.08, SD = 0.97). In the fourth video, a crowd worker transcribed a receipt. Participants agreed that this task demonstrated *keeping track of multiple pieces of information in one's mind* (M = 3.08, SD = 1.08) and *attending to key information within a large area* (M = 3.33, SD = 1.23). The fifth video showed someone transcribing text from a picture. Similarly, the sixth video narrated a crowd worker transcribing a store receipts. Participants did not agree which skills the tasks in these videos exercised. In the final video, participants watched a task where the worker had to search for an image on Google and copy the image of that URL into Mechanical Turk to complete the task. Participants agreed that this task *incorporated remembering patterns and locations* (M = 3.08, SD = 0.79), *associating names with faces* (M = 3.25, SD = 1.35), *keeping track of multiple pieces of information in one's mind* (M = 3.41, SD = 1.16), *attending to key information within a large area* (M = 3.75, SD, = 0.75), *ignoring distractions* (M = 3.5, SD = 1.38), and *quickly picking out patterns* (M = 3.08, SD = 1.37). These findings indicate that the most common cognitive skills utilized by common AMT tasks are *attending to key information* and *keeping track of multiple pieces of information,* crucial for executive functioning.

Opportunities & Challenges for Older Adults.
The experts taking our survey indicated **potential benefits of crowdwork** for older adults might include providing cognitive stimulation, leading to a sense of purpose, improving quality of life and self-esteem, money, and a means for improving computer skill. Related to cognitive stimulation, participants indicated that crowd work could provide "*cognitive training benefits in terms of RT (reaction time) and attention,*" (P7). In terms of providing a sense of purpose, respondents said completing crowd work could lead to a sense of purpose as "*feeling part of a working society may have some benefits,*" (P14). Participants indicated that crowd work could lead to being "*more engaged [in society] if one so desires,*" (P2). Other potential benefits mentioned were physical exercise (e.g. encouraging hand activity for people with arthritis) and social engagement (e.g. if completing tasks in a group of other crowd workers). When asked about the **barriers to engaging** in crowd work, participants were most concerned about older adults' motivation and interest in crowd work, further highlighting the need for the present research.

Participants were then asked to **compare cognitive training opportunities of crowd work to cognitive training systems** such as Lumosity. Cognitive stimulation was seen as a benefit of crowd work because of the potential transfer due to the novelty and challenge provided where "*[the tasks] constantly changing, which keeps it novel,*" (P1). Also, paying "*participants rather than them having to pay for cognitive training tools,*" (P6) was seen as advantage over existing brain training software. Social engagement and contribution were other benefits. One disadvantage of crowd work compared to cognitive training tools is that the system is not currently adaptive to cognitive improvements or individual needs, "*not adaptive to individual abilities,*" (P3). Some viewed the repetitive nature of tasks as a disadvantage. However, one participant noted that this repetition could be advantageous, commenting "*This repeated exposure allows individuals time to improve on the tasks and potentially allows for more focused training of a particular cognitive skill,*" (P14).

Conclusion

Crowd work may offer cognitive benefit for older adults in terms of executive functioning, but to be effective, more targeted types of crowd work tasks are likely needed. Although exploratory, our results suggest that situating crowd work within the context of cognitive training may be a viable way of engaging older adults in online work.

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