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Addressing labour exploitation in the data science pipeline: views of precarious US-based crowdworkers on adversarial and co-operative interventions

Abstract

Purpose

Underlying much recent development in data science and AI is a dependence on the labour of precarious crowdworkers via platforms such as Amazon Mechanical Turk. These platforms have been widely critiqued for their exploitative labour relations and over recent years there have been various efforts by academic researchers to develop interventions aimed at improving labour conditions. The aim of this paper is to explore US-based crowdworkers' views on two proposed interventions: (1) a browser plugin that detects automated quality control 'Gold Question' checks, and (2) a proposal for a crowdworker co-operative.

Methodology

We interviewed twenty US-based crowdworkers and undertook a thematic analysis of collected data.

Findings

Our findings indicate that US-based crowdworkers tend to have negative and mixed feelings about the Gold Question detector, but were more enthusiastic about the crowdworker co-operative.

Originality

Drawing on theories of precarious labour, we suggest an explanation for our findings based on US-based workers' objective and subjective experiences of precarity. We argue that for US-based crowdworkers 'constructive' interventions such as a crowdworker co-operative have more potential to improve labour conditions.

1. Introduction

Behind recent advances in data science and AI, tens of thousands of low-paid "invisible" workers (Martin et al, 2014) are engaged in labour markets mediated by crowdwork platforms such as Amazon Mechanical Turk (AMT). A significant amount of the "ghost work" (Gray & Suri, 2019) available on crowdwork platforms involves the production of data required for the development and functioning of advanced data processing through completion of 'human intelligence tasks' (HITs) e.g. labelling datasets, engaging in experimental studies and completing surveys. HITs are added to the crowdwork platform by requesters, primarily university researchers and employees of private firms, who offer a small micropayment – often only a few cents or equivalent – for each task completed.

Critical research that recognised the implications of this began a couple of years after the launch of AMT in 2005, led by Irani and Silberman. They began a long-term ethnographic study of workers on the AMT platform, observing various largely "invisible" (Silberman et al., 2010, p. 40) challenges faced by crowdworkers: requesters who don't pay; staying safe from malware; sale of personal information; scams; no control by Amazon when problems arise; and, workers bearing the costs of requester errors. They also identified a number of approaches that workers took to address these challenges, including making use of a range of digital tools and scripts. Similar findings have been widely documented since (e.g. Kaplan et al., 2018, Graham et al, 2017; Lehdonvirta, 2018; Gray and

Suri, 2019), and have led to the classification of crowdwork as a form of precarious labour (Lehdonvirta, 2016).

While there are efforts underway to provide technical and regulatory solutions to some identified issues (e.g., Hanrahan et al., 2015; Saito et al., 2019; Wang et al 2022), much of this research involves little if any engagement with workers. A different approach aims to work with crowdworkers to better understand their perspectives and collaboratively design interventions, examples include browser plugins such as Turkopticon (https://turkopticon.net/) and Dynamo (Salehi et al, 2015), and projects such as Fairwork (https://fair.work/en/fw/about) and Fair Crowd Work (http://faircrowd.work/unions-for-crowdworkers/frankfurt-declaration), as well as work that aims to address crowdworkers low participation rates in these kinds of initiatives (Osterbrink and Alpar, 2021). This paper aims to contribute to these latter efforts, by examining intervention in precarious crowdwork from the perspective of US-based crowdworkers.

We focus specifically on worker perspectives about two suggestions for intervention that aim to address identified issues embedded in the technical design of existing crowdwork platforms: (1) quality control mechanisms and (2) atomisation of the workforce. We undertook a qualitative study that explored the research questions: Do US-based crowdworkers prefer interventions that are more adversarial or more constructive in relation to the existing design of crowdwork platforms? And, drawing on theories of precarious labour, what might explain the answer to this question? The specific interventions considered were:

- **The Gold Question (GQ) detector (adversarial intervention)**: 'Gold questions' are test questions used by requesters to check workers are undertaking quality work. They are a form of automated quality control as getting a Gold Question wrong can lead to automatic rejection of a job. The GQ detector is a browser plug-in to inform workers of the likelihood of part of a HIT being a quality control test. Colluding workers could also use it to enable a 'digital strike'. The Gold Question detector was proposed by two of the current authors in Checco et al (2018).
- **A crowdworker co-operative (constructive intervention)**: The idea of a crowdwork co-operative has been discussed by various researchers in the field (e.g. Gray and Suri, 2019; Graham et al, 2017), and emerged in discussions with crowdworkers in our first round of interviews. The current authors built on this work and discussions with crowdworkers reported in this paper to develop an initial prototype design for a crowdwork cooperative in Bates et al (2022).

The paper begins by discussing the literature on globalisation of crowdwork labour markets, theories of precarious labour and intervention in crowd labour markets. We then go on to describe our research methods, prior to presenting US-crowdworkers' views about the two proposed interventions. In the discussion section, we explore a possible explanation for our findings based on theories of precarious labour, and discuss the implications for interventions in the US crowdwork labour market.

2. Crowdwork interventions in context

2.1 Crowdwork globalisation

While in the early years (2005-2009) of Amazon Mechanical Turk the labour force was primarily US-based (Ipeirotis, 2010), this began to change in 2009 when changes to the payment options

meant more Indian workers were attracted to the platform (Gray & Suri, 2019). By 2017 the majority of crowdwork was undertaken by people in low-income countries, in particular India and the Philippines, and most of the demand came from requesters in wealthy countries such as the United States, Canada and the United Kingdom (Graham et al., 2017). A more recent report by the ILO confirms these trends in supply and demand for crowd labour have continued (Rani et al., 2021).

The impact of this globalisation of the crowdwork labour supply on US-based workers has been recognised. Martin et al. (2016) report a general concern from US workers that the "global reach of the market'' has led to downward pressure on wages meaning it is increasingly difficult to make a living from crowdwork (Martin et al., 2016, p, 51). Graham et al. (2017, p. 146) report workers in sub-Saharan Africa and SE Asia experiencing: "an inability…to exert any significant bargaining power, and a 'race to the bottom' in wage rates." Further, they note that "workers from low- and high income countries end up competing in the same contexts''. Combined these factors have resulted in a significant reduction in wage rates for those crowdworkers in higher income countries.

Moreover, Lehdonvirta (2016) observes that, relative to Filipino participants, American "precariat" crowdworkers were much more likely to express strong concerns regarding their vulnerability to changes in earnings via the platform. He notes a number of potential reasons for this including the fact that the economic security that US workers experienced in the mid-20th century was never a feature of the Filipino job market, leading him to conclude that "individuals, families, and communities in the Philippines may possess more coping strategies for microwork than America's post-industrial workforce" (Lehdonvirta, 2016, p. 65). A finding somewhat reflected in Elbanna and Idowu's (2021) recent research with Nigerian crowdworkers.

2.2 Theorising precarious labour

Precarious work is defined as an objective set of job characteristics related to insecurity, low wages, insufficient and variable hours, low regulation and state protection of workers, and workers' loss of individual and collective control of working conditions (Rogers, 1989; Rubery et al, 2018; Vosko, 2010). Such working conditions are widely recognised to be of detriment to population health and contribute to significant health inequalities (Gunn et al., 2021). Crowdwork has been recognised as a form of precarious work (e.g. Lehdonvirta, 2016).

The increase in precarious work in post-industrial economies is well established. Some researchers have perceived a 'dualisation' process resulting from neoliberal economic reforms in which only a minority of workers have been able to hold on to stable jobs with regular salaries and protections from pure market labour relations (Rubery et al, 2018), with the majority of workers increasingly reliant on precarious work (Manky, 2018). Others have observed that this shift towards precarious labour has been most prevalent for male workers in the Global North, with unstable employment a longstanding norm for women and migrants in the North and all workers in the Global South (Rogers, 1989; Betti, 2016; Schierup & Jorgensen, 2016). Others have warned against such dualisation between those workers in stable and those in precarious employment. They observe that all workers are now vulnerable to precarity due to structural changes in employment and welfare resulting from processes of economic liberalisation (e.g. Moore and Newsome, 2018), and that the security of 20th Century Fordist labour relations was an "exception" to the rule of capitalist labour relations (Neilson & Rosters, 2008).

Beyond debates about how best to theorise objectively precarious work, a further strand of research explores workers' subjective experience of precarious work, what Alberti et al (2018, p. 451) describe as a deepening subjective "sense of insecurity" that has taken hold among workers in response to widespread restructuring of workplaces. While some critical accounts have assumed that a worker's

position vis-à-vis precarious employment will determine their class-conscious perception of precarious work (e.g. Dörre 2004; 2016), others have critiqued this as overly deterministic (Baron, 2015).

Beyond debates about class-consciousness, other research explores how context can affect workers' subjective experience of crowdwork. This research demonstrates that while many people that engage in precarious work can be defined as "precarious workers" i.e. those engaged in precarious work that must also "endur[e] the necessary consequences of precariousness" (Campbell and Price, 2016, p. 315), others are better protected from the most challenging aspects of precarity. For example, factors such as parental support (Campbell and Price, 2016; Worth, 2016) or being members of communities with long established coping mechanisms for dealing with non-standard labour markets (Lehdonvirta, 2016; Elbanna and Idowu, 2021), can help shield some workers and shape their subjectivity.

In this paper, we aim to avoid a dualistic approach and instead recognise precarious working conditions as something that all workers are vulnerable to and a core feature of the unmanaged capital-labour relation (Moore and Newsome, 2018). Yet, following Alberti et al (2018), we also recognise that the extent and depth of that precariousness varies tremendously across different forms of employment. Further, we recognise that the experience of precarious work can vary significantly depending on a workers' social context. Given this, we argue that both objective work conditions and the subjective experiences of workers in particular contexts are equally important for both understanding and improving labour conditions.

Based on this theoretical stance, we observe that the work available on crowdwork platforms fits the objective definition of precarious work – it is low paid, insecure, there is little worker control over working conditions, and little regulation to protect workers. We also recognise that many – although not all – US-based workers using crowdwork platforms can be categorised as "precarious workers"; that is, they endure the consequences of precarious work and the insecurity, low pay and lack of protection that comes with it (Campbell and Price, 2016). Finally, given our interest in interventions to improve the objective conditions of crowdwork, we argue it is necessary to understand such efforts from the subjective experience of workers, particularly those workers who are "precarious workers" (Campbell and Price, 2016) and therefore have most to lose from misguided interventions.

2.3 Crowdwork interventions

US-based crowdworkers and researchers have long raised concerns about academic intervention and regulatory approaches that risk erasing worker agency and reducing their ability to access work via the crowdwork platforms (Martin et al, 2014; Irani et al, 2016). Given the concerns of crowdworkers about academic interventions, Martin et al. (2014) advocate for an approach that reflects Irani and Silberman's i.e. "helping Turkers to make better decisions within the market" (p. 234) with tools such as Turkopticon. Others have suggested similar interventions, focused on issues of information and communication. For example, Cherry (2016) emphasises transparency and due process; Kittur et al. (2013) recommend better task design facilitated by better worker-requester communication, as well as systems that can facilitate learning. Salehi in collaboration with Irani and other colleagues, developed the platform Dynamo which also focuses on enhancing communication between crowdworkers for the purpose of collective action (Salehi et al., 2015). The Gold Question detector proposed by the current authors (Checco et al 2018; Checco et al 2020), and which we asked crowdworkers about in this study, falls into this informational type of intervention. However, the design and capabilities of the GQ detector plugin are more adversarial in relation to the existing system than those interventions described above, in that the plugin potentially negates requesters' ability to use Gold Question quality control checks.

Beyond enhancing information sharing and communication platforms, others have begun to explore alternative business models for crowdwork platforms including social enterprise models (Gray, 2019) and worker co-operatives (Gray, 2019; Graham et al, 2017). Fan et al (2020) propose a reward scheme in which a group of workers distribute payments between them, thus reducing workers' hourly wage uncertainty. Graham et al. (2017) conclude by arguing for four core strategies: "certification schemes, organising digital workers, regulatory strategies and democratic control of online labour platforms" (p. 135). Further, Al-ani and Stumpp (2016) suggest a role for trade unions, something that activist and researcher Silberman is now involved in from his base in Germany. Graham, Silberman and their collaborators are also involved in the Fairwork project which is working collaboratively with platforms, workers, trade unions, regulators, and academics to "set global principles of fair work in the platform economy" (https://fair.work/en/fw/about). The Crowdworker Co-operative intervention, described by the current authors in Bates et al (2022) and which we ask workers about in this study, also falls under this intervention category of alternative business models and governance for crowdwork platforms.

Developing a better understanding of crowdworkers' perspectives on such interventions is important for informing future work.

3. Methodology

We decided to focus our empirical work on US-based crowdworkers. While a lot of early research on crowdwork focused on US-based workers, more recently the focus has shifted to non-US workers primarily those based in the global south (e.g. Lehdonvirta and Mezier, 2013; Lehdonvirta, 2016; Gray et al., 2016; Gray and Suri, 2019; Martin et al., 2016; Graham et al., 2017; Elbanna and Idowu, 2021). This body of work has significantly enriched understanding of global crowdwork markets, including how globalisation has contributed to the deepening precarity of US-based workers who are now competing in the same labour markets as those in countries with lower wages rates. While this trend has been recognised, there has been little empirical work that re-engages US-based workers in research about the future of crowdwork. It is therefore important to understand the US-workers shifting positionality in this context of a globalising labour markets and shifting socio-economic conditions. Our decision was therefore motivated by a desire to return to the experiences of US-based crowdworkers in the context of a deepening globalisation of crowdwork platforms, which has had significant implications for their earning potential through crowdwork.

We adopted a qualitative interview approach in order to develop a deep and nuanced understanding of the complexity of individual crowdworkers experiences and perspectives. We conducted twenty semi-structured interviews with US-based crowdworkers via Skype. Interviews began by asking about the worker's background, before going on to explore the issues and challenges they face as a crowdworker, social and technical challenges related to self-organisation of crowdworkers, perceptions about the GQ Detector (i1-20) and crowdworker co-op (i-11-20), and ideas for other types of interventions. Only ten respondents were asked about the worker co-operative as the idea emerged later in the process, in part through discussions with four out of the first 10 interviews. We then actively asked about the crowdwork co-op intervention in the final 10 interviews. After twenty interviews we found that we had reached "meaning saturation" (Hennink et al, 2016). At this point we were gaining little new insight from each interview and we felt we had gained "a richly textured understanding of issues" (p. 591), and so we decided to pause data collection. This sample size is in

line with Hennink et al's (2016) study which concluded that studies that report reaching "meaning saturation" tend to do so at around 16-24 interviews.

We recruited participants via crowdworker forums and Slack channels, and from among previous participants in a study on crowdwork co-operatives conducted by co-author Checco. For interviews 1-10, we contacted the 100 most active users of two crowdworker forums popular with US based workers - TurkerNation and Reddit (subgroups Turkkit and HITsWorthTurkingFor) – and recruited the first five people from each that replied. For interviews 11-20, we contacted a Slack mutual help forum and recruited the first five that replied, and contacted 400 people that had previously been recruited to Checco's experimental study on crowdwork co-ops and from these recruited five people.

Each worker was paid for their time at a rate of $13.50/hour. We aimed for diversity in relation to demographics and experience within the sample. Overall, our sample was fairly balanced in relation to gender (9F; 11M; 0 Other) and age (25-67). We interviewed people with a range of years of experience on the platform: Pre-2010 (n=5); 2011-2015 (n=6); 2016-2019 (n= 9, with 5 less than 12 months). Hours worked per week were: 1-15 (n=4); 16-30 (n=14); and, > 31 (n=2). Earnings per month were: <$200 (n=2); $201-$500 (n= 11); <$501 (n= 2), with 5 unknown. The workers were also highly educated with the majority having a Bachelor's degree or higher: High School Diploma (n=3); Associate degree (n=3), Bachelor's degree (n=11); Master's degree (n=3).

As we expected from the literature, the workers we spoke to indicated that the labour conditions they were experiencing as US-based crowdworkers had decreased significantly over the last decade. Fifteen of the twenty workers complained about low and decreasing levels of pay. For one worker who began working on AMT in 2007, the $6/hour (half the minimum wage in their state) that was previously an AMT guideline was an ideal that was increasingly difficult to attain. Others who began work on the platforms more recently (2017-18) similarly reported extremely low paid HITs earning $2-3/hour for challenging work. Eleven participants were currently experiencing significant financial precarity and were dependent on their income from crowdwork. Three participants had been experiencing significant financial precarity when they began crowdwork, but had since found other paid employment but continued with crowdwork for extra income. Five had other income and used crowdwork to, for example, save for a pension, have some extra savings or extra flexibility. One participant did not share their level of dependency. The precarious conditions that were reported by workers reflected the key issues emerging in other literature on crowdwork e.g. Hara (2018); Graham et al. (2017), and we therefore understand our sample to be a good reflection of the experience of US-based crowdworkers.

We adopted Braun and Clarke's (2006) approach to thematic analysis. Two of the authors were involved in this process to ensure thorough analysis and the opportunity to discuss any uncertainties. We undertook two rounds of thematic analysis. The first round was aimed at capturing insight into workers' experiences and conditions on the crowdwork platforms. The second round was a more specific thematic analysis focused specifically on workers' perceptions of the Gold Question detector and crowdwork co-operative ideas. In this paper, we focus primarily on the findings of the second phase of analysis, with findings from the first phase used for purposes of contextualisation.

Potential limitations of our approach include: (1) the power imbalance introduced by the technical limitations of setting up the interview in AMT. The payment went through AMT and was completed only after the interview, thus the worker might have had some reservations about being completely honest as the researchers had access to the worker ID and could potentially flag them based on their answers or decide not to pay them at the end of the interview; (2) all of our participants were based

in the USA mean the findings may not be transferable to crowdwork in other countries. Further research is recommended to examine our findings in more depth and in other contexts.

Ethical approval for the study was gained from University of Sheffield Information School.

4. Findings

4.1 The Gold Question Detector: mixed feelings

Impact on working conditions

Workers had mixed feelings about whether the GQ detector would improve their working conditions. They shared their current experiences of GQs, observing that while some requesters used very obvious attention check questions, in some cases they could be easy to miss with the potential implication being having a job rejected and receiving no payment – a clear example of the precarious nature of their work on the platforms. For many the automated management of quality control that Gold Questions represent had at times caused problems leading to loss of pay. In such cases, many interviewees could see the benefits of the GQ detector:

> "if there's something that maybe is a little bit funny, it would alert me to pay a little bit more attention" (i19).

Those whose overall evaluation of the GQ Detector was largely positive (n=4) suggested it was something they would be keen to try out for a while to see if it helped, however many interviewees had mixed feelings (n=9) or were largely negative (n=7) about the detector. Some of those that were negative questioned the necessity of the detector due to their perception that most GQs were obvious anyway (i1, i16, i18). Those that had mixed views also observed that they could not depend on such a technology (i4) and that it had limited functionality (i12). One worker also thought it might reduce her satisfaction as she enjoyed the challenge of spotting the test questions (i17). Workers with varying levels of financial dependency on the platform shared such views.

Ethical concerns

Beyond the efficacy of the GQ detector for improving working conditions, many interviewees raised ethical concerns. Some perceived the GQ detector explicitly as a form of cheating (i2; i18; i11). Notably two of these workers (i2 and i11) were in the least precarious category of workers – the money they earned from crowdwork was not their primary income. I11 explained that he perceived such tools as a form of "cheating to stay ahead and make more money" in a highly competitive labour market. I8 described how he had developed a similar script when he first started crowdwork and was resultantly kicked out of the MTurk Crowd online community by other crowdworkers. Others perceived that while not essentially cheating, it could be used by those that want to cheat the system – "people that are not good MTurkers" (i13). However, some of these respondents felt the cheats would be caught eventually (i8), and that it would also be used "wisely" by those that are good workers (i14). Workers varied in their perceptions of the proportion of likely "cheats'', but there was a feeling from many interviewees (all of whom were in the most precarious financial circumstances) that most crowdworkers were honest (i19; i5; i15; i17). One person observed that she thought it was the highly competitive nature of the crowdwork system that led to negative behaviour (i15; i17): "that kind of scarcity makes people hungry…and when you're hungry you're not very cooperative [laughs].." (i17). These insights point to the ways in which competition for securing work on the

platforms frames workers' perceptions of other workers, and how they imagine what is important to maintain their status as a good worker in a precarious labour market.

Data quality

Beyond the ethics of "cheating", a number of workers who had negative or mixed feelings about the GQ detector shared concerns about the impact on data quality (i8; i13; i15; i16; i18; i20 – varying financial circumstances). These workers tended to identify with the needs of requesters and accepted attention checks as a means to ensure the integrity of data produced (i15). Some worried about the implications of the GQ Detectors for requesters (i18; i13) and observed that it would likely lead to requesters establishing new ways of quality checking data (i20; i11) which could make the already precarious work more challenging to complete.

Worker-requester relations

In terms of worker-requester relations, for those that were largely negative about the GQ detector, they tended to identify more with the requesters and Amazon than with other crowd workers. For example, i18 spoke of how requesters already have to worry about data quality, "they're paying a lot of money for good data…its fair work for fair pay", and it is probably against Amazon's Terms of Service. This was our only example of a worker perceiving "fair pay" in crowdwork, with others complaining of low pay of $2-3/hour (e.g. i15). Interestingly, this particular worker was in our most vulnerable category of financial precarity - dependent on income from crowdwork. Similarly, i6 (another worker who was financially dependent on the platform) identified with Amazon claiming if he were Amazon he would ban workers using the tool, and i16 thought that the tool would make requesters more sceptical about using the platform thus impacting the amount of work available in an already challenging labour market.

On the other hand, those that had mixed feelings or were largely positive about the GQ detector tended to identify more with the crowdworkers. Workers in this category were all financially dependent on crowdwork, or at least had been when they began and now used it for extra income. I5, who was positive overall, recognised that there was currently a dichotomy between worker and requester and the relationship was "adversarial". He observed that some requesters try to "cheat" workers, and despite being positive about the detector, he perceived that "it would be more constructive to have a dialogue about it" (i5). I17 also observed that requesters do not trust workers and that it would make them uncomfortable, however she also thought it would make many workers more comfortable with attention checks. Similarly, i4 observed that it would likely frustrate requesters, but that "MTurkers might enjoy that a little bit, [laughs]" (i4). However, one such worker who was currently financially dependent on crowdwork voiced concern about Amazon's possible response, arguing that she would only use it

> "as long as it conforms with Amazon's terms of service. I don't want to do anything that would upset the apple cart with them…. I wouldn't want to do anything that might make Amazon unhappy" (i7).

Fear of consequences

This fear of the consequences was also expressed by many that were negative about the GQ detector. One concern was around automation of crowdwork, and the increasing use of bots and VPNs (i1; i18; i20) to make money on crowdwork platforms. Two of these workers (i1 and i20) were in the category of least dependent on crowdwork, and therefore not the most precarious. I1 perceived

> "it could be dangerous…[requesters] are not trying to weed out people that aren't paying attention. That's what they say they're doing, but what they're really doing is trying to weed out automation".

These participants were anxious that what they perceived as an enabler of automation and human cheating, could lead to negative implications in terms of reduction in the number of requesters using the platform (i20) and, ultimately, that the "system is going to go away and the platform is going to completely change" (i11). In this sense, they saw the GQ Detector not as a tool for resisting automated management of quality control, but as an enabler of further automation of the type of work available on the platform. Interestingly, those with this concern tended to be those that were least dependent on the platform for income.

4.2 Crowdworker co-operative: guarded enthusiasm

The ten workers that we asked about the crowdworker co-operative tended to perceive the idea in a far more positive light than the Gold Question detector. The ideas caught participants' attention and generated a lot of curiosity and discussion, as explored in more depth in Bates et al (2022) in which we develop an initial prototype of a crowdworker co-op based on workers' thoughts. Two participants who were financially dependent on the platform (i15 and i13) expressed a high level of enthusiasm:

> "Yes, that would, right there, solve so many problems, so many problems… the humanitarian in me, I'd be like, "Yeah, all over that"" (i15);

> "I think that'd be pretty cool, like a collective, yeah… Well, it sounds like--, almost like socialism [laughs] or something… In the US, Bernie Sanders, they're getting ready for the 2020 Presidential election, and they're talking about a lot of these collective sort of endeavours" (i13).

Co-operatives in practice

They and others engaged enthusiastically about how the co-operative might work in practice. They explored issues of who should be able to join: "you want to qualify people that have humanity behind them rather than a dog-eat-dog persona" (i15). Those that had more mixed feelings recognised that there would be a need to protect against malicious workers (i16 – not financially dependent), and i19 imagined higher earners would want to group together and exclude lower earners. However, i15 also thought that some of the problematically competitive practices of precarious workers on AMT might decline in a co-operative model:

> "you take that threat away, when you give support where there was never any in certain areas, you're going to see a shift" (i15).

I18 (financially dependent on the platform) also observed it would likely be easier to get rid of those that did little work, as the social ties between crowdworkers were less than in face-to-face environments - a factor that might of course work against some workers in certain contexts.

They also explored ideas for paying workers and collaborative governance. There was widespread agreement that an hourly rate of pay would be better than the current more precarious model, and some thought that all workers should receive an equal rate of pay regardless of what tasks they undertook as part of the collective (i18; i20 – varying dependence on the platform). Others however thought that higher quality work should receive more pay, so more experienced workers would likely receive a higher rate (i11 – not financially dependent on the platform). In relation to governance of

the co-operative, workers felt that decision-making should be collaborative (i11). I18, who was financially dependent on the platform, recognised the need for an experienced leader, although on the basis that this would not be a traditional manager role and they should receive the same rate of pay as other workers. I19 perceived that a significant challenge of a crowdworker co-operative would be consensual decision making among so many people. These ideas and desires of workers in relation the crowdwork cooperative can also be read as a critique of the precarity in existing crowdwork i.e. conditions that foster insecurity, low wages, insufficient and variable hours, and workers' loss of individual and collective control of working conditions

Volume of work

Yet, despite the enthusiasm the implications of not having an abundance of work were a concern for some (i17; i19), who recognised that the co-operative could only work in practice if there was enough work to go around: "how would you guarantee, you know, like $8 an hour if you have a bad day where there's no work for anybody?" (i17 – financially dependent on platform). Relatedly, i19 raised the question of compliance with the Amazon platform. As a number of workers noted AMT was currently their preferred platform as it was where the majority of work was. If the co-operative was not compliant with Amazon, they argued, it would need to be a standalone platform and may struggle to generate enough work. Despite the ILO (Rani et al., 2021) reporting that there are now around 46 different crowdwork platforms, from the perspective of US-based workers Amazon still dominates. These concerns highlight the challenge of improving working conditions in a political economic context in which firms such as Amazon have been allowed to gain a monopoly across a wide range of services, including in precarious crowd labour markets.

Fairness

The question of fairness was another significant theme that emerged, particularly for those that had mixed views about the co-operative idea. While some thought the above suggestions "would be pretty fair most of the time" (i20 – not financially dependent), others disagreed and this made them hesitant about the fairness of the co-operative. Specifically, workers with varying levels of financial dependency were concerned about the fairness for more productive crowdworkers:

> "I feel like at some point it won't be fair to all the workers if you just kind of share out [the money] - some people will maybe work more but they earn less" (i12);
>
> "why would the person who can do more work give me some of their money?... I don't know, I think that would be a difficult concept to sell to the higher earners" (i19).

5. Discussion

Among the workers we spoke to there was a striking difference in their perception of the Gold Question detector relative to the crowdworker co-operative. While both ideas aimed to make an intervention in the relationship between crowdworkers, requesters and platform owners, workers tended to reject the 'adversarial' Gold Question Detector and be more interested in the more 'constructive' Crowdworker Co-operative. In this section, we will discuss our understanding of what might explain this difference through the lens of research on precarious labour.

In our discussions with US-based crowdworkers, they described both objectively precarious labour conditions, as well as sharing – directly and indirectly - their subjective experiences of these conditions as they related to the two interventions. Workers reported labour practices that clearly met the objective conditions for defining their work as precarious (See e.g. Rogers, 1989; Rubery et

al, 2018; Vosko, 2010; Campbell and Price, 2016), thus confirming Lehdonvirta's (2016) classification of crowdwork as precarious labour. These precarious work conditions are driven by the nature of the worker-requester-platform relation on AMT and similar platforms, the design and governance of the platform that leads to intensifying competition for work, and the expansion of the platform into a global labour market that has pushed down the earning capacity of US-based workers to less than $6/hour. Further, many of the workers we spoke to were economically dependent on these platforms (n=11) or had been when they began crowdwork (n=3), thus clearly classifying as "precarious workers" (Campbell and Price, 2016).

These objectively precarious work conditions made some workers worry that if the GQ detector proved effective, dishonest workers would use it to cheat or potentially automate tasks, putting the majority of 'honest' workers at an unfair disadvantage that could further deepen the objective precarity of crowdwork. Such fears articulated in response to the GQ detector appear to be deeply rooted in the way in which the worker-requester relation is built into the platform, and the intense and largely individualised competition for work that it creates. These worries also relate to the workers' subjective experience of precarity. For many of the workers we spoke to, this subjective – and more general - "sense of insecurity" (Alberti et al, 2018, p. 451) was apparent. They perceived few protections from precarious working conditions, and we argue this was a further reason underlying their wariness in relation to the GQ detector.

We also observed their subjective experience of precarious work emerge subtly in relation to their identification as crowdworkers. As researchers we were surprised both by the level of identification that some workers had with their work and also the extent to which some put themselves in the shoes of the requesters and platforms, often seemingly internalising the needs of the latter at the expense of their own exploitation. This was the case across all levels of financial dependency on crowdwork. Despite most acknowledging their exploitation as a platform worker, the majority of workers projected an identity of being good, honest workers - or "contractors" - whose values and work ethic seemingly led to the rejection of the GQ detector for reasons other than fear of possible reprisals. A good number of workers, for example, expressed genuine concerns about the likely impact on the integrity of the data that was produced by crowdworkers. Some of these workers argued that automated quality control checks were entirely fair on the part of requesters and saw no reason to try and subvert them.

A possible explanation for this position may relate to the sense of identity that working on the crowdwork platforms appeared to provide some of these workers. As Dörre et al. (2004, 2013 - original German source paraphrased and cited in Alberti et al 2018, p. 449) observe, the "subjective feeling of precarity [is] constituted by a sense of lost recognition and social integration". For many of the workers we spoke to, the stories they shared about their working lives reflected this subjective sense of loss. However, for some experienced crowdworkers we also heard about how they had managed to gain a reputation with some requesters as 'good workers' or had built relations with other workers on crowdworker forums. Others spoke about being a contractor, rather than an employee, and with this sense of independence came a certain amount of pride related to self-sufficiency. In this sense, these workers had managed through crowdwork to gain, or re-gain, some of this lost sense of recognition and connection through labour. The importance of recognition is also something observed by Lehdonvirta and Mezier (2013) when they noted that while forums were generally used for information purposes, some workers also used forums for "identity related purposes'' that would otherwise be met within the structures of traditional workplaces. For the workers we spoke to, using a GQ detector risked being labelled a cheat or rule breaker, and thus damaging the good relations and reputations that some of them had built through the platform and

forums, and ultimately risked a form of security through a sense of belonging and recognition they had found through crowdwork.

The possibility of a subjective sense of security within precarity, that could be lost with adoption of the 'adversarial' GQ detector, also helps to explain workers' enthusiasm for engaging with the more 'constructive' crowdwork co-operative idea. As discussed above, the crowdwork co-operative idea emerged initially from early discussions with workers in our first round of interviews, so unlike the GQ detector it came partially from within, rather than external to, workers' experiences. Through discussion of the co-operative model we observed a clear desire from many workers for a system that reduced competition between workers and allowed them to work together to develop fairer, more collaborative working conditions, which fostered feelings of belonging and recognition, and reflected values they expressed in things such as fairness, democratic governance, ethical practice and producing quality work - desires which can also be read as a strong critique of the existing system. These findings also reflect those of Fiesler et al (2019) on workers' suggestions for increasing platform-mediated fairness. These positive responses to the crowdworker co-operative idea reflect workers' desires and existing efforts to counter some of the subjective experience of precarity with its absence of recognition and social integration that Dörre et al (2004; 2013) identify. Nonetheless, workers also recognised that in the existing social context a crowdworker co-operative would still struggle to address their objective precarity, with concerns raised about how wages for co-op members could be guaranteed in an environment of scarcity of work relative to the number of workers.

6. Conclusion

Our findings evidence a strong preference among US-based crowdworkers towards the more constructive proposal of developing a crowdworker co-operative, although with a recognition that such a venture would need to find a way to overcome the problem of ensuring its sustainability in a labour market currently dominated by AMT. This is a challenge we explore in more depth in Bates et al (2022). In contrast, workers tended to reject the more adversarial GQ Detector as ethically problematic, more likely to benefit unscrupulous workers and to risk any subjective security they have found through connection and recognition in crowdwork. We argue that a possible explanation for these findings can be found through consideration of US-based crowdworkers' experiences of both objective and subjective precarity in a shifting post-industrial economy.

Our findings suggest that there is no quick technical or procedural fix for these labour issues given the social context, rather there is a clear need for deeper engagement with critically and socially grounded approaches that take seriously the experiences and perspectives of crowdworkers – particularly those that might be classified as 'precarious workers'. We suggest that in depth qualitative methods offer more scope for understanding these dynamics than some of the quantitative survey approaches that are common in the field, and which tend not to explore some of the more complex social and affective dynamics shaping crowdwork practices and interventions. Based on our own findings, we also suggest that, in the context of US-based crowdworkers, interventions should aim to maintain or enhance workers' sense of reputation and belonging whilst also aiming to counter the objective forms of precarity and exploitation evident in the existing platform-requester-labour relation, and to do so through interventions that are more constructive than adversarial in nature. The crowdworker co-operative is one such intervention, and an initial prototype based on our discussions with workers so far is shared as a starting point for further co-design in Bates et al (2022).

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