Job Characteristics and Turker Motivation:
A Crowdsource Study of Amazon Mechanical Turk

by
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Abstract

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There is substantial opportunity for I-O psychology to study and further understand the growing industry of gig work. The research gap in the limited domain of gig work prompted the exploration of studying what perceived job characteristics matter for crowdsource workers on Amazon's Mechanical Turk (MTurk) and whether job characteristics predict traditional workplace outcomes in the gig economy. Participants from MTurk allowed the research question to be efficiently assessed within a gig related crowdsourcing sample. This study demonstrated that traditional theories from I-O psychology can apply to crowdsource based work. Specifically, job characteristics were related to job satisfaction and organizational commitment, and were found to be further mediated by workers' level of autonomous motivation. Worker seriousness, while not a significant moderator for all moderated mediation models, had a moderating impact on certain indirect effects. This study further adds to the limited, but growing, literature examining work in the gig economy and provides a furthering of the current understanding of crowdsource based work on MTurk

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Introduction

The way in which people work is always evolving. Work has to change and adapt to the newest technology being developed. This idea is not new to many industries who have quickly adapted with the automatization and mobile phone technology. Digitalization and automation have been referred to as the fourth industrial revolution, a trend that has quickly changed the nature of work, business, and society (Schwab, 2017; Hirschi, 2017). Riding the wave of using contingent workers in the workplace, gig work was not far off with the use of mobile phone technologies that allowed workers to quickly accept and complete individual "gigs" from anywhere. The gig economy is the collection of markets that help match providers to consumers for a singular job, or gig (Donovan, Bradley, & Shimabukuru, 2016). Gig work consists of short-term (minutes, hours, or days) work that is usually coordinated through a mobile app or other internet-based connection (Farrell & Greig, 2016). As this new form of work continues to grow in popularity from companies such as Uber, Lyft, MTurk, Fiverr, Amazon Flex, and Doordash, work will continue to evolve with the demands of the market in combination with the ability of the current technology.

With increasing changes in the population from traditional work settings to gig based work, it is unclear if I-O psychology is prepared to understand how workers are performing within this new domain. Even in the seemingly limited domain of gig work, Kuhn (2016) suggests there is still substantial opportunity for

I-O psychology to study and further understand worker behavior. Major I-O psychology topics such as organizational attraction, job satisfaction, and turnover may seem to lack relevance in gig work where workers are self-employed (Kuhn, 2016). This initial irrelevance of traditional I-O psychology topics may be unwarranted, due to gig platforms still competing with one another for freelance workers. Gig based platforms are dependent on their workers, so understanding how to attract and retain their workforce is vital for this developing domain of work. Additionally, Brawley (2017) noted a gap within the research regarding gig work and proposes it is time to study I-O psychology theories relevance in the gig economy and how they can be adapted to changes in the workplace that are driven by technology.

This gap in knowledge has prompted the question: what perceived job characteristics and motivational factors matter for gig workers and do these factors predict workplace outcomes in the gig economy? While it may be easy to assume that gig workers are purely driven by extrinsic motivations (i.e., economic incentives), research on workers from the crowdsourcing website Amazon Mechanical Turk (MTurk) show that is not completely representative of this workforce. Crowdsourcing workers complete work for different reasons, but real time flexibility and monetary compensation appear to be the primary drivers for completing these virtual tasks (Teodoro et al., 2014). Additionally, while extrinsic motivators are strong indicators for completing tasks, intrinsic motivations such as

feeling enjoyment or solving challenges are also import to task completion in gig work (Teodoro et al., 2014). Some MTurk workers reported money as a reason for doing work, but indicated that money was irrelevant to their work satisfaction – they wanted enjoyment in completing tasks as well (Ross et al., 2000; Ipeirotis, 2000; Paolacci, Chandler, & Ipeirotis, 2010).

Examining crowdsourcing financial incentives, Mason and Watts (2009) found that the level of compensation did not have an effect, potentially due to intrinsic motivations role. Specifically, they found that more pay motivated participants to complete more tasks in either quota or piece-rate conditions, with the quota condition eliciting more participant effort (Mason & Watts, 2009). However, there was not a significant impact of compensation on quantity of work in either compensation schemes. It could be concluded that strictly extrinsic motivation was not a significant driver and intrinsic motivation may have played a bigger role in the study two task. Additionally, in Mason and Watts' (2009) research, the experimental task consisted of completing online puzzles; they had one participant in the unpaid condition spend five hours completing all 24 puzzles. While many people might assume that extrinsic motivation is the primary driver of gig work, research has begun to provide a more complex understanding of gig workers.

This study examined the role of job characteristics and their relation to job satisfaction within crowdsourcing work, while building off of current motivation

research (Chandler & Kapelner, 2013; Schulze et al., 2011; Rogstadius et al., 2011). Specifically, individual differences in motivational orientation were analyzed as a mediator within this model. The goal of this research is not to compare traditional workers to gig workers, because in some cases traditional workers are also gig workers. They may be working only gigs, or a gig in addition to full-time or part-time employment. The goal of this study is to better understand gig work, specifically crowdsourcing, and whether attitudes about this style of work are consistent with findings among more traditional workers. Crowdsourcing is a form of gig work, but consists of small tasks being completed by freelance workers through third party online platforms. Work can include tasks such as data processing, content review, and academic research. One of the most popular sites is MTurk.

It is important to study this topic because despite gig work's growth in popularity, research into understanding this new work environment is still in its early stage. This study provides additional insights into the characteristics of gig workers and adds to the current, and limited, research in the field. By analyzing job characteristics and individuals' intrinsic and extrinsic motivational orientations, this research can further understand if (a) traditional job characteristics in a crowdsourcing environment are associated with workers satisfaction and commitment; and if (b) workers' motivation orientation is a mediating variable within this model.

Literature Review

Within the workplace there are various types of work. Traditional work would consist of customary work settings where it was commonly expected to be (a) full-time, (b) indefinite until retirement, and (c) in a set location (Kalleber, 2000). On the other hand, there are nonstandard or alternative work arrangements. These work arrangements are not new and can include: part-time work, temporary and contract employment, short-term employment, contingent work, and gig work. "Gig" is a style of work that offers benefits such as freedom and flexibility, but lacks benefits afforded by law to traditional employees.

Gig workers lack traditional benefits and nearly all workplace protections due to businesses avoiding labels such as "employers" and "employees" (Cunninham-Parmeter, 2016). Rather they use terms such as "providers" and "independent contractors", thus not officially employees (Donovan, Bradley, & Shimabukiri, 2016). The gig economy allows individuals to work and make money when they want through the use of digital services that handle the customer matching and payment solutions. A "gig" can describe a single project or task for which a worker is hired, often through a digital marketplace, to work on demand (Torepy & Hogan, 2016). Unfortunately, there is no universally accepted definition of the type of activities that fall unto the gig economy or who should be counted as a gig worker. It is difficult to accurately estimate the number of workers because some individuals are moonlighting in addition to holding full-time or working

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multiple jobs at a time (Spreitzer, Cameron, & Garrett, 2017). Due to this, a wide range of estimates for the number of people in these jobs has been produced.

Gig work is not as uncommon as many people think. Katz and Krueger (2015) found that nearly sixteen percent of workers are engaged in some sort of alternative work arrangements. A JPMorgan Chase (2016) analysis of its checking account customers estimated that one percent actively earn income from some type of online platform in a given month and that four percent had participated in one of these platforms over a three-year period. Gallup (2018) reported that online platform workers make up a small proportion of the U.S. workforce, with 7% completing online work (e.g., MTurk) or customer facing work (e.g., Uber). The Bureau of Labor Statistics (2018) report estimated that 10% of U.S. workers had alternative employment arrangements in the gig economy. As shown through the range of estimates, these reports express the wide variation of data on this growing niche of workers. As online labor platforms increase in popularity, there is becoming an increasing need to fully understand what it means to be a gig worker.

Crowdsourcing and MTurk

Crowdsourcing consists of connecting employers with an online global pool of low cost free-agent workers. Work is published on third party online platforms in the form of small human computing tasks. Crowdsourcing work has been noted to contain six essential characteristics: on-demand virtual labor, open access to work, Internet access to join the crowd, three stakeholders (crowdsourcer,

crowdsourcee, and crowdsourcing intermediary), human tasks, and modular technical architecture (Deng & Joshi, 2016). Current popular crowdsourcing sites include MicroWorkers, ClickWorker, CrowdFlower, and MTurk. A quick search will reveal even more sites that are seemingly being created each day.

One of the most studied virtual crowdsourcing platforms is Amazon Mechanical Turk (MTurk). Many other crowdsource sites share close similarities with MTurk. On MTurk Requesters post Human Intelligence Tasks (HITs) which are then completed by an on-demand labor force of workers. Requesters include individuals, groups, or organizations that post work in the form of HITs for the workers on MTurk to complete. HITs include tasks that require little training but can only be performed by humans and not by computers (Brawley & Pury, 2016). It has been reported that there was an average of 1,278 active requesters per day (in 2015 via www.mturk-tracker.com) (Ipeirotis, 2010; Difallah et al., 2015).

The economic factors of MTurk are similar to other markets that use the "gig economy" model. MTurk work is similar to contract work, but more limited in scope and typically has shorter work tasks (seconds or minutes) (Brawley & Pury, 2016). Tasks on crowdsourcing sites fall under seven categories: data processing (e.g., verifying data entry), categorization (e.g., categorizing products), sentiment (e.g., rating the sentiments in online forms), tagging (e.g., generating keywords for images), content (e.g. reviewing and editing content), business feedback (e.g.,

rating Web search accuracy), and academic research (e.g., surveys or scientific studies) (Deng & Joshi, 2016).

Difallah, Filatova, and Ipeirotis (2018) MTurk population and demographic analysis indicated at least 100K-200Kworkers are on the platform, with more than 2K active at any given time. The average half-life of workers is 12-18 months, but the population renews overtime due to the rate of arrival counteracting the rate of departures (Difallah, Filatova, & Ipeirotis, 2018). Additionally, most of the workers on MTurk are noted to be from the U.S. (75%), followed by India (16%), Canada (1.1%), Great Britain (0.7%), Philippines (0.35%), and Germany (0.27%) (Difallah, Filatova, & Ipeirotis, 2018). The overwhelming majority of the U.S. followed by Indian workers has been noted in prior studies (Mason & Watts, 2009; Ross et al., 2010). MTurk workers appear to have a balanced gender ratio, tend to be younger than the overall population, and have household incomes that are below the average US population – median US household income is around $57K, MTurk median household income is around $47K (Difallah, Filatova, & Ipeirotis, 2018).

Crowdsourcing and Work Design Characteristics

Work design characteristics have been defined as the attributes of the task, job, and social and organizational environment (Humphrey, Nahrgang, & Morgeson, 2007). Hackman and Oldham's (1976) job characteristics model (JCM) is one of the most famous work design theories in the field. The JCM framework consists of five core job dimensions (task significance, task identity, skill variety,

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autonomy, and job feedback) that have been theorized to be associated with motivation, job satisfaction, and performance. Past meta-analyses have supported these hypotheses associated with the JCM (Fried & Ferris, 1987; Humphrey, Nahrgang, & Morgeson, 2007).

Even with its popularity, several criticisms have been noted with their theory and with Hackman and Oldham's (1980) job design measure, the Job Diagnostic Survey (JDS). Some claim it focuses on a narrow set of motivational job characteristics (Parker, Wall, & Cordery, 2001), and that other important job characteristics have been overlooked (Morgeson & Humphrey, 2006). Other studies have found issues with its factor structure and internal consistency (Harvey, Billings, & Nilan, 1985; Idaszak & Drasgow, 1987; Kulik, Oldham, & Langer, 1988; Taber & Taylor, 1990). In an attempt to address the noted issues, Campion (1988) developed the Multimethod Job Design Questionnaire (MJDQ). This measure, while more comprehensive than previous job characteristics measures, still suffered from measurement problems and identified gaps in construct measurement (Edward, Scully, & Brtek, 1999, 2000). In response to the concerns of past work design measures, Morgeson and Humphrey (2006) developed the comprehensive Work Design Questionnaire (WDQ).

The WDQ was created to expand and improve upon the current measurement of job characteristics as well as to address issues with past measures of job characteristics. To expand and address previous scale deficiencies, the WDQ

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includes four characteristics categories (task, knowledge, social, and contextual) that further break down into a total of 21 sub-factors. Task characteristics deal with how the work is accomplished and the range and nature of tasks associated with the work itself, and further break down into autonomy, task variety, task significance, and feedback from the job (Morgeson & Humphrey, 2006). Knowledge characteristics deal with the knowledge, skill, and ability demands that are placed on individuals as a function of the work, and further break down into job complexity, information processing, problem solving, skill variety, and specialization (Morgeson & Humphrey, 2006). Social characteristics further break down into social support, interdependence, interaction outside the organization, and feedback from others. Contextual characteristics include ergonomics, physical demands, work conditions, and equipment use. Additionally, the WDQ addressed past overly complex response scales and negatively worded items that have been shown to create psychometric issues in the measurement of job characteristics (Harvey et al., 1985; Idaszak & Drasgow, 1987).

In a range of traditional work samples, Loher, Noe, Moeller, and Fitzgerald (1985) meta-analysis found a moderate correlation between job characteristics index and job satisfaction of 0.39. An additional meta-analysis of job characteristics (motivational, social, and work-context) in traditional work samples by Humphrey, Nahrgang, and Morgeson (2007) found that on average motivation job characteristic explained 34% of the variance in job satisfaction and 24% of the

variance in organization commitment. Beyond motivation job characteristic, social explained incremental variances of 17% in job satisfaction and 40% in organizational commitment. Additionally, beyond both motivation and social, work context characteristics explained incremental variance of 4% in job satisfaction (Humphrey, Nahrgang, & Morgeson, 2007).

While research has explored job characteristics in traditional work settings, limited research has begun to examine components of various job characteristic models with gig work and crowdsourcing work. Deng and Joshi (2014) were perplexed at the increasing number of individuals working, in some cases, independently with little social interaction and low pay. Their research re-examined the motivation properties of the Job Characteristics Theory (Hackman & Oldham, 1976) to assess if it needed revision or extension in crowdsource work and to further examine the potential enriching properties of digital work. Crowdsourcing task characteristics (job autonomy, task variety, task significance, task instruction, and task compensation) and the crowdsourcing environment shaped workers continued participation in this style of work (Deng & Joshi, 2016).

In another study, extrinsic motivational categories (immediate payoffs, delayed payoffs, social motivation) were related to the amount of time workers spent on MTurk (Kaufmann, Schulze, & Veit, 2011). However, intrinsic motivation was more important for many workers. Intrinsic motivation facets of "task autonomy" and "skill variety" were ranked higher than other extrinsic motivations

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(Kaufmann, Schulze, & Veit, 2011). When a task was framed in a meaningful context, workers participated in the task at a higher rate and the worker's output quantity increased (Chandler & Kapelner, 2013). Similarly, tasks that emphasized the importance of work on MTurk had a statistically significant effect on the quality of answers (Rogstadius et al., 2011). The research in this domain has explored work dimensions in the JCM by Hackman and Oldham (1976), but very limited research to date has extensively used work design theories past the JCM.

   Hypothesis 1: Task characteristics, knowledge characteristics, and social characteristics will have a significant positive relationship with job satisfaction and organizational commitment.

Crowdsourcing and Motivation

   Within the extensive meta-analysis of crowdsourcing motivations by Spindeldreher and Schlagwein (2016), they reviewed a multitude of reasons people participate in this style of work. Some factors that motivate individuals to participate in this style of work are to earn money (Brabham, 2010; Leimeister et al., 2009), develop skills through engaging in challenging activities (Kosonen, Gan, Vanhala, & Blomquist, 2014), obtaining reputation and recognition (Ipeirotis, 2010; Leimeister et al., 2009), or as a form of entertainment (Brabham, 2008). These reasons span across intrinsic and extrinsic motivations to perform work on MTurk. Spindeldreher and Schlagwein's (2016) results support that the six factors (enjoyment, challenge, outward recognition, compensation, sense of community,

and passing of time) based off of the Work Preference Inventory (Amabile et al., 1994) are relevant not only in several crowdsourcing studies but also potentially in understanding crowdsource work motivations. Additionally, another study revealed while using a self-determination theory (SDT) approach that material external regulation was the most important motivation for crowdworkers, followed by intrinsic motivation (Posch et al., 2019). This close split of motivational importance within this type of work potentially suggests an interesting duality of monetary and interest-driven motivators (Posch et al., 2019).

Motivation theory can be used to explain the driving factors of individuals. Self-determination is a macro theory of motivation that developed from intrinsic and extrinsic motivation research (Deci & Ryan, 1985). SDT differentiates between types of motivation and expresses that different types of motivation have distinctive catalyzers, concomitants, and consequences (Deci, Olafsen, & Ryan, 2017). This theory proposes that intrinsic and extrinsic motivation are separate constructs that exist on a continuum (Deci & Ryan, 1985). Intrinsic motivation is the experiences of interest and enjoyment in the activity. Extrinsic motivation involves doing an activity to attain a separable consequence, and it is differentiated within SDT into forms that include external, introjected, identified, and integrated regulation.

External regulation, the least autonomous end of the continuum, is when an individual perceives their behavior as being directly controlled by others (e.g., control through contingent rewards or threats). Introjected regulation, a slightly

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higher form of autonomous motivation, involves an individual's focus on approval

versus disapproval in their jobs (Deci, Olafsen, & Ryan, 2017). Identified

regulation is when individuals have personal identification with the importance of

their work. Integrated regulation, the highest autonomy of extrinsic motivation, is

when individuals assimilate and integrate their identifications (Deci, Olafsen, &

Ryan, 2017). In the crowdsourcing environment, external regulation could

represent an aspect of workers perceiving the platform as controlling their

performance through approval rates that dictate what work they choose from. On

the other end of the autonomy spectrum in the crowdsourcing environment,

identified regulation and integrated regulation could represent HITs that are more

meaningful to the worker.

SDT orders motivation into external regulation, introjected regulation,

identified regulation, integrated regulation, and intrinsic motivation, which are

ordered from least to most autonomous. The more autonomous motivation, the

more individuals are engaged in an activity with a sense of willingness and volition

(Deci, Olafsen, & Ryan, 2017). Alternatively, low autonomous motivation on the

continuum is controlling motivation. Both intrinsically and extrinsically motivated

activities can be autonomously motivated in the workplace (Deci, Olafsen, & Ryan,

2017). Following a common procedure from past SDT literature, an index score

can be created to measure relative autonomous motivation (RAI) at work (Ryan &

Connell, 1989; Millette & Gagné, 2008; Trépanier et al., 2013). Higher scores

indicate stronger autonomous motivation, and vice versa for lower autonomous motivation scores. Evidence for the ordering of SDT motivation types originates from an underlying pattern that places each construct along the continuum according to their conceptual similarity (Millette & Gagné, 2008; Ryan & Connell, 1989). Thus, variables more similar will have a higher positive correlation than those that are more dissimilar from one another (Millette & Gagné, 2008). The following formula has been used by Millette and Gagné (2008) to measure RAI:

$$RAI = 2(\text{intrinsic}) + 1(\text{identified}) - 1(\text{introjected}) - 2(\text{external})$$

This process of using the RAI has been predictive of organizational outcomes in a variety of contexts (Ryan & Deci, 2017).

A theoretical underlying link between job characteristics and an individual's level of autonomous motivation could be directed to the overarching psychological needs. Psychological needs of competence, relatedness, and autonomy are theorized as needing to be satisfied to provide the "nutriments" for intrinsic motivation and internalization to develop (Gange & Deci, 2005). Job characteristics could be providing the satisfaction of these basic psychological needs, thus providing a potential structure for intrinsic motivation and internalization to develop. In support of this, job characteristics have been found to promote autonomous motivation (Gange, Senecal, & Koestner, 1997).

Additionally, there could be a theoretical link between the subdimensions of job characteristics and the psychological needs within SDT. Knowledge

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characteristics within the WDQ are the knowledge, skill, and ability demands placed on individuals (Morgeson & Humphrey, 2006). This job characteristic subdimension has a potential connection with the psychological need for competence – the need for people to gain a mastery of tasks or to learn different skills. Due to the wide range of potential tasks on MTurk and the range of challenges inherent in these different tasks, MTurk work has the potential ability to meet this psychological need. Task characteristics include how the work is accomplished and specifically measures the autonomy, task variety, task significance, task identity, and feedback from the job (Morgeson & Humphrey, 2006). The subdimensions within task characteristics could also have a connection with the psychological need for autonomy – the need for people to have a sense of control. Gig work, and more specifically crowdsource work such as MTurk, allows individuals to choose their work schedules and specific tasks. This attractive characteristics of gig work should also potentially satisfy the need for autonomy. Lastly, social characteristics are the degree and extent of social connections with others in a work setting. This is a potential direct link with the psychological need for relatedness, or the need to have a sense of belonging with others. While crowdsource work like MTurk typically has low opportunities for social connections or for sharing social information, there are a number of off-site forums workers can use to communicate with one another (Schmidt, 2015). Additionally, workers can communicate with Requesters via email in regards to completed HITs.

Both of these features could contribute to the satisfaction of the psychological need for relatedness.

I-O Psychology has not been fully applied to understanding work within crowdsourcing (Brawley & Pury, 2015). Specifically, this literature review reveals that job characteristics have been studied on MTurk using JCM but not always using an extensive measure, such as the WDQ. Furthermore, past research in the literature review reveals that workers motivations to work on MTurk differ on various intrinsic and extrinsic motivations. While both work design and motivation research have been conducted on MTurk, it appears no research is readily available, especially within crowdsourcing work, to answer the question: How does MTurk workers' perceived job characteristics relate with job satisfaction and organizational commitment while also considering the relation of individual work motivations? Similar to past research, it is hypothesized that higher perceived job characteristics will be associated with higher job satisfaction (e.g., Loher et al., 1985; Humphrey et al., 2007) and higher organizational commitment (e.g., Eby, Freeman, Rush, and Lance, 1999). Intrinsic motivation has also been shown to be a partial mediator between job characteristics and work attitudes (organizational commitment and job satisfaction) (Eby, Freeman, Rush, and Lance, 1999). Based on these findings, it is hypothesized that the relationship between job characteristics, job satisfaction, and organizational commitment will be mediated by individual's autonomous motivation (see Figure 1).

Hypothesis 2: The relationship between job characteristics and job satisfaction/organizational commitment will be mediated by the level of participants autonomous motivation.
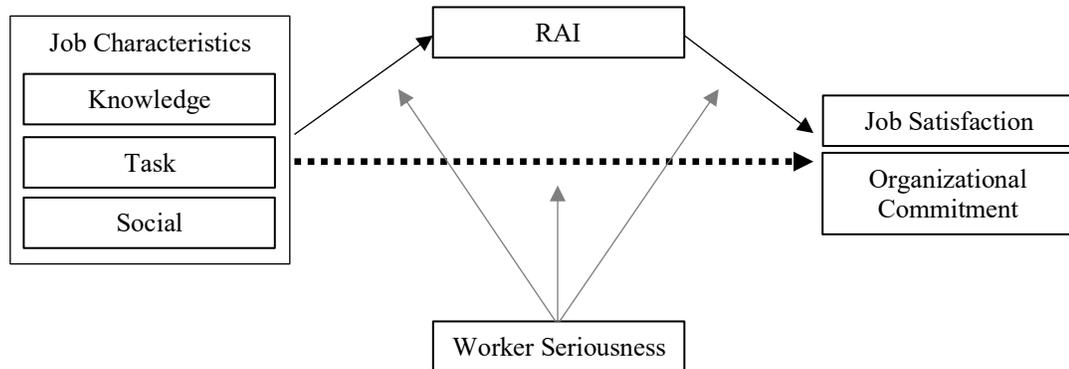
Figure 1. Hypothetical Model

Seriousness of MTurk Work

An additional aspect of gig workers that should be addressed is their seriousness. It is estimated that 10-40% of MTurk workers consider their "gig" either a full-time job or necessary income source, thus considering themselves "serious workers" (Brawley & Pury, 2016; Brawley, 2017). First introduced by Brawley (2017), worker seriousness is a theoretical construct that represents the workers' dependence on and treatment of gig work as a real job and/or as necessary income.

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Self-determination theory's three needs (Relatedness, Competence, and Autonomy) was significantly associated with lower turnover intentions and higher job satisfaction, but mattered less for serious gig workers on MTurk (Brawley, 2017). It has been purposed that serious workers are potentially motivated by other internal drives (e.g., intrinsic enjoyment), or by other external forces (e.g., income) (Brawley & Pury, 2016). Brawley (2017) questions how serious gig workers can be defined and what characteristics distinguish serious versus part-time (or "fun money") gig workers. Past research has revealed that "power-workers", as measured by weekly work time, have different motivations as compared to occasional workers (Kaufmann et al., 2011). Thus, power-workers or serious workers appear to have different drives for completing HITs on MTurk. Seriousness attempts to distinguish between individuals by focusing on how each worker respectively views their work, as a necessity or just supplemental. This could have an impact on the model displayed in Figure 1. Specifically, it is hypothesized that worker seriousness will moderate the indirect and direct effect between job characteristics and the outcomes variables due to the different underlying drives of high seriousness versus low seriousness workers.

Hypothesis 3: The direct and indirect effects between job characteristics and the outcomes variables will be moderated by worker seriousness.

Methods

Procedure

To study these research questions a survey-based study was used. The study

sampled participants from Amazon's Mechanical Turk (MTurk). This participant

pool was analyzed because it allows the research question to be efficiently assessed

within a gig related crowdsourcing sample. A human intelligence task (HIT) was

available for participants on MTurk to complete. The HIT was only open to U.S.

workers to limit potential risk of biases based on cultural or language differences.

Once a participant accepted the HIT, it redirected them to a Qualtrics survey. First,

participants were required to read through and accept a consent form detailing the

research. To measure the job characteristics of the participants they completed the

Work Design Questionnaire (Morgeson & Humphrey, 2006), which is currently the

most extensive work design measure to date. To measure participants motivation

for working on MTurk, the Multidimensional Crowdworker Motivation Scale

(Posch et al., 2019) was used. This measure has been designed specifically for

crowdsource workers. Job satisfaction was measured using the MOAQ-JSS three

item scale (Cammann et al., 1979). This measure has shown in a past meta-analysis

to be a reliable and construct-valid measure of job satisfaction (Bowling &

Hammond, 2007). Organizational commitment was measured using the affective

commitment measure (Meyer & Allen, 1991). In addition, demographic

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information was collected. These demographics variables assist with providing

supplement detail behind the results of the study.

Participants

The initial sample consisted of 227 participants and they were compensated

$0.50 for participation in this study. Participants were sampled using a stratified

sampling method based on the number of HITs that workers have completed. The

stratified samples consisted of workers who have completed 0 to 100 HITs, 100 to

500 HITs, 500 to 1000 HITs, and more than 1000 HITs. As suggested by past

MTurk research on participant screening (Downs, Holbrook, Sheng, & Cranor,

2010), attention check questions were included to disqualify participants who might

not be paying attention or are not taking the survey seriously. No discernable

patterns were noted after inspecting the missing data, which is an indication that

they were missing at random. After reviewing participants with extensive missing

data above the predetermined cutoff and participants that failed the attention

checks, 42 participants were removed resulting in a final sample of 185

participants. With the remaining participants, missing data were imputed using a

random forest-based MICE algorithm (Buuren & Groothuis-Oudshoorn, 2010). All

of the study analyses were conducted using the final sample of 185 participants.

The average participant was 37 years old, 66.7% of the sample were Caucasian,

50% were female ($n = 93$ women; $n = 91$ men, $n = 1$ unreported), the average

tenure on MTurk was 14.48 months, and the average weekly reported time on

MTurk was 23.72 hours. The three highest employment statuses were working paid

employee (54.05%), gig worker (17.30%), and working self-employed (12.43%).

Additional demographics are reported in Table 1.

Table 1
Demographics

Variable	\<multicol\>				
	0-100	100-500	500-1000	1000+	Total
	M (*SD*)				
Tenure on MTurk (in months)	1.36	5.48	7.25	40.14	14.48 (55.2)
Weekly time on MTurk (in hours)	9.17	36.67	26.52	23.41	23.72 (40.63)
Age	36.3	35.09	36.25	38.88	36.72 (11.69)
Gender	*n* (%)				
Male	23	20	17	31	91 (49.19%)
Female	23	23	27	20	93 (50.27%)
Education	*n* (%)				
Less than High School	0	1	0	0	1 (0.54%)
High School graduate	5	3	1	10	19 (10.27%)
Some college	19	11	12	7	49 (26.49%)
Associate's degree	6	4	10	3	23 (12.43%)
Bachelor's degree	8	15	7	25	55 (29.73%)
Master's degree	8	7	11	5	31 (16.76%)
Doctoral degree	0	1	2	1	4 (2.16%)
Professional degree (JD, MD)	1	0	1	0	2 (1.08%)
Current employment status	*n* (%)				
Working (paid employee)	29	16	23	32	100 (54.05%)
Working (self-employed)	6	7	4	6	23 (12.43%)
Not working (temporary layoff from job)	0	1	0	0	1 (0.54%)
Not working (looking for work)	6	5	3	0	14 (7.57%)
Not working (retired)	0	1	2	1	4 (2.16%)
Not working (disabled)	2	2	0	1	5 (2.70%)
Not working (other)	1	2	2	0	5 (2.70%)
Prefer not to answer	0	0	1	0	1 (0.54%)
Gig worker	3	9	9	11	32 (17.30%)
Sample totals	47	43	44	51	*n* = 185

The header "Stratified Sample HIT Groups" spans the columns 0-100, 100-500, 500-1000, 1000+, Total.

Measures

All measures in this study were modified to suit MTurk. Similar to Brawley and Pury (2016), references to organizations, coworkers, and jobs were revised to refer to Requesters, other Workers, and HITs, respectively. This study had the predictors and criterion on two different rating scales consistent with recommendation from Podsakoff, MacKenzie, Lee, and Podsakoff (2003).

Job characteristics. MTurk job characteristics were measured using the Work Design Questionnaire (WDQ; Moregeson & Humphrey, 2006). This measure is the most comprehensive work design measure to date and it provides additional job characteristics beyond those traditionally measured with Hackman and Oldham (1980) Job Diagnostic Survey. The WDQ consists of the subdimensions: *task*, *knowledge*, *social*, and *contextual characteristics*. Only task, knowledge, and social characteristics were used due to the lack of contextual characteristics necessity in crowdsource work. The format of this measure is 73 items on a seven-point Likert scale ranging from "strongly disagree" to "strongly agree".

Motivation. The Multidimensional Crowdworker Motivation Scale (MCMS) was used to assess MTurk workers' motivation (Posch et at., 2019). This measure is theoretically grounded in SDT and is tailored to the domain of crowdsourced work. The MCMS consists of 18 items that are answered on a seven-point Likert scale ranging from "not at all" to "completely". This scale consists of three items for each of the six motivational dimensions in SDT.

Worker seriousness. The seriousness of each worker was measured using the one self-report measure used by Brawley (2017) with an additional 3 items created to better represent the theoretical latent construct: *The money I earn on MTurk plays an important role in my income*, *I consider working on MTurk to be a real job*, and *Right now working on MTurk is a matter of necessity*. The items were measured using a seven-point Likert scale ranging from "strongly disagree" to "strongly agree".

Job satisfaction. Workers' job satisfaction with MTurk was measured using the three item Michigan Organizational Assessment Questionnaire Job Satisfaction Subscale (MOAQ-JSS; Cammann et al., 1979). The scale was measured along a five-point Likert scale ranging from "strongly disagree" to "strongly agree". The MOAQ-JSS has shown to be a reliable and construct-valid measure of job satisfaction (Bowling & Hammond, 2007).

Organizational commitment. Organizational commitment was measured using the 8-item affective commitment measure by Meyer and Allen (1991). The scale was measured using five-point Likert scale ranging from "strongly disagree" to "strongly agree".

Results

Means, standard deviations, internal consistency statistics, and correlations for all measured variables are displayed in Table 2.

Table 2

Means, Standard Deviations, and Correlations with Confidence Intervals

Variable	1	2	3	4	5	6	7
1. Task characteristics	(.94)						
2. Knowledge characteristics	.59**	(.92)					
3. Social characteristics	.41**	.45**	(.93)				
4. Job Satisfaction	.41**	.19**	.17*	(.73)			
5. Organizational Commitment	.45**	.41**	.49**	.44**	(.81)		
6. Worker Seriousness	.38**	.40**	.25**	.04	.38**	(.79)	
7. RAI	.30**	.22**	.15*	.55**	.33**	.01	(.90)
Mean	5.42	4.57	3.79	3.94	2.76	4.71	2.62
Standard Deviation	.86	.94	1.17	.89	.82	1.46	4.11

Note. n = 185. * indicates $p < .05$. ** indicates $p < .01$.

Job Characteristics Relationship with Outcome Variables

The correlation analysis reported in Table 1 supports Hypothesis 1 that task characteristics, knowledge characteristics, and social characteristics will have a significant positive relationship with job satisfaction and organizational commitment. Additional multiple regression analysis further supports Hypothesis 1 with task, knowledge, and social characteristics explaining 32.5% of the variance in organizational commitment, $F(3,181) = 29.05$, $p < 0.001$, $R^2 = 0.325$. Task characteristics ($b = 0.24$, $t(181) = 3.28$, $p < 0.001$) and social characteristics ($b = 0.24$, $t(181) = 4.94$, $p < 0.001$) were the only significant predictors. Additionally, task, knowledge, and social characteristics explained 16.9% of the variance in job

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satisfaction, $F(3,181) = 12.27$, $p < 0.001$, $R^2 = 0.169$, with only task characteristics being a significant predictor within the model $b = 0.45$, $t(181) = 5.17$, $p < 0.001$.

Mediation

Regression analysis with Hayes (2017) PROCESS macro were used to test a mediation effect between task, knowledge, and social characteristics and job satisfaction/organizational commitment through RAI. Six different mediation analysis were conducted for each of the three core dimensions of job characteristics (knowledge, task, and social) and each of the outcome variables (job satisfaction and organizational commitment). Supporting Hypothesis 2, all three core job characteristics dimensions revealed significant indirect effects for both job satisfaction and organizational commitment.

Job satisfaction. To test for mediation for job satisfaction a regression found that knowledge characteristics alone, $b = 0.18$, $p < 0.01$, task characteristics alone, $b = 0.42$, $p < 0.001$, and social characteristics alone, $b = 0.13$, $p < 0.05$, accounted for significant variations in job satisfaction. Additionally, knowledge characteristics alone, $b = 0.96$, $p < 0.01$, task characteristics alone, $b = 1.42$, $p < 0.001$, and social characteristics alone, $b = 0.53$, $p < 0.05$, accounted for significant variations in RAI. Using both knowledge characteristics and RAI to predict job satisfaction, RAI positively predicted job satisfaction, $b = 0.12$, $p < 0.001$, and knowledge characteristics no longer significantly predicted job satisfaction, $b = 0.07$, $p = .214$. Both RAI, $b = 0.10$, $p < 0.001$, and task characteristics, $b = 0.27$, $p <$

0.001, positively predicted job satisfaction. Lastly, using both social characteristics and RAI to predict job satisfaction, RAI positively predicted job satisfaction, $b = 0.12$, $p < 0.001$, and knowledge characteristics no longer significantly predicted job satisfaction, $b = 0.07$, $p = 0.155$. The indirect effects for each of the models predicting job satisfaction were significant for knowledge characteristics, $b = 0.11$, $BootSE = 0.04$, BootCI [0.04, 0.20], task characteristics, $b = 0.14$, $BootSE = 0.04$, BootCI [0.07, 0.23], and for social characteristics, $b = 0.06$, $BootSE = 0.03$, BootCI [.00, 0.13].

Organizational commitment. To test for mediation for organizational commitment, knowledge characteristics alone, $b = 0.357$, $p < 0.001$, task characteristics alone, $b = 0.43$, $p < 0.001$, and social characteristics alone, $b = 0.35$, $p < 0.001$, accounted for significant variations in organizational commitment. As stated above, knowledge characteristics alone, $b = 0.96$, $p < 0.01$, task characteristics alone, $b = 1.42$, $p < 0.001$, and social characteristics alone, $b = 0.53$, $p < 0.05$, accounted for significant variations in RAI. Furthermore, using both knowledge characteristics and RAI to predict organizational commitment, RAI, $b = 0.05$, $p < 0.001$, and knowledge characteristics, $b = 0.31$, $p < 0.001$, positively predicted organizational commitment. Both RAI, $b = 0.04$, $p < 0.01$, and task characteristics, $b = 0.37$, $p < 0.001$, positively predicted organizational commitment. Lastly, using both social characteristics and RAI to predict organizational commitment, RAI positively predicted organizational commitment,

$b = 0.05$, $p < 0.001$, and knowledge characteristics no longer significantly predicted organizational commitment, $b = 0.32$, $p = 0.155$. The indirect effects for each of the models predicting organizational commitment were significant for knowledge characteristics, $b = 0.05$, *BootSE* $= 0.02$, BootCI [0.01, 0.10], task characteristics, $b = 0.06$, *BootSE* $= 0.03$, BootCI [0.02, 0.12], and for social characteristics, $b = 0.03$, *BootSE* $= 0.02$, BootCI [.00, 0.06].

Moderated Mediation

Additionally, the PROCESS macro (Hayes, 2017) was used to explore Hypothesis 3 via a moderated mediation model (model 59) analysis of worker seriousness. Predictor scores were mean centered for the analyses. Table 3 and Table 5 represent the regression and direct and indirect output for job satisfaction, and Table 4 and Table 6 represent the output for organizational commitment. The results reveal that Hypothesis 3 was not fully supported.

Job satisfaction. The interaction between work characteristics and seriousness regressed on RAI revealed non-significance for knowledge, $b = -0.19$, $p = 0.31$, social, $b = -0.19$, $p = 0.28$, and task characteristics, $b = 0.29$, $p = 0.13$. The interaction between work characteristics and seriousness regressed on job satisfaction revealed no significance for knowledge, $b = -0.03$, $p = 0.44$, social, $b = 0.01$, $p = 0.69$, and task characteristics, $b = -0.02$, $p = 0.53$. Additionally, the interaction between RAI and seriousness regressed on job satisfaction revealed no significance across knowledge, $b = 0.004$, $p = 0.63$, social, $b = 0.002$, $p = 0.82$, and

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task characteristics, $b = 0.003$, $p = 0.75$. None of the interactions with job satisfaction were significant. This might mean that the conditional direct and indirect effects are noise, thus caution should be warranted when interpreting these effects.

The direct effect of task characteristics on job satisfaction was moderated by workers seriousness such that the direct effect was stronger among participants relatively low in seriousness (-1 *SD* below the mean; $b = 0.32$, $SE = 0.08$, $p < 0.01$, 95% CI [0.17, 0.48]) than participants high on seriousness (+1 *SD* above the mean; $b = 0.26$, $SE = 0.10$, $p < 0.05$, 95% CI [0.06, 0.46]. This reveals a decrease in conditional direct effect size as participants seriousness increases. This pattern of findings is inverted for the conditional indirect effects. As seriousness decreases (-1 *SD* below the mean), the significant conditional indirect effect, $b = 0.13$, *BootSE* = 0.05, BootCI [0.05, 0.23], was smaller than for participants with higher levels (plus 1 *SD* above the mean) of seriousness, $b = 0.23$, *BootSE* = 0.07, Boot CI [0.10, 0.38].

None of the conditional direct effects for either knowledge or social characteristics on job satisfaction were significant. For knowledge characteristics, the conditional indirect effects were only significant for participants at the mean, $b = 0.12$, *BootSE* = 0.05,, Boot CI [0.04, 0.23], and for participants with lower levels of seriousness (-1 *SD* below the mean), $b = 0.15$, *BootSE* = 0.06, BootCI [0.06, 0.29]. The conditional indirect effects for social characteristics were also only

significant for participants at the mean, *b* = 0.07, *BootSE* = 0.03, Boot CI [0.00, 0.13], and for participants with lower levels of seriousness (-1 *SD* below the mean), *b* = 0.10, *BootSE* = 0.04, BootCI [0.01, 0.17]. Neither knowledge nor social characteristics were directly or indirectly related to job satisfaction at higher levels of seriousness.

Organizational commitment. The interaction between work characteristics and seriousness regressed on RAI revealed non-significance for knowledge, *b* = -0.19, *p* = 0.31, social, *b* = -0.19, *p* = 0.28, and task characteristics, *b* = 0.29, *p* = 0.13. The interaction between work characteristics and seriousness regressed on organizational commitment revealed no significance for knowledge, *b* = -0.02, *p* = 0.49, social, *b* = -0.003, *p* = 0.92, and task characteristics, *b* = 0.01, *p* = 0.67. Additionally, the interaction between RAI and seriousness regressed on organizational commitment revealed significance for knowledge, *b* = 0.03, *p* < 0.01, social, *b* = 0.02, *p* < 0.01, and task characteristics, *b* = 0.02, *p* < 0.05. Only the indirect pathway within the organizational commitment model for all three job characteristics revealed a significant interaction term. This might mean that the other non-significant interaction terms conditional direct and indirect effects are noise, thus caution should also be warranted when interpreting those effects.

Task characteristics as the predictor and organizational commitment as the outcome variable revealed significant conditional direct effects for participants with lower levels of seriousness (-1 *SD* below the mean), *b* = 0.25, *SE* = 0.07, *p* < 0.01,

CI [0.10, 0.39], moderate levels of seriousness (at the mean), $b = 0.27$, $SE = 0.07$, p < 0.01, CI [0.13, 0.41], and at higher levels of seriousness (plus 1 SD above the mean), $b = 0.29$, $SE = 0.10$, $p < 0.01$, CI [0.10, 0.48]. The conditional indirect effects were only significant for moderate levels of seriousness, $b = 0.08$, $BootSE = 0.03$, BootCI [0.03, 0.15], and for higher levels of seriousness $b = 0.16$, $BootSE = 0.06$, BootCI [0.06, 0.30]. Overall, this indicates that both the direct and indirect effects of task characteristics were stronger when workers were more serious about gig work.

For the model with knowledge characteristics as the predictor and organizational commitment as the outcome variable, the conditional direct effects were significant for participants with lower levels of seriousness (-1 SD below the mean), $b = 0.26$, $SE = 0.07$, $p < 0.01$, CI [0.11, 0.41], moderate levels of seriousness (at the mean), $b = 0.23$, $SE = 0.06$, $p < 0.01$, CI [0.11, 0.35], and at higher levels of seriousness (plus 1 SD above the mean), $b = 0.20$, $SE = 0.08$, $p < 0.05$, CI [0.04, 0.35]. The conditional indirect effects for this model only revealed significance at moderate levels of seriousness, $b = 0.05$, $BootSE = 0.03$, BootCI [0.01, 0.11].

Lastly, for the model with social characteristics as the predictor and organizational commitment as the outcome variable, the conditional direct effects were significant for participants with lower levels of seriousness (-1 SD below the mean), $b = 0.28$, $SE = 0.06$, $p < 0.01$, CI [0.16, 0.40], moderate levels of

seriousness (at the mean), $b = 0.28$, $SE = 0.04$, $p < 0.01$, CI [0.19, 0.36], and at

higher levels of seriousness (plus 1 SD above the mean), $b = 0.27$, $SE = 0.06$, $p <$

0.01, CI [0.16, 0.38]. The conditional indirect effects for this model only revealed

significance at moderate levels of seriousness, $b = 0.03$, $BootSE = 0.02$, BootCI

[.00, 0.06].

Table 3

Moderated Mediation Job Satisfaction Regression Output

	RAI		
	Knowledge	Social	Task
Job characteristic	1.09**	0.58*	1.79
Seriousness	-0.32	-0.13	-0.33
Interaction 1: WC×Seriousness	-0.19	-0.19	0.29
ΔR^2	0.01	0.01	0.01
R^2	0.06*	0.03	0.11**
	Job Satisfaction		
	Knowledge	Social	Task
Job characteristic	0.07	0.06	0.29**
RAI	0.11**	0.12**	0.10**
Seriousness	0.00	0.01	-0.04
Interaction 1: WC×Seriousness	-0.03	0.01	-0.02
ΔR^2	0.00	0.00	0.00
Interaction 2: RAI×Seriousness	0.00	0.00	0.00
ΔR^2	0.00	0.00	0.00
R^2	0.31**	0.31**	0.37**

Note. $n = 185$. * indicates $p < .05$. ** indicates $p < .01$. WC = Work Characteristics, and is designated by each of the columns: Knowledge, Social, and Task.

Table 4

Moderated Mediation Organizational Commitment Regression Output

	RAI		
	Knowledge	Social	Task
Job characteristic	1.09**	0.58	1.79**
Seriousness	-0.32	-0.13	-0.33
Interaction 1: WC×Seriousness	-0.19	-0.19	0.29
ΔR^2	0.01	0.01	0.01
R^2	0.06*	0.03	0.11**
	Organizational Commitment		
	Knowledge	Social	Task
Job characteristic	0.23**	0.28**	0.27**
RAI	0.05**	0.05**	0.04**
Seriousness	0.15**	0.16**	0.16**
Interaction 1: WC×Seriousness	-0.02	0.00	0.01
ΔR^2	0.00	0.00	0.00
Interaction 2: RAI×Seriousness	0.03**	0.02**	0.02*
ΔR^2	0.04**	0.03**	0.02*
R^2	0.33**	0.42**	0.33**

Note. $n = 185$. * indicates $p < .05$. ** indicates $p < .01$. WC = Work Characteristics, and is designated by each of the columns: Knowledge, Social, and Task.

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Table 5

Job Satisfaction Direct/Indirect Effects

Task Characteristics

	Conditional direct effect							Conditional indirect effect				
Seriousness	Effect	SE	t	p	LLCI	ULCI		Seriousness	Effect	BootSE	BootLLCI	BootULCI
-1.46	0.32	0.08	4.21	0.00	0.17	0.48		-1.46	0.13	0.05	0.05	0.23
0.00	0.29	0.07	4.03	0.00	0.15	0.43		0.00	0.18	0.05	0.10	0.27
1.46	0.26	0.10	2.54	0.01	0.06	0.46		1.46	0.23	0.07	0.10	0.38

Knowledge Characteristics

	Conditional direct effect							Conditional indirect effect				
Seriousness	Effect	SE	t	p	LLCI	ULCI		Seriousness	Effect	BootSE	BootLLCI	BootULCI
-1.46	0.11	0.08	1.35	0.18	-0.05	0.27		-1.46	0.15	0.06	0.06	0.29
0.00	0.07	0.07	1.06	0.29	-0.06	0.20		0.00	0.12	0.05	0.04	0.23
1.46	0.03	0.09	0.37	0.71	-0.14	0.20		1.46	0.10	0.07	-0.02	0.26

Social Characteristics

	Conditional direct effect							Conditional indirect effect				
Seriousness	Effect	SE	t	p	LLCI	ULCI		Seriousness	Effect	BootSE	BootLLCI	BootULCI
-1.46	0.04	0.07	0.59	0.56	-0.10	0.19		-1.46	0.10	0.04	0.01	0.17
0.00	0.06	0.05	1.27	0.21	-0.03	0.16		0.00	0.07	0.03	0.00	0.13
1.46	0.08	0.07	1.25	0.21	-0.05	0.21		1.46	0.04	0.05	-0.05	0.14

Note. $n = 185$. Number of bootstrap samples for percentile bootstrap confidence intervals: 5000. Seriousness vales in conditional tables are the mean $+/-$ *SD* from the mean.

Table 6

Organizational Commitment Direct/Indirect Effects

Task Characteristics

	Conditional direct effect							Conditional indirect effect			
Seriousness	Effect	SE	t	p	LLCI	ULCI	Seriousness	Effect	BootSE	BootLLCI	BootULCI
-1.46	0.25	0.07	3.37	0.00	0.10	0.39	-1.46	0.02	0.03	-0.03	0.08
0.00	0.27	0.07	3.90	0.00	0.13	0.41	0.00	0.08	0.03	0.03	0.15
1.46	0.29	0.10	3.01	0.00	0.10	0.48	1.46	0.16	0.06	0.06	0.30

Knowledge Characteristics

	Conditional direct effect							Conditional indirect effect			
Seriousness	Effect	SE	t	p	LLCI	ULCI	Seriousness	Effect	BootSE	BootLLCI	BootULCI
-1.46	0.26	0.07	3.51	0.00	0.11	0.41	-1.46	0.02	0.03	-0.05	0.08
0.00	0.23	0.06	3.74	0.00	0.11	0.35	0.00	0.05	0.03	0.01	0.11
1.46	0.20	0.08	2.51	0.01	0.04	0.35	1.46	0.07	0.05	-0.02	0.18

Social Characteristics

	Conditional direct effect							Conditional indirect effect			
Seriousness	Effect	SE	t	p	LLCI	ULCI	Seriousness	Effect	BootSE	BootLLCI	BootULCI
-1.46	0.28	0.06	4.55	0.00	0.16	0.40	-1.46	0.01	0.02	-0.02	0.05
0.00	0.28	0.04	6.59	0.00	0.19	0.36	0.00	0.03	0.02	0.00	0.06
1.46	0.27	0.06	4.86	0.00	0.16	0.38	1.46	0.03	0.03	-0.04	0.10

Note. n = 185. Number of bootstrap samples for percentile bootstrap confidence intervals: 5000. Seriousness vales in conditional tables are the mean +/– *SD* from the mean.

Dominance Analysis

A supplementary dominance analysis (Table 7) was used to explore the relationship of the sub-facets of job characteristics with job satisfaction and organizational commitment. The dominance analysis was conducted in R using the package "dominanceanalysis" (Navarrete & Soares, 2019). Dominance analysis provides an examination of the R^2 values for all possible subset models (Budescu, 1993; Azen & Budescu, 2003). It revealed quite different results for each of the outcome variables. While it does not present a clear pattern for both of the outcome variables, it does highlight that some of the subscales (e.g., task significance, feedback from the job) had higher average contributions for both.

Table 7

Dominance Analysis Average Subscale Contributions

Job Satisfaction		Organizational Commitment	
WDQ Subscales	Avg. Contribution	WDQ Subscales	Avg. Contribution
Task Significance	0.116	Feedback from Others	0.067
Task Identity	0.042	Task Significance	0.066
Feedback from Job	0.032	Social Support	0.054
Task Variety	0.029	Feedback from Job	0.053
Information Processing	0.013	Specialization	0.040
Autonomy	0.010	Problem Solving	0.035
Feedback from Others	0.008	Interaction Outside Organization	0.027
Problem Solving	0.008	Skill Variety	0.021
Specialization	0.008	Interdependence	0.017
Skill Variety	0.007	Task Variety	0.014
Interdependence	0.006	Information Processing	0.014
Social Support	0.004	Autonomy	0.011
Interaction Outside Organization	0.002	Task Identity	0.007
Job Complexity	0.000	Job Complexity	0.006

Discussion

The present study, to the authors knowledge, is the first examination of MTurk workers' job characteristics and their relationship with key workplace outcomes while considering workers' motivation. This study suggests that job characteristics (knowledge, task, and social) are predictors of job satisfaction and organizational commitment for crowdsource employees. Furthermore, participants level of autonomous motivation, as measured by RAI, is a significant mediator for all three job characteristics and their relationship with job satisfaction and organizational commitment. Worker seriousness was found to be a significant moderator within the mediation model at certain levels only for organizational commitment, and thus should be considered for future analysis. Additionally, the dominance analysis provides supplemental information as to the various sub-facet within the Work Design Questionnaire and their average contributions depending on the outcome variable being analyzed. The dominance analysis thus raises further questions as to the best subscale predictors dependent on the outcome variable being studied.

Theoretical Contributions

This study offers three contributions to theory and research within the domain of gig work and job characteristics. The first contribution further reveals I-O psychologies relevance of theories in the gig economy by demonstrating job characteristics relationship with key workplace outcome variables job satisfaction and organizational commitment. Task, knowledge, and social characteristics thus

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provide an explanation of a significant portion of key workplace outcome variables, thus providing further support for job characteristics theory within crowdsource work. A past meta-analysis on the relationship between job characteristics and job satisfaction found 0.39 in traditional workplace settings (Loher, Noe, Moeller, & Fitzgerald, 1985). Similarly, this research found that task characteristics relationship with job satisfaction was 0.41. Job characteristics have also been shown in a past meta-analysis to explain 34% of the variance in job satisfaction and 24% in organizational commitment (Humphrey, Nahrgang, Morgeson, 2007). This study was different in comparison, with job characteristics explaining 32.5% of the variance in organizational commitment and 16.9% of the variance in job satisfaction.

The second contribution is the further elaboration of the relational mechanism that mediates job characteristics relationship with job satisfaction and organizational commitment through autonomous motivation. Specifically, all three work characteristics were indirectly related to both job satisfaction and organizational commitment through autonomous motivation. This further supports SDT in crowdsource work.

The third contribution is the attempt to further explain the mediation models through a past developed theoretical construct of crowdsource worker seriousness. While the overall hypothesis was not fully supported, the results did reveal some significant direct and indirect effects, thus revealing potential usefulness and a need

for further research exploring this construct. Additionally, worker seriousness was positively correlated with perceptions of job characteristics but not with autonomous motivation.

Practical Contributions

An important caveat to consider is that crowdsource work is considered a form of gig work, but not all gig is necessarily the same. While gig work does all typically share similarities in the overall structure of allowing workers to choose when, where, and how long they work, the nature of the work can vary considerably. For example, rideshare drivers (e.g., Uber) are customer-facing and interacting directly with a new customer each ride whereas MTurk workers have no direct face-to-face social interaction built into their platform. The overall structure of both of these jobs are similar in that workers can freely signup and work with little necessary qualifications, and they can choose when to start and stop their work. The differentiator between these two jobs though can be quite great in how and in what environment they are completing their work. Researchers should be careful not to lump all gig workers together. There is no "grand theory" for gig workers, let alone all workers, thus it is important to be clear on the workers being studied and to whom it specifically generalizes (Spreitzer, Cameron, & Garrett, 2017). While this study might not have direct implications for all forms of gig related work, it does have direct implications for online and crowdsource or task-based work.

This study provides an in-depth analysis of a form of gig work, specifically crowdsource work on MTurk. By segmenting the analysis and results by knowledge, task, and social characteristics a more detailed understand of each of their relationships with job satisfaction and organizational commitment can be understood. This research can be applied in regards to how Requesters are designing HITs and how platforms like MTurk are designing their work environments. This study found that job characteristics were significantly related with job satisfaction and organizational commitment, and RAI was a significant mediator in these models. Requesters should be cognizant of how their tasks can contribute to increasing task, knowledge, and social job characteristics. Due to the WDQ assessing multiple job characteristics, the range of design choices is much greater than past measures (Morgeson & Humphrey, 2006).

It has been suggested that to increase job satisfaction, increasing any of the motivational characteristics would serve to increase job satisfaction (Morgeson & Humphrey, 2006). Not all job characteristics are able to be feasibly changed within crowdsource work, but maybe things such as social support and interaction outside of the organization can be further leveraged. If crowdsource sites further adopted and used chat boards for workers, they might be able to ask and resolve questions about HITs while communicating with other workers and individuals from the organization. By having better job characteristics, it could assist with workers' levels of satisfaction and organizational commitment. These outcomes are

important not only for singular Requesters but also for the platform as a whole. It is the collection of HITs from multiple Requesters that makes up the whole work environment for a worker. Requesters individually need to be mindful of how they can contribute to better their job characteristics, by understanding that the makeup of their HIT leads to the development of the overall worker experience.

Limitations and Future Directions

One limitation of this study is the use of cross-section, self-reported data, which could potentially be a concern in regards to common method variance or other potential biases. Future studies should explore other research designs, but as noted by Brawley and Pury (2016), gathering meaningful reports from multiple sources other than self-report data about an individual's work experience on MTurk may be near impossible. Additionally, the cross-sectional nature of the data limits the ability to make causal conclusions.

Despite RAI being a predictive value, and revealing to be significant within this study, the use of an equation to determine autonomous motivation raises potential psychometric issues associated with weighted contrast scores (Ryan & Deci, 2017). Additionally, the use of RAI could also obscure specific profile configurations of importance (Ryan & Deci, 2017). Future studies could further explore specific difference in individual's external regulation, introjected regulation, identified regulation, integrated regulation, intrinsic motivation, and amotivation.

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An additional limitation is that participants chose to complete the HIT if available to them, so non-response bias is a potential threat but is ultimately part of the autonomy and freedom of gig work. Non-response bias occurs when respondents in the sample, in this case the MTurk users, do not respond to the survey, thus potentially resulting in a variation between the true mean values and the sample mean values. It is near impossible to eliminate this completely due to MTurk providing all available HITs that the worker qualifies for on a page and then the worker picks what they are interested in.

Future studies should further test the findings of this study on other crowdsource platforms and in other gig related work domains. Different gig work domains differ in their job characteristics (e.g., customer facing versus non-customer facing jobs), and workers' motivation and seriousness might not necessarily produce similar results as this study. Gig work has similar underlying dimensions of work autonomy due to the nature of the freedom to choice when and sometimes where to work, but the differentiations of the multiple domains of gig work could reveal different results compared to this study. Another future direction could consist of exploring if the relation of job characteristics to the outcome variables in this study are also related to task performance or organizational citizenship behaviors. By further exploring a concept like organizational citizenship behavior (OCB) within crowdsource based work it might further illuminate how traditional work settings differ as compared to forms of gig work. When

considering the work setting for a MTurk worker it could be concluded that they do not have the freedom to go above and beyond their contractual task. They either meet the task requirement or they do not. On the contrary, there are some opportunities, such as a MTurk worker emailing the Requester about an error in their task even when they are not getting paid to do so, or providing extensive feedback when the bare minimum would still allow them to get paid. When a MTurk worker performs an OCB it could be explained by a social exchange theory approach. When an employee feels satisfied with their job, they will be likely to reciprocate with positive behavior in the benefit of the organization, or the Requester in regards to platform based work. This is highlighted in a meta-analysis by Organ and Ryan (1995) that showed that individual's job attitudes (e.g., job satisfaction, organizational fairness, and organizational commitment) significantly predicted OCB, and better than disposition measures. Thus, future studies could further explore how job characteristics, job attitudes, and OCB relate in an overall model within gig work.

Conclusion

This study demonstrated that traditional theories from I-O psychology can apply to crowdsource based work. Specifically, job characteristics related to job satisfaction and organizational commitment, and were found to be further moderated by workers' level of autonomous motivation. However, the findings also reveal that other factors, potentially unique to gig work, could be a contributor in those traditional theories. Worker seriousness, while not significant for all moderated mediation models, had a moderating impact on certain indirect effects. This study further adds to the limited, but growing, literature examining work in the gig economy and provides a furthering of the current understanding of this domain. As platforms like MTurk continue to grow in popularity and are increasingly used by both researchers and organizations, it is a necessity to continue to understand how theories from I-O psychology can assist those working in this expanding domain of gig work. Furthermore, this study reveals that crowdsource platforms should be mindful of how workers job characteristics are related to not only their motivation, but also to positive job attitudes.

References

Amabile, T. M. (1993). Motivational synergy: Toward new conceptualizations of intrinsic and extrinsic motivation in the workplace. *Human resource management review*, *3*(3), 185-201.

Amabile, T. M., Hill, K. G., Hennessey, B. A., & Tighe, E. M. (1994). The Work Preference Inventory: assessing intrinsic and extrinsic motivational orientations. *Journal of personality and social psychology*, *66*(5), 950.

Azen, R., & Budescu, D. V. (2003). The dominance analysis approach for comparing predictors in multiple regression. *Psychological methods*, *8*(2), 129.

Brabham, D. C. (2008). Moving the Crowd at iStockphoto: The Composition of the Crowd and Motivations for Participation in a Crowdsourcing Application. First Monday, 13(6), 1122-1145.

Brabham, D. C. (2010). Moving the crowd at Threadless: Motivations for participation in a crowdsourcing application. *Information, Communication & Society*, *13*(8), 1122-1145.

Brawley, A. M. (2017). The Big, Gig Picture: We Can't Assume the Same Constructs Matter. *Industrial and Organizational Psychology*, *10*(4), 687-696.

Brawley, A. M., & Pury, C. L. (2016). Work experiences on MTurk: Job

satisfaction, turnover, and information sharing. *Computers in Human

Behavior*, *54*, 531-546.

Budescu, D. V. (1993). Dominance analysis: a new approach to the problem of

relative importance of predictors in multiple regression. *Psychological

bulletin*, *114*(3), 542.

Bustos Navarrete, C. & Coutinho Soares, F. (2019). dominanceanalysis:

Dominance Analysis. R package version 1.0.0. https://CRAN.R-

project.org/package=dominanceanalysis

Buuren, S. V., & Groothuis-Oudshoorn, K. (2010). mice: Multivariate imputation

by chained equations in R. *Journal of statistical software*, 1-68.

https://www.jstatsoft.org/v45/i03/.

Cammann, C., Fichman, M., Jenkins, D., & Klesh, J. (1979). The Michigan

organizational assessment questionnaire. *Unpublished manuscript,

University of Michigan, Ann Arbor*.

Chandler, D., & Kapelner, A. (2013). Breaking monotony with meaning:

Motivation in crowdsourcing markets. *Journal of Economic Behavior &

Organization*, *90*, 123-133.

Cunningham-Parmeter, K. (2016). From Amazon to Uber: Defining employment in

the modern economy. *BUL Rev.*, *96*, 1673.

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Deci, E., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer Science & Business Media.

Deci, E. L., Olafsen, A. H., & Ryan, R. M. (2017). Self-determination theory in work organizations: The state of a science. *Annual Review of Organizational Psychology and Organizational Behavior*, *4*, 19-43.

Deng, X. N., & Joshi, K. D. (2016). Why individuals participate in micro-task crowdsourcing work environment: Revealing crowdworkers' perceptions. *Journal of the Association for Information Systems*, *17*(10), 648.

Difallah, D. E., Catasta, M., Demartini, G., Ipeirotis, P. G., & Cudré-Mauroux, P. (2015, May). The dynamics of micro-task crowdsourcing: The case of amazon mturk. In *Proceedings of the 24th international conference on world wide web* (pp. 238-247). International World Wide Web Conferences Steering Committee.

Donovan, S. A., Bradley, D. H., & Shimabukuru, J. O. (2016). What Does the Gig Economy Mean for Workers?.

Downs, J. S., Holbrook, M. B., Sheng, S., & Cranor, L. F. (2010). Are your participants gaming the system?: screening mechanical turk workers. In *Proceedings of the SIGCHI conference on human factors in computing systems*(pp. 2399-2402). ACM.

Eby, L. T., Freeman, D. M., Rush, M. C., & Lance, C. E. (1999). Motivational

bases of affective organizational commitment: A partial test of an

integrative theoretical model. *Journal of occupational and organizational

psychology*, *72*(4), 463-483.

Edwards, J. R., Scully, J. A., & Brtek, M. D. (1999). The measurement of work:

Hierarchical representation of the Multimethod Job Design

Questionnaire. *Personnel Psychology*, *52*(2), 305-334.

Edwards, J. R., Scully, J. A., & Brtek, M. D. (2000). The nature and outcomes of

work: A replication and extension of interdisciplinary work-design

research. *Journal of Applied Psychology*, *85*(6), 860.

Farrell, D., & Greig, F. (2016). Paychecks, paydays, and the online platform

economy: Big data on income volatility. *JP Morgan Chase Institute*.

Fried, Y., & Ferris, G. R. (1987). The validity of the job characteristics model: A

review and meta-analysis. *Personnel psychology*, *40*(2), 287-322.

Grant, A. M., Nurmohamed, S., Ashford, S. J., & Dekas, K. (2011). The

performance implications of ambivalent initiative: The interplay of

autonomous and controlled motivations. *Organizational Behavior and

Human Decision Processes*, *116*(2), 241-251.

Hackman, J. R., & Oldham, G. R. (1980). Work redesign.

Hackman, J. R., & Oldham, G. R. (1976). Motivation through the design of work: Test of a theory. *Organizational behavior and human performance*, *16*(2), 250-279.

Harvey, R. J., Billings, R. S., & Nilan, K. J. (1985). Confirmatory factor analysis of the Job Diagnostic Survey: Good news and bad news. *Journal of applied psychology*, *70*(3), 461.

Hayes, A. F. (2017). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. Guilford Publications.

Hitlin, P. (2016). Research in the crowdsourcing age, a case study. *Pew Research Center*, *11*.

Hirschi, A. (2017). The fourth industrial revolution: Issues and implications for career counseling research and practice. *Career Development Quarterly*, 1-13.

Horton, J. J., & Chilton, L. B. (2010). The labor economics of paid crowdsourcing. In *Proceedings of the 11th ACM conference on Electronic commerce* (pp. 209-218). ACM.

Humphrey, S. E., Nahrgang, J. D., & Morgeson, F. P. (2007). Integrating motivational, social, and contextual work design features: a meta-analytic summary and theoretical extension of the work design literature. *Journal of applied psychology*, *92*(5), 1332.

Idaszak, J. R., & Drasgow, F. (1987). A revision of the Job Diagnostic Survey:

    Elimination of a measurement artifact. *Journal of Applied*

    Psychology, *72*(1), 69.

Ipeirotis, P. G. (2010). Demographics of mechanical turk. Technical Report

    CeDER-10-01. New York University.

Ipeirotis, P. G. (2010). Analyzing the amazon mechanical turk marketplace. *XRDS:*

    Crossroads, The ACM Magazine for Students, Forthcoming.

Kalleberg, A. L. (2000). Nonstandard employment relations: Part-time, temporary

    and contract work. *Annual review of sociology*, *26*(1), 341-365.

Katz, L. F., & Krueger, A. B. (2016). *The rise and nature of alternative work*

    arrangements in the United States, 1995-2015 (No. w22667). National

    Bureau of Economic Research.

Kaufmann, N., Schulze, T., & Veit, D. (2011, August). More than fun and money.

    Worker Motivation in Crowdsourcing-A Study on Mechanical Turk.

    In *AMCIS* (Vol. 11, No. 2011, pp. 1-11).

Kosonen, M., Gan, C., Vanhala, M., & Blomqvist, K. (2014). User motivation and

    knowledge sharing in idea crowdsourcing. *International Journal of*

    Innovation Management, *18*(05), 1450031.

Kulik, C. T., Oldham, G. R., & Langner, P. H. (1988). Measurement of job

    characteristics: Comparison of the original and the revised Job Diagnostic

    Survey. *Journal of Applied Psychology*, *73*(3), 462.

Leimeister, J. M., Huber, M., Bretschneider, U., & Krcmar, H. (2009). Leveraging crowdsourcing: activation-supporting components for IT-based ideas competition. *Journal of management information systems*, *26*(1), 197-224.

Loher, B. T., Noe, R. A., Moeller, N. L., & Fitzgerald, M. P. (1985). A meta-analysis of the relation of job characteristics to job satisfaction. *Journal of applied psychology*, *70*(2), 280.

Mason, W., & Watts, D. J. (2009). Financial incentives and the performance of crowds. In *Proceedings of the ACM SIGKDD workshop on human computation* (pp. 77-85). ACM.

Meyer, J. P., & Allen, N. J. (1991). A three-component conceptualization of organizational commitment. *Human resource management review*, *1*(1), 61-89.

Millette, V., & Gagné, M. (2008). Designing volunteers' tasks to maximize motivation, satisfaction and performance: The impact of job characteristics on volunteer engagement. *Motivation and Emotion*, *32*(1), 11-22.

Morgeson, F. P., & Humphrey, S. E. (2006). The Work Design Questionnaire (WDQ): developing and validating a comprehensive measure for assessing job design and the nature of work. *Journal of applied psychology*, *91*(6), 1321.

Mowday, R. T., Steers, R. M., & Porter, L. W. (1979). The measurement of

    organizational commitment. *Journal of vocational behavior*, *14*(2), 224-

    247.

Organ, D. W., & Ryan, K. (1995). A meta-analytic review of attitudinal and

    dispositional predictors of organizational citizenship behavior. *Personnel*

    psychology, *48*(4), 775-802.

Paolacci, G., Chandler, J., & Ipeirotis, P. G. (2010). Running experiments on

    amazon mechanical turk.

Parker, S. K., Wall, T. D., & Cordery, J. L. (2001). Future work design research

    and practice: Towards an elaborated model of work design. *Journal of*

    occupational and organizational psychology, *74*(4), 413-440.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003).

    Common method biases in behavioral research: A critical review of the

    literature and recommended remedies. *Journal of applied*

    psychology, *88*(5), 879.

Rogstadius, J., Kostakos, V., Kittur, A., Smus, B., Laredo, J., & Vukovic, M.

    (2011). An assessment of intrinsic and extrinsic motivation on task

    performance in crowdsourcing markets. *ICWSM*, *11*, 17-21.

Ross, J., Irani, L., Silberman, M., Zaldivar, A., & Tomlinson, B. (2010). Who are the crowdworkers?: shifting demographics in mechanical turk. In *CHI'10 extended abstracts on Human factors in computing systems* (pp. 2863-2872). ACM.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of personality and social psychology*, *57*(5), 749.

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Publications.

Schmidt, G. B. (2015). Fifty days an MTurk worker: The social and motivational context for Amazon Mechanical Turk workers. *Industrial and Organizational Psychology*, *8*(2), 165-171.

Schulze, T., Seedorf, S., Geiger, D., Kaufmann, N., & Schader, M. (2011). Exploring task properties in crowdsourcing-an empirical study on mechanical turk. In *ECIS*(Vol. 11, pp. 1-1).

Schwab, K. (2017). *The fourth industrial revolution*. Crown Business.

Spindeldreher, K., & Schlagwein, D. (2016). What Drives the Crowd? A Meta-Analysis of the Motivation of Participants in Crowdsourcing. In *PACIS* (p. 119).

Spreitzer, G. M., Cameron, L., & Garrett, L. (2017). Alternative work

    arrangements: Two images of the new world of work. *Annual Review of*

    Organizational Psychology and Organizational Behavior, *4*, 473-499.

Taber, T. D., & Taylor, E. (1990). A review and evaluation of the psychometric

    properties of the Job Diagnostic Survey. *Personnel psychology*, *43*(3), 467-

    500.

Teodoro, R., Ozturk, P., Naaman, M., Mason, W., & Lindqvist, J. (2014). The

    motivations and experiences of the on-demand mobile workforce.

    In *Proceedings of the 17th ACM conference on Computer supported*

    cooperative work & social computing (pp. 236-247). ACM.

Thompson, E. R., & Phua, F. T. (2012). A brief index of affective job

    satisfaction. *Group & Organization Management*, *37*(3), 275-307.

Torpey, E., & Hogan, A. (2016). Working in a gig economy. *Career Outlook May.*

    URL http://www. bls. gov/careeroutlook/2016/article/what-is-the-gig-

    economy. htm.

Trépanier, S. G., Fernet, C., & Austin, S. (2013). Workplace bullying and

    psychological health at work: The mediating role of satisfaction of needs for

    autonomy, competence and relatedness. *Work & Stress*, *27*(2), 123-140.

Kuhn, K. M. (2016). The rise of the "Gig Economy" and implications for

    understanding work and workers. *Industrial and Organizational*

    Psychology, *9*(1), 157-162.

Grömping, U. (2006). Relative importance for linear regression in R: the package

   relaimpo. *Journal of statistical software*, *17*(1), 1-27.

Webster, J., & Watson, R. T. (2002). Analyzing the past to prepare for the future:

   Writing a literature review. *MIS quarterly*, xiii-xxiii.