Management Revue

Manag. Rev. **2026**; 37(3): 57906
https://doi.org/10.31083/MRev57906

Article

Who are the Actively Participating Crowdworkers? A Qualitative Comparative Analysis of a German Text Creation Platform

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Academic Editors: René Schmoll and Simon Jebsen
Submitted: 20 February 2025 Revised: 17 September 2025 Accepted: 19 September 2025 Published: 24 September 2026

Abstract

Crowdwork refers to paid online tasks mediated by platforms. Crowdworkers are a heterogeneous and footloose workforce who choose different levels of activity and can leave a platform without notice. However, platform providers that broker more complex digital work, such as programming or texting, rely on experts who participate on a more long-term basis. In this paper, we adopt a configurational perspective to explain which groups of crowdworkers can be expected to participate more actively and why. We apply fuzzy-set qualitative comparative analysis to questionnaire survey data (N = 204) from active users registered with a German texting platform. Six distinct groups of crowdworkers emerged: loyal workers, precariat, stars, freelancers, core workers, and side jobbers. While they all share a strong commitment to the platform, their reasons for that commitment differ substantially. Consequently, they also differ in their level of participation, measured in terms of work hours per week and intention to remain active on the platform. Overall, the paper reduces the apparent heterogeneity of the crowd to a limited number of groups and illustrates the nuanced relationship between the mindset of commitment and the (expected) behaviors of participation. The paper therefore offers important managerial insights into designing incentive systems for crowdwork.

Keywords: external crowdwork; platform economy; online labor markets; incentive system; commitment; participation; qualitative comparative analysis
JEL: J44, J23, J33, D26

1. Introduction

External crowdwork has been growing for some time and experienced a sharp increase during the COVID-19 pandemic. It is now a "multi-billion-dollar industry" (Hornuf and Vrankar, 2022, p. 553), which creates employment opportunities for a wide range of individuals (Kässi et al., 2021; Wong et al., 2021). This form of work involves paid online tasks that workers complete after a crowdsourcer published a call for a specific task on a crowdsourcing platform (Durward et al., 2016; Estellés-Arolas and González-Ladrón-de-Guevara, 2012; Schulte et al., 2020). The way tasks are matched with workers varies substantially depending on the type of platform (Durward et al., 2020; Schmidt, 2016). For instance, on microtask platforms that specialize in simple tasks, such as tagging photos or typing words, workers largely self-select into posted tasks. On platforms specializing in creativity contests, workers apply by submitting solutions, and the crowdsourcer then selects the best one. Typically, only the winner is paid for their work. On platforms that mediate complex professional services such as programming software or creating text, interested workers must often fulfill eligibility criteria and are then selected by the crowdsourcer.

External crowdwork has become so attractive partly because of its low entry barriers (Hornuf and Vrankar, 2022, p. 553). Unlike internal crowdwork where firms limit the calls for tasks to their own workforce, the platform providers in external crowdwork offer the tasks to a broader crowd (Durward et al., 2016). Anyone interested can register on the platform's website without entering a formal employment contract. Then they can decide on a case-by-case basis whether to apply for particular tasks.

This highly flexible arrangement creates two closely related challenges for platform providers. First, the personal circumstances of workers who register on the platform's website are highly *heterogeneous*, ranging from students to pensioners and from full-time professionals to unemployed persons (Bertschek et al., 2015; Durward et al., 2016). The reasons why they do crowdwork also vary considerably (Kittur et al., 2013). These reasons can be based on various needs such as (additional) income, entertainment, reputation, and community experience (Brabham, 2010; Deng et al., 2016; Gol et al., 2018; Jiang et al., 2021). Workers can register with one platform only or various platforms at the same time. Platform providers usually have limited information about most characteristics of crowdworkers, who may seem like an amorphous mass of people to them. This limited information about crowdworkers poses a fundamental challenge for platform providers (Qin et al., 2024).

Second, platform providers face the challenge of ensuring *participation*. They need crowdworkers who are not

merely registered, but also intend to be active on the platform. These workers should continuously accept tasks and provide a considerable number of work hours (Connelly et al., 2021; Mrass, 2020, p. 129; Wu et al., 2023). Estimates on the extent of crowdwork vary substantially but it is safe to say that the majority of registered crowdworkers do not participate much (Pongratz and Bormann, 2017, pp. 163–165). According to one estimate for Germany, only around 25% of registered crowdworkers are active at all (Mrass et al., 2020, p. 10). Globally, only 14 million of the 163 million registered crowdworkers ever worked, and only 3.3 million were considered to provide "significant" work (Kässi et al., 2021). The problem of activating workers is especially salient for complex professional tasks that call for substantial expertise such as testing software, designing marketing campaigns, innovating business models, or producing text (Boons et al., 2015; Schulten and Schaefer, 2015; Zogaj et al., 2014). Unsurprisingly, platform providers grapple with retaining expert workers (Connelly et al., 2021) and offer multiple incentives including gamification elements, interesting tasks, and opportunities for advancement (Hoose and Kramer, 2024).

The two challenges combine to produce a conundrum: Who among the registered crowdworkers will participate substantially on a long-term basis when crowdworkers are heterogeneous? In this paper, we offer an answer. Using data from a survey among workers registered with a Germany-based text creation platform, we apply qualitative comparative analysis (QCA, Ragin, 2000, 2009). One analytic variant of QCA, fuzzy-set QCA (fs/QCA), enables us to identify six distinct groups of crowdworkers: *loyal workers*, *precariat*, *stars*, *freelancers*, *core workers*, and *side jobbers*. These groups exhibit distinct patterns of work hours per week and intentions to remain active on the platform, which – in line with recent work – serve as our measures of active participation (Wu and Gong, 2021; Wu et al., 2023).

Overall, this paper disentangles which groups of crowdworkers in complex professional services are likely to participate actively in external crowdwork, and explains why. A large, multi-faceted and interdisciplinary body of literature focuses on crowdworkers' needs, incentives to be active in crowdwork, and their engagement, commitment, and participation (Bush and Balven, 2021; Wang et al., 2020; Wu and Gong, 2021; Wu et al., 2023). Our paper contributes to this literature in two specific ways.

First, by applying QCA it demonstrates how the seemingly amorphous heterogeneity of the crowd can be reduced to a limited number of groups that share similar needs. Hence, we respond to the widely held view that not enough is known about the diverse characteristics of crowdworkers (e.g., Du and Lease, 2022; Kittur et al., 2013; Morgan et al., 2023). In a literature dominated by variable-oriented approaches using regression, we apply QCA and thereby adopt a configurational (Meyer et al., 1993a; Misangyi et al., 2017) and person-centered perspective (Meyer et al., 2013). It is configurational by considering combinations of factors rather than single variables as mechanisms of explanation. It is person-centered because it characterizes individuals holistically with a combination of characteristics. Similar to Morgan et al. (2023), who identify four groups of microtasks crowdworkers, we are able to find six groups of workers active in complex tasks. They are characterized as "sub-populations" of the crowd (Meyer et al., 2013), who are all committed but differ systematically in other respects.

Second, we uncover nuanced links between crowdworkers' commitment to a platform and their active platform participation. The few previous studies that examined crowdworker commitment theorized commitment as a one-dimensional construct (Li et al., 2023; Mousa and Chaouali, 2023; Wang et al., 2020). In our paper, we show that crowdworkers show two different facets, namely affective and continuance commitment. We thus transfer a well-established distinction in the literature on organizational commitment among regular workers (Meyer and Allen, 1991) to the context of crowdwork. More importantly, previous work examined either commitment (Mousa and Chaouali, 2023; Wang et al., 2020) or participation (Jiang et al., 2021; Wu and Gong, 2021; Ye and Kankanhalli, 2017). Our paper demonstrates the importance of studying commitment and participation simultaneously and examining their intricate relationship. Commitment to a platform is a mindset that reflects why workers are bound to a platform (Meyer and Allen, 1991; Meyer and Herscovitch, 2001). Active participation consists of (intended) behaviors. Such behaviors can be expected to correlate with commitment (e.g., Meyer and Herscovitch, 2001; Meyer et al., 2002) but are not determined by it, as this paper illustrates. Although the six identified groups show strong commitment to the platform, they differ systematically in their work hours per week and intention to remain active on the platform. Thus, this paper demonstrates that, in the context of crowdwork for complex tasks, strong commitment does not automatically translate into active participation.

2. Methodological and Theoretical Background

2.1 QCA as a Research Approach

We use QCA in the twin function of a research approach and a technique of data analysis (Schneider and Wagemann, 2010). As a technique, fs/QCA relies on fuzzy Boolean algebra and set theory to model how different combinations of conditions sufficiently explain an outcome and how some single conditions might be necessary conditions for the same outcome. Although fs/QCA was introduced in comparative political science (Ragin, 2000), it has predominantly been adopted in business and management studies (Di Paola et al., 2025; Meuer and Fiss, 2020). This is primarily because fs/QCA is well-suited to modeling how archetypes, gestalts, or configurations unfold their effects

(Fiss, 2007, 2011), thus facilitating the development of new configurational theories and the revision of existing ones (Meyer et al., 1993a). Meanwhile, a neo-configurational movement is underway (Misangyi et al., 2017), accompanied by a significant rise in empirical studies (Di Paola et al., 2025). Though these often focus on organization-level data (Misangyi et al., 2017, p. 267), recent applications use fs/QCA with individual-level data as well (e.g., Cangialosi, 2023; Frazier et al., 2016; Wu and Zhou, 2023).

Several characteristics of QCA as a configurational research approach help us to achieve our study's main goal: to better understand which groups among a heterogeneous crowd will actively participate on a platform. First, QCA uncovers *mechanisms* that possibly drive an outcome, and each mechanism is defined by a combination of conditions (Di Paola et al., 2025; Rutten, 2022). Our study seeks to explain commitment through various combinations of personal circumstances. Second, QCA is *case-based*, defining individual observations as the intersection of various conditions. This is important for our analysis. Although we explain commitment in terms of crowdworker needs and satisfaction, we also consider a number of demographic variables. This conforms with QCA principles to "return to the cases" (Ragin, 2009, p. 121) and to portray cases in a holistic way (Schneider and Wagemann, 2010, p. 378). Third, QCA uncovers *multiple causation* or *equifinality*, the fact that more than one but usually only a limited number of mechanisms or paths can produce the same outcome (Goertz, 2020, pp. 58–60). In this way, our study narrows down the seemingly idiosyncratic heterogeneity of committed crowdworkers into a few groups.

In what follows, we will introduce the concepts of affective and continuance platform commitment, which will feature as outcomes in the fs/QCA. Then, we will synthesize a large literature on crowdwork to theorize how inter-individual differences in commitment arise through specific mechanisms based on needs, satisfaction, and underlying personal circumstances. Finally, we will argue how participation on a platform might differ between groups of committed crowdworkers.

2.2 Platform Commitment and Incentives in Crowdwork

Organizational commitment has been studied since the 1960s (Becker, 1960; Spanuth and Wald, 2017), with various definitions (Mercurio, 2015; Meyer and Herscovitch, 2001). Commitment consists of a number of mindsets that bind a person to some target, for example a worker to an organization (Meyer and Herscovitch, 2001). In a highly influential model, Meyer and Allen (1991) propose that commitment is made up of three facets, namely affective, continuance, and normative commitment.

The commitment concept has been extended beyond its original application, the regular worker (Meyer and Herscovitch, 2001). Applications related to our study include commitment among volunteer workers (McCormick and Donohue, 2019), among users of virtual communities and websites (Gupta and Kim, 2007; Bateman et al., 2011; Schulten and Schaefer, 2015), and among members of temporary organizations (Dwivedula et al., 2013; Spanuth and Wald, 2017). Recently, several studies have examined the commitment of crowdworkers, but not necessarily to the platform itself. For example, Staiger et al. (2022) examined commitment to crowdsourcing customers, and Ma et al. (2018) examined commitment to an online chat community that is part of the Amazon Mechanical Turk (MTurk) platform. To the best of our knowledge, crowdworker commitment to a crowdsourcing platform as such has only been examined by Wang et al. (2020), Li et al. (2023), and Mousa and Chaouali (2023). While these studies demonstrated that the commitment concept is applicable to seemingly footloose crowdworkers, they all understood platform commitment to be one-dimensional (Li et al., 2023; Mousa and Chaouali, 2023; Wang et al., 2020).

We distinguish two dimensions or facets introduced by Meyer and Allen (1991), namely *affective* and *continuance commitment*. Departing from their work, we do not include normative commitment in our theoretical framework. Normative commitment is defined as the perceived obligation of a worker to stay. It regularly develops in response to an employer's training investments and intensive socialization (e.g., Schneider and Flore, 2019). Arguably, these are relatively unimportant or even absent in crowdwork. In line with that, Staiger et al. (2022, pp. 1224–1225) argue that in crowdwork, a moral obligation to stay is not relevant. Reassuringly, normative commitment was hardly understood by respondents in the pretest to our study and did not function as a meaningful construct. Therefore, and consistent with previous work (Gong et al., 2009; Ma et al., 2018; Shore et al., 2006; Whitener and Walz, 1993), we focus on affective and continuance commitment.

Some platform providers have implemented an incentive system designed to engender affective and continuance commitment among crowdworkers (Hemsen, 2023). Depending on their performance record, crowdworkers receive a discrete rating of their reputational status, ranging for instance from one to five stars. Achieving a higher rating level implies moving up an "incentive hierarchy" (Auriol and Renault, 2001; Goes et al., 2016). Crowdworkers with a higher status receive important non-monetary rewards, namely recognition, glory, or reputation, because the ratings are public knowledge (Auriol and Renault, 2001; Goes et al., 2016). An important element in exhibiting status are visible points, stars, or badges as well as procedures of feedback-giving (Feng et al., 2018; Morschheuser et al., 2016). A higher status is also accompanied by monetary rewards (Auriol and Renault, 2001). Crowdworkers with a higher rating level usually receive higher pay rates, certain bonuses, and privileged access to lucrative tasks (Hoose and Kramer, 2024). In what follows, we will argue how the incentive system on platforms engenders affective and continuance commitment.

Affective commitment can be defined as a crowdworker's "emotional attachment to, identification with, and involvement in" the platform (Meyer and Allen, 1991, p. 67). It has been described as the result of a social exchange, which involves an open-ended relationship based on trust and socio-emotional goods (Schneider and Flore, 2019; Shore et al., 2006; Tajfel et al., 2000; Vroom, 1964). Crowdworkers have already been shown to develop affective commitment to a platform (Li et al., 2023; Mousa and Chaouali, 2023; Wang et al., 2020). The main factor fostering affective commitment is a positive work experience that the employer creates (Meyer and Allen, 1991). There is both indirect and direct evidence in the literature that the platform's elaborate incentive system can engender affective commitment. On websites, users show more affective commitment when they experience personal relationships on, and immersion in, the website, and when they are satisfied with the process (Gupta and Kim, 2007; Schulten and Schaefer, 2015). These aspects also involve gamification elements such as points, other rewards, and feedback (Feng et al., 2018; Hoose and Kramer, 2024; Morschheuser et al., 2016). Long-term factors also matter. Even in temporary organizations, perceived career opportunities are related to affective commitment (Spanuth and Wald, 2017). Crowdworkers who perceive interesting tasks and constructive feedback as organizational support will reciprocate with an increased affective commitment (Rhoades et al., 2001). The systematic feedback and the ratings that signal recognition will increase intrinsic motivation consisting of self-recognition, self-effectiveness, playfulness, and social bonds in crowdsourcing (Feng et al., 2018; Mousa and Chaouali, 2023)—all contributing to a positive work experience. Crowdworkers' self-efficacy is increased by the hierarchical matching of tasks and by rating levels because crowdworkers are inhibited from picking tasks that are too demanding. This is an important aspect because crowdworkers often overestimate their own skills (Gadiraju et al., 2017).

Continuance commitment can be defined by the degree to which crowdworkers think they need to stay with the current platform because they lack alternatives or find it too expensive to switch (Meyer and Allen, 1991, p. 67). This in turn is an outcome of available alternatives and the investment the worker has already made in the current relationship. We theorize that the elaborate incentive system encourages crowdworkers to make specific investments that lock them gradually into the relationship with the platform, thereby increasing the switching costs, as has been argued in a related context already (Jones et al., 2007; Sashi, 2012). This is because higher pay per unit of effort, more interesting tasks, and more recognition are achieved by moving up the hierarchy, which to some extent resembles job ladders that constitute a key element of internal labor markets of larger conventional employers (Wachter and Wright, 1990). Incentive hierarchies are platform-specific, and it takes time for a worker to achieve the highest level (e.g., five stars). Therefore, once they have moved to the top of the hierarchy, crowdworkers have a strong interest in remaining active on the current platform. In other words, over time, crowdworkers will incur higher switching costs. That effect has been considered as possibly so severe that crowdworkers will be dependent on and locked into a specific platform, an issue even of public policy concern (Hauben et al., 2020; Schörpf et al., 2017).

2.3 Mechanisms Accounting for Crowdworker Commitment

Crowdworkers can be expected to develop some commitment to the platform, and the platforms' incentive system generally encourages that. But how can we explain inter-individual differences? This is an important issue given the heterogeneity of the crowd. The literature offers no generally recognized model framework linking affective and continuance commitment to particular antecedents (Meyer et al., 2002; Spanuth and Wald, 2017). Further, the studies explaining crowdworker commitment to a platform adopt diverse frameworks, namely the job demands-resources model (Wang et al., 2020), job crafting (Mousa and Chaouali, 2023), and categories of fair work (Li et al., 2023). We adopt a different theoretical lens. Crowdworker heterogeneity is presumably based on differing personal circumstances and resulting needs. It can then be assumed that the level of commitment will depend on how the platform's incentive system caters for these needs. In other words, we focus on needs-satisfaction combinations. Füller et al. (2012) pursue a similar approach when arguing that workers' needs and how these are met by incentives jointly determine a crowdworker's level of activity. Like Wu and Gong (2021), we consider a range of motivations. Rather than distinguishing intrinsic and extrinsic motivations, we adopt the dichotomy that has been used in the commitment literature, namely between economic and social exchange (e.g., Shore et al., 2006; Schneider and Flore, 2019). This results in our framework distinguishing between economic and socio-emotional motivations or needs.

Needs are the factors that drive people to do crowdwork (Zhao and Zhu, 2014; Zheng et al., 2011). In terms of economic needs, people conduct crowdwork in order to earn a living, to supplement other types of income (Archak, 2010; DiPalantino and Vojnovic, 2009; Horton and Chilton, 2010; Stewart et al., 2010), to improve job prospects (Brabham, 2008, 2010), or to signal capability to potential clients or employers (Lakhani and Wolf, 2003). In terms of socio-emotional needs, people conduct crowdwork because of their need for recognition (Brabham, 2008, 2010), general trust (Zheng et al., 2011), glory (Archak, 2010), social identification (Lakhani and Wolf, 2003), partaking in virtual communities (Brabham, 2010), past experience (Bayus, 2010), perceived enjoyment and fun (Brabham, 2008, 2010; Stewart et al., 2010), individual skill development (Brab-

ham, 2010), curiosity and interest (Brabham, 2010), or simply to pass the time (Paolacci et al., 2010). The needs, in turn, are influenced by personal circumstances such as age and employment status (Wang et al., 2020).

The general needs can be met to differing degrees by a platform's incentive system. (Acar, 2018; Füller et al., 2012; Kittinger, 2015; Pee et al., 2018; Schörpf et al., 2017). If crowdworkers, for instance, want to signal capability, achieve self-affirmation, or seek recognition among peers and in relation to clients, then the individual rating and associated status should cater for these needs (Chittilappilly et al., 2016; Goes et al., 2016; Schörpf et al., 2017). A crowdworker can be more or less *satisfied* with the platform's incentive system.

We theorize that commitment is produced by needs and satisfaction in configurational, that is, complex and non-linear ways. A crowdworker's need for recognition, for example, does not necessarily produce high affective commitment alone. Perhaps the crowdworker must also be satisfied with the way the rating is handled by the platform provider. In a similar vein, it has been argued that the combination of needs and incentives will activate people to participate on online communities (Füller et al., 2012). This form of complexity is an example of conjunctural causation (e.g., Schneider and Wagemann, 2012, pp. 5–6). Another form of complexity, multiple causation (e.g., Ragin, 2009, p. 54), can also be expected in our context. Some self-employed persons who do crowdwork as their main occupation, for example, might seek income opportunities. Students or unemployment persons might be drawn to crowdwork by a lack of alternatives. Despite their differing needs, both might show a high level of continuance commitment. Overall, we argue that both high affective and high continuance commitment can be reduced to a limited number of needs-satisfaction combinations. These combinations can be interpreted as causal mechanisms or causal paths, each of which—once activated—can bring about the outcome (Ragin, 2009, pp. 109–112; Rutten, 2022).

We refrain from speculating about the exact number and content of relevant mechanisms. The QCA technique implies that, with c conditions, 2^c ideal typical combinations of conditions are logically possible. With the four needs and two categories of satisfaction which we will examine empirically, up to 64 of such ideal types exist. It is practically impossible to theorize for each ideal type whether it describes a relevant mechanism or not. Instead, in line with most QCA studies in management research, we follow a more inductive strategy (Di Paola et al., 2025). We identify the important conditions and will infer mechanisms from the empirical QCA solutions (Park et al., 2020). Having said that, we adopt the implicit assumption in QCA thinking according to which combinations of conditions that explain an outcome usually cluster into very few types (Goertz, 2020, pp. 58–60). Hence, our first proposition states that a limited number of meaningful mechanisms exist each describing high platform commitment and representing a specific group of crowdworkers. In other words, we posit that the seemingly heterogeneous crowd actually consists of a small number of groups each of whose members are quite similar.

Proposition 1: There is a limited number of groups of crowdworkers with a distinctive needs-satisfaction mechanism that generates high continuance or high affective commitment.

2.4 Commitment and Participation

It is crucial for the platform provider's success that registered workers also participate, that is, intend to conduct tasks on a long-term basis (e.g., Ye and Kankanhalli, 2017). Participation has been studied in terms of the number of tasks performed or hours worked (Deng and Joshi, 2016; Ma et al., 2018; Ye and Kankanhalli, 2017) and in terms of the crowdworkers' intention to remain active on the platform (Jiang et al., 2021; Ma et al., 2018). These measures reflect behaviors. Behaviors differ from states of mind such as commitment (Meyer and Herscovitch, 2001) or job engagement (Schaufeli, 2013) but are influenced by them. Specifically, one might suspect that crowdworkers who are committed to the platform also participate actively. This is because commitment has been found to be associated in general with work performance or other intended or actual behaviors (Meyer and Herscovitch, 2001; Meyer et al., 2002). For example, high affective and high continuance commitment among employees were found to be associated with lower turnover intention and higher intention to stay (Meyer and Allen, 1991; Meyer et al., 2002). Similarly, links between employee commitment and job performance were found to be weakly positive (Meyer et al., 2002, p. 34).

However, the proposition of a linear relationship between the two facets of commitment and participation would not do justice to our specific context. As we argued, crowdworkers are diverse in terms of personal circumstances, are not obliged contractually to provide a certain number of work hours, might spread them between several platforms, and are able to leave a platform anytime. Hence, strong commitment does not necessarily imply active participation. Instead we theorize that more complex, group-specific relationships hold, reflecting configurational causality (Misangyi et al., 2017). As far as we know, no previous studies have examined the link between commitment and participation in paid crowdwork. However, some indirect evidence suggests the existence of group-specific relationships. For example, Ye and Kankanhalli (2017) distinguish between professionals and amateurs and find that factors that are related to active participation in crowdwork differs between these groups. Wang et al. (2020) find that job demands, job resources, and platform commitment differ by various demographic dimensions—suggesting that participation might also differ group-wise.

We expect such effects to characterize our data, too. For example, students who currently feel a strong continuance commitment to the platform often do not intend to stay after graduation, and full-time employees who feel a strong affective commitment to the platform usually participate, but for very few hours as a side-job or pastime. Therefore, commitment and participation are not related in a homogeneous way across all crowdworkers. Instead, links will be contingent on the mechanism responsible for affective and continuance commitment and will therefore differ between groups. Given the potentially numerous needs-satisfaction links, and the underlying personal circumstances that exist, it is impossible to predict specific relationships in advance. Therefore, we posit a general proposition and will characterize the group-specific patterns in a more inductive way.

Proposition 2: Platform participation in terms of work hours per week and intention to remain active on the platform differ between groups of committed crowdworkers.

3. Method

3.1 Research Environment

The empirical analysis examines crowdworkers registered with *Content* (https://www.content.de/), a platform provider that specializes in commissioning the creation of various forms of text in German language. Founded in 2010, *Content* reported more than 6500 registered users in 2022. In their comparative analysis of how platforms represent themselves, Hoose and Kramer (2024) find that *Content* emphasizes on its website that it seeks a high level of expertise and offers a long-term perspective to workers in terms of income, interesting tasks, and professional development. For our study, important background information was provided by one of the platform's founders in various interviews (e.g., on the design of the incentive system). The founder agreed to the survey, which we organized as a call for a paid online task on the platform. There was no conflict of interest because the study was developed by a team of researchers and funded by a third party, and the survey was anonymous. Only the research team handled the data.

The core of the incentive system, summarized in Table 1, are six rating levels, namely 2, 3, 4, 4+, 4++ and 5 and additional badges ("Certified Author", "VIP Author", i.e., Very Important Person). Each crowdworker is assigned to one of these levels, which is determined by the worker's past activity and quality assessments for each task both by the platform management and by the crowdsourcers, the customers. Each writing task requested by a customer is also given one of the six ratings levels prior to announcing the task. This serves to indicate the expected quality of the text, to fix a particular price per word for the task, and to help match text and worker. Crowdworkers are eligible to take on a task if they hold a rating level that is equal to, or higher than, the level assigned to the task. Price per word increases with each rating level 2 to 5 and additional advantages are attached to each of the badges, namely additional bonuses and prioritized access to a number of tasks. Overall, the elaborate incentive system offers a combination of incentives found in the literature to be important for crowdworkers to commit and participate.

3.2 Measures, Data, and Steps in the Analysis

An informal, qualitative pretest was conducted with six students, who checked the length of the questionnaire and the plausibility of questions. A similar pretest was conducted by *Content* management with some of the platform's registered workers (N for this pretest is unknown). Data were collected in the context of a larger online survey conducted between November 2018 and June 2019 (Giard et al., 2019). Completing the questionnaire survey was posted as a paid task to *Content*. Paying crowdworkers to provide information on their own work situation has become an accepted approach for data collection (Bertschek et al., 2015; Brabham, 2010; Leimeister et al., 2009). Based on power analyses, 200 responses were aimed at, so the paid task was removed as soon as the target was met. A number of measures were taken to ensure data quality (details are reported in Giard et al., 2019, in German language). Only fully completed questionnaires (N = 206) were used. Survey participants were asked what the last day of the year was; only two persons did not respond correctly, and their data was removed from the further analysis, leading to our sample of N = 204. Additional analyses showed that response did not differ depending on the time the respondents needed to complete the questionnaire.

Registered users who happened to see the posting were free to complete the questionnaire until a sufficient number of responses had come in. As a result, the more active crowdworkers are overrepresented in the sample. In fact, only authors who are certified authors or VIP authors responded to the survey, while regular authors, who have not written frequently for *Content*, did not respond at all. As we are interested in understanding commitment and participation among workers who are at least to some extent active, the sample—though biased and non-representative—is highly suitable for the purpose of this study.

The questionnaire included established scales available in German language whenever possible and adapted them to the platform environment. Details are reported in Table 2.

Continuance commitment was measured by applying the COBB ("Commitment Organisation, Beruf und Beschäftigungsform") questionnaire (Felfe et al., 2014). Cronbach's standardized alpha for this scale is 0.82. In measuring a*ffective commitment*, we did not follow COBB as the pretest showed that items framed for regular employees in organizations are not meaningful to crowdworkers. Instead, it was measured following the German short inventory (G-OCQ) (Maier and Woschée, 2008) of the Organizational Commitment Questionnaire (OCQ) of Mowday et al. (1982). Cronbach's standardized alpha is 0.89. For

Table 1. Selected elements of the incentive system of *Content*.

Author status	Requirements	Added value
Content.de Author	● 2 to 4 stars ● Worked on a low number of tasks	
Certified Author	● Vote by Content ● 4+ stars and higher ● Minimum of 22,500 words per quarter year	● Reservation of 12 tasks ● Badge "Certified Author" ● Consideration in author pools ● 5% Christmas bonus on payments in November
VIP Author	● Vote by Content ● 4++ stars and higher ● Minimum of 30,000 words per quarter year	● Reservation of 20 tasks ● Badge "VIP Author" ● Consideration in author pools ● 10% Christmas bonus on payments in November ● 0.1 cent surcharge per word (for so-called open order)

Note: Based on information provided on Content.de (accessed on 29 March 2022), our own translation. VIP, Very Important Person.

both constructs, wording has been changed slightly to fit the platform context.

Participation was measured in two variables, which in similar ways have been used in the (platform) literature. *Work hours per week* is self-reported and gives the number of hours typically worked per week on the platform. *Intention to remain active* is also self-reported. On a five-point scale, crowdworkers indicate whether they expect to be working for *Content* in 12 months' time.

Needs to do crowdwork were measured in four one-item scales. No established instrument we are aware of covers the range of economic and socio-emotional needs documented in the literature. Therefore, the five-point scales were self-developed. The four needs concerning job alternatives—additional income, interesting tasks, and passing the time—arguably cover the most important needs of crowdworkers discussed in the literature.

Satisfaction with the platform-specific incentive system was also measured with self-developed items. Three items cover satisfaction with the pay aspects of the platform's rating system, namely the level of rewards at each rating level, the increase in income from one level to the next, and a motivating effect of the rating system overall. Similarly, three items covered satisfaction with status aspects, namely interesting tasks, recognition for performance, and recognition by coworkers. The two instruments should be considered indexes (or formative scales) rather than reflective scales (Diamantopoulos and Siguaw, 2006). Accordingly, Cronbach's standard alpha was relatively low in each case, with 0.70 for satisfied with pay aspects, and 0.53 for satisfied with status aspects.

Descriptive statistics and correlations for variables included in the analysis are reported in Table 3.

To explore links between needs-satisfaction combinations and affective as well as continuance commitment, we utilize fs/QCA (Di Paola et al., 2025; Ragin, 2000, 2009; Schneider and Wagemann, 2012). Fs/QCA has been found suitable to derive typologies or taxonomies (e.g., Fiss, 2011; Saka-Helmhout et al., 2020) and has been used with individual data for example to explain multiple paths to organizational commitment (Gabriel et al., 2018) or trust (Frazier et al., 2016) among employees or well-being among gig workers (Wu and Zhou, 2023). We calculated two separate fs/QCAs, one with affective and one with continuance commitment as outcome variable. Though that is the core of our analysis, we returned to individual cases, an important step in QCA (Ragin, 2009, p. 121). We did so by examining in more detail the individuals (cases) that are characterized by a particular combination or causal path related to affective or to continuance commitment in the fs/QCA. For each group, we computed means for a whole range of other characteristics not included in the fs/QCA. Information on personal circumstances such as tenure and employment status allowed us to characterize each group more holistically in order to better understand the basis of their needs-satisfaction combination and confirm that we uncovered meaningful groups (Proposition 1). By examining whether the different groups of committed crowdworkers differ in work hours per week and intention to remain active, we were able to explore group-specific levels of participation (Proposition 2).

3.3 Calibration for fs/QCA

As the fs/QCA analyzes set values, raw data for outcomes and conditions need to be calibrated into values from 0 to 1 (Table 4). Affective and continuance commitment are defined as mean values ranging from 1 to 5 based on

Table 2. Measurement scales.

Construct	Literature	No. of items	Scale/Item	(Sample) items
Continuance commitment	Felfe et al., 2014, Meyer et al., 1993b	4	Five-point Likert	"I have invested already too much energy and vigor to even think about leaving the platform"
Affective commitment	Maier and Woschée, 2008; Mowday et al., 1982	9	Five-point Likert	"I am willing to put in a great deal of effort beyond that normally expected in order to help this platform to be successful"
Work hours per week	Deng and Joshi, 2016	1	Number	"How many hours do you work on average per week on Content.de?"
Intention to remain active	Numerous papers with similar one-item scale, e.g., Jiang et al., 2021	1	Five-point Likert	"How likely is it that you will be working on Content.de in 12 months from now?"
Need for job alternatives	Self-developed	1	Five-point Likert	"Why do you work on a crowdwork platform? Lack of job alternatives"
Need for additional income	Self-developed	1	Five-point Likert	"Why do you work on a crowdwork platform? Improving my financial situation"
Need for interesting tasks	Self-developed	1	Five-point Likert	"Why do you work on a crowdwork platform? Interesting job tasks"
Need to pass time	Self-developed	1	Five-point Likert	"Why do you work on a crowdwork platform? Passing the time"
Satisfied with pay aspects	Self-developed	3	Five-point Likert	"Rewards for the platform's rating levels are appropriate" "Higher rating levels will lead to a substantial improvement of income from work on this platform" "I am motivated by the platform's rating levels"
Satisfied with status aspects	Self-developed	3	Five-point Likert	"Higher rating levels lead to a better choice of tasks" "My performance is being recognized by the platforms through the rating levels" "I receive recognition from other crowdworkers through the rating levels"
Crowdworkers' personal circumstances	Various	7	Various	Questions on employment status; tenure with the platform in months; rating on the platform

Table 3. Descriptive statistics and correlations of analyzed variables and indices.

Variable		M	SD	1	2	3	4	5	6	7	8	9
1	Continuance commitment	3.50	1.09									
2	Affective commitment	3.48	0.84	0.47***								
3	Need for job alternatives	2.23	1.46	0.18**	–0.13*							
4	Need for additional income	3.91	1.15	0.27***	0.12*	0.35***						
5	Need for interesting tasks	3.74	1.08	0.10	0.46***	–0.06	0.19***					
6	Need to pass time	2.06	1.21	–0.27***	0.04	–0.05	0.03	0.21***				
7	Satisfied with pay	3.11	1.14	0.19***	0.48***	–0.11	0.12*	0.31***	–0.00			
8	Satisfied with status	2.00	1.18	0.17	0.38***	–0.10	–0.01	0.18**	0.06	0.38***		
9	Intention to remain active	4.57	0.87	0.30***	0.35***	0.00	0.12*	0.21***	–0.07	0.26***	0.11	
10	Work hours per week	15.72	11.22	0.47***	0.26***	0.12*	0.06	0.09	–0.26***	0.19***	0.17**	0.07

Note: N = 204. M, mean; SD, standard deviation.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 4. Calibration of outcomes and conditions for the fuzzy-set qualitative comparative analysis.

Name	Scaling of raw data	Calibration
	Outcomes	
High continuance commitment	Mean of values on four items each on a scale from 1 to 5	Log-odds method with anchor points: 2.0, 3.0, 4.5
High affective commitment	Mean of values on nine items each on a scale from 1 to 5	
	Conditions	
Strong need for job alternatives Strong need for additional income Strong need for interesting tasks Strong need to pass time	Each variable on a single-item scale from 1 to 5	For each variable: (1): 0.00; (2): 0.25; (3): 0.499; (4): 0.75; (5): 1.00
Highly satisfied with pay aspects Highly satisfied with status aspects	Each variable with three items, each on a scale from 1 to 5	For each variable: (1): 0.00; (2): 0.25; (3): 0.499; (4): 0.75; (5): 1.00 Minimum of set values used as condition

underlying Likert scales. In such scales, a raw value of 3 is formulated in a neutral way, closely resembling the idea in QCA that a case is neither in nor out of the set. We therefore choose the value of 3 as crossover point. This is in line with idea that substantive knowledge rather than distributional considerations should guide calibration (Mattke et al., 2021; Misangyi et al., 2017, p. 263). Still, in light of few cases with low values, the 0 and 1 values are not set at the 1 and 5 raw values, but slightly higher and lower respectively, reflecting skewed data. To ensure that no observations will be lost for the minimization procedure, we follow usual practice and subtracted 0.001 from all fuzzy-set values of 0.5 (Rubinson et al., 2019). As a result, all cases with a raw value of 3 were treated as being slightly out of the set.

The value of 3 was also taken as the 0.5 crossover point for the four conditions measuring needs. Proportionate fuzzy values for the raw values of 1, 2, 4, and 5 were chosen.

Being highly satisfied with pay aspects was measured with an index consisting of three single items on a five-point scale. Rather than averaging the items, we used the minimum of the three items' set values. The resulting condition is the intersection of the three items and indicates the degree to which a crowdworker is highly satisfied with all three pay aspects measured. Being highly satisfied with status aspects of the platform was calibrated likewise. Taking the minimum of fuzzy-set values, as we do, implies a "weakest link" assumption: the single items are not mutually substitutable in their link to the outcome (Goertz, 2020, pp. 15–16). By aggregating in this way, we include configurational logic into the construction of the conditions, which is consistent with the QCA approach. The procedure is also consistent with the idea of a formative scale defined by all three items (Diamantopoulos and Siguaw, 2006).

Using the set values of six conditions, we examined the 204 crowdworkers (cases) in a sufficiency analysis in fs/QCA. This proportion of conditions to cases strikes a balance that is consistent with important guidelines suggested in the literature (Marx, 2010; Schulze-Bentrop, 2013).

In the fs/QCA procedure, a truth table analysis serves to identify those ideal types—combinations of all conditions—that are sufficiently linked to the outcome. Then the Boolean expressions for the solution can be reduced through a logical minimization procedure. There is some discussion on which solution in fs/QCA to choose (e.g., Baumgartner, 2015; Schneider, 2018). We report the most parsimonious solution. It uncovers solutions that only include core conditions (those that will form part of the solution in other minimization options, see Fiss, 2011) and produces fewer and more general causal paths. For our analysis, the solution is identical to the intermediate solution if we assume that all conditions contribute to the presence of the outcome. As this implies, our model is robust with reference to unobserved ideal types (remainders). Robustness was also achieved through imposing a frequency threshold of 3 in our analysis, as suggested by Greckhamer et al. (2013, p. 54). In other words, for an ideal type to enter the analysis, it must cover at least three crowdworkers. This decision also works towards the identification of fewer but more important groups and underlying needs-satisfaction mechanisms. Reverting from ideal types to real observations, we consulted coverage, consistency, and PRI (proportional reduction of inconsistency) scores to specify the models (Ragin, 2009; Schneider and Wagemann, 2012). Only the findings for the sufficiency analysis are reported because, in an analysis of necessity, none of the conditions or their negation was found to be necessary (results not reported).

All calculations were conducted on R version 4.0.5 (R Foundation for Statistical Computing, Vienna, Aus-

Table 5. Truth table of the observed ideal typical combinations.

Need				Satisfied with			Consistency	
for job altern.	for additional income	for int. tasks	to pass time	pay aspects	status aspects	n	Continuance commitment	Affective commitment
0	1	0	1	0	1	20	**0.84**	**0.92**
0	1	0	1	1	1	7	**0.85**	**0.96**
1	1	0	1	1	1	3	**0.87**	**0.99**
0	0	1	1	0	0	15	**0.83**	0.75
0	1	1	1	0	0	13	**0.85**	0.81
0	1	1	1	0	1	7	**0.87**	**0.91**
0	0	0	0	0	0	14	0.77	0.86
0	0	0	0	0	1	3	0.80	0.91
0	1	0	0	0	0	15	0.77	**0.90**
0	1	0	0	0	1	7	0.79	**0.95**
1	1	0	0	0	0	4	0.64	**0.92**
0	0	0	1	0	0	16	0.81	0.85
0	0	0	1	0	1	9	0.83	**0.91**
0	1	0	1	0	0	26	0.83	0.89
1	0	0	1	0	0	4	0.73	0.89
1	1	0	1	0	0	9	0.79	**0.93**
1	1	0	1	0	1	8	0.80	**0.95**
0	0	1	0	0	0	4	0.80	0.87

Note: Altern., alternatives; int., interesting; n, number of cases in ideal type. Consistency scores in bold indicate that the ideal type passes the imposed thresholds for consistency (0.90 for affective commitment, 0.82 for continuance commitment), proportional reduction of inconsistency (0.70), and frequency thresholds (3) and therefore enter the minimization process.

tria) with the QCA library, version 3.18 (Duşa, 2019) and the Setmethods library, version 3.0 (Oana and Schneider, 2021).

4. Results

4.1 Main Analysis

Of the 64 logically possible combinations of conditions (ideal types), 34 were observed. After imposing the frequency threshold of 3, only 18 ideal types entered the minimization process. These cover 184 or 90% of the original 204 cases, which is more than the suggested minimum of 80% (Greckhamer et al., 2013). For affective commitment, a consistency threshold of 0.90 was applied because of a substantial drop in the consistency level to the next row in the truth table. By the same logic, a threshold of 0.82 was applied for high continuance commitment. Both thresholds exceed the suggested minimum of 0.70 (Ragin, 2009, p. 46). Table 5 summarizes the two truth tables.

The solutions for the two fs/QCA sufficiency analyses are reported in Table 6. The table also reports the results of our additional post-fs/QCA, case-based analysis. We sought to identify the cases that best represent the mechanisms indicated by the causal paths. Therefore, for each of the two outcomes, we further explored the uniquely covered cases: the crowdworkers who follow that specific path but not the other two. For example, crowdworkers are uniquely covered by the mechanism described by Path 1 if their continuance commitment can be explained by Path 1 but not by the Paths 2 and 3. In other words, for each of these crowdworkers the expression (*highly satisfied withstatus aspects*) is true (that is, the fuzzy-set values exceed 0.5) but (with * denoting a logical "and", and ~ denoting a negation) the expressions (*strong need for job alternatives * strong need for additional income*) and (*strong need for additional income * strong need for interesting tasks * ~strong need to pass time * highly satisfied withpay aspects*) are not true (that is, the fuzzy-set values are below 0.5). For the resulting groups, we report in Table 6 means for additional information on workers' personal circumstances, as well as affective and continuance commitment. Crucially, we also include means of work hours per week and intention to remain active.

Juxtaposing that information and the solution term for each path, we found the overall pattern so plausible that we name tagged each group to summarize its distinctive features. Overall, the fs/QCA along with the additional analysis lends support to the propositions: A limited number of needs-satisfaction combinations exists which are sufficiently linked to high continuance or high affective commitment, and these combinations reflect important inter-group differences in terms of the type and level of commitment, and in terms of participation (work hours per week and intention to remain active).

More specifically, three groups of crowdworkers, characterized by the Paths 1, 2, and 3, show high continuance commitment.

Table 6. Needs-satisfaction mechanisms of high commitment and underlying groups.

		Outcome					
		Strong continuance commitment			Strong affective commitment		
		1	2	3	4	5	6
Condition		Loyal workers	Precariat	Stars	Freelancers	Core workers	Side jobbers
Strong need for job alternatives			●				
Strong need for additional income			●	●	⊗	●	
Strong need for interesting tasks				●	●		●
Strong need to pass time				⊗			●
Highly satisfied with pay aspects				●		●	
Highly satisfied with status aspects		●					
Additional information[a]							
Tenure in months	(58)	70	51	63	65	67	57
Top rating: 4 ++ or 5 in %	(30)	38	23	60	38	52	0
CW main occupation in %	(44)	15	66	58	50	62	11
Self-employed in %	(66)	69	68	75	85	70	22
Dependently empl. in %	(20)	0	10	0	4	17	44
Unemployed in %	(8)	0	13	10	4	11	22
Train'g/ret./par. leave in %	(25)	46	23	25	4	22	22
Work hours per week	(15.7)	17.8	17.1	19.9	16.9	20.2	10.8
Intention to remain active[b]	(74)	70	81	90	62	83	89
Continuance commitment	(3.5)	3.6	3.7	4.0	3.3	4.0	3.6
Affective commitment	(3.5)	3.9	3.2	3.9	3.6	3.9	3.7
Parameters of fit							
Covered cases		23	41	35	32	60	29
Uniquely covered cases		13	31	20	26	46	9
Consistency		0.82	0.78	0.84	0.87	0.90	0.87
Raw coverage		0.32	0.36	0.49	0.31	0.63	0.33
Unique coverage		0.06	0.12	0.14	0.00	0.27	0.04
Overall solution consistency			0.78			0.87	
Overall solution coverage			0.68			0.77	
Frequency cut-off			3			3	
Consistency cut-off			0.82			0.90	
PRI cut-off			0.70			0.70	

Note: PRI, proportional reduction of inconsistency. The table reports two separate analyses of sufficiency, one each for the outcome strong continuance commitment and the outcome strong affective commitment. The most parsimonious solution is reported. The most parsimonious solution is identical with an intermediate solution when the presence of each condition is assumed to contribute to the presence of the outcome.

Calculations with the qualitative comparative analysis (QCA) package for R provided by Duşa (2019), version 3.18, on R version 4.0.5 (R Foundation for Statistical Computing, Vienna, Austria).

● presence of the respective condition. ⊗ absence of the respective condition. An empty cell indicates that it does not matter whether the condition is absent or present (Fiss, 2011).

CW, crowdwork; empl., employment; Train'g/ret./par. leave, training, retraining, and parental leave.

[a] Means of variables for cases only covered by the path (means for all cases in parentheses).

[b] Intention to remain active is measured here as the percentage of respondents who report the highest category in the five-point scale because raw data are heavily skewed.

Loyal workers (Path 1 with 13 uniquely covered cases) form a relatively small group. It is also the only group for which the path consists of one single condition (highly satisfied with status aspects). Members of this group hold the highest average tenure (70 months) and are relatively often in training, retraining, or parental leave (46%). Though the mechanisms explained high continuance commitment, the *loyal workers* are also among the groups with the highest level of affective commitment (3.9). While that indicates high loyalty at present, intention to remain active (70%) is not high in comparison to most other committed groups.

The *precariat* (Path 2, 31 cases) combines a lack of job alternatives with a motivation to gain additional income to explain high continuance commitment. The path can be

written as: (*strong need for job alternatives * strong need for additional income*). They are often unemployed (13%), many of them report crowdwork to be their only occupation (66%) and less than a quarter (23%) have acquired a high reputation (4++ or 5 stars). That this group tends to be in a precarious situation is supported by another conspicuous pattern: Among all six committed groups, the members of the *precariat* report the lowest level of affective commitment (3.2) but the second-highest level of continuance commitment (3.7).

Stars (Path 3, 20 cases) are highly satisfied with pay aspects and strongly seek additional income and interesting tasks – but do not need to pass the time. The path can be written as: (*strong need for additional income * ~strong need to pass time * strong need for interesting tasks * highly satisfied with pay aspects*). The group contains a large share of crowdworkers who report crowdwork to be their main occupation (58%) and the largest share of crowdworkers (60%) ranked at the reputational top levels (4++ and 5). The *stars* are the group with the highest levels of both continuance (4.0) and affective commitment (3.9). They work 19.9 hours, only surpassed by the *core workers* (see below), and they report more often than other groups to intend to remain active on the platform (90%).

Similarly, three groups of crowdworkers, characterized by the Paths 4, 5, and 6, show high affective commitment.

Freelancers (Paths 4, 26 cases) strongly seek interesting tasks but not additional income (*strong need for interesting tasks * ~ strong need for additional income*). The group includes the largest share of self-employed workers (85%) but only half of them report crowdwork to be their only occupation (50%). Among all groups, the *freelancers* report least often to intend to remain active (62%), and they work relatively few hours (16.9); only the *side jobbers* (see below) work less.

Core workers (Path 5, 46 cases), the largest group, seek additional income and are highly satisfied with pay aspects of the platform's incentive system (*strong need for additional income * highly satisfied with pay aspects*). Group members exhibit relatively high tenure (67 months) and are often (52%) ranked at reputational top levels (4++ and 5). Demographically, *core workers* are similar to *stars* (Path 3), and that is no coincidence: The solution term for Path 5 is a superset of that for Path 3, and the *stars* are also included in the group of *core workers*. Both groups show a similarly high level of continuance and affective commitment (4.0 and 3.9, respectively). Compared to the *stars*, the *core workers* intend to stay less often (83% compared to 90%) but they work at roughly the same level (20.2 compared to 19.9 hours).

Side jobbers (Path 6, 9 cases) seek to pass the time and interesting tasks (*strong need to pass time * strong need for interesting tasks*). This smallest group contains no workers ranked at the reputational top levels (4++ and 5), the highest share of dependently employed workers (44%) and the lowest share of workers with crowdwork as their only occupation (11%). The pattern suggests that members of the group are often active on the platform as a side job and can afford to pick more interesting tasks to pass the time. Consistent with that pattern, many of the *side jobbers* intend to remain active (89%) but they are the group with the fewest work hours per week (10.8).

Cross-group comparisons show that our analysis captures plausible and important differences that help us to understand why and how the committed crowdworkers differ. For example, *loyal workers* often study or are on parental leave. *Freelancers* are often permanently self-employed persons who do not rely on the platform or crowdwork alone. Plausibly, both groups report a lower average intention to remain active than the remaining groups. On the other hand, the *stars* report the highest average intention to remain active. They include a considerable number of self-employed, permanent crowdworkers. Further, there appears to be a link between tenure and the needs-satisfaction combination. The *loyal workers*, *stars*, and *core workers* report high tenure (70, 63, and 67 months respectively). Not surprisingly, these groups are the ones whose solutions involve satisfaction with the incentive system of *Content*; the mechanism explaining commitment involves high satisfaction with status aspects for the *loyal workers*, and high satisfaction with pay aspect for the *stars* and *core workers*. Hence, they are committed because they appreciate particular platform characteristics rather than crowdwork more generally. Two among the remaining groups (*precariat* and *side jobbers*), by contrast, report relatively low tenure and are committed based on needs that might be catered for by crowdwork more generally and not specifically *Content*.

4.2 Robustness Checks

Two additional analyses were conducted to examine the robustness of findings.

First, we conducted sufficiency analyses with the negated outcomes. Similar to a platform provider, we are not so much interested in explaining lack of commitment as such, but the path explaining the absence of commitment should not overlap with those explaining its presence. Solutions for the negated outcomes were only attainable with permissive model assumptions, in which we imposed no frequency threshold and no proportional reduction of inconsistency (PRI) value, and a consistency threshold of 0.80, which is however still above the suggested minimum of 0.70 (Ragin, 2009, p. 46). We found the negation of high continuance commitment is explained by a single path: (*~strong need for additional income * strong need to pass time * ~strong need for interesting tasks*). The negation of high affective commitment was explained by a more comprehensive solution with three paths. With + denoting a Boolean inclusive "or", the paths can be written as: (*strong need for job alternatives * ~strong need for additional in-*

*come + ~strong need to pass time * ~strong need for interesting tasks *~highly satisfied with status aspects* ~highly satisfied with pay aspects*). The paths are plausible mechanisms explaining the absence of commitment and they do not contradict the findings of our main analysis.

Second, we conducted additional fs/QCA following the robustness check protocol suggested by Oana and Schneider (2021). When the frequency cutoffs and consistency thresholds were varied, no sensitivity ranges existed. In other, words, our findings immediately change when the model assumptions are altered. To further assess the nature of these changes, we created two test sets for each outcome. We both increased and decreased the frequency cutoff by 1 case, and the consistency threshold by 0.02 points, and then conducted sufficiency analyses with those varied assumptions. The robust core of the solution was then derived. It is defined as the intersection of the two test set solution terms and the set of the initial solution. Comparing the initial solutions with the robust core solutions for both outcomes (Oana and Schneider, 2021, p. 20), we find the solution terms for the *stars* (with high continuance commitment as outcome) and for the *core workers* (with high affective commitment as outcome) unchanged, while the remaining mechanisms in the robust core are subsets of those in the initial solutions. In other words, the findings for the two groups that show the highest level of commitment and participation remain identical to our initial solution. For the other groups, the findings become more specific but do not contradict our main model.

5. Discussion

5.1 Main Findings and Contributions

Based on a questionnaire survey data covering crowdworkers on a German text creation platform, this paper has uncovered complex links between crowdworker needs and satisfaction, platform commitment, and participation. In particular, it has shown that strong participation in terms of work hours per week and intention to remain active does not follow in a linear way from high platform commitment; that platform continuance or affective commitment can be explained by six distinct mechanisms defined as needs-satisfaction combinations; and that the mechanisms correspond to groups of crowdworkers with similar personal circumstances: *loyal workers*, *precariat*, *stars*, *freelancers*, *core workers*, and *side jobbers*.

Applying QCA, we bring a configurational and person-centered perspective to the analysis of crowdwork, and our paper contributes to the debate that calls for a better understanding of the heterogeneous crowd. Our paper extends work that found demographic variables to moderate links explaining participation (e.g., Jiang et al., 2021). Arguing that participation does not simply differ by broad demographic categories but by a combination of conditions is a straightforward next step in the analysis. The step we take is similar to Morgan et al. (2023), who also demonstrated that the apparently amorphous mass of crowdworkers can be reduced to a small number of distinct groups. They used latent class analysis and distinguished groups by a number of demographic variables. We have used the QCA methodology because it is better able to cope with smaller samples and derived groups with reference to an outcome, in this case affective and continuance commitment. Hence, we do not find only distinct groups of crowdworkers but also distinct groups of committed crowdworkers, even in a very specific context of one single platform with a sample of relatively active crowdworkers.

The paper also enhances our knowledge on crowdworker commitment and participation. It confirms and complements recent findings according to which participation and commitment differ across groups. Jiang et al. (2021) distinguished part-time and full-time workers, Ye and Kankanhalli (2017) amateurs and professionals in terms of participation, and Wang et al. (2020) examined demographic variables that moderate how demands and resources influence commitment to a platform. While our paper resonates with these findings by confirming group-specific patterns, its configurational perspective yields additional insights. Groups are endogenous, they are identified by distinct mechanisms rather than exogenously identified by demographic characteristics that serve as moderators. Furthermore, the mechanisms are defined as conjunctions of conditions, which closely aligns with the underlying configurational theory of needs-satisfaction combinations. Previous authors also theorize in partly configurational ways, when they consider, for example, costs and benefits of crowdwork (Ye and Kankanhalli, 2017) or job demands and resources (Jiang et al., 2021) but the statistical methods applied in such work only uncovers linear-additive links rather than the theorized configurational ones. Our paper also demonstrates that commitment and participation are not linked in linear ways as the literature on organizational commitment argues (Meyer et al., 2002). Though all groups of crowdworkers which our fs/QCA has identified are committed to the platform, their participation in terms of work hours per week and intention remain active on the platform differ markedly. Finally, our paper distinguishes affective and continuance commitment among crowdworkers. Previous work did not discuss multiple facets but only focused on affective commitment (Mousa and Chaouali, 2023), on a general concept of commitment (Wang et al., 2020), or on continuance commitment without labeling the instrument in this way (Li et al., 2023). The results of our paper highlight the importance of distinguishing different facets of commitment. Despite some overlap (with respect to the *stars* and the *core workers*), the groups of crowdworkers differ by type of commitment; it makes a difference whether crowdworkers think they need to stay or want to stay with the platform. Hence, the paper also confirms that it is important to measure continuance commitment (Li et al., 2023), especially in light of the voiced concern that

crowdworkers may become too dependent on a single platform (e.g., Schörpf et al., 2017; Hauben et al., 2020). Measuring continuance commitment can throw light on this issue, with important managerial implications.

5.2 Managerial Implications

If we assume that platforms such as *Content* are interested in committing expert workers on a long-term basis (Hoose and Kramer, 2024) and that the gist of our findings carry over to other platforms specializing in more complex professional services, this paper has important practical implications. These implications pertain to designing incentive systems that commit and activate workers – an area that has largely been sidestepped by work that discussed the human resource management implications of crowdwork as a new form of employment (Kuhn et al., 2021; Bush and Balven, 2021).

First, implementing a sophisticated incentive system matters because of cross-group differences. For *stars* and *core workers* the pay aspects of the system are important; for *loyal workers*, the status aspects are important. Second, within the incentive system, the pay aspects seem to be more important than the status aspects for binding and activating experts. *Core workers* and *stars* work longer hours than all other groups and demonstrate a high intention to remain active.

Third, the configurational approach we adopted yields a number of group-specific managerial implications. The platform provider can develop and retain *loyal workers* by providing positive feedback through badges and other channels as well as offering interesting tasks. They should do so because such workers tend to have long tenures. The platform can find these workers among those in training or on parental leave.

The platform provider should offer some support to workers with lower tenure, who are represented by the *precariat*. Many of them have not yet achieved a higher reputational status. Investing in the support of such workers might pay off because this group strongly relies on income from the platform, is likely to stay on, and already participates a considerable number of hours.

The platform should pay particularly attention to the *core workers*, including the *stars*, because they are the most active participants and the groups most likely to continue participating. The platform provider can do so by maintaining an attractive pay system, which is an important element in these groups' paths to high affective or high continuance commitment. These groups include most of the experienced expert writers who can provide more complex services and are likely to remain important even when competition intensifies due to technological advancements (see below).

Conversely, the platform provider should care much less about the *side jobbers*, who do not include any writer with top ratings and who contribute the fewest hours. Finally, the platform should view the *freelancers* as an important group of occasional contributors who are primarily self-employed and have many activities beyond the platform. To activate them, it is important for the platform to offer interesting tasks.

5.3 Limitations and Future Research

As with any study, the present study has some limitations, which point at opportunities for future research. As the questionnaire was organized as a paid task posted on the platform, the sample can be expected to include particularly committed crowdworkers with above-average participation. Our goal was to identify particularly committed crowdworkers rather than produce representative findings. This goal was not jeopardized by the presumed sampling bias, as we did find substantive differences between the groups, differences that would only be more pronounced in more random samples. Still, future studies should try to examine more representative samples to explore whether our findings carry over to other contexts. In particular, these studies should explore other platforms for professional services and platforms that organize creativity contests. Future studies could also examine which workers abandon a platform.

Our needs-satisfaction framework, which is to some extent similar to the framework suggested by Füller et al. (2012), could be explored and refined further in the future. In our study, we derived the needs based on a literature review and aimed to cover the most important general goals that workers might pursue when conducting crowdwork. Satisfaction with pay and status aspects were modeled based on the platform's incentive hierarchy. Future work could seek a closer correspondence between needs and satisfaction categories. Future work could also examine whether incentives on other platforms yield similar results. In a conceptual paper, Bush and Balven (2021) discuss how various human resources practices might influence job engagement. Future work could explore how the group-specific participation we study can be linked to practices beyond the incentive system, and whether our groups (or similar ones on other platforms) differ in job engagement (Wang et al., 2020), a construct that has been argued to influence commitment (e.g., Schaufeli, 2013; Walden et al., 2017).

A recent meta-analysis calculated average hourly pay for crowdwork of less than $ 6 and showed that unpaid work is widespread (Hornuf and Vrankar, 2022). We have focused on a single platform provider located in an affluent society, Germany, and specializing in text creation, a type of tasks that to some extent shields workers from global competition and allows better pay and working conditions. Hence, though the findings of our study cannot be generalized in an unreflective way, similar patterns are likely to emerge in platforms that mediate tasks with higher skill needs and an incentive system similar to that of *Content*. Future work should explore other platforms with similarly

complex online tasks but more global competition; programming would be an interesting example.

The study was cross-sectional and limited in sample size (N = 204). Larger samples or panel data would allow researchers to answer additional questions. For example, whether workers are willing to pursue a career in crowdwork depends on employment conditions and other career anchors (Li et al., 2023; Taylor and Joshi, 2019). How satisfaction, commitment, and participation evolve as crowdworkers ascend along a platform's rating levels would be an interesting avenue for future research.

6. Conclusion and Outlook

This study tackles the seemingly amorphous heterogeneity of crowdworkers and uncovers complex links between platform commitment and active participation. It defragments the many dimensions in which crowdworkers differ into a limited number of distinct needs-satisfaction mechanisms that explain continuance or affective platform commitment. The mechanisms are represented by distinct groups in terms of personal circumstances. Though each group is committed, they differ markedly in their active participation on the platform. Distinguishing groups of committed crowdworkers is important for understanding important differences in participation, as recent developments illustrate. Within eight months after the introduction of ChatGPT, job postings for automation-prone writing and coding tasks declined by approximately 21% relative to postings for manual-intensive tasks (Demirci et al., 2025). In a blog post on the website of our case company *Content*, it was announced that business has declined drastically since the beginning of 2023, that only more demanding, sophisticated tasks remain, and that a considerable number of crowdworkers had to leave the platform (Sigge, 2025). The findings of this paper allow us to predict how the groups are affected. Many members of the *precariat*, who are relatively inexperienced texters, will not be eligible for the remaining tasks in the ChatGPT era. This is also true for many *side jobbers* and *freelancers*, though they appear to be less dependent on the additional income. Conversely, the more sophisticated tasks favor the *stars* and *core workers* (and to a lesser extent the *loyal workers*) who have registered with the platform for a longer time and have often acquired higher ratings, entitling them to take on the remaining tasks.

Availability of Data and Materials

The data analyzed in this study are available on request: https://pub.uni-bielefeld.de/record/2949800.

Author Contributions

PH developed the survey questionnaire and prepared the raw data for analysis. PH and MS designed the research idea, analyzed the data and wrote a first version of the paper. MS conducted additional data analysis. DK validated the findings and, together with MS, planned and supervised the a new version of the paper. MS and DS developed a new conceptual model, wrote, reviewed and edited various versions of the paper. All authors contributed to the critical revision of the manuscript for important intellectual content. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Acknowledgment

Much earlier versions of this article were presented at 1st Crowdworking Symposium: Understanding Digital Labor Markets, the 82nd Annual Conference of the German Academic Association of Business Research (VHB), and the 36th EGOS Colloquium: Organizing for Sustainable Future: Responsibility, Renewal & Resistance. We thank all participants for their valuable feedback.

Funding

This work was funded by the Ministry of Culture and Science of the German State of North Rhine-Westphalia within the research program "Digital Future" [grant number 324-8.03.02.01.03-131116].

Conflicts of Interest

The authors declare no conflicts of interest.

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