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Anthropomorphising the Algorithm: A ‘Theory of Mind’ Perspective on Psychological Contract Creation in Gig Work Arrangements

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1 | Introduction

The ‘agency’ question is long-standing in psychological contract (PC) research: *Who is the target party when a PC is created?* Rousseau (1995), reflecting on the various organisational agents involved in working relationships, suggested that ‘most contract makers are individuals acting as the organisation’s agents, who communicate demands and expectations upon which employment, advancement, remuneration, and retention are predicated’ (p. 60). Although administrative contract makers such as policies and HR practices are also historically recognised (Rousseau and Greller 1994; Suazo et al. 2009), the primacy of the ‘human’ contract maker in PC research has been central (Guest and Conway 2002). Yet, the rapid emergence of algorithmic-enabled forms of employment in the gig economy disrupts the idea that the PC target party is always a human agent (Duggan et al. 2020). Digital labour platforms (DLPs) act as technological intermediaries to connect customers with service-providing, independent freelancers in an on-demand manner to carry out short-term tasks. It is in this context that we raise the fundamental question of whether a worker can create a PC with a non-human agent in the form of an algorithm that mediates their relationship with an organisation. The implications of this question compel a fresh look at the features of PC Theory and its assumptions.

PC research has provided scholars with a solid basis for understanding how perceptions of mutuality and reciprocity shape

traditional working relationships, and critical work outcomes including performance and commitment in a range of different settings (Zhao et al. 2007). Though the existence of PC-related beliefs has been studied in algorithmic-enabled employment (e.g., Bankins and Formosa 2020; Cropanzano et al. 2023), to date no consideration has been given to the possible creation of a PC with an algorithm. Addressing how PCs emerge and the cognitive processes they activate among app-workers is fundamental to understanding digitalised working relationships. In such relationships, workers may never have contact with a human agent of the organisation. In addition, we suggest that if the conceptual rigour of PC theory extends to novel forms of employment, such as technologically mediated working relationships, then scholars must first consider if, and how, a worker could create a PC with a non-human agent. Without addressing the foundations of the exchange itself, PC scholarship on worker-algorithm relations may be ‘trying to run before it can walk’.

Against this backdrop, this conceptual review engages in problematization (Alvesson and Sandberg 2011) to propose the expansion of the boundary conditions of PC theory to include a heretofore omitted target party: non-human agents in the form of an algorithm. Intentionally, we focus on the literature regarding gig working relationships where the idea of a worker-algorithm PC is most pertinent. We assess the conditions under which a PC between a gig worker and an algorithm could emerge. Our review is framed by two basic questions in any PC

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formation: (1) *how* does a PC with the target party emerge? (2) *Why* does a worker develop a PC with the target party? To theoretically account for both the gig worker's cognitive processes underpinning PC emergence and the characteristics and intentions that gig workers ascribe to the algorithm, we draw from scholarship on the Theory of Mind (TOM). TOM sheds light on the innate capacities humans have to understand their actions and those of other parties with respect to beliefs, goals, desires and intentions (Ermer et al. 2006).

We make three contributions to the extant literature on PCs and gig work. First, we propose extending the boundary conditions of PC theory to open it up to a broader range of exchange relationships via the introduction of the algorithm as a common target party in work arrangements. This is important because as Child (2015) argues, as scholars we should avoid letting the changes unfolding in contemporary organising outpace our theoretical toolkit. Second, we call attention to an underused analytical lens in PC research, namely, TOM, to account for how gig workers form mental models of their relationship with a non-human organisational agent when the motivational conditions for developing TOM are met. Finally, we highlight the implications of algorithmic-enabled forms of employment for future HRM scholarship and offer a research agenda based on TOM principles to expand inquiry into PC dynamics (Rousseau et al. 2018).

2 | Focussing the Review

The purpose of this review is to conceptualise how a PC could emerge between a worker and a non-human target party in the form of an algorithm. By adopting a 'prospector' approach of stepping outside disciplinary boundaries and introducing new perspectives to venture beyond knowledge silos (Breslin and Gatrell 2023), we bring together three streams of literature (i.e., gig work, PC dynamics, and TOM) to build our argument. First, we start with the literature on gig working to put this nascent working relationship in context. Multiple variants of gig work currently exist (Wu and Huang 2024). We focus on 'algorithmic-enabled' forms of employment like app-work (ridesharing, food delivery, etc.) because they best resemble a typical 'employee-employer exchange' (Duggan et al. 2020).

Second, based on extant PC research, we identify the PC characteristics relevant to app-work, particularly the distinctive nature of the exchange and the agents involved. Using the dynamic phase model of PC processes (Rousseau et al. 2018), we show how developing a PC with a non-human organisational representative differs from PC formation in traditional relationships. Third, we articulate how TOM can explain how app-workers form a PC with an algorithm when the exchange is endowed with social, as well as economic aspects, facilitating personal goal attainment.

Despite over 60 years of attention to the PC in HRM, scholarship on gig working is recent though growing (see, e.g., Ballas et al. 2024; Wu and Huang 2024). Yet, research at the intersection of these two domains remains sparse. In the interests of search reliability, we partnered with an experienced research colleague independent of our writing team to conduct a parallel literature

search. Based on review methodology guidance as set out by Fan et al. (2022), the review process proceeded as follows: First, using keywords 'psychological contract' and 'gig work' in four leading academic databases (Academic Search Complete, PsycINFO, Scopus, & Web of Science), those papers that explicitly explored the nature of the PC in the context of gig working were identified. Second, the search criteria actively sought peer-reviewed journals to represent the literature. Third, as per Elsbach and van Knippenberg (2020), we established narrow-boundary conditions for our review. As we intended to explore the PC in a highly contextualised work scenario, we only included PC papers on algorithmic-enabled forms of gig working (See Cropanzano et al. 2023 for a review on different forms of gig work).

Following this process, we met with our research colleague to compare our outputs. Between the two parties, 24 papers were identified. We considered those papers outside the intersection of our searches and discussed if they aligned with the focus of our review. Some of these papers were excluded for two reasons. First, those papers where the PC concept features but was not a central line of enquiry were omitted (e.g., Keegan and Meijerink 2025). Second, a significant number of papers that explored the PC in the context of the sharing economy were subsequently excluded from the search (e.g., Rifkin et al. 2023). The reason for this is that although the sharing economy connects parties via an algorithm, this form of gig work is more akin to a 'business-to-business' relationship (e.g., leasing a property on AirBnB) and not an employee-employer exchange as required where the conditions give rise to the possible emergence of a PC between an individual and an algorithm (Duggan et al. 2020).

In total, we identified 10 papers that explicitly examined PCs in the context of algorithmic-enabled gig working. However, none addressed the focus of our paper, namely, the conditions under which a PC between the gig workers and the algorithmic agent of the organisation may be created. This supports the recent finding by Ballas et al. (2024) regarding research on the PC in the digital age noting that the PC creation process with an algorithm has not yet been addressed by researchers. Table 1 provides an overview of the papers we identified, describes the focus of each paper, and details how the PC between the worker and the algorithm was accounted for in the focal study. Our paper builds on this literature to assess how PC formation with an algorithm unfolds differently over time when compared to traditional work arrangements. Addressing a call by Post et al. (2020), our review advances scholarship on the PC by proposing an expansion of the boundary conditions of the PC to account for how non-human organisational agents in the form of an algorithm can be viewed as new PC target parties.

2.1 | App-Working in the Gig Economy

The *gig economy* is an economic system that largely uses online platforms or 'apps' to digitally connect workers, or 'individual service providers', with consumers or customers (Kuhn and Maleki 2017). In most forms of gig work, algorithms enact key management activities such as recruitment, rewards, talent identification, and performance management, once the sole preserve of (human) supervisors (Kellogg et al. 2020). Our focus

TABLE 1 | Papers identified in our search.

	Authors	Year	Focus of paper	Treatment of PC	Source
1	Saksida et al.	Forthcoming	Reactions to PC violations	Assumes DLP is PC target party. No consideration of algorithmic nature	Journal of Managerial Psychology
2	Cropanzano et al.	2023	Considers the implications of gig work for PC	Discusses novel features of the PC in gig work context. No consideration of PC formation with algorithm as PC target party. Views algorithm as a management tool	Applied Psychology
3	Sherman & Morley	2020	PC measurement using repertory grid technique	Considers multiple PC target parties within gig work arrangement. Suggest reciprocity mechanism is different in gig work. No consideration of PC formation with algorithm as PC target party	European Journal of Work & Organizational Psychology
4	Ballas et al.	2024	Literature review on the changing nature of PC in digital age of work	Views algorithm as tool used by organisations to shape PC. No consideration of PC formation with algorithm as PC target party	European Journal of Work & Organizational Psychology
5	Wu & Huang	2024	Literature review of gig working	Views algorithm as tool used by DLP to manage the employment relationship	Journal of Organizational Behavior
6	Tomprou & Lee	2022	Influence of algorithmic management of PC	View algorithm as PC target party. No consideration of PC formation with algorithm as PC target party	Computers in Human Behaviour
7	Shanahan & Smith	2021	How DLPs exert power over gig workers	Assumes DLP is PC target party. No consideration of PC formation with algorithm as PC target party	International Journal of Human Resource Management
8	Bankins & Formosa	2020	Explores PC human-robot relationships	Suggests PC may emerge when algorithmic target party is anthropomorphised but no consideration of how this could occur. Suggests norm of reciprocity is different when other party is an algorithm	European Journal of Work & Organizational Psychology
9	Duggan et al.	2020	Influence of algorithmic management and app-working on HRM	Suggests gig workers could create a PC with the app when conditions to do so are met. No consideration of PC formation with algorithm as PC target party	Human Resource Management Journal
10	Ravenelle	2019	Platform control and autonomy in gig working	Views the DLP as the PC target party when violation occurs. No consideration of PC formation with algorithm as PC target party	Journal of Managerial Psychology

is on one form of gig worker, namely, *app-workers*. Although multiple variants of gig work exist, app-work is most identifiable as an ‘employee-employer’ working relationship because work must be undertaken locally at a specific place and time, with minimum organisationally-set performance standards (Duggan et al. 2020). App-workers are typically hired on a per-task basis by a DLP, an organisation that acts as an intermediary in deploying individual workers on-demand to perform tasks locally for customers (e.g., couriers for *DoorDash* or ridehail drivers for *Uber*). Most DLPs view app-workers as self-employed independent contractors and treat them as such for tax purposes. The purported self-employment status of these workers

is a strategic feature of the platform business model (Walker et al. 2021), which transfers most risks and liabilities to the worker. The platform model omits a minimum wage, sick-pay entitlement, unemployment benefits, overtime payments, and income security (Heeks et al. 2021), as well as worker channels for feedback and grievance mechanisms (Dasgupta et al. Forthcoming).

Although app-workers typically are classified as independent contractors rather than employees, research shows that independent contractors can form deep attachments to an organisation (Millward and Brewerton 1999). App-work differs from

typical self-employment in that the DLP fully mediates the arrangement with the worker. In other types of independent contracting, the worker has varying degrees of interaction with the hiring firm. For instance, some independent contractors work on-site every day while others may only be on-site occasionally, or not at all. In any case, they can interact with a human representative of the organisation to clarify expectations, share feedback and so on. This is in stark contrast to the experience of app-workers where there is a clear absence of human interaction between worker and the organisation (Duggan et al. 2022). Rather, the DLP intermediary shapes the exchange between the parties and the understanding that accompanies the working relationship. The workers' interactions with the DLP, and their access to customers, occur almost completely via an app,¹ the operation of which is underpinned by algorithms. These algorithms, built upon artificial intelligence infrastructures, make decisions by pairing large quantities of data with prescribed processes to sort through, organise, and extract information (Tomprou and Lee 2022). Because these algorithms underpin most facets of gig work (Jarrahi et al. 2021), they serve as the de facto decision-maker replacing the conventional human decision-maker as organisational representative (Wu and Huang 2024). The deployment of algorithms for managing essential workforce processes fundamentally changes how organisations interact with workers and manage the labour process (Danaher et al. 2017).

The displacement of traditional HRM functions by algorithms in app-work represents more than a simple technological shift; it fundamentally alters how workforce management decisions are executed and experienced (Duggan et al. 2020). While algorithms can efficiently handle transactional aspects of workforce management such as task allocation and performance monitoring, their deployment raises critical questions about HRM's evolving role. The increasing prevalence of algorithmic management creates a paradox wherein HRM expertise in understanding human behaviour and fostering productive employment relationships becomes simultaneously more vital yet more distant from daily workforce operations.

This distancing of HRM from direct worker management in app-work settings creates potential vulnerabilities in the employment relationship. Although algorithms excel at processing vast quantities of worker data to make swift decisions, they lack the nuanced understanding of individual circumstances and contextual factors that historically informed HRM decision-making (Duggan et al. 2023). For instance, while an algorithm can automatically deactivate a courier's account based on predefined performance metrics, it cannot assess whether external factors such as severe weather conditions or technical glitches contributed to missed deliveries. This automation of crucial employment decisions without human oversight raises questions about the appropriate balance between algorithmic efficiency and human judgement in workforce management (McDonnell et al. 2021).

The design and implementation of these algorithmic management systems seemingly occur without substantial input from HRM professionals, despite their expertise in employment relationships and worker psychology. Technical teams typically lead platform development, potentially overlooking critical

insights about worker motivation, fairness perceptions, and psychological needs that HRM could provide (Meijerink et al. 2021). This gap between technical implementation and human resource expertise may help explain why many app-workers report feeling disconnected from, and sometimes misunderstood by, their algorithmic managers.

As DLPs expand, system designers, programmers, and data scientists are recruited (Meijerink and Keegan 2019), designing, maintaining, and developing the platform used by workers and customers. Policies for recruiting, monitoring, and managing app-workers are primarily developed by these core staff, rather than HR professionals. The algorithm incorporates performance ratings, metrics and data collected from non-organisational parties in the working arrangement (e.g., customers/requesters and suppliers) to determine the allocation of future tasks and worker retention (Duggan et al. 2023). The distributed nature of app-working relationships across multiple parties is in line with a shift from traditional dyadic employee-employer arrangements (Sherman and Morley 2020).

2.2 | Psychological Contract Theory

Although competing definitions exist (cf. Korczynski 2023), in agreement with Rousseau et al. (2018) we define the PC as a cognitive structure, or schema, comprising individual beliefs, shaped by the organisation and *its agents*, concerning an exchange agreement typically between an individual and an organisation. We explicitly include 'agents' in our definition as recent PC research points to an increasing number of participating parties in contemporary working relationships (Alcover et al. 2017; Schuster et al. 2022), especially in the case of app-work.

While the basic cognitive processes underlying PCs hold in an app-work context, they can manifest in somewhat different forms when compared to conventional work. First, the PC reflects beliefs regarding the terms of an *exchange of reciprocal obligations*. This speaks to the idea of a 'quid pro quo' relationship where each party has obligations to the other and the exchange of fulfilled obligations drives the relationship (Conway and Briner 2009). Even though uncertainty exists at the outset in many working relationships, in traditional forms of labour it is easier to discern employer and employee obligations at the beginning of employment through discussion, clarification and feedback with the target party (e.g., promotional opportunities in exchange for meeting targets). This communication forms an individual's understanding that their employment is based on a mutual exchange, with obligations on their part, as well as their employer. One key feature of this early communication between employer and employee is the development of mutual or shared beliefs (Rousseau 1995). A second feature is that explicit commitments made by the employer at the time of hire help differentiate the current employer from any a priori beliefs the worker may hold based on experiences with previous employers or taken-for-granted assumptions about what an employer should offer (Montes and Irving 2008). The employer's failure to communicate specific employment conditions can lead new hires to maintain false assumptions regarding the new exchange (Rousseau et al. 2018).

However, app-workers have very limited interaction with, and understanding of, how the algorithm functions before they begin, making it difficult for them to know whether what they are looking for in their work arrangement is available. Beyond the obvious financial obligations associated with the algorithm, app-workers must wait to see what else they can get from the exchange. Unlike most traditional forms of work, the app-worker is left with limited insight into the nature of the exchange before they begin. In effect, they enter into an opaque arrangement with the algorithm. No paper identified in our literature review considered the nature of the exchange agreement between workers and algorithms at the outset of employment. This supports the finding that researchers tend to ignore the PC creation phase in algorithmic-enabled employment (Ballas et al. 2024).

Second, *mutuality* is a central PC principle. It refers to the extent to which both parties are perceived to share a common understanding of their obligations towards each other (Dabos and Rousseau 2004). Again, in traditional forms of work when the employee and employer can discuss and clarify the terms of their relationship it facilitates the emergence of mutuality. However, as is the case with the exchange principle, mutuality need not exist at the beginning of app-work relationships as limited opportunities exist for the worker to get feedback from the algorithm on their respective obligations towards each other. For instance, a food-delivery courier has no way of knowing the consequences of taking time off from the app. Could the algorithm potentially penalise their lack of availability by excluding them from the most lucrative delivery slots in the future? Research indicates that algorithms can be changed or adapted regularly by the DLP, and without warning (Goods et al. 2019). While greater experience interacting with the algorithm can facilitate a better understanding of the terms of the exchange which, in turn, is more conducive to the existence of mutuality, the creation of the PC in the context of app-work has been likened to the case of 'building the scaffolding while standing on it' (Allen et al. 2022). Reciprocity and mutuality take some time to develop in the employment arrangement as individuals develop their understanding of the exchange over time (Rousseau et al. 2018). However, in app-work, the process may differ as interaction opportunities are limited; satisfactorily querying the other party is challenging in the absence of human agents. Duggan et al. (2020) call attention to the ever-shifting nature of the algorithm, making it difficult for the worker to establish a stable and enduring understanding of PC foundations such as mutuality and reciprocity. This outcome, as Shanahan and Smith (2021) note, may be an intentional design feature by the DLP organisation to exert power over the worker.

We noted that existing research has ignored the PC creation process in algorithmic-enabled employment. PC research demonstrates that problems emerge in an exchange from failure to make clear from the outset what to expect from the employer in terms of treatment and resources. Lack of interaction or onboarding can lead to inaccurate PC beliefs. Seifried et al. (2024) found that some gig workers believe the intense monitoring of their activity by the algorithm to be a breach of their PC. Yet, without measuring the specific terms of the relationship with the algorithm, namely, the mutual obligations created at the beginning of the exchange, it is difficult to know what constitutes PC breach or what are the conditions of its

fulfilment. Although Shanahan and Smith's (2021) study of gig workers' PC violations includes specific content dimensions, they measure dimensions used in studies on PCs in traditional work settings. Cropanzano et al. (2023), in their review of organisational psychology and gig working, address the implications of job design, recruitment, performance management, reward management, and social relationships for the PC, but not the foundational question of PC formation.

Third, *trust* is foundational to every PC exchange. Each party must trust that the other will make good on their obligations. As observed by Robinson (1996), trust in the employer at the time of hire can help to reduce perceived breach later in the relationship. Of course, one will avoid entering an exchange agreement if they do not trust the other party to fulfil its side of the agreement. Even if an agreement is reached at the outset, those with low trust early in the exchange are more likely to experience PC breach as the exchange continues. When the organisation fulfils the psychological needs of the worker it reinforces trust between the two parties (Lambert et al. 2020).

In the context of app-work, the ease with which the individual can enter and leave the exchange means establishing trust with the algorithm is perhaps less important at the very beginning of the arrangement. If the algorithm's rewards are not as expected or opportunities to earn are not forthcoming, then the app-worker will simply leave the platform with minimum concern as little personal investment has been made. However, for veteran app-workers, trust in the algorithm is fundamental to the achievement of individual goals. When compared to the PC in traditional work relationships, trust may not be a necessity for app-workers at the beginning of the exchange, but like the PC pillars of mutuality and reciprocity, it will emerge over time with the accumulation of experience of interacting with the algorithm. Again, in the articles identified in our literature review, none explicitly consider the idea of how trust might be established with an algorithm. For example, Saksida et al. (Forthcoming) found that Uber drivers experienced less trust in the organisation following PC breach. Yet, they do not consider how trust is established with the organisation's non-human interface. Indeed, recent research by Alacovska et al. (Forthcoming) suggests that trust develops differently in the context of algorithmic management compared to traditional forms of employment.

Overall, our analysis of the literature suggests that researchers have assumed that creating a PC with an algorithm is no different to creating a PC with a human agent. It seems as if the algorithm is attributed agency by respondents in the studies identified without researchers considering how the algorithm could be anthropomorphised in the first instance as part of the PC creation process. We question this assumption and seek to demonstrate how the creation and development of a PC with an algorithm plays out differently when compared to more traditional work arrangements. In effect, we propose that the manner in which the exchange develops over time is entirely dependent on the kind of relationship created between the gig worker and the algorithm in the first instance. Gaining insight into the nature of this relationship should be the starting point of any measurement approach to PC breach or fulfilment in worker-algorithm exchanges.

We next build on existing PC theory to highlight where differences in PC dynamics can arise for app-workers. Rousseau et al.'s (2018) dynamic phase model of PC processes illustrates how the PC develops over time as the individual makes sense of their work exchange with the target party. They identify four distinct phases of PC development wherein the function of key PC facets changes over time and context: *creation*; *maintenance*; *renegotiation*, and *repair*. In the next section, we critically review the extant literature on the first PC phase (creation) in the context of app-work and demonstrate *how* creating a PC with an algorithm differs from more traditional work arrangements. We build on the issues of agency, reciprocal exchange, trust and mutuality discussed above to account for the creation of the PC. Sample interview data from extant empirical research on the experiences of app-workers helps illustrate how the PC with an algorithm emerges.

3 | Phase 1: Creation

3.1 | How an App-Worker Creates a PC With an Algorithm

The PC emerges through a process whereby the focal party, usually an individual, develops a mental model that it can rely on to guide its exchange with another party (Rousseau et al. 2018). A key tenet of PC formation theory and research is the centrality of information conveyed by the parties to establish mutuality regarding terms of the exchange (Rousseau 1995). The cognitive processes the focal party manifests are both triggered by environmental cues conveying PC-related information, and activated by the party's felt need to obtain information regarding the exchange. In conventional employment, the PC creation process unfolds over time, typically within the first year. The cues workers rely on in PC formation are influenced by several factors including the organisation's culture and the length of the employment contract, along with the individual's behaviours and predispositions (De Vos et al. 2003). The worker typically encounters many agents representing the employer in early socialisation, as well as across the course of employment (e.g., supervisors, mentors, colleagues). These agents can function as contract makers, providing cues the individual relies upon to interpret present and future job conditions as the PC develops (Rousseau 1995). At times, these agents provide inconsistent or ambiguous information (Sherman and Morley 2015), motivating the worker to seek clarifications or resolve uncertainties. This opportunity to 'exchange' information with the target party and other organisational agents enables the worker to make sense of the PC and thus form an understanding to be drawn upon in future interactions. In its early phases, the PC is typically revised and updated until the individual forms a more stable representation of their deal with the employer, and perceives congruence between PC terms and the individual's personal goals. Once this more stable representation is formed, the PC enters a maintenance state in which the individual relies on this representation to guide actions and expectations with little conscious effort (Rousseau et al. 2018). However, if a serious discrepancy is noted, the existing PC is called into question.

PC formation in app-working arrangements is different from that in traditional arrangements (see Figure 1). First, the time it takes an app-worker to move from what Feldman (1981) refers to as 'pre-entry' to 'encounter' stages of the socialisation process, can be as short as a few minutes or a few hours. Many app-workers are hired almost instantly after agreeing to the terms and conditions set out in the app and uploading proof of their identity. Such swift entry contrasts starkly with the gradual emergence of the traditional PC (De Vos et al. 2003). The new hire typically interacts only with the app itself, without contact with co-workers, supervisors or other agents. Without ever meeting a human 'boss' in the pre- or post-entry stages, the app worker can make sense of an ongoing deal with the algorithm relatively quickly (Barley et al. 2017).

From a PC perspective, the app is, simultaneously, both the target party with which the worker interacts, and the sole formal agent of PC-related cues. The app-worker has no mentor, exists as an independent contractor, has no *formal* co-workers, and experiences almost no opportunity to meet other human organisational agents (e.g., business owner, HR representative). These conditions make the app-worker highly dependent on the information the app provides to create a PC. In many cases, beyond work availability, the app-worker cannot ask questions of the algorithm (e.g., the ride-hail platform Lyft has a channel whereby drivers can contest customer ratings, while Uber does not). The app-worker cannot make demands of an algorithm, pose follow-up questions or negotiate on the algorithm's decisions. Research drawing on app-worker experiences illustrates this lack of engagement, highlighting that the 'app is basically the only form of guidance you have on the job, but it's not very good – it just gives you prompts and guidance without making it clear why' (Duggan et al. 2021, 4482). As a result, although the algorithm cannot force workers to take an order, it can mimic the authority of a supervisor by doggedly pursuing workers to complete a certain task, often 'offering them the same order again and again' (Griesbach et al. 2019).

Any changes that do occur within the algorithm are implemented without consultation, and often without notifying workers. This uncertainty underpins the nature of the exchange with the worker when compared to a traditional supervisory role (Duggan et al. 2021). For instance, in food-delivery, specific delivery slots may be available immediately or not for several weeks. These app-workers do not know the destination of the delivery until they have accepted an order or collected food from the restaurant, while restaurants can have an order ready in minutes or sometimes much longer (Goods et al. 2019). How these, and other uncertainties, are interpreted by the algorithm is unpredictable from the workers' perspective. Moreover, worker accounts highlight how they are not always clear if changes have been made in the algorithm's responses:

On multiple occasions people are, like, 'I think the algorithm's changed' and with no real proof. There's a lot of speculation on the algorithm.

(Gregory 2021, 327)

Another novel feature is the formative role that distal (non-organisational) human agents can play in the app-worker's PC

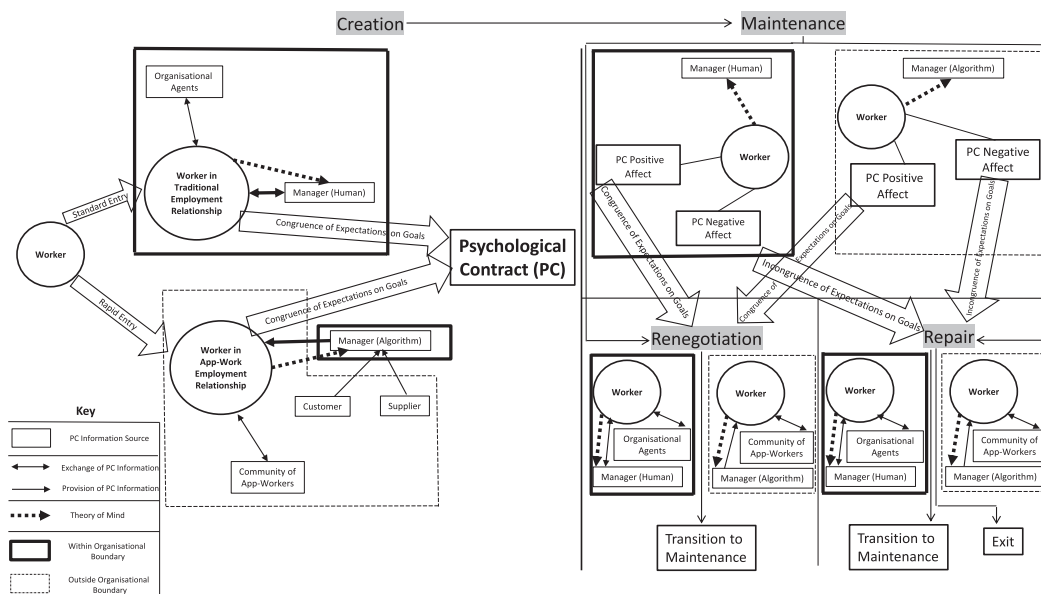


FIGURE 1 | The dynamic phase model of psychological contract processes: comparing app-workers and traditional workers (based on Rousseau et al. 2018).

(Sherman and Morley 2020). Alcover et al. (2017) call attention to the emergence of new variants of work characterised by polyadic PCs, that is, PCs outside the traditional dyadic form. The distributed work arrangement within app-work is characterised by multiple parties contributing to its functioning. Duggan et al. (2020) identify two agents in app-work arrangements, namely, the *customer/requester* (common to all app-work contexts), and *supplier* (only exists in courier or food-delivery gigs on DLPs such as Deliveroo, DoorDash, UberEats, etc.). Although the app-worker physically meets both customers and suppliers during their work, their respective relationships with the worker and any information they provide is mediated by the algorithm.

Nonetheless, the app-worker's experience interacting with the supplier and the customer can shape the PC created with the app, particularly in the early post-hire stage. Issues like 'dead-waiting' (where the courier must wait for the restaurant to prepare the order without getting paid) or 'unchallenged customer ratings' (where the worker has little recourse to contest the customer's rating of the worker) can frustrate workers, affecting how they view the fairness of the algorithm (Gregory 2021). Although some remain working on the platform for a prolonged period, most app-workers see it as temporary, in part because of these frustrations (Kaine and Josserand 2019).

We know that employees often source important PC-related information from outside the organisation, such as ex-employees and websites such as Glassdoor (Lee et al. 2022). These independent sources, coupled with formal organisational PC sources, provide the employee with deeper insights into the nature of their relationship with the firm. The app-worker can also encounter PC information and other cues away from the app representing the employer. An important source of PC-related information is the community of app-workers. These can take various forms ranging from dedicated online discussion forums such as in the case of ridehail drivers, or in-person pop-up gatherings where workers congregate in person on streets

while awaiting assignments, as in the case of food-delivery couriers.

Given the perceived distance between the worker and the algorithm in terms of opportunities to exchange PC information, recent research (e.g., Kost et al. 2020) highlights the necessary support provided by these communities to new members, including more experienced workers advising on how to navigate the algorithm more effectively. As app-workers tend not to have legal status as employees, the 'community as information source' can serve as an unofficial agent outside the boundaries of the organisation, providing ways to game the algorithm, in addition to other contract-related information about the algorithm (Wood and Lehtonvirta 2023). As gig workers form 'communities of coping' (Korczyński 2003) with others for practical, emotional, and moral support, research speaks to both in-person and digital versions of such communities and how they attempt to counter the way in which algorithms can individualise workers and disempower the community (Van der Schaft et al. 2020). Although recent scholarship positions the PC beyond the boundaries of the traditional employment dyad (Baruch and Rousseau 2019), an informal agent like that of an occupational community is seldom considered. In the context of app-work, these communities can play an important role in helping workers create an effective relationship with the algorithm in terms of congruence on goal expectations and establishing reciprocity, despite the app itself being unavailable to the worker for clarification or any other direct consultation (Dasgupta et al. Forthcoming).

The sources of information a worker accesses at organisational entry are central to the formation of the PC (Knapp et al. 2020). Although the PC information provided by the algorithm is limited, interacting with more distal parties, namely, the supplier and the customer as above, assists the app-worker in making sense of the exchange arrangement with the algorithm. Additionally, the tacit knowledge provided by the community and developed over time can support the worker to 'fill in the gaps' on how the algorithm is likely to respond. Certainly, identifying

where PC information is sourced and subsequently interpreted by the focal party is essential to explaining *how* it is created. However, working for an algorithm requires a cognitive leap on the part of the worker as many aspects of this form of work run counter to typical assumptions regarding the responses of a boss or experiences on the job. To this end, we draw on a theory in cognitive psychology, the Theory of Mind, to help explain *why* app-workers may wish to create a PC with an algorithm.

3.2 | Why an App-Worker Creates a PC With an Algorithm: The ‘Theory of Mind’ Bridge

Scholars agree that the PC functions as a *schema* and that the individual engages in a *sensemaking* process as they try to understand the world (De Vos et al. 2003; Sherman and Morley 2015). A schema is a mental framework of conceptually related elements that directs how new information is organised (Stein 1992). Sensemaking refers to the process that allows an individual to understand ambiguous or novel experiences based on cues received from the environment (Weick 1995). In a PC context, research drawing on cognitive frameworks suggests that new recruits form a rudimentary schema at organisational entry that becomes elaborated over time as they make sense of both their role and their employment relationship (Rousseau 2001). This cognitive architecture is central to our understanding of the relationship between the focal party and the target party as their future interaction is influenced by the mental model that emerges over time (Rousseau 2001).

Anthropomorphism occurs when people attribute to non-humans distinctively human characteristics such as conscious thought, feelings, motivations and intentions (Gray et al. 2007). We often anthropomorphise technology with which there is likely to be an ongoing relationship where cooperation and trust are needed (Einola et al. 2024) such as when we say, ‘my phone does not like me today’. Theory of Mind (TOM) accounts for our tendency to anthropomorphise non-human actors in this way. TOM refers to an individual’s intuitive understanding of their own and others’ mental states. Its origins lie in the research of Premack and Woodruff (1978) who, while observing the behaviour of chimpanzees, investigated whether these primates could infer typical human mental states such as thinking, liking, and deciding. They found that chimpanzees held a TOM about others and recognised that another’s behaviour was a consequence of particular mental states. Although rooted in primatology, TOM has diffused into the broader management field in the last decade. Researchers have drawn on TOM to investigate topics like reward design (N. Foss and Stea 2014) and Machiavellianism in organisations (Bagozzi et al. 2013). The corpus of TOM research suggests it can explicate aspects of meaningful relationships, particularly whether individuals are predisposed to form a TOM regarding their interactions with another (Wellman 2018). We argue that TOM informs the nature of the PC in the context of app-work, and can theoretically account for why a worker may wish to create a working relationship with an algorithm.

Like other cognitive mechanisms such as schemata (for understanding) or scripts (for acting), TOM emerges over time through direct experience with the target party. Importantly, it

is not necessary to think of the target party as a person, or even alive, to attribute mental states to it: Self-driving cars might be seen as ‘knowing the way’ and chatbots to be ‘thinking’. Indeed, AI design often includes specialised subsystems that handle different aspects of social cognition (e.g., inferring intentions or predicting actions), essentially incorporating a TOM into its functioning (Cuzzolin et al. 2020).

When the target party is non-human, holding a TOM about them is essential for creating an ongoing and meaningful relationship where individual goals can be fulfilled (Yam et al. 2023). The TOM inference system has evolved to promote social exchange and strategic cooperation for mutual benefit (Baron-Cohen 1997). Indeed, the inferences we make about another party’s mental content are fundamental for interpreting the rules of exchange agreements with that party (Ermer et al. 2006). Therefore, TOM is central to the analysis of performance-reward exchange agreements, providing insights into relational dimensions like trust, agency, and reciprocity (N. Foss and Stea 2014). It offers threshold theoretical ideas to understand the PC an app-worker can form with an algorithm since assumptions the app-worker makes regarding the functioning of the app are likely factors in PC formation and any future exchanges.

At the outset, it is important to ask *why* an app-worker might develop a TOM regarding the algorithm. Given the high turnover in app-work and the volume of research describing the difficulties workers face, ranging from stress (Walker et al. 2021) to unfair customer ratings (Myhill et al. 2021), app-workers who leave the platform quickly are likely to have experienced unmet expectations. Given the temporal foundations of TOM, these ‘novices’ are unlikely to have had the time to form a TOM with the algorithm. However, those app-workers who remain active on the platform for longer periods tend to view this form of labour as providing stable employment (Duggan et al. 2021). These ‘veterans’ are the focus of our analysis here.

Goal attainment, a core process in PC dynamics (Rousseau et al. 2018), helps account for why a veteran app-worker may be motivated to develop a TOM regarding an algorithm. Individuals develop a PC where they believe goal attainment is likely in an exchange with another party. Veteran app-workers pursuing this work as an open-ended exchange over time pursue a variety of personal goals through app-work. DoorDash, a prominent food-delivery platform, highlight the idea of achieving personal goals on its website:

Choosing a career path isn’t always easy. However, if you’re looking to supplement your income, in the middle of a life transition, or find that traditional employment isn’t for you, gig work like delivering with DoorDash can help you explore your options or can set you on the path to achieving your dreams.

In this vein, research suggests that underlying app-worker motivations include boosting their retirement fund, wanting extra money for grandchildren, funding college, scheduling flexibility to continue education, and helping to support a family (Cameron 2022). Accordingly, when workers believe the target

party has fulfilled its goal-consistent agreements, this reinforces commitment to exchange (Van der Schaft et al. 2020). Hence, app-workers are expected to develop informed beliefs over time about how the algorithm operates to enable them to perform appropriately and efficiently, and to be compensated. This repeated fulfilment of expectations forms the basis for a TOM regarding what the algorithm prioritises or values, in effect, what its goals are concerning the app-worker's efforts. Even when the algorithm changes, a TOM allows the veteran app-worker to remain committed to executing their tasks as they know in the long run that reciprocity will occur, allowing the continued attainment of personal goals. In effect, a TOM fills in the blanks in ongoing interactions of a worker with another, enabling the individual worker to develop a sense of predictability and reliance, features of well-functioning employment arrangements (Rousseau 1995). We postulate that an accurate TOM, developed over time through interacting with the algorithm, contributes to beliefs that personal goals can be attained by remaining committed to the work arrangement.

When the target party is a human, attributing mental states to them is inherent to PC formation as the individual interprets the intentions and beliefs of the other in regulating their future behaviour. We construe others as engaging in behaviour they believe will get them what they want. For instance, an employee with seniority is likely to be well-positioned to gauge the supervisor's reaction to a proposed new work arrangement based on their history together. That employee has some knowledge of what might occur 'inside the head' of the supervisor (N. J. Foss and Hallberg 2014). Forming accurate beliefs can be difficult in app-work as there are few cues to base an interpretation on, leading to what has been referred to as 'asymmetrical assumptions' (Orr and Davis 2020). Disparities can arise where what the worker expects from the algorithm differs from its real-time responses. The challenge in forming an accurate TOM makes it likely that the initial PC beliefs an individual forms are inaccurate or unreliable, increasing the likelihood that a PC breach by the algorithm will occur (Cropanzano et al. 2023). However, over time, veteran app-workers will develop a more accurate understanding of the algorithm's responses, often rooted in the perceived existence of an underlying trust between the parties. This is particularly the case when the algorithm exhibits human qualities such as humour, familiarity, recognition, and care (e.g., prompts asking workers 'Do you need to take a break?'). As Brink and Wellman (2020) note, trust is a necessary condition for TOM development regardless of whether the other party is human or not. In our everyday reasoning, if we trust the other to follow through on what has been promised then we create closer ties with them. This reasoning is at the heart of every PC relationship (Robinson 1996). For the worker to commit to the exchange they must trust that the organisation, or its agent, will fulfil their side of the agreement (Conway and Briner 2009). Cues that mirror human concern create a sense of connection and care.

Some DLPs, or indeed the designers of the algorithm itself, seem to recognise the need for workers to develop a TOM about their algorithm. They designedly anthropomorphise the algorithm, giving it human characteristics. For instance, Deliveroo encourages couriers to use the moniker 'Frank' for their proprietary algorithm. Its workers are managed by 'Frank' rather

than a nameless algorithm. As Bankins and Formosa (2020) argue, employees need to anthropomorphise certain types of technology at work to interact and communicate with it more effectively. Enabling such design features can assist in the creation of a PC between the worker and the algorithm. When technology engages socially with humans it can lead to trusting and empathetic connections (Turkle 2012), particularly when that technology seems transparent and accessible. Although app-workers may not develop a deep emotional attachment given the transactional nature of the work, they are more inclined to attribute motives and preferences to an algorithm if it exhibits human characteristics or a person-like name (Bankins and Formosa 2020). In effect, by humanising the algorithm, the platform organisation is softening its features to foster more relational qualities such as trust and understanding in interactions in the app-worker-algorithm exchange.

Nonetheless, the workings of the algorithm in app-work can appear to be capricious (Ravenelle 2019). Research repeatedly highlights inconsistencies in how the algorithm manages workers (e.g., Goods et al. 2019; Myhill et al. 2021). In Cameron's (2022) study of how Ridehail app-workers find meaning in their work, a TOM can be observed in workers reacting to an algorithm's 'decisions':

■ [the algorithm] is out to get me.

(p. 242) (an 18-month veteran employee)

Even though the algorithm is purportedly designed to treat each worker the same way based on their behaviour, app-workers may feel the algorithm is *deciding* to penalise them individually. Conceiving the other party as being able to make choices and decisions is reflective of a TOM even if the inference, at times, implies a threat to the future relationship.

The notion of a 'machine' displaying a TOM about humans is the subject of much debate in technology and artificial intelligence literature (Rabinowitz et al. 2018), with discussions regarding whether social skills associated with TOM like the attribution of goals, beliefs, desires to other people can be replicated in a machine. Cuzzolin et al. (2020) argue that with input from neuroscientists and psychologists, algorithms developed by data scientists can incorporate TOM into their interactions with humans. These design features may be limited to resolving specific problems that arise in their interactions or may be a part of the overall gestalt of the app, such as a friend, 'wingman', or partner. App-work is a good example of specific tasks being carried out in a distinctive context. A socially intelligent and sophisticated algorithm could be developed to model their workers' TOM to create effective working relationships.

Assumptions regarding how workers are likely to feel, behave, and think are designed into the functioning of algorithms. For example, in ride-hailing, the algorithm attempts to *motivate* the worker by offering 'nudges' to entice them to work by highlighting how many users are looking for rides (Duggan et al. 2020), resulting in workers realising that 'you have 10 seconds so you're not really looking at it...you're like, accept' (Veen et al. 2020). It recognises when workers may be *tired* by advising them to take a break or limiting their hours (Crain

et al. 2020) but, at the same time, it may *encourage* fatigued drivers to continue working by showcasing the number of users looking for rides and thus enquiring ‘are you sure you want to exit?’ (Sivarajan et al. 2021). These, and other examples, suggest that algorithms deployed in an app-work context hold the potential of designing in a TOM about workers, although much more research is needed as the technology continues to evolve.

The application of TOM to algorithmic management has significant implications for HRM theory. Research demonstrates that effective HRM systems must account for employees’ cognitive and social needs (Guest and Conway 2002; Meijerink et al. 2021), therefore, HRM expertise is crucial in the design and implementation of algorithmic management systems. The propensity to anthropomorphise technological interfaces necessitates careful consideration of how algorithmic systems communicate, provide feedback, and maintain engagement. This aligns with broader scholarship on the role of HRM in technological implementation, where success depends on balancing technical capabilities with human psychological requirements (Parent-Rochelleau and Parker 2022).

The cognitive architecture underlying worker-algorithm relationships presents both opportunities and challenges for HRM practice. While technical teams typically prioritise algorithmic efficiency and accuracy in platform development, evidence suggests that neglecting workers’ needs can lead to decreased engagement and increased turnover (Duggan et al. 2023). HRM’s traditional expertise in PCs and employment relationships becomes particularly salient as workers develop increasingly sophisticated mental models of algorithms over time. This evolution mirrors findings from traditional employment contexts where workers’ PCs become more elaborate through sustained organisational interaction (De Vos et al. 2003; Rousseau et al. 2018).

In addition, research indicates that the effectiveness of algorithmic management systems depends significantly on their alignment with workers’ cognitive frameworks and expectations (Tomprou and Lee 2022). We posit that HRM professionals’ understanding of PCs and employment relationships could be instrumental in designing systems that effectively respond to and manage these evolving worker-algorithm relationships. Such insights become particularly crucial as organisations increasingly rely on algorithms for workforce management decisions, potentially creating new forms of PCs that differ substantially from traditional employment relationships (Kraak et al. 2024).

The app-workers’ TOM matters because it shapes their behaviour and contributions in algorithm-based employment (e.g., availability or flexibility, hours worked, willingness to move location, etc.). It influences how the worker perceives the algorithm and the way they navigate the working relationship. Although TOM may be a central psychological mechanism in employment relationships generally, we suggest it is essential to an effective working arrangement over time between a ‘veteran’ app-worker and an algorithm. It provides a basis for cooperation, exchange, trust, and reciprocity between the parties (N. Foss and Stea 2014) and creates the foundation for personal goals to be attained as part of PC fulfilment. We argue that TOM

is a necessary bridge in accounting for why app-workers may view their exchange with the algorithm in both economic and social terms. Building on our exploration of research on app-worker-algorithm exchanges during the creation phase, we now turn to the implications of app-work for future PC research based on the remaining three phases of PC development.

4 | Phase 2: Maintenance

The maintenance phase is characterised by a sustained exchange between parties with minimal PC-related cognitive effort. A key process during the maintenance phase is continuity as the individual relies on their established understanding of the exchange in the course of work. The individual’s TOM holds so long as the target party’s contributions are allowing established goals to be achieved. Maintenance is disrupted when cues from the environment are recognised as at odds with existing beliefs about the PC, creating the perception that the exchange arrangement has somehow been interrupted (Rousseau et al. 2018). A disruption does not necessarily mean a breach of the PC, nor does it mean that the TOM no longer persists, and it can result in either positive or negative affect for the focal party. A disruption means that something in, or about the relationship, has changed. Although discrepancies are likely when comparing pre-entry expectations to the reality of organisational life, novel information can be assimilated into the existing PC through gradual updating. However, given the limited interaction at the outset of app-work, new cues are likely to be particularly salient to the worker’s TOM in terms of gauging how the algorithm functions, when compared to traditional work arrangements.

The maintenance phase in app-working is likely to be short-lived as the algorithm itself is constantly updating and changing. These repeated alterations, particularly in the early stages of an app-worker’s tenure on the platform, are liable to be interpreted as disruptions as the individual attempts to make sense of the exchange. However, we argue that the duration of each maintenance phase for veteran app-workers over time is likely to become more sustained. The idea here is that the app-worker may be more tolerant of changes to the algorithm so long as personal goals are still being achieved. For example, imagine that the price of Uber fares on a busy weekend is lower than expected. Rather than perceive a disruption to the PC, a veteran app-worker’s TOM about how the algorithm functions will help to reduce negative affect as they know that they can still achieve their personal goals in the long run as the algorithm is likely to ‘right itself’ in the near future. As such, temporary changes to the exchange are likely to be easily assimilated into the existing PC once goal congruence remains (Rousseau et al. 2018). Yet, when it occurs, disruption to the PC tends to bring the maintenance phase to an end, triggering a need for remediation.

5 | Phase 3: Renegotiation

The renegotiation phase refers to the period in the employment relationship where the employee revises old obligations or negotiates new ones in response to some disruption. When a

disruption to the PC engenders positive affect, such as when early goal attainment occurs, the worker is motivated to reflect on the state of the exchange and look ahead to what may be expected of both parties (Conway and Briner 2005). In conventional employment, for instance, promotions or potential new contributions asked of workers can trigger renegotiation. We know from the extant literature on 'worker voice' in gig work that collective action by workers around the globe is commonplace as part of renegotiation efforts regarding pay and conditions (Wilkinson et al. 2021) but renegotiation as it exists at the individual level is understudied. As such, renegotiating the PC does not neatly apply to app-work given the distal nature of the exchange. It is more likely to occur intra-individually as the worker modifies the PC schema to better reflect the new work conditions (Rousseau et al. 2018). For instance, if the algorithm consistently offers a food-delivery courier the most desirable slots, the courier might be tempted to be less active on the app, believing they will not be penalised because of their historical record. If the app-worker's TOM about how the algorithm operates holds during this phase, they may still expect to be prioritised by the algorithm when looking for future delivery slots given their loyalty, even though they are less active and available on the platform.

During the renegotiation phase, app-workers must be cognisant of remediating the exchange as changes in algorithms are unpredictable (Ravenelle 2019). An accurate TOM about the algorithm, developed over time, can help the app-worker if and when they decide to adjust their contributions. It may be the case that the margin for error in terms of PC renegotiation is much smaller for an app-worker when compared to traditional employment given that the smallest tweak in contribution can imbalance the equilibrium of the exchange, as recognised by the algorithm. Regardless, the app-worker will know almost immediately if the renegotiated deal has maintained congruence of expectations around goals between both parties. If so, the transition back to maintenance will happen quickly. If not, they will enter the repair phase.

6 | Phase 4: Repair

When workers encounter circumstances that impede the achievement of their goals, they often attribute blame to the employer. If this experience constitutes PC breach, or goal incongruence, it can result in negative affect, or PC violation. For instance, an Uber driver can attribute blame to the organisation if a perceived unfair customer rating reduces their future earning potential. If they remain on the platform, they enter the PC repair phase. In the context of app-working, Tomprou and Lee's (2022) study on gig working raises important questions about PC repair. First, they found that workers may be less likely to report PC breach when algorithms under-delivered on promised relational inducements compared to human agents. However, when it came to failing to deliver on transactional inducements, there was no difference between human agents and algorithmic agents in terms of perceived breach. The suggestion here is that algorithms are viewed the same as human managers when they fail to fulfil transactional contributions such as pay or bonuses. Given the predominantly

economic focus within app-work, one might imagine that the algorithm failing to deliver transactional inducements would constitute PC breach. However, it may be the case that the app-worker's TOM about how the algorithm functions minimises the likelihood of PC breach in the short-term. However, we would argue that repeated instances of PC breach by the algorithm leading to goal incongruence would be grounds for exiting the relationship.

As part of the repair phase in most employment situations, workers often look to the broader environment to better understand the meaning of the negative experience with their employer. For app-workers, the other connected parties in the work ecosystem can be influential when a breach is perceived given the elusive nature of the algorithm (Meijerink and Keegan 2019). The app-worker community is useful in communicating PC information, particularly in terms of gaming the algorithm or re-building ratings. Rousseau et al. (2018) highlight the importance of colleagues in advising and assisting the employee in their attempts to repair the PC with the employer. In the context of app-work, they are likely to play an even more influential role in assisting workers given the lack of other PC information sources. The app-worker can discuss their experiences on the platform with other workers, in effect comparing their respective TOM about the algorithm.

One way in which app-workers pursue their employment goals during the repair phase is to act against parts of the platform ecosystem that undermine their interests. For instance, if a restaurant is slow in preparing the food (dead-waiting for the worker), or consistently makes the wrong order for the customer (which must be rectified by the worker), app-workers may avoid or 'blacklist' that restaurant (Duggan et al. 2023). Their TOM for the algorithm is likely to entail the expectation that the platform organisation removes that restaurant as a supplier so that mutual goals can be achieved. In PC terms, this could be conceived of as a 'repair' of sorts if the organisation takes steps to ensure their relationship with the worker is strengthened for the future. A platform that fails to remove unreliable suppliers risks breaching its PC with app-workers. As new platforms enter the market, there is an increased likelihood that workers will simply move to a competitor (Duggan et al. 2022). Accordingly, it is in the platform organisation's interest to improve its relationship with workers.

7 | Discussion

The explanatory power of PC concepts to help understand emerging work arrangements derives from its capacity to reveal the tacit foundations on which employment exchanges rest. Yet, the nature of the labour arrangement in app-work is far removed from the factory setting of early PC research (Argyris 1960). Indeed, the notion of developing a PC based on interactions with an algorithm unsettles prevailing discourse in the literature and sets new challenges for future PC researchers. From an HR perspective, workplace algorithms are having an increasingly enactive effect on the employment relationship, creating new challenges for human managers in terms of appropriately embedding them into the design of work (Parent-

Rocheleau and Parker 2022; Cheng and Hackett 2021) whereby securing technological efficiency is balanced with safeguarding employee well-being (Zhang et al. Forthcoming). Understanding how workers make sense of their relationship with an algorithm and the likely expectations and demands they make of this new organisational party, can help the HR function to better predict workers' behaviour over time. By specifically focussing on app-workers, we connect to a growing body of research, including in HRMJ, regarding the HR function's expanded reach to include independent contractors as part of the underscoring of the 'human' in the HR profession (Cross and Swart 2021). App-work offers scholars the opportunity to investigate the limits and boundaries of current theory regarding the organisation-worker exchange. We shed light on the implications of app-work for a fundamental component of the employment relationship, namely, the PC. When individuals provide services to customers through the mediation of a digital platform, a new party enters the work arrangement: the algorithm that governs the exchange and is shaped by those who contribute to its functioning.

Although algorithmically-mediated employment exchanges are newly emergent, PC theory helps chart a path for understanding an array of employment relationships beyond the conventional dyadic individual-employer arrangement. Predicated on self-regulatory principles underpinning goal attainment and the cognitive and emotional processes that support goal progress (Rousseau et al. 2018), PC theory has expanded its reach to multi-party exchanges as in the case of faculty-academic community exchanges (Alcover et al. 2017), or expatriate relationships with both home and host country organisations (Schuster et al. 2022). We make the case for deploying PC concepts to deepen our understanding of the employment exchange in the gig economy, in particular how app-workers enact the exchange between themselves and the DLP, in which an algorithm—as the organisational representative—governs the interactions among customers, suppliers, and workers. Within this multi-party, algorithmic-enabled exchange, PC foundations such as mutuality, trust, reciprocity, exchange and so on, may not be fully established at the beginning of employment given the limited interaction between parties. However, greater experience on the platform, assisted by support from the app-work community, could reinforce these pillars so long as the employee's personal goals continue to be achieved.

A fundamental question throughout this conceptual review has been how likely it is that app-workers form a PC with the algorithm itself. We know that humans tend to anthropomorphise entities with which they interact, from household pets to the cars they drive. We tend to identify with numerous parties we encounter, sometimes superficially and other times deeply (Rousseau 2001). We readily develop mental models or schemata as part of our sensemaking regarding organisations from banks to the corner grocery store. In this paper, we theoretically advance this tendency and posit that TOM can form on the part of an individual worker, attributing human qualities such as thoughts and motives to the algorithm that governs their ongoing employment arrangements. Ascribing TOM to a non-human agent opens up a myriad of possibilities to enrich the lived experience of those engaging with that non-human agent. Conceiving of the other party as having particular thoughts or

motives will likely expand the array of resources a person could or would exchange with a non-human agent, introjecting into the app-worker's employment exchange such socioemotional resources as respect and loyalty.

Although we advocate for an expansion of the boundaries of PC to include non-human contract-makers in the form of an algorithm, the focus of our paper designedly stays within the realms of an 'employer-employer exchange', the predominant basis of PC scholarship to date. We caution against the idea of creating a PC with other non-human targets particularly when the foundational elements to do so are not met such as mutuality, reciprocity, trust, agency and so on. However, given this tendency to humanise the things around us, bestowing attributes and motives on the non-human entities we interact with, the formation of a PC in the exchange between veteran workers and algorithms is likely to be inevitable. Developing a representative TOM is an important step in functional algorithmic design. For this purpose, HRM needs to be 'brought in from the cold' and be given an opportunity by the platform organisations to contribute its expertise on how algorithms can be re-designed to ensure a better working relationship for all parties. Deploying the concept of TOM as a design practice invites both designers and the managers who direct them, to attend to the habits of mind and responses individual workers are likely to make. Informed by thought experiments ('if someone did this to me, how would I react?'), by insights obtained from data on the lived experiences of app-workers, and by contributions from HR, algorithms can be better designed to align with worker goals, increasing the sustained participation by app-workers in the evolving ecosystem of work in the gig economy and the new architectures of participation it affords.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The authors have nothing to report.

Endnotes

¹ An app in this context refers to a software programme that enables a user, typically on smartphones, to avail of a service/product directly. The app is the interface that workers have with the organisation and in which the underpinning algorithm is central.

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