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Empirical Study

Knowledge Workers: Deregulated Work, Psychological Contracts and How These Affect Them

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Author Note

During my bachelor's degree studies at the University of Hagen, Germany my thesis project with the title "Perceived organizational support, psychological contracts, and i-deals: Adaptation of established scales and validation of German instruments" was in part concerned with psychological contracts. Its aim was the translation, adaptation, and validation of a measures for, among other constructs, the psychological contract. However, this earlier project was not concerned with knowledge work or deregulation of work. While the present study was in part also grounded in the psychological contract literature, it should not be misunderstood as an extension or even repetition of the earlier study.

I wish to express my gratitude for Birgitta Wanek's advice and supervision throughout this thesis project. Her support in the conception of this research, her willingness to challenge my thinking in a constructive manner, and the critical reflection on my writing were endlessly helpful.

Abstract

Background: Knowledge work has been described in a boundaryless context with increasingly deregulated working conditions. How common deregulated work is and how the psychological contract (PC) of knowledge workers is affected remains unclear. **Objective:** An empirical investigation of deregulated work, PCs, and their effects on outcomes, namely work-to-life balance, affective organizational commitment, and work satisfaction. **Method:** $n = 111$ knowledge workers in the UK were surveyed online. Mean age was 37.25 ($SD = 10.10$) years; only 28.8 % identified as male. **Results:** Deregulation was common, but while time and space deregulation overall did not predict outcomes and PCs, performance and collaboration deregulation did. Moreover, the latter kinds of deregulation were associated with more beneficial PCs and outcomes, except work-to-life balance. Relational and balanced PCs were generally positively, while transactional and, more importantly, transitional PCs were negatively associated with outcomes. **Discussion:** Results are discussed, e.g. unexpected results for time and space deregulation as well as work-to-life balance. After reflecting on limitations, implications for theory and practice are considered.

Keywords: knowledge work, flexibility, autonomy, deregulated work, boundaryless work, relational, transactional, psychological contract, social exchange, worker-organization relationship, work-to-life balance, affective organizational commitment, work satisfaction

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Overview of the Created Measure for Deregulated Work

Table A.2

List of Abbreviations

Psychological Contract

PC

United Kingdom

UK

Copenhagen Psychosocial Questionnaire

COPSOQ II

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Now people can bring value to new employers totally untethered from company, industry or continent because of the knowledge, experience and resources they have acquired. [...] The concept of boundarylessness has gotten very rich in terms of the potential resources and opportunities individuals can have. (Mike & Rousseau, 2015, p. 245)

The nature of work and employment is changing (Flecker, Fibich, & Kraemer, 2017). In addition, the initial quote points to an important development: the emergence of knowledge work embedded in boundarylessness. And according to Drucker, increasing and ensuring the productivity of those performing knowledge work is “the biggest of the 21st-century management challenges” (1999, p. 92).

As the focal point of the present study, it was aimed to advance our understanding of knowledge workers. Specifically, it was asked if and how boundarylessness, here described as different degrees of deregulation of working conditions, affects those in knowledge work. It was further asked what the worker-organization relationship, here conceptualized as psychological contracts (PC), from the perspective of knowledge workers looks like.

Before looking more closely at these more specific research questions, I will now provide an overview of what knowledge work is and make the case for studying those performing it.

Knowledge Work – What it is and why it matters

We live in a time of dramatic changes. More and more, even non-routine tasks can be carried out by machines (Frey & Osborne, 2017). In addition, technologies such as artificial

intelligence, blockchain, or machine learning are widely believed to disrupt old business and production structures (Heltzel, 2018; Swan, 2015). What is more, in some factories the workforce already became replaced by robots in the course of automatization (Tilley, 2017). In this economic climate, innovation is the main driver of growth and the main force behind this innovation is knowledge work (Davenport, 2005; Grossman & Helpman, 1991).

But what is knowledge work? It involves “the acquisition, creation, packaging, or application of knowledge” (O’Donohue, Sheehan, Hecker, & Holland, 2007, p. 75). Consequently, it can be characterized by tasks that include “signs (e.g. data management), communication (e.g. in the media), or exchange of knowledge (e.g. teaching)” (Albertsen, Persson, Garde, & Rugulies, 2010, p. 164) and it can usually at least partly be performed using a computer. Furthermore, those in knowledge work are usually highly educated (Davenport, 2005). Knowledge work is not just carried out by scientists, but it includes many more professions such as engineers, teachers, professionals, dentists, and those employed in IT and media (Albertsen et al., 2010).

For the reasons described above, those capable of knowledge work become increasingly important for economies and represent assets to their organizations (Davenport, 2005). In fact, according to Drucker (1999), knowledge workers now often represent the single largest group in the workforce of developed countries. Nevertheless, research investigating knowledge workers, specifically their working conditions and their relationships with organizations is still rare (for an exception, see Albertsen et al., 2010). According to O’Donohue et al. (2007), we have yet to understand how increasingly deregulated working conditions affect knowledge workers beyond single organizations or what the worker-organization relationship for them generally tends to look like.

Three outcomes – work-to-life balance, affective organizational commitment, and work satisfaction – were investigated in the present paper. Work-to-life balance was here defined as the perceived absence of conflict between the demands of the organization and other, private demands (compare Albertsen et al., 2010). Affective organizational commitment describes the individual's feeling of association with the organization is and whether they want to stay with it (Meyer, Allen, & Smith, 1993). Work satisfaction then represents general emotional state and cognitive evaluation of whether the worker feels happy with their work situation (Zalewska, 1999).

Along with a review of relevant literature, the following sections aim to deduce specific hypotheses for an empirical research study. First, the deregulation of working conditions and how this may affect knowledge workers will be considered. Then, the PC concept will be introduced before examining the PC of knowledge workers more specifically. Finally, I will look at potential links between the PC and deregulated work.

Working Conditions of Knowledge Workers

Deregulation as a driver towards flexibility has been heralded as the new normal as organizations struggle to remain competitive in rapidly changing market conditions (Arthur, 1994; Zapf & Weber, 2017), with some authors going so far as calling it flexibility through empowerment (Allvin, Aronsson, Hagström, Johansson, & Lundberg, 2011; Sparrow, 1996). Others are more critical, cautioning against the self-exploitation of workers (Voß & Pongratz, 1998). Regardless, evidence suggests that deregulation is a growing phenomenon, and in some cases boundaryless work surfaced (for an overview see Flecker et al., 2017). In fact, for about six out of ten German employees work hours were deregulated to some degree in 2011 (Zapf & Weber, 2017). Meanwhile in Sweden, Allvin, Mellner, Movitz and Aronsson (2013)

found that 47 % of a sample of 2,489 workers held low or fully deregulated jobs regarding several dimensions.

Nevertheless, why does this matter? The answer is that knowledge workers may have been particularly affected by this development (Albertsen et al., 2010; Allvin et al., 2013; O'Connell & Russell, 2005). On the one hand, this is because someone working at an assembly line in a factory needs to be physically present to perform their tasks. But if your work consists of developing a training seminar, this may easily be done at least in part from somewhere else other than the main office. On the other hand, knowledge workers' productivity may largely be dependent on their autonomy over tasks (Drucker, 1999; Tovstiga, 1999), which in turn could encourage organizations to deregulate their working conditions.

Taking a closer look, boundarylessness with respect to career development (Greenhaus, 2003; Sullivan & Baruch, 2009) and boundarylessness with respect to the work itself should be viewed as separate concepts. Comparably little attention in research has been given to the latter type where the tacit, everyday rules governing work and tasks are altered or altogether removed. This type of boundarylessness was the concern of the present paper as it remains somewhat unclear what effects deregulated work has on the individual and organizations. Specifically, the present paper focused on the extent to which deregulated work is a reality for knowledge workers and how this may affect them.

Here, boundaryless work (Allvin et al., 2011) was defined as such employment arrangements where several dimensions within a given position are low regulated or even fully deregulated by the organization. Instead of strict rules governing the everyday work (Allvin, 2008), workers in boundaryless work are tasked to constantly innovate, find out what their organization could benefit from, seek out and attain these new opportunities, and

structure their work around them (Flecker et al., 2017). They are more and more obliged to find out what their tasks actually are themselves (Drucker, 1999). Some examples of boundaryless work include the introduction and increase of flexible working-hours, teleworking, home-office, job sharing, and project work (Joyce, Pabayo, Critchley, & Bambra, 2010).

It should be noted however, that the present study differentiated between *different degrees of deregulation* rather than merely focusing on fully boundaryless work. Thus, it was assessed how much control knowledge workers have rather than only asking whether they have total control.

On first sight, deregulation could well be a win-win situation for both organizations and knowledge workers alike (Turner, 2013). For organizations, deregulation could allow quick adaptation to changing demand both in quantity and quality (Allvin et al., 2011), and if Drucker's argument is correct, they can count on higher productivity (1999). Considering the workers, they are granted greater autonomy over when, where, how, and with whom to perform their tasks (Allvin et al., 2013); and autonomy is often proposed as a key job resource for workers (Kubicek, Paškvan, & Bunner, 2017; Tovstiga, 1999). Perhaps flexible work-hours allow the single parent to balance the demands of work and family life. Alternatively, working from home may be preferred by those living in suburbs of large cities with busy streets or those who prefer to work in the quiet atmosphere of their home. As another example, project work could hold the promise of exciting new challenges rather than the monotony of routine tasks.

Another matter concerns the differences that could exist between different groups of workers within the same organization, where some have access to flexible work arrangements and others do not (Rousseau, 1998). Deregulated working conditions may then be viewed as a

reward given to those who are particularly important to the organization's success – typically core workers. Knowledge workers are more likely to belong to this core group of workers due to their unique contributions to their organization's ability to innovate (Allvin et al., 2011).

Conversely however, deregulation also goes along with new demands (Flecker et al., 2017). Some workers may become overburdened (Kubicek et al., 2017) when they feel they need to commit more and more to their work even in their off-time. Moreover, autonomy may be increased with respect to individual aspects of the work, but paradoxically remains highly limited overall (Allvin et al., 2011; Flecker et al., 2017). New control mechanisms could be introduced, and organizations monitor workers for example through standardized key performance indicators (Ramioul & Van Hootehem, 2015). And when the boundary between office and home becomes more and more permeable until it disappears altogether, conflicts between work and private life could worsen (Allvin et al., 2011). When multiple projects need to be juggled simultaneously and there are no more routine tasks allowing to rely on previously learned strategies, it is imaginable that the pressures of deregulated work may just become too taxing for the individual to handle.

It should be noted that compared to other groups, knowledge workers perhaps more often seek out deregulated work (Flecker et al., 2017; Marler, Woodard Barringer, & Milkovich, 2002). Through education, they may have gained the skills needed to successfully cope with the new demands (Allvin et al., 2011). Additionally, they are in a strong position to negotiate these terms as their productivity depends more than for other groups on output quality rather than quantity and them happily choosing to work for the organization (Drucker, 1999). This can make us think of knowledge work as a protean career, where the workers themselves are in charge of building this career, and crafting opportunities through learning and growth (Greenhaus, 2003). This is relevant given that Joyce et al.'s (2010) review

cautioned that deregulation interventions showed greater success with respect to health and well-being when they were perceived as worker- rather than organization-oriented. Similarly, perceived agency, i.e. whether workers felt they had a choice in their employment arrangement, was a significant predictor of well-being, satisfaction, and commitment (Guest, 2004). As a result, compared to the general working population, knowledge workers may have a more positive outlook on deregulated working conditions.

As a first step with respect to deregulated or – in its more pronounced form – boundaryless work, the present study explored how prevalent deregulation of knowledge work is with respect to different dimensions.

What dimensions of work are subject to deregulation? Exploring deregulated work in more detail, there are several approaches to deregulate employment arrangements. Allvin et al. (2013) identified four main dimensions of work potentially targeted by efforts to deregulate. They are time, space, performance, and collaboration; and deregulation of different dimensions could affect workers in distinct ways. However, while there has been considerable theoretical and descriptive work in this area (Allvin, 2008; Allvin et al., 2013), research considering associations between deregulation and organizational as well as worker outcomes has surprisingly only begun to emerge (notable exceptions are Albertsen et al., 2010; Joyce et al., 2010). Additionally, the existing research literature usually only focuses on a subset of dimensions, for example only looking at the effects of flextime (see for example Russell, O’Connell, & McGinnity, 2009).

The *time* dimension (Allvin et al., 2013) concerns how length and scheduling of work hours are determined. Some organizations may choose to ask all workers to oblige by a strict work schedule, starting and ending work at the same time after a set number of hours for five days per week. Others could strive towards more flexibility, allowing workers to choose when

they start and end their work within a specified time interval, e.g. they may choose to start work anytime between 7:00 and 9:00 am depending on their needs. Another example of deregulation is when both parties merely agree to a number of hours to be worked in a week or year, with the specific schedule determined by the individual. Finally, some organizations may entirely omit to keep track of their workers' hours, instead opting to base rewards only on other performance indicators.

Consequently, allowing workers greater control over when they work should allow them to find a schedule that best meets the different demands of their life and in turn work-to-life balance should be improved. Yet, a study with knowledge workers found no positive association between work-to-family conflicts and time flexibility (Albertsen et al., 2010). Conversely however, beneficial effects of deregulation on work-to-life conflict have been reported in the general working population of Ireland (Russell et al., 2009).

Regarding satisfaction and commitment, tentative support in favor of time flexibility was found in a review of six studies, out of which four reported significant improvements in health outcomes such as mental health or sense of community (Joyce et al., 2010). However, no effects of time deregulation on work satisfaction or organizational commitment were found in an Irish sample (O'Connell & Russell, 2005). Following from these arguments, the hypothesis with regard to time deregulation was:

Hypothesis 1: More time deregulation will be associated with more (a) work-to-life balance, (b) affective organizational commitment, and (c) work satisfaction.

The *space* dimension (Allvin et al., 2013) pertains to where the worker performs the tasks. Traditionally, workers would be required to do all their work either at the main office or in contact with their clients. However, some organizations opt for greater flexibility by allowing workers to work from home or wherever else suits them best. A fully deregulated

space dimension may mean that workers never choose to be physically present at the organization's main location, instead only joining meetings remotely.

This could reduce commuting times, thereby allowing more time to devote to family or other interests. However, in a study involving knowledge workers (i.e. software developers), Hyman, Baldry, Scholarios, and Bunzel (2003) found that space deregulation can lead to perceptions of work invading all aspects of life. Similarly, empirical evidence from Ireland suggested higher degrees of work-to-life conflict for those working from home (Russell et al., 2009). In another notable development, IBM recently limited programs allowing workers to work from home after initially voicing enthusiastic support for the policy (Kinsey Goman, 2018). The company argued that real-life interaction between workers was important to building relationships as well as a source of ideas and innovation.

Looking closer at commitment, developing a common group identity is based on situational cues (Rousseau, 1998). But when working conditions become deregulated, situational cues reinforcing this sense of "we", such as an interdependent task or a common goal, may become less salient (Rousseau, 1998). For example, an IT specialist designing a website may easily forget the organization's objectives if she works from home or collaborates with different people all the time. This could mean that workers no longer identify with their employer's values and objectives, i.e. committing less to their organizations. Further, the potentially adverse effects regarding work-to-life balance and commitment should also mean decreased satisfaction. Accordingly, the following hypothesis was stated:

Hypothesis 2: More space deregulation will be associated with lower (a) work-to-life balance, (b) affective organizational commitment, and (c) work satisfaction.

With regard to the *performance* dimension (Allvin et al., 2013), regulation represents the extent to which rules, predefined strategies, and determined tasks govern how workers perform their work. On the one hand, for example, an assembly line worker may be required to enact precisely defined hand movements as well as obey to strict targets of quality and quantity. In this case, there may be little creativity required as all tasks have been predesigned by the organization. On the other hand, deregulation may mean that workers are given some degree of freedom over how they accomplish their tasks and the organization may merely determine the type of tasks to be performed. Moreover, some organizations may only present their mission and objectives to their workers and otherwise let them creatively explore ways in which to contribute to these objectives, thereby not even determining what kind of tasks need to be performed.

Drucker's (1999) arguments most closely align with the performance dimension of regulation, claiming that knowledge worker's productivity is largely dependent on their level of autonomy. Greater autonomy (Deci & Ryan, 2000; Tovstiga, 1999) has been proposed to increase motivation and this should increase satisfaction and commitment. However, these arguments do not correspond to a relationship with work-to-life balance.

Hypothesis 3: More performance deregulation will not be associated with (a) work-to-life balance, but with higher (b) affective organizational commitment and higher (c) work satisfaction.

Finally, the *collaboration* dimension (Allvin et al., 2013) reflects the degree to which the worker can choose who to work with in a team, whom to ask for information, or even whom to inform about their progress. Under very regulated conditions, workers will be restricted to work with and be informed by people within their defined work group and report to their supervisor about their progress. In less regulated circumstances, workers are

encouraged to seek information wherever necessary – within or outside the organization – and collaborate with whomever they please. They may even choose themselves who best to report present their progress on specific projects to. It seems reasonable to assume that this will enhance satisfaction and commitment, but again no relationship with respect to work-to-life balance can be deduced from these arguments.

Hypothesis 4: More collaboration deregulation will not be associated with (a) work-to-life balance, but associated with higher (b) affective organizational commitment and higher (c) work satisfaction.

Conceptualizing the Worker-Organization Relationship – The Psychological Contract (PC) and Its Outcomes

Now, I move toward the worker-organization relationship. Taking account of this relationship between knowledge workers and their organizations should allow us a better understanding of their expectations with regard to work (Shore & Tetrick, 1994).

Expectations are often developed as the relationship takes shape. In turn, the relationship determines whether the parties trust each other, or are motivated to show more and more effort over time, and are thus willing to continue working with each other (Blau, 1986; Rousseau & Tijoriwala, 1998).

Appreciating this relationship will be important to achieve Drucker's (1999) goal of increasing productivity of knowledge workers. Already, previous research points to the relevance of the worker-organization relationship as it explained why workers are committed to their organization or contend with their work (for an overview, see Rousseau, 2011).

The relationship has often been thought of as a social exchange (Blau, 1986). It exists alongside the formalized work contract. But it cannot usually explain why some workers outperform their colleagues despite similar monetary rewards, and thus merely represents the

tip of the iceberg of the relationship. (Rousseau, 2011). The social exchange relationship covers those more intricate aspects (Shore & Tetrick, 1994). It entails the parties' expectations about what the other party will be obliged to do in return for their efforts. For example, a worker may always show up on time and avoid calling in sick believing that this will promote stability of employment and loyalty of the organization. Such an expectation would be difficult to formalize in a traditional employment contract and thereby usually relies on a silent understanding between the parties (Shore & Tetrick, 1994).

What is the PC? In this context, the PC has received much attention as it attempts to shine light on those less formal aspects of the worker-organization relationship, asking the question why organizations may always pay the same for work but don't always get the same out of it (Rousseau, 2011). Rousseau defined the PC as: "An individual's belief regarding the terms and conditions of a reciprocal exchange agreement between that focal person and another party. Key issues here include the belief that a promise has been made and a consideration offered in exchange for it, binding the parties to some set of reciprocal obligations," (1989, p. 123).

It is important to emphasize, that the PC does not contain all kinds of expectations the worker may have. Rather, it specifically considers expectations resulting from believed promises (Shore & Tetrick, 1994), which entails that the individual assumes the other party agreed to these promises and therefore views the other party as bound to uphold them. As a result, if the worker thinks the organization is not upholding its part of the PC, this breach should bring about intense reactions by the worker (Rousseau & Tijoriwala, 1998).

However, the PC is not formally negotiated between the parties and grounded firmly in subjective experience (Rousseau & Tijoriwala, 1998). This may lead to very different interpretations for both parties about what is or is not part of the agreement (Rousseau &

Tijoriwala, 1998). Regardless, the individual will view their interpretation of the PC as mutually binding (Rousseau & Tijoriwala, 1998), for instance because prior obligations have been met and both parties choose to continue working with each other (Shore & Tetrick, 1994).

The PC provides workers with a frame of reference of what behavior is appropriate and expected (Shore & Tetrick, 1994) in an organizational context which has become a weaker situation relative to work with highly regulated conditions (Weick, 1996). Weick (1996) argues that less tightly regulated organizations have fewer and less salient behavioral cues, instead allowing inter-personal differences to determine a higher proportion of the variability of behavior in a specific context. Here, PCs can reduce uncertainty and allow the worker to deduce appropriate actions and predict rewards (Shore & Tetrick, 1994).

Differentiating four kinds of PCs. Traditionally, PCs were merely characterized as either transactional or relational (Hall & Moss, 1998; Rousseau, 1990), but this distinction has been challenged. For example, while an exploratory study with knowledge workers found some support for the relevance of the PC (O'Donohue et al., 2007), the simple distinction between transactional and relational PCs was questioned (also Sparrow, 1996). It appeared that transactional and relational obligations are simply not mutually exclusive or exhaustive of the variability of potentially perceived obligations (see also Hall & Moss, 1998).

To overcome these shortcomings, the distinction of four kinds of PCs has been proposed by Wade-Benzoni, Rousseau, and Li (2006) – relational, balanced, transactional, and transitional. They are based on whether the obligations are focused rather on the short or long term and whether there are highly specified performance requirements or not (Wade-Benzoni et al., 2006). The reader should note however, that workers may have very complex

PCs that are simultaneously characterized by more than one kind, and there is no strict requirement for symmetry in these perceptions (Jepsen & Rodwell, 2012).

Each of the aforementioned four kinds will now be described. *Relational* PCs are based on stability, loyalty, the prospect of internal advancement and consideration of the worker's well-being (Jepsen & Rodwell, 2012). Obligations are open-ended, less tangible, and focused on a long-term commitment to the same organization (Wade-Benzoni et al., 2006). According to Rousseau (1995), relational PCs represent the "traditional" work relationship between workers and their organization.

Balanced PCs also represent an open-ended relationship, but with well specified performance requirements that may actively be negotiated and changed over time (Wade-Benzoni et al., 2006). Hall and Moss (1998) argue that new employment arrangements are characterized more by balanced – or as they call them protean – PCs. In this context, obligations often focus on internal and external employability (Jepsen & Rodwell, 2012). Workers' identification with their organization may be enhanced when they can believe to benefit their organization and when membership offers them a broad spectrum of resources, e.g. status, or personal support (Rousseau, 1998). Partly, this is because rewards such as love or status are difficult to obtain through demands or threats. Thus, when organizations voluntarily show that they value their workers, as with balanced or relational PCs, it enforces a more personal relationship (Rousseau, 1998).

Transactional PCs consist of obligations with only a limited duration, but they still have specified performance requirements (Wade-Benzoni et al., 2006). Obligations are easily measurable and timely, limiting the social exchange relationship to as little mutual obligation as possible, akin to a tit-for-tat exchange of effort in return for pay (Jepsen & Rodwell, 2012). Yet, transactional PCs nonetheless mean that the worker perceives *some kind of* obligation;

thus, there is not necessarily an uncertainty of what is expected of each party. However, research with respect to boundaryless careers points to challenges regarding commitment and organizational citizenship behavior (Coyle-Shapiro & Kessler, 2002). In other words, workers could foster purely transactional relationships with organizations but do not identify with the organization and its goals beyond tangible and timely rewards.

Finally, *transitional* PCs resemble an erosion of the relationship – there are only short-term commitments and no explicit performance requirements (Wade-Benzoni et al., 2006). Little mutual obligations exists and if they do exist, there is a sense of mistrust and uncertainty associated with them (Jepsen & Rodwell, 2012). Frequent organizational changes led some authors to propose that in the new work workers' identification with their organizations is undermined (e.g. Rousseau, 1998). Their emotional attachment to the organization suffers (compare O'Donohue et al., 2007). Further, they may emphasize their own employability to protect against the uncertainty of the new economy.

Considering this, it was proposed that relational and balanced PCs are positively associated with commitment and satisfaction. However, due to the considerable investment involved, a negative association with work-to-life balance was assumed.

Hypothesis 5: Relational PC terms will be negatively related to (a) work-to-life balance, but positively related to (b) affective organizational commitment and (c) work satisfaction.

Hypothesis 6: Balanced PC terms will be negatively related to (a) work-to-life balance, but positively related to (b) affective organizational commitment and (c) work satisfaction.

Moving on, transactional PCs were proposed to also be positively related to satisfaction as there is clarity regarding the exchange relationship, but also to work-to-life balance due to

the very limited investment. Similarly, commitment was hypothesized to be lower the more transactional a PC is.

Hypothesis 7: Transactional PC terms will be related positively to (a) work-to-life balance, negatively to (b) affective organizational commitment, and positively to (c) work satisfaction.

Finally, the most disadvantageous relationships were assumed for transitional PCs, with negative relationships to satisfaction and commitment. Little predictability and lack of trust should also make for a lower work-to-life balance.

Hypothesis 8: Transitional PC terms will be negatively related to (a) work-to-life balance, (b) affective organizational commitment, and (c) work satisfaction.

Moreover, it was proposed that the positive relationships with regard to satisfaction are more pronounced for relational and balanced than transactional PCs.

Hypothesis 9: The relationships of relational and balanced PC terms with satisfaction will be stronger than those of transactional PC terms.

Understanding the PC of knowledge workers. Researchers have often tried to describe the changes associated with the transition from the old to new forms of work (Allvin et al., 2011). With frequent and disruptive organizational changes, Nalis (2017) argued that the PC of workers has been broken. While it is certainly debatable whether this is generally true, references to a shift in the PC of workers are abundant in the literature (e.g. O'Donohue et al., 2007; Sparrow, 1996). This shift has often been described as moving away from traditional long-term, open-ended mutual commitment to more short-term, purely economic terms as with transactional PCs (Rousseau, 1995; see also Sparrow, 1996; Sullivan & Baruch, 2009). However, little evidence exists to support this notion with regard to knowledge

workers. The present study could contribute some empirical evidence to advance this discussion. Specifically, in line with the dominant assumption in the literature, it was hypothesized that knowledge workers' PCs are already more transactional than relational.

Hypothesis 10: Knowledge workers' PCs will tend to be characterized more by transactional than relational PC terms.

However, the present study attempted to actually go beyond this initial hypothesis. In fact, I proposed that knowledge workers more often view the worker-organization relationship as balanced rather than merely transactional. Balanced PCs have rarely been considered by authors claiming a shift (e.g. Sparrow, 1996). Yet, new forms of work make subjective demands on the workers and in turn these workers want to identify more strongly with what they do (Baethge, 1991). This stands in contrast to more traditional notions of work organization, where subjectivity was limited through regulation and standardization, making demands objective across groups of workers (Lohr, 2013). In knowledge work, this tendency towards subjectivity may be particularly pronounced and encouraged by organizations (Flecker et al., 2017).

Additionally, according to Drucker (1999), knowledge work requires continuous learning and teaching. Thus, knowledge workers may frequently emphasize contract terms transcending the specific organization they are working for. This reminds of workers interviewed by O'Donohue et al. (2007) who revealed that creating knowledge which had a meaningful impact for the society at large was important to them. Moreover, continuously developing skills and abilities provides the basis of the market value of any knowledge worker and they should thus seek out relationships where these opportunities are promised. Support for this may be found in a study on the relationships between doctoral students and

their faculty, where balanced and relational PCs were viewed as more favorable compared to transactional and transitional PCs (Wade-Benzoni et al., 2006).

Hypothesis 11: Knowledge workers' PCs will tend to be characterized more by perceived obligations associated with balanced than transactional PCs.

Deregulated Work and the PC

Previously, the opposing viewpoints of whether deregulated work is beneficial or disadvantageous for workers were presented. This raises the question whether those opposing positions could be bridged. The answer may be that the effects of deregulation differ depending on other variables. In line with suggestions by Guest (2004), I specifically proposed that deregulation changes the PCs of knowledge workers, which in turn may mediate the effects of deregulation on outcomes. This approach was explored in the present study. Keep in mind, however, that the previously discussed aspects already presented a new avenue for research and it was therefore not the goal to provide an in-depth answer regarding the potential mediation.

Deregulation may alter knowledge workers' PCs. There has to my knowledge presently been no investigation of how deregulated working conditions affect the PC of knowledge workers. With regard to overall flexibility however, Turner (2013) gave an overview of the relevance of the PC construct and Guest (2004) highlighted how flexible employment contracts interact with the PC to affect workers' attitudes and behaviors. Nevertheless, as highly regulated work represents more traditional employment arrangements (Allvin et al., 2011), it was hypothesized that lower levels of deregulation should be associated with more relational and less transactional PCs.

Hypothesis 12: Compared to low levels, higher levels of deregulation at work will be less strongly associated with relational PCs.

Hypothesis 13: Compared to low levels, higher levels of deregulation at work will be more strongly associated with transactional PCs.

Further, as discussed previously, knowledge workers could more often actively seek deregulated work, successfully cope with the associated demands, and view it as a reward. Thus, higher degrees of deregulated work may be associated with more balanced PCs for this group of workers.

Hypothesis 14: Compared to low levels, higher levels of deregulation at work are more strongly associated with balanced PCs.

Conversely, the development with regard to deregulation of working conditions also raises an important question (compare Mike & Rousseau, 2015, p. 245 for a similar point with respect to virtual teams). When the worker is less and less obliged to obey rules set by the organization, when there are fewer and fewer face-to-face interactions between the worker and supervisor, and when the worker becomes less concerned with the organization than the market as their point of reference, how can a clear, healthy psychological contract between worker and organization even develop? How is the growing distance bridged where implicit understandings and nonverbal cues present in traditional work arrangements are increasingly absent? The resulting PCs may become ill-defined and unclear. With respect to temporary work groups, weaker ties within the network, distancing oneself, interactions based on roles rather than individuals, side bets and increased monitoring behavior were discussed (Meyerson, Weick, & Kramer, 1996). In a similar vein, transitional PCs were those where there were least meetings between the two parties to the exchange (Wade-Benzoni et al., 2006). This informed the next hypothesis:

Hypothesis 15: Compared to low levels, higher levels of deregulation at work are more strongly associated with transitional PCs.

Do PCs mediate effects of deregulation? Finally, if deregulation were indeed to explain work-to-life balance, affective organizational commitment, and work satisfaction, and if deregulation also explained the PCs of knowledge workers, it would be possible that the effects on outcomes are actually mediated by differences in the PCs. As the present study could not build on a strong foundation of evidence from prior research with regard to this possibility, the proposed mediation was not stated as a hypothesis but rather just as a proposition to be explored in the present study.

Proposition 1: The effects of deregulated work on knowledge workers' work-to-life balance, affective organizational commitment, and work satisfaction will be at least partly mediated by differences in the PCs.

The Aims of the Present Study

To sum up, the present research was concerned with three thematic questions with respect to knowledge workers: (1) How prevalent is deregulation of different working conditions and how is deregulation associated with work-to-life balance, affective organizational commitment, and work satisfaction, (2) How can the PC of knowledge workers be characterized and how do different contract dimensions relate to the same outcomes, and (3) how does deregulation affect PCs and do differences in the PCs at least partly explain the effects of deregulation on outcomes? To provide a better overview, the hypotheses about relationships between the considered variables are presented in Table 1. Note, however, that this table does not include hypotheses about means or the proposition stated above.

To answer the questions and hypotheses outlined above, empirical data was gathered in an online survey study with knowledge workers in the United Kingdom (UK). The procedure employed for this study will be outlined in detail in the following sections.

Table 1
Hypothesized Relationships Between Variables

Variable	Deregulation				Psychological Contract			
	Time	Space	Performance	Collaboration	Relational	Balanced	Transactional	Transitional
Outcomes								
<i>a</i> Work-to-Life Balance	+	–	0	0	–	–	+	–
<i>b</i> Affective Organizational	+	–	+	+	+	+	–	–
<i>c</i> Work Satisfaction	+	–	+	+	+	+	+	–
<i>Corresponding Hypothesis</i>	1	2	3	4	5	6	7	8
Any Deregulation					–	+	+	+
<i>Corresponding Hypothesis</i>					12	14	13	15

Note. Leading letters (a, b, c) correspond with letters in the hypotheses. For each hypothesis, '+' indicates positively, '-' negatively, and '0' unrelated variables. Empty cells indicate that no hypothesis about a relationship existed. Hypothesis 9 - 11 are not included as they were not about relationships.

Method

Procedure

An online survey was created using *Artologik Survey&Report* (Artisan Global Media, 2017). Data collection commenced on February 19th, 2018 and was terminated on April 8th, 2018. A brief introduction clarified the aims of the study and explained the use of instructional manipulation checks (see below). Then, a consent form emphasized subjects' anonymity and informed them of their right to withdraw from their study at any point in time without giving a reason. They were then asked to enter their *Prolific* ID (see below for more information on *Prolific*), which was required for compensation but did not enable the researchers to identify participants.

In total, the survey consisted of 14 pages which were organized in five blocks (an overview can be found in the Appendix, Table A.1); these were (1) sociodemographic information, (2) deregulation of working conditions, (3) PC, (4) involvement and organizational commitment, and (5) work satisfaction and work-to-life balance. Each block

contained a short introductory description. Subjects were reminded to consider only their main job in the first block and reminded of this in the second and fourth block.

Before submitting their responses, a final page included a seriousness check (see below), a second question asking participants if they still consent to the inclusion of their responses, and an option to leave a comment. Following submission, participants were thanked and redirected to *Prolific*.

Participant recruitment and pre-screening. The study was distributed online through *Prolific*¹, a dedicated participant recruitment platform. There, it was titled “Job characteristics, expectations and well-being in so-called knowledge work” and a description explained the aims of the research. A time estimate of 19 minutes was given and used as the basis for compensation, which was 1.59 £ for each approved submission. Participants in the final sample took on average 19:30 minutes ($SD = 6:55$) to finish it.

Prolific allows anyone interested in participating in research to sign up for free and subjects are compensated for successful participations. Two independent papers detail how the platform compares to alternatives and discuss its usefulness in more detail (Palan & Schitter, 2018; Peer, Brandimarte, Samat, & Acquisti, 2017). Some information on the demographics of *Prolific*’s general participant pool is available through their website.

Any potential subject was initially pre-screened through the platform. Specifically, they had to indicate that they were at least 18 years old and currently live in the UK. This country was chosen to ensure understanding of the English language and because the UK’s policies regarding work deregulation are comparably flexible (Wallace, 2018). Meanwhile, the percentage of employees working for temporary hiring agencies in the UK is low in comparison to most other European countries (Eurostat, 2017). Similarly, this restriction to

¹ www.prolific.ac

just one country allows to control for national differences in, for example, legislation and personal significance of work (Rousseau, 2011).

Additionally, participants had to work at least 21 hours per week and they had to currently be in paid work, but not self-employed, a temporary employee (e.g. working for a third-party agency) or a student. This ensured that work – and not mostly other factors such as education – played a significant role in the participant's daily life and that there was a single, easily discernible second party to the PC. For example, temporary employees working for hiring agencies might have conflated their PC with their hiring agency and the one with their organization (Rousseau, 2011).

Finally, to ensure that all subjects were in fact knowledge workers according to the definition of Albertsen et al. (2010), potential subjects were asked about technology use at work. They were only included if their work required them to use any specific technology at least twice per week. If a potential subject fulfilled these requirements, they were allowed to access the survey.

However, *Prolific* did not allow more in-depth pre-screening with regard to knowledge work. Thus, two *yes-no-don't know* questions were included in the beginning of the survey. These were “is it at least theoretically possible to perform part of your work using IT equipment (e.g. computer or tablet)?” and “do you work with signs (e.g. data management), communication (e.g. in the media), or exchange of knowledge (e.g. teaching)?”. For the latter, some example occupations were listed that fulfil this criterion. A subject's submission was only included for analysis if at least one of these questions was answered with yes, but this did not affect compensation.

Strategies to improve data quality. Participants may become fatigued or otherwise do not pay attention to instructions and questions in survey studies. In online research,

particularly if compensation is offered, this risk may be higher due to less control by the researchers over the experimental situation (Reips, 2002). As a consequence, participants may get distracted or start to satisfice (Oppenheimer, Meyvis, & Davidenko, 2009). For example, in the present study some respondents may have been motivated primarily by monetary reward and quickly clicked through the survey to reduce their time investment.

Such strategies contribute to noise in the data, and in turn they lower the experimental power and validity of findings (Oppenheimer et al., 2009). To alleviate these problems here, several strategies were employed. On the one hand, they aimed to refocus and increase attention throughout the survey and, on the other hand, to make the survey less attractive for those who habitually satisfice. Notably, they also allowed to more easily identify those who did not participate seriously (compare Aust, Diedenhofen, Ullrich, & Musch, 2013).

To ensure that participants filled out the survey in one session without long interruptions or distractions, the maximum allotted time for the survey was 45 minutes (in accordance with Reips, 2002). After the allotted time ran out, the survey was automatically terminated.

In addition, the survey contained instructional manipulation checks, read checks, and a seriousness check. Participants were informed of the use of such checks in the introduction and the instructional manipulation checks were explained using an example. The aim was to avoid confusion and the perception of a mistrusting attitude toward serious participants while reducing the attractiveness of the study for those who did not intend to participate seriously.

Six instructional manipulation checks (Oppenheimer et al., 2009) were distributed throughout the survey. They were similar in length and style to the items surrounding them but asked participants to select a specific answer. This ensured that participants read the items and consistently focused on the survey. As an example, one read “I still pay attention and

therefore select ‘strongly disagree’ as my response to this statement”. For each participant, the number of correct responses was recorded. Compensation was only approved if the participant had passed at least five of the six checks; this policy was also included in the survey instructions.

Additionally, the same read check was employed twice. It aimed to refocus attention to the instructions on the survey pages tapping into the PC, reading “The statements on this page refer to what I think my organization’s obligations are. Is that correct?”. While this statement was accurate the first time, it was not correct the second time. If the wrong answer was selected, a pop-up message appeared reiterating the instructions (Oppenheimer et al., 2009 reported a similar strategy to be successful). Then, subjects were prompted to revisit their answers.

Finally, there was a seriousness check (Aust et al., 2013) on the last page of the survey, stating “I have read and understood the instructions, questions, and statements in this survey and answered truthfully” with a 4-point Likert scale from 1 = *not at all* to 4 = *all of the time*. This was not used as a basis for denying compensation and subjects were alerted to this answering this item.

These checks were complemented with a review with regard to the logical consistency of the answers (Aust et al., 2013). For instance, it was checked whether regular and reverse coded items of a specific scale frequently got the same responses. It should be noted that this mostly served to prevent premature denial of a submission if, for example, one of the read checks was not passed and the participant had not changed their answer to it after the pop-up message.

To sum up, a careful review of each submission based on different strategies served as the basis for a decision to either approve or reject a participant's inclusion in the sample.

When rejection appeared necessary, compensation was denied through *Prolific*.

Participants

$N = 132$ participants finished the survey. Two subjects did not consent to their inclusion either in the beginning or end of the survey. Of the remaining entries, seven people did not pass at least five out of the six instructional manipulation checks and were dropped from the sample. Further, despite pre-screening through *Prolific*, eleven participants could not be classified as knowledge workers as they did not answer *yes* to at least one of the two aforementioned additional screening questions. Finally, one remaining person answered less than 3 = *usually* to the seriousness check and was also not included.

As a result, the sample consisted of $n = 111$ knowledge workers in line with the definition of Albertsen et al. (2010). Of these, 78 were female, 32 male, and one non-binary. The mean age was 37.25 years ($SD = 10.10$), and they were on average educated for 16.26 years ($SD = 3.29$). The actual weekly work-hours including overtime were indicated to be 38.56 hours on average ($SD = 8.16$) with a median organizational tenure of 4.00 years ($IQR = 6.00$). Additionally, Table 2 shows the distribution of employment sectors and roles. For example, the largest single sector was health with 19.8 % of the sample and 39.6 % worked as a professional in their respective sector. Finally, 8.1 % of the sample held more than one job.

A priori, the required sample size was estimated using G*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007). To achieve a power threshold of .80 the required sample size was 119. This estimate was based on two-sided significance testing of a single predictor in linear multiple regression with eight predictors, which was the most complex planned analysis. The

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Table 2
Sample Distribution of Employment Sectors and Roles

Sector	%	Role	%
Health	19.8	(2) Professional	39.6
Other Services	18.0	(4) Clerical Support	22.5
Education	16.2	(1) Manager	13.5
Industry	10.8	(3) Technician or Associate Professional	13.5
Public Administration	9.9	(5) Services or Sales Worker	6.3
Commerce and Hospitality	8.1	(6) Skilled Agricultural, Forestry, or Fishery Worker	1.8
Transport	6.3	(7) Craft or Related Trades Worker	0.9
Financial Services	5.4	(8) Armed Forces Occupation	0.9
Construction	1.8	Other	0.9
Agriculture	0.9		
Other	2.7		

Notes. $n = 111$. Categories for sectors were based on Eurostat (2017). Categories for roles were based on ISCO-08 (Hoffmann, 2003); leading numbers indicate its hierarchical order.

effect size, partial R^2 , was estimated to be .05, which was purposefully low. It may arguably be the minimum explanatory value for practical relevance and represented a conservative estimate in comparison with, for example, Russell et al.'s (2009) results concerning the influence of time and space deregulation on work-to-life conflict. Keep in mind however, that power would increase or required sample size decrease, if the true effect size was in fact larger (Howell, 2012).

Measures

Some minor adjustments compared to the original versions were made to the scales described below. For instance, terms such as *boss* or *employer* were replaced with *organization* so that subjects consistently reflected on their relationship with the organization as a whole. Furthermore, for some scales a response category was added in case the item was not applicable to the subject's work. For each scale, scores were computed as the mean of valid responses, but only if valid answers were given to at least half of the respective scale's items.

Only measures relevant for the present analysis will be reported below; the survey contained some additional scales however. A list of included scales and their order can be found in the Appendix (Table A.1). The full survey is available upon request.

Sociodemographic variables. Subjects indicated their gender, age, years of education, and if they have one, more than one, or no job. In addition, they were asked about their actual weekly work hours (taken from Albertsen et al., 2010), the sector their organization is in (based on Eurostat, 2017), and their occupation (based on ISCO-08, Hoffmann, 2003).

Deregulation of work. The degree of deregulation was differentiated along four dimensions – namely time, space, performance, and collaboration – based on Allvin et al.’s (2013) definitions and measure. In the Appendix (Table A.2), the interested reader can find the created measure, which will be described in this section.

First, based on Allvin et al.’s measure (2013), the item stem was “In your current job, to what degree can you...” and eight different statements followed. Three time-related items (based on Albertsen et al., 2010 description of Allvin et al., 2013) asked about the degree of control during a typical day, week, and year respectively. Regarding space, the original item “...decide where to do your work“ was extended to two items, ending in “on a typical day” and “in a typical week” respectively. Two items were used for the performance and one item for the collaboration dimension. For this, five-point Likert scales ranging from 1 = *never / almost never* to 5 = *always / most of the time* were used.

As Allvin et al.’s (2013) measure only tapped into the worker’s perceived level of control, it remained unclear whether the organization actually deregulated these working conditions. This is because in some cases, worker and organizational control might be limited not because of the organization but due to customer or regulatory demands. Consequently, in fully deregulated work, the worker’s perception of their own control should be high, and the

perception of their organization's control should be low. To tap into this aspect, the eight aforementioned items were presented again with the same response scale, but this time the item stem read "In your current job, to what degree does your organization (represented by, for example, your supervisor) ...". Responses to these items were reverse coded.

Some additional items were included. One item each (from Kossek, Lautsch, & Eaton, 2006) complemented the time ("I do not have control over when I work," reverse coded), and space dimension ("I have the freedom to work wherever is best for me – either at home or at work"). Similarly, one item for the collaboration dimension was formulated based on Allvin et al.'s (2013) definition ("To get my work done, I can freely decide who I want to collaborate with"). The performance dimension was expanded with Morgeson and Humphrey's (2006) decision-making and work methods autonomy subscales with three items each. For this part, five-point Likert scales ranging from 1 = *strongly disagree* to 5 = *strongly agree* were used.

All items were coded so that higher values corresponded to higher degrees of deregulation of related working conditions, i.e. higher levels of control by the worker. Moreover, all items were standardized prior to computing the scale, because the descriptions on the response scales differed. This means that for the scale, M will be 0 and SD will be less than 1 as some of the variability in the items, whose SD s will be 1, averages out.

It should be emphasized that compared to Allvin et al.'s study (2013) a broader operationalization of deregulation was explicitly aimed for in the present study. However, typically there is a trade-off between broader operationalizations and lower internal consistencies and less consistent factorial structures (Bühner, 2011). For each dimension, a principal component analysis with subsequent Promax rotation was conducted; extracted components were therefore allowed to be intercorrelated. Generally, these analyses suggested a two-component structure, explaining more than 70 % of the item variance, with the worker-

centered items loading highest on one and organization-centered items loading highest on the other component. Further, the two components showed moderate, positive intercorrelations. Thus, both components were combined for each scale.

To sum up, a total of seven items tapped into deregulation of time ($\alpha = .78$), and five items into deregulation of space ($\alpha = .82$). Moreover, ten items measured performance deregulation ($\alpha = .90$). The shortest and least consistent scale with three items was deregulation of collaboration ($\alpha = .67$). The removal of any items would not have substantially improved these results with the exception of the organizational side of collaboration, which showed the weakest results anyway. However, as elimination would have entirely removed the organizational side from the scale, all items were retained.

PC. Rousseau's (2000) Psychological Contract Inventory tapped into the contents of each participant's PC and Jepsen and Rodwell's (2012) recommendations for improving the instrument were incorporated. The four types of PCs – relational, balanced, transactional, and transitional – were differentiated for each participant. Each was represented by several distinct dimensions tapping into the participant's perception of their organization's and their own obligations. Consequently, rather than simply categorizing participants, it was assumed that any individual can hold perceptions corresponding to more than just one type of PC simultaneously.

The inventory (Rousseau, 2000) included several subdimensions for each PC type, but the exact nature of these subdimensions is still a matter of debate (Jepsen & Rodwell, 2012). However, the present study was not concerned with these lower-level scales, and each of the PC scales was therefore computed as the average of all worker and organizational obligation items rather than the average of associated subdimensions. Yet, to allow the reader a better understanding of the kind of obligations included, the subdimensions (based on Jepsen &

Rodwell, 2012) are presented in Table 3. It also shows the number of items, Cronbach's α , and an example item for each subdimension. The same five-point Likert response scale from 1 = *not at all* to 5 = *to a great extent* was used throughout and included an additional response category labelled *not applicable*.

From Table 3, it can be seen that the internal consistency for scales ranged from very good to excellent (Tavakol & Dennick, 2011). However, the transactional scale – the shortest of the four – showed only satisfactory results, which is comparable with Jepsen and Rodwell (2012).

Table 3

Overview of the Psychological Contract Inventory (Rousseau, 2000) Used to Assess the Four Types of Psychological Contract

Dimension	α	Worker		Organization	
		Items	Example Item	Items	Example Item
		<i>To what extent have you made the following commitments or obligations to your organization? To what extent have you indicated you may ...?</i>		<i>To what extent has your organization made the following commitments or obligations to you?</i>	
Relational	.85	8		7	
Stability		4	Remain with this organization indefinitely	3	Secure employment
Loyalty		2	Protect this organization's image	4	Make decisions with my interests in mind
Personal		2	Take this organization's concerns personally		
Balanced	.93	11		12	
External Employability		4	Build skills to increase my future employment opportunities elsewhere	2	Help me to develop externally marketable skills
Internal Advancement		4	Build skills to increase my value to this organization	4	Opportunity for career development within this organization
Dynamic Performance		3	Accept new and different job standards	4	Enable me to adjust to new, challenging performance requirements
External People & Jobs				2	Contacts that create employment opportunities elsewhere
Transactional	.73	5		6	
Narrow		3	Do only what I am paid to do	2	Training me only for my current job
Short Term				4	A job only as long as the organization needs me
Discretion to Exit		2	Quit whenever I want		
		<i>To what extent do these statements describe your relationship with your organization?</i>		<i>To what extent do these statements describe your organization's relationship to you?</i>	
Transitional	.96	10		10	
Suspicion & Doubt				7	My organization withholds information from its employees
Erosion				3	There is more and more work for less pay
Mistrust		4	I have no trust in my organization		
Uncertainty		4	It's difficult to predict the future of this relationship		
Oppression		2	I'm doing more for less		

Notes. Only the four higher-order dimensions were of interest for the present study and scales were computed as the average of all associated items regardless of subdimension or whether it pertained to the perception of employee's or organization's obligations. Scales and descriptions are based on Jepsen and Rodwell's (2012) revision of Rousseau's (2000) Psychological Contract Inventory. Some changes were made so that items referred only to the *organization* (not employer or supervisor).

Work-to-life balance. Two instruments were combined to assess work-to-life balance, where balance was defined as the absence of conflict. The work-family conflict subscale from the Copenhagen Psychosocial Questionnaire (COPSOQ II, Pejtersen, Kristensen, Borg, & Bjorner, 2010) was included. One initial item was “do you often feel a conflict between your work and your private life, making you want to be in both places at the same time?” with a response scale from 1 = *no, never* to 4 = *yes, often*. An example of the following three items was “do you feel that your work takes so much of your time that it has a negative effect on your private life?”. Here, the response scale ranged from 1 = *no, not at all* to 4 = *yes, certainly*.

Additionally, the cognitive irritation subscale from Mohr’s (2006) measure was included with three items, tapping into how subjects deal with work related uncertainty (e.g. “even at home I often think of my problems at work”). For this, a five-point Likert scale from 1 = *strongly disagree* to 5 = *strongly disagree* was used.

All items were reverse coded to achieve a measure of balance and standardized due to the different response scales. Internal consistency of the resulting scale was excellent (Tavakol & Dennick, 2011) with $\alpha = .90$, and no possible deletion would have improved this further.

Affective organizational commitment. Affective commitment was measured with six items from Meyer, Allen, and Smith’s instrument (1993). A six-point Likert response scale from 1 = *strongly disagree* to 5 = *strongly agree* was used and included an additional category labelled *not applicable*. An example item was “I really feel as if this organization’s problems are my own”, with $\alpha = .81$.

Work satisfaction. The survey included the satisfaction with work scale from the COPSOQ II (Pejtersen et al., 2010) with four items. The item stem read “regarding your work

in general, how pleased are you with...” and an example ending was “... your job as a whole, everything taken into consideration?”, with $\alpha = .85$. The response scale ranged from 1 = *very unsatisfied* to 4 = *very satisfied*.

Ethical Considerations

In the present study, several ethical concerns were addressed. Participants were fully informed of the aims and structure of the survey and how their data was to be used. They were not deceived at any point of the study, no manipulation was required, and the validity checks were explained. It was further allowed to skip items.

Anonymity was granted and strictly upheld throughout. For example, no email addresses were collected and no background information on the participant’s specific organization or location was asked for.

The participants were asked to consent to their inclusion in the analysis twice – once before starting and once after finishing the survey. This ensured informed consent as participants were allowed to change their mind once they knew exactly what data they were required to provide in the course of the survey. The interested reader can further be assured, that withdrawal of consent at the end of the survey never led to denial of compensation.

Subjects were compensated for their participation. For compensation and matching a participant’s submission with their prescreening data, random identification numbers provided by *Prolific* were used. Rules for compensation were made transparent and the careful review process ensured that all serious responders were rewarded. These rules were designed not to punish honesty. As such, neither indicating little seriousness in the final check nor very short or long completion times (within the allotted time limit) were used as the basis for compensation. However, even when compensation was not approved after a careful review, the participant was informed of the reasons through *Prolific*. It should be noted, that it was

always possible to reach out to the author of this study and appeal the decision, if the participant felt it was made unjustly. The process for reaching out was simple and completely anonymous, as only an inquirer's *Prolific* ID was shown.

Additionally, extensive prescreening through *Prolific* was used to prevent unnecessary submissions as much as possible. Those few prescreened participants who filled out the survey but did not meet the definition of knowledge workers were compensated regardless.

Results

Analysis was performed using IBM SPSS Statistics for Macintosh, Version 25. Assumptions for the performed calculations were checked and, if not reported otherwise, there were no notable violations. The full syntax detailing the analysis reported below is available from the author upon request.

Preliminary Analysis

To start out, the potential influence of sociodemographic variables was investigated. Specifically, age, organizational tenure, and years of education were considered. Table 4 presents the intercorrelations for all variables. Age was significantly and marginally significantly positively related to tenure and collaboration deregulation respectively. Considering years of education, there was a significant positive relationship with balanced PCs. Moreover, tenure showed a significant positive correlation with space, collaboration, and overall deregulation as well as a marginally significant negative correlation with perceived transactional obligations.

Consequently, education and tenure were controlled for in all subsequent models. As age did not relate to any variables beyond those associated with tenure, it was not controlled for.

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Table 4
Intercorrelations of Control Variables (1-3), Dimensions of Deregulation (4-7), Psychological Contract Types (8-11), and Outcomes (12-14)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Age	—													
2 Tenure	.44***	—												
3 Years of Education	-.08	-.14	—											
Deregulation														
4 Time	.07	.14	.09	—										
5 Space	.06	.22*	.07	.68***	—									
6 Performance	.13	.13	.05	.50***	.43***	—								
7 Collaboration	.17†	.22*	-.01	.34***	.36***	.66***	—							
Psychological Contract Types														
8 Relational	-.02	.02	.02	.12	.03	.27**	.35***	—						
9 Balanced	-.13	-.08	.19*	.15	.06	.32**	.35***	.54***	—					
10 Transactional	-.09	-.18†	-.03	-.02	-.15	-.20*	-.23*	-.38***	-.08	—				
11 Transitional	.15	.00	.01	-.06	-.12	-.26**	-.35***	-.56***	-.31**	.31**	—			
Outcomes														
12 Work-to-Life Balance	-.03	-.09	-.06	.04	.00	.07	.08	.01	.10	.05	-.30**	—		
13 Affective Organizational Commitment	.06	.10	.07	.03	.05	.29**	.22*	.55***	.44***	-.39***	-.52***	.00	—	
14 Work Satisfaction	-.08	.02	.09	.17†	.19†	.43***	.42***	.54***	.45***	-.25**	-.67***	.24**	.58***	—

Notes. $n = 111$.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$. All two-tailed.

Deregulation in Knowledge Work

The following sections will be structured according to the three thematic questions outlined previously. The first of them was: How prevalent is deregulation of different working conditions and how is deregulation associated with work-to-life balance, affective organizational commitment, and work satisfaction.

Prevalence of deregulation in knowledge work. Thus, while no hypotheses were stated for this, an exploration of how much work deregulation the sampled knowledge workers perceived was in order. For this analysis, the participants' unstandardized ratings needed to be used – the participants' actual ratings of deregulation, not their differences, were of interest.

Table 5 shows the means and standard deviations along with 95 % confidence intervals around the mean for the studies' main variables. Note that the response scale for deregulation items ranged from 1 to 5, where 5 indicated high deregulation. From the table, it follows that performance deregulation was perceived as highest whereas time deregulation was less pronounced.

Table 5
Means, Standard Deviations, and Confidence Intervals (CI) for Dimensions of Deregulation, Psychological Contract Types, and Outcomes

Variable	Scale	<i>M</i>	95 % <i>CI</i>	<i>SD</i>
Deregulation^a				
Time	1 – 5	2.52	2.35 – 2.69	0.90
Space	1 – 5	2.28	2.09 – 2.47	1.01
Performance	1 – 5	3.46	3.30 – 3.62	0.84
Collaboration	1 – 5	2.89	2.72 – 3.07	0.94
Psychological Contract Types				
Relational	1 – 5	3.46	3.32 – 3.59	0.73
Balanced	1 – 5	3.22	3.07 – 3.38	0.82
Transactional	1 – 5	2.21	2.06 – 2.35	0.77
Transitional	1 – 5	2.39	2.21 – 2.58	0.97
Outcomes				
Work-to-Life Balance ^b	-	0.00	-0.14 – 0.15	0.78
Affective Organizational Commitment	1 – 5	2.66	2.49 – 2.83	0.90
Work Satisfaction	1 – 4	2.85	2.74 – 2.97	0.61

Notes. *n* = 111.

^a Items were *not* standardized (only in this table). Means should be interpreted cautiously as different descriptions on the response scale were used within these scales.

^b Items were standardized prior to scale computation as length of the response scale differed throughout, leading *M*_{scale} to be 0 and *SD*_{scale} to be < 1.

Next, three categories were constructed to allow a better understanding. The level of deregulation in the respective dimension was classified as low if a participant's score was between 1.00 and 2.33, as intermediate between 2.34 and 3.67, and as high between 3.68 and 5.00.

Deregulation of performance and collaboration appeared most common among the sample of knowledge workers. 45.0 % and 18.0 % of the sample respectively reported high and 44.1 % and 47.7 % respectively reported intermediate deregulation. Conversely, least deregulation was found with regard to the time and space dimensions. Here, only 10.8 % and 10.0 % respectively indicated high and 48.6 % and 38.7 % respectively indicated intermediate levels of deregulation.

Moreover, it was of interest how prevalent deregulation in multiple dimensions is. Table 4 shows the intercorrelations of all study variables. Notice here how all four dimensions of deregulation were at least moderately intercorrelated, e.g. those indicating higher time deregulation tended to also indicate higher performance deregulation. Further, for each

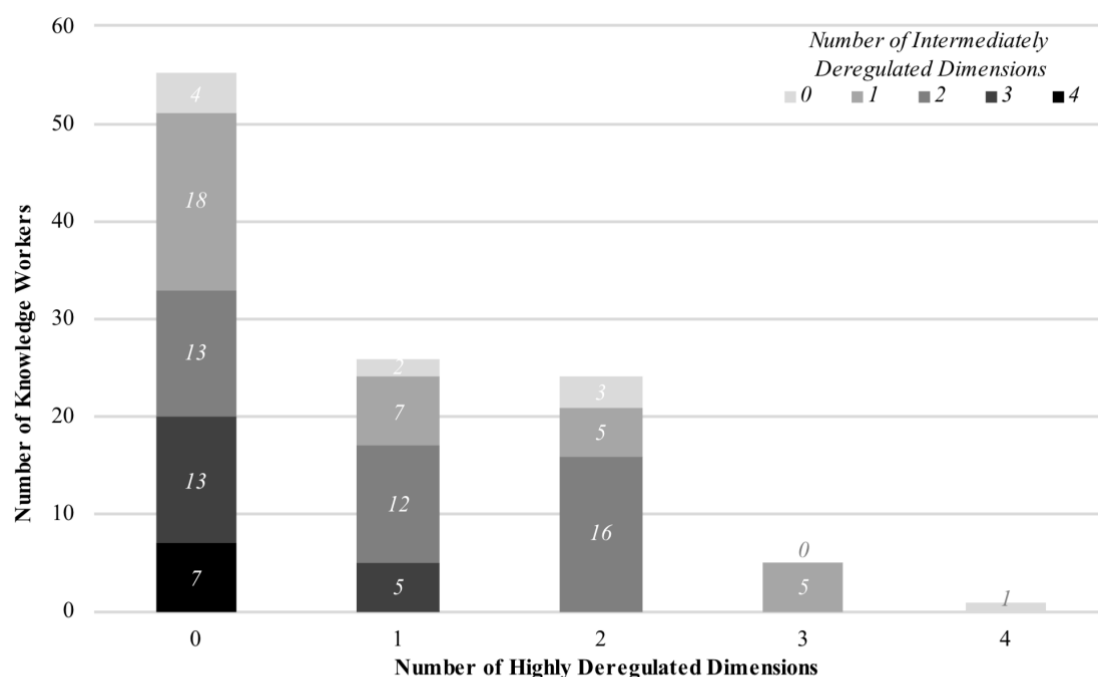


Figure 1. Distribution of the number of highly and intermediately deregulated work dimensions for a sample of $n = 111$ knowledge workers. A total of four dimensions of deregulation were differentiated and three categories – low, intermediate, and high deregulation – were built based on the subject's ratings on five-point Likert scales.

participant it was counted how many dimensions were highly, intermediately, or lowly deregulated. This distribution is presented in Figure 1. From this, it follows that 22 (19.8 %) participants indicated low deregulation in at least three of the four dimensions. Conversely, for 64 (57.7 %) of the sampled knowledge workers three or four dimensions were intermediately or highly deregulated.

Association of deregulation with outcome variables. Regarding associations between deregulation and work-to-life balance, affective organizational commitment, and work satisfaction, the intercorrelations presented in Table 4 and regression models were considered. Specifically, to test Hypotheses 1 – 4, a hierarchical multiple linear regression model was calculated for each of the outcome variables. In a first step, tenure and years of education were entered as control variables. In a second step, the four deregulation scales were entered. A third step was performed to test for mediation (Proposition 1), but this should be ignored for now. Table 6 presents these regression models.

From the correlations (Table 4), it can be seen that no dimension of deregulation was significantly related to work-to-life balance, which was not expected for time and space deregulation. Consequently, the regression model in step 2 only explained $R^2 = 2.9$ % of the variance ($F(6, 110) = 0.51, p = .799$) and all predictors failed to significantly relate to work-to-life balance.

Regarding commitment, significant positive correlations with performance and collaboration deregulation were observed. The regression model (after step 2) for this outcome explained $R^2 = 11.2$ % of the variance, which was significantly better than a model without predictors ($F(6, 110) = 2.19, p = .050$). However, only performance deregulation emerged as a significant predictor.

Finally, there were significant positive correlations between work satisfaction and performance and collaboration deregulation. With time as well as space deregulation, these relationships were marginally significant but also positive, which was unexpected for space deregulation. $R^2 = 23.2\%$ of the variance of satisfaction was explained by the model in step 2 ($F(6, 110) = 5.24, p < .001$). Nonetheless, only performance and collaboration significantly predicted this outcome.

Table 6

Regression Analysis of Work-to-Life Balance, Affective Organizational Commitment, and Work Satisfaction on Control Variables (Step 1), Four Dimensions of Work Deregulation (Step 2), and the Psychological Contracts (Step 3)

Predictor	Work-to-Life Balance		Affective Organizational Commitment		Work Satisfaction	
	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.01		.02		.01	
Tenure		-.08		.11		.04
Years of Education		-.10		.09		.09
Step 2	.01		.09 *		.22 ***	
Tenure		-.12		.09		-.05
Years of Education		-.08		.08		.07
Deregulation ^a						
Time		.06		-.14		-.09
Space		-.06		-.03		.04
Performance		.02		.32 *		.29 *
Collaboration		.09		.05		.26 *
Step 3	.13 **		.36 ***		.33 ***	
Tenure		-.07		.12		.01
Years of Education		-.08		.03		.06
Deregulation ^a						
Time		.12		-.10		-.05
Space		-.11		-.02		.04
Performance		.00		.22 *		.21 *
Collaboration		.02		-.21 *		.02
Psychological Contract						
Relational		-.28 *		.21 †		.13
Balanced		.11		.25 *		.15 †
Transactional		.06		-.20 *		.02
Transitional		-.44 ***		-.29 **		-.49 ***
Total R^2	.16 *		.47 ***		.56 ***	

Notes. $n = 111$.

^a Deregulation scales were computed as the average of standardized items due to different response

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

For a better overview of how these and subsequent results relate to the study's hypotheses, consider Table 9. It shows the expected relationships again and indicates which relationships were supported and not supported respectively based on the regression analyses.

Hypotheses 3 (a) and 4 (a) that pertained to work-to-life balance were supported; performance and collaboration deregulation did not significantly explain this outcome. Regarding commitment, Hypothesis 3 (b) was supported – those who indicated higher performance deregulation also tended to report higher affective organizational commitment. Moreover, Hypotheses 3 (c) and 4 (c) were supported as satisfaction tended to be significantly higher for those in higher deregulated jobs with regard to performance and collaboration.

Hypotheses 1 (a), 2 (a) were not supported; neither time nor space deregulation were able to significantly predict work-to-life balance. Hypotheses 1 (b), 2 (b), and 4 (b) were not supported either, as time, space, and collaboration deregulation did not significantly predict affective commitment. Finally, Hypotheses 1 (c) and 2 (c) were not supported as time and space deregulation did not explain participants' work satisfaction significantly.

Investigating the PC of Knowledge Workers

Let us now turn to the second of the three thematic questions for the present study: How can the PC of knowledge workers be characterized and how do different contract dimensions relate to the same outcomes.

Characterizing the PC of knowledge workers. Before looking at Hypotheses 5 – 9, I will first consider Hypotheses 10 and 11, which pertained to what characterized the PCs of the investigated knowledge workers. Means and standard deviations along with confidence intervals for each of the four PC types can again be found in Table 5. Compare also Table 4 which shows that all PC scales were significantly intercorrelated.

To test the differences between their means, a repeated measures ANOVA with the four PC scales was performed. As the assumption of sphericity was violated (Mauchly's $W = .47$, $p < .001$), the Greenhouse-Geisser correction was used. As expected, the difference between means was significant with $F(2, 110) = 55.83$ and $p < .001$. Furthermore, contrasts testing the difference between each PC type and the transactional PC scale were calculated. These showed significant differences between the mean perception of relational and transactional mutual obligations ($F(1, 110) = 111.80$, $p < .001$) and between the mean perception of balanced and transactional mutual obligations ($F(1, 110) = 83.43$, $p < .001$).

From this and the confidence intervals for the means presented in Table 5, it follows that the PCs of the investigated sample of knowledge workers were more characterized by relational than transactional obligations – Hypothesis 10 was therefore not supported. Hypothesis 11, however, was supported. The sample of knowledge workers indicated significantly more balanced than transactional mutual obligations.

The PC and its association with outcome variables. Now, to test Hypothesis 5 – 9, a similar procedure as with deregulation was adopted. Thus, a series of hierarchical multiple linear regression models for each of the outcome variables was computed. In the first step, control variables were entered before, in the second step, the four PC scales were added. Table 7 presents the results of these analyses.

Regarding work-to-life balance, the correlations with the PC scales presented in Table 4 tended to be small and insignificant with the exception of transitional PCs. Moreover, the full regression model only explained $R^2 = 15.4\%$ of the variance ($F(6, 110) = 3.15$, $p = .007$). Relational and transitional PCs were significantly negatively associated with work-to-life balance. Balanced and transactional PCs did not significantly predict this outcome.

Table 7

Regression Analysis of Work-to-Life Balance, Affective Organizational Commitment, and Work Satisfaction on Control Variables (Step 1) and Four Kinds of Psychological Contracts (Step 2)

Predictor	Work-to-Life Balance		Affective Organizational Commitment		Work Satisfaction	
	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.01		.02		.01	
Tenure		-.10		.11		.04
Years of Education		-.08		.09		.09
Step 2	.14 **		.42 ***		.51 ***	
Tenure		-.08		.08		.05
Years of Education		-.08		.03		.06
Psychological Contract						
Relational		-.26 *		.19 †		.12
Balanced		.12		.24 *		.21 *
Transactional		.08		-.20 *		-.01
Transitional		-.43 ***		-.28 **		-.53 ***
Total R^2	.15 **		.44 ***		.52 ***	

Notes. $n = 111$.

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

With regard to organizational affective commitment, the correlations presented in Table 4 were all significant and in the expected direction. Further, the full regression model of commitment was able to explain $R^2 = 44.1\%$ of the variance ($F(6, 110) = 13.66$, $p < .001$). With the exception of relational PCs, whose impact was only marginally significant, all four kinds of PCs were significantly related to commitment in the expected directions.

Finally, as with commitment, the correlations between the PC scales and work satisfaction were all significant and in the predicted direction (see Table 4). The full regression model for work satisfaction was able to explain $R^2 = 52.2\%$ of the variance ($F(6, 110) = 18.94$, $p < .001$). On the one hand, transactional and relational PCs did not significantly predict, and transitional PCs were significantly negatively associated with satisfaction. On the other hand, those with balanced PCs tended to be significantly more satisfied with their work.

To sum up (compare again Table 9 for an overview), these results lend support to Hypotheses 5 (a), and 8 (a); those with more transitional or relational PCs showed lower

work-to-life balance. Furthermore, Hypotheses 6 (b), 7 (b), 8 (b) that pertained to affective organizational commitment were supported. While more relational and balanced PCs were associated with significantly higher, transactional and transitional PCs were associated with significantly lower commitment. Moreover, Hypotheses 6 (c), 8 (c) that pertained to the association of balanced and transitional PCs with work satisfaction received support based on the regression models. Only tentative support was found for Hypotheses 5 (b) and 5 (c) as the assumed associations of relational PCs with commitment and satisfaction were in the expected direction, but only marginally significant.

Conversely, Hypotheses 6 (a), and 7 (a) were not supported as the postulated relationships between balanced and transactional PCs and work-to-life balance were insignificant. Similarly, transactional PCs were not positively related to work satisfaction as was expected with Hypothesis 7 (c).

As a consequence, Hypothesis 9 was supported. The relationship between transactional PCs and work satisfaction was insignificant and unexpectedly even negative when other PC scales were controlled for, while those of relational and balanced PCs were positive and significant or marginally significant respectively.

An Exploration of the Link Between Deregulation and the PC

At last, the third thematic question needs to be answered. It was: How does deregulation affect PCs and do differences in the PCs at least partly explain the effects of deregulation on outcomes?

Deregulation and its impact on the PC. In this context, I was initially interested in whether deregulation was associated with different PCs (Hypotheses 12 – 15). To test this, a series of regression models for each type of PC were calculated based on tenure and education

as control variables (step 1), and the four dimensions of deregulation (step 2). The results are shown in Table 8.

Table 8
Hierarchical Regression Analysis of Psychological Contracts on Control Variables (Step 1) and Four Dimensions of Deregulation (Step 2)

Predictor	Psychological Contract							
	Relational		Balanced		Transactional		Transitional	
	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2	β
Step 1	.00	.02	.04		.04		.00	
Tenure		.03		-.06		-.19 [†]		.00
Years of Education				.18 [†]		-.05		.02
Step 2	.14 ^{**}		.16 ^{**}		.07		.14 ^{**}	
Tenure		-.03		-.12		-.14		.08
Years of Education		.02		.17 [†]		-.05		.02
Deregulation								
Time		.08		.07		.23 [†]		.13
Space		-.17		-.15		-.16		-.08
Performance		.08		.16		-.12		-.09
Collaboration		.34 ^{**}		.30 [*]		-.14		-.32 [*]
Total R^2	.14 [*]		.20 ^{**}		.10 [†]		.14 [*]	

Notes. $n = 111$.

[†] $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Collaboration deregulation significantly and positively predicted the perception of relational and balanced mutual obligations. Conversely, collaboration deregulation was significantly and negatively associated with transitional PCs. Further, time deregulation marginally significantly and positively predicted transactional PCs. All other relationships failed to achieve significance.

Following from this (see Table 9 for an overview), Hypotheses 12 – 15 received no or only little support with regard to any dimension of deregulation except for the postulated positive predictive value between collaboration and relational as well as balanced PCs. Tentative support was found for the postulated positive association between time deregulation and transactional PCs. Notably, the opposite of Hypothesis 15 appeared to be true with regard to collaboration and transitional PCs – the more deregulated collaboration was, the less transitional the PC of a participant tended to be.

The PC as a potential mediator of the effects of deregulation on outcomes. But to answer the third thematic question, Proposition 1 also needs to be investigated. It stated that the effects of deregulation on outcome variables might have been mediated by the PCs. To establish mediation, three conditions need to be met (Baron & Kenny, 1986): (1) links between the four kinds of PCs and the three outcome variables, (2) links between the four dimensions of deregulation and those same outcomes, and (3) a full or at least partial reduction in the strength of association between deregulation and the outcomes when PCs are controlled for.

The first and second of these conditions were already tested previously. Remember that, out of the three outcome variables, differences in work-to-life balance were explained least by deregulation and PCs alike. Further, time and space deregulation did not significantly predict any of the outcomes. As a result, mediation is not likely for time and space deregulation. It is only somewhat more likely for performance deregulation. Regarding collaboration deregulation however, mediation is possible (except for work-to-life balance).

Finally, the third condition was assessed. It represented Proposition 1, which stated that the PCs may have been able to at least partly explain the relationships of deregulation with the three outcome variables. To test this potential mediation of the effects of deregulation, an additional step was performed for the regression analyses pertaining to the effects of deregulation presented in Table 6. In this additional step, all four PC scales were entered into the models.

Taken together with the previous analysis, mediation was not supported for work-to-life balance as both deregulation and PCs only explained a small proportion of the variance of this outcome. With respect to performance, evidence for partial mediation was found concerning affective organizational commitment. When PCs were controlled for, the relationship between

performance deregulation was still significant and positive, but less strong. However, there was not enough evidence for partial mediation for the relationship between this type of deregulation and work satisfaction.

Looking at collaboration deregulation, mediation was supported for affective organizational commitment and work satisfaction. While its relationship with commitment was positive and insignificant when PCs were not controlled for, this turned significant and negative when PCs were entered into the model. Thus, beyond its impact on PCs, more collaboration deregulation tended to be associated with lower commitment. Moreover, when PCs were controlled for, the formerly significant positive relationship between collaboration deregulation and work satisfaction decreased and became insignificant.

Table 9
Overview of Evidence Regarding Hypothesized Relationships

Variable	Deregulation				Psychological Contract			
	Time	Space	Performance	Collaboration	Relational	Balanced	Transactional	Transitional
Outcomes								
<i>a</i> Work-to-Life Balance	+ <i>ns</i>	– <i>ns</i>	0 <i>ns</i>	0 <i>ns</i>	– *	– <i>ns</i>	+ <i>ns</i>	– ***
<i>b</i> Affective Organizational Commitment	+ <i>ns</i>	– <i>ns</i>	+ *	+ <i>ns</i>	+ †	+ *	– *	– **
<i>c</i> Work Satisfaction	+ <i>ns</i>	– <i>ns</i>	+ *	+ *	+ <i>ns</i>	+ *	+ <i>ns</i>	– ***
<i>Corresponding Hypothesis</i>	1	2	3	4	5	6	7	8
Any Deregulation					– <i>ns</i> ^a	+ <i>ns</i> ^a	+ <i>ns</i> ^b	+ <i>ns</i> ^c
<i>Corresponding Hypothesis</i>					12	14	13	15

Note. Leading letters (a, b, c) correspond with letters in the hypotheses. For each hypothesis, '+' indicates positively, '–' negatively, and '0' unrelated variables. Empty cells indicate that no hypothesis about a relationship existed. Here, evidence was based on regression coefficients.

^a Collaboration deregulation *

^b Time deregulation †

^c Collaboration deregulation *, but in opposite direction

ns $p > .10$. † $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Discussion

The present study aimed to advance our understanding of knowledge workers by investigating the deregulation of working conditions and the worker-organization relationship, conceptualized as PCs. Specifically, an online survey study was conducted with knowledge workers in the UK, asking how deregulated their work is and what their PCs looked like, and

how deregulation and PCs affect outcome variables, namely work-to-life balance, affective organizational commitment, and work satisfaction.

Overall, deregulation appeared common among knowledge workers, particularly with regard to performance and collaboration. Looking at the effects of different dimensions, time and space deregulation, on the one hand, overall only showed a small association with PCs and outcomes. For example, work-to-life balance could not be explained by these dimensions. On the other hand, the assumed beneficial impact of performance and collaboration deregulation with respect to PCs and affective organizational commitment as well as work satisfaction was supported. Moreover, the results suggested that knowledge workers had stronger relational and balanced PCs with their organization than transactional or even transitional ones. In turn, PCs were able to explain workers' affective organizational commitment and work satisfaction. Notably, they also mediated the effect of collaboration deregulation on these outcomes.

The following section will consider the findings in relation to the arguments and results of other authors. Then, limitations and strengths of the present study and avenues for future research will be discussed. Finally, a conclusion will be drawn.

Deregulated Work: Common but Not That Impactful

Deregulation was investigated with regard to work time, space, performance, and collaboration. Results revealed that deregulation was indeed the new normal for knowledge workers. The majority of the sample experienced intermediate to high levels of control over three or four of their working conditions. This finding was in line with previous studies (Allvin et al., 2013) and supports the notion that the nature of employment is changing towards more flexible arrangements (Allvin et al., 2011; Baker, 2009).

However, truly boundaryless work, i.e. full deregulation, was still uncommon. Only one of the investigated knowledge workers indicated high deregulation in all four dimensions. Instead, it appears that most organizations strived toward exerting control in some dimensions, often with regard to time and space, while allowing their knowledge workers more control in others, typically with regard to performance and collaboration.

The results suggest that organizations aimed towards fulfilling Drucker's (1999) proposal. Thus, the performance dimension, closely associated with autonomy, was the most commonly deregulated, which according to Drucker (1999) should improve productivity. While productivity was not investigated herein, higher deregulation with regard to performance did positively predict affective commitment to the organization and work satisfaction. Moreover, collaboration deregulation – which is theoretically also somewhat related to autonomy – was able to predict work satisfaction through more relational and balanced PCs. This reiterates the importance of autonomy that has frequently been emphasized (e.g. Tovstiga, 1999).

In the literature on boundaryless careers, the argument is often presented that deregulation may lead to less organizational commitment (e.g. Coyle-Shapiro & Kessler, 2002). Yet, with regard to deregulated work the present study provided no evidence to support these claims, in line with Rousseau (1998) and Guest (2004). Regardless of how deregulated the investigated knowledge workers' work time, space, or collaboration was, their affective organizational commitment was not meaningfully different. Regarding collaboration, it was interesting that it indeed was negatively associated with commitment, but only when its beneficial impact on PCs was controlled for. Those however, who indicated higher deregulation of performance, tended to also commit more strongly to their organizations.

Finally, it was often argued that flexibility through deregulating work time and space restrictions on workers could allow them more balance between demands of their private life and work (Allvin et al., 2011). But the findings suggest that deregulation did not or at least not strongly affect work-to-life balance. No dimension of deregulation appeared to affect the sample's perception of balance. These results were, at least in tendency, in line with Russell et al. (2009) and Albertsen et al. (2010). Perhaps personal skills and resources allowed some of the sampled knowledge workers in time and space deregulated work to successfully cope with the new demands while others did not have this ability – thereby constituting the low impact overall. This lends some credence to those criticizing work intensification and cautioning that deregulation of work time and space can easily become a burden for workers (Turner, 2013). It also points to the necessity to research what individual or organizational resources and skills could explain these results (compare Hyman et al., 2003).

The PC of Knowledge Workers: Rather Relational and Balanced

The worker-organization relationship was looked at within a PC framework and four kinds of PCs were differentiated, namely relational, balanced, transactional, and transitional. The results strongly suggested that the PCs of knowledge workers tend to be more relational and balanced than transactional and transitional. Thus, the investigated knowledge workers still emphasized obligations associated with relational PCs such as stability, loyalty and personal support over short-term and narrow transactional obligations. While this does not disprove the notion of a shift away from relational PCs in newer employment arrangements (Rousseau, 1995; Sparrow, 1996), it challenges it as it appears that the shift at least has not yet been completed. This could be the result of organizations that recognize the importance of knowledge workers to their continued success and in turn wish to actively manage the worker-organization relationship to increase commitment (compare Mike & Rousseau, 2015).

This result also highlights the importance for research to consider more than just a dichotomous categorization of either relational or transactional PCs. Knowledge workers appeared to perceive more balanced mutual obligations than mere tit-for-tat exchanges. Thus, an increased emphasis on as opposed to a shift towards balanced mixed with relational rather than mere transactional relationships appears more likely (in line with Baker, 2009).

In turn, PCs were able to explain knowledge workers' work satisfaction, affective organizational commitment, and, to a lesser extent, work-to-life balance. In line with previous studies (e.g. Guest, 2004), the results of the present study reiterated the potential of relational PCs to enhance commitment and satisfaction. Moreover, this potential appeared to be shared by balanced PCs. In contrast and again in line with previous research (Rousseau, 2011), the results also point to disadvantageous relationships between transactional and transitional PCs and these outcomes.

With regard to work-to-life balance the results were less consistent with the hypotheses, but transitional and relational PCs were both negatively related to balance while the other two PC kinds did not predict this outcome. This may highlight the importance of specificity of expected contributions as both relational and transitional PCs are thought to resemble a less specified exchange relationship (Wade-Benzoni et al., 2006). Those who tended to perceive more unclear performance requirements may have had trouble leaving their work behind in their recovery time.

The PC in Deregulated Work

An advantage of the present study was the opportunity to jointly consider the impact of both deregulation and PCs of knowledge worker on the investigated. It was often argued that the nature of the relationship between worker and organization is changing due to the

changing nature of employment arrangements (Allvin et al., 2011; Rousseau, 1998, 2011).

Thus, it was specifically investigated whether deregulation affects workers' PCs.

On the one hand, the data provided no clear evidence that deregulated work would generally contribute to an erosion of the relationship between workers and organizations. In fact, deregulation only explained the PCs to a rather small extent. On the other hand, there was some evidence that deregulated work actually had a beneficial impact on the PCs of the sampled knowledge workers as those in more collaboration deregulated work tended to perceive more relational and balanced PCs. However, time deregulation was associated with the perception of more transactional PCs. Moreover, space deregulation showed negative relationships with all kinds of PCs, but these associations were small and insignificant.

Exploring the linkage between deregulation and PCs further, a potential mediation of the effects of deregulation on outcomes through differences in PCs was checked. Yet, as deregulation only had limited explanatory value for work-to-life balance, mediation was not supported regarding this outcome. Regarding affective organizational commitment and work satisfaction however, results only suggested a mediation of the effect of collaboration deregulation. Those who had more control over who they collaborate with and report to also tended to have more relational and balanced as well as less transitional PCs. This in turn was associated with higher commitment and satisfaction. Notably, beyond this mediation, collaboration had no association with satisfaction and a negative association with affective commitment.

Strengths and Limitations

Some limitations of the present study should be considered when reviewing the aforementioned findings as with any other empirical investigation. Now, the trade-offs that were made are going to be discussed and how these may have affected the results.

A key advantage of the present study was the opportunity to investigate PCs and deregulation of working conditions simultaneously, thereby bridging the gap between two streams of research. However, there were few previous studies investigating deregulated working conditions or knowledge workers and their PCs. This limited the basis on which hypotheses were able to be deduced. Further, this increased the length of the survey and complexity of the analysis. In turn, I limited the amount of additional, potentially interesting calculations to limit the scope of the paper to only answer the three initial thematic questions.

Then, the operationalization and measurement of key variables should be addressed. The Psychological Contract Inventory (Rousseau, 2000) was a relatively recent development and research considering its reliability and validity is still rare. And while more research will be needed to further improve upon the measure, particularly with regard to the subdimensions of each PC type or transactional PCs, its main benefit was the differentiation of all four PC types. Further, it should be emphasized that Jepsen and Rodwell (2012) were able to replicate the main dimensions, which were the only ones of interest in the present study and these dimensions showed high internal consistencies (with the exception of the transactional scale).

Furthermore, Jepsen and Rodwell (2012) pointed out a lack of symmetry in the perceptions of obligations of workers. This might mean that not mutual obligations overall were affected by deregulation or in turn affected outcomes, but that only the perception of the workers' own or the organization's obligations was altered. Yet, differentiating both sides for all four PCs would have made for an even more complex analysis and it was not required to answer the studies' main questions.

Similarly, Allvin et al.'s (2013) scales used to assess deregulation of working conditions were adjusted substantially for the present study. Of course, this means that their reliability and validity were not independently assessed. Especially with regard to the unexpectedly low

predictive value of time and space deregulation, low validity of the scale as a potential explanation cannot be ruled out. However, all additions and adaptations were made on the basis of Allvin et al.'s (2013) definitions and I attempted to complement them with previously assessed instruments where possible. The benefit was a broader operationalization of deregulation. Still, the collaboration scale remained quite short and its internal consistency was unsatisfactory. Conversely, results with regard to the other dimensions were very promising, showing high internal consistency and a factorial structure in line with theoretical thinking. Moreover, comments from participants indicated that it was advantageous to include the organizational side of control, as some noted how neither them nor their organization had control over their working conditions. Regardless, this measure could perhaps be improved upon further, for example by including specific examples of organizational policies associated with deregulation such as flextime or home office or by asking how much freedom the respondent has over whom to report their progress to.

Beyond these measurement issues, only few additional variables were controlled for in the present study. Among potentially notable omissions were variables such as size of organization or whether the worker had the resources to cope with or preferred deregulated working conditions. However, including these variables would have increased the length of the survey (making it more expensive to conduct), increased the required sample size, made the analysis more complex, and shifted the focus of the study.

Considering the sample, the results remain somewhat limited to knowledge workers in the UK. While this choice was deliberate to control for factors such as legislative rules with regard to work deregulation, it also means that the results cannot readily be generalized to populations in other countries. The significance of work, workers' expectations and the

relationships with their organizations may be quite different from country to country (Rousseau, 2011).

Finally, I also want to address participant recruitment. On the one hand, the benefit of recruiting participants through *Prolific* was very quick data collection of the required number of participant, which was important in order to carry out this study in the given timeframe. Additionally, it allowed for a more heterogeneous compared to recruiting participants only through friends, family, or social media. In fact, while there were few men in the sample, I considered the generated sample to be quite heterogeneous and representative of the population of knowledge workers in factors such as occupations, sectors, and age (see Tovstiga, 1999).

On the other hand, this strategy for participant recruitment comes with some risks that go beyond those associated with compensation. First, these participants may have been very used to scientific research, thereby lowering their naivety and in turn potentially lowering effect sizes (Chandler, Paolacci, Peer, Mueller, & Ratliff, 2015). Second, participants may have been very used to the instructional manipulation checks. They could have paid special attention to those checks as they were alerted to them in the introduction and then returned to merely satisficing for all other items. To alleviate these concerns, I attempted to make the study less attractive for habitual satisficers (Aust et al., 2013). This was coupled with a careful review of each submission and different kinds of validity checks were implemented.

Finally, it was noticed during the review process that the second of the read checks could have been difficult for participants. While the items on the respective page actually pertained to the workers' own obligations, many participants did not change their answer compared to the first read check. The planned pop-up message reiterating the instructions may have failed to appear on some devices or participants may not have wanted to change their

first response, which is why I chose to screen for logical consistency when the second read check was not passed. This increased my confidence that those in the final sample did still follow the instructions even when one of the read checks was not answered correctly.

Areas for Future Research

The present study may provide useful starting points for future research. Overall, a strong case was made for research rather than armchair psychology on deregulated work and the deregulation measure adapted in the present study could benefit from further improvement in future studies. Moreover, the PC framework was shown as highly relevant for explaining workers' satisfaction and commitment.

The results challenged some of the common assumptions in popular culture and literature regarding the impact new work arrangements would have on those in the labor force. Authors have often argued about the value of time and space deregulation (Allvin et al., 2011), some claiming it to be beneficial and others claiming it to be detrimental for, e.g., work-to-life balance. Yet, the present study found little to no impact of these types of deregulation on knowledge workers' perceptions of work-to-life balance, and to a similar extent, work satisfaction and affective organizational commitment. It simply did not seem to matter much whether someone is given greater control over when and where they work. Future research should explain why these associations were this small. A starting point could be an investigation into individual and organizational resources increasing workers' ability to cope with the new demands (Allvin et al., 2011).

A shift away from traditional worker-organization relationships that were characterized by open-ended obligations centered around stability and loyalty (relational PCs) was claimed (Rousseau, 1995). Instead, the relationship would become increasingly narrow, specified and focused on the short-term (transactional PCs). The present study challenged this notion. In

fact, knowledge workers still perceived relational, followed by balanced obligations most strongly. Future research could help overcome the preconceived notion further, e.g. through research investigating how the perceptions of obligations change for the same workers over longer time periods. At the very least, future research on PCs should ensure measuring more than just relational and transactional PCs. With regard to the measurement of transactional PCs, the Psychological Contract Inventory (Rousseau, 2000) could benefit from improvement in future studies as well.

Concluding Remarks

This research linked two areas of increased interest in organizational psychology, the deregulated work and PC literature. As deregulation becomes more prevalent (e.g. Zapf & Weber, 2017) and when knowledge work is a driver of economic growth (Grossman & Helpman, 1991), this study advanced research and theory by assessing different degrees of deregulation. It explored a framework for how deregulation may affect the worker, i.e. through the PC. Organizations generally and human resource management specifically can benefit from the insights provided.

Anticipating exactly what workers expect in return for their efforts is of great importance to organizations. To build trust as well as promote better performance, it may not be enough to simply reward good work with a financial bonus. Instead, as Rousseau (2011) pointed out, if a received reward was not expected by an worker, this reward does not provide information about the PC. The present study contributed to our understanding of the PC of knowledge workers, which should inform organizational leaders. It revealed that they tend to perceive mutual obligations associated with relational and balanced PCs, which opposes the notion that new work arrangements are becoming increasingly transactional (Shore & Tetrick, 1994). Moreover, balanced PCs in particular showed beneficial associations with knowledge

workers' affective commitment and satisfaction. Organizations could benefit from actively managing and enforcing these kinds of relationships with their workers.

Furthermore, much ado was made about deregulation in new work arrangements (Allvin et al., 2011). Reiterating the importance of autonomy, performance and collaboration deregulation were overall beneficial for affective commitment and satisfaction. They were additionally associated with relational and balanced PCs. Conversely however, time and space deregulation did not have much of an impact on knowledge workers. The question that needs an answer now is: Is all the buzz about deregulation really much ado about nothing?

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Appendices

Table A.1
Overview of Scales and Their Order in the Full Survey

Block	Scale or Variable	Items	Checks	Source
-	Introduction			
	Consent Form			
	Prolific ID			
1	Sociodemographic Variables			
2	Deregulation of Work ^a	25	1 x IMC	Rousseau, D. M. (2000). <i>Psychological contract inventory</i> . Technical Report, Pittsburgh, PA: The Heinz School of Public Policy and Management, Carnegie Mellon University. Retrieved from https://tepper.cmu.edu/-/media/399b664f2bc43aabba79f12f851cc09ashx
3	PCs			Robinson, S. L., & Wolfe Morrison, E. (2000). The development of psychological contract breach and violation: A longitudinal study. <i>Journal of Organizational Behavior</i> , 21(5), 525–546. doi: 10.1002/1099-1379(200008)21:5<525::AID-JOB40>3.0.CO;2-T
	PC Inventory ^b	69	2x IMC, 2 x Read Check	
	Breach	5	1 x IMC	
4	Involvement	20		Meyer, J. P., Allen, N. J., & Smith, C. A. (1993). Commitment to organizations and occupations: Extension and test of a three-component conceptualization. <i>Journal of Applied Psychology</i> , 78(4), 538–551. doi: 10.1037/0021-9010.78.4.538
	Organizational Commitment		1 x IMC	
	Affective	6		
	Continuance	6		
	Normative	6		
5	Work Satisfaction	4		Pejtersen, J. H., Kristensen, T. S., Borg, V., & Bjorner, J. B. (2010). The second version of the Copenhagen Psychosocial Questionnaire. <i>Scandinavian Journal of Public Health</i> , 38(3 suppl), 8–24. doi: 10.1177/1403494809349858
	Work-to-Life Balance		1 x IMC	
	Conflict	4		Pejtersen, J. H., Kristensen, T. S., Borg, V., & Bjorner, J. B. (2010). The second version of the Copenhagen Psychosocial Questionnaire. <i>Scandinavian Journal of Public Health</i> , 38(3 suppl), 8–24. doi: 10.1177/1403494809349858
	Cognitive Irritation	3		Mohr, G., Müller, A., Rigotti, T., Aycan, Z., & Tschan, F. (2006). The assessment of psychological strain in work contexts. <i>European Journal of Psychological Assessment</i> , 22(3), 198–206. doi: 10.1027/1015-5759.22.3.198
-	Seriousness Check	1		
	Consent	1		
	Comments			

Notes. IMC = Instructional Manipulation Check. PC = Psychological Contract.

^a Refer to Table A.2^b Refer to Table 3

Table A.2
Overview of the Created Measure for Deregulated Work

Dimension			
Time			
<i>In your current job, to what degree can you...^a</i>	... decide when during the day to do your work?	... decide when during the week to do your work?	... decide when during the year to do your work?
<i>In your current job, to what degree does your organisation...</i>	... decide when during the day to do your work? (R)	... decide when during the week to do your work? (R)	... decide when during the year to do your work? (R)
Space			
<i>In your current job, to what degree can you...^a</i>	... decide where to do your work on a typical day?	... decide where to do your work in a typical week?	
<i>In your current job, to what degree does your organisation...</i>	... decide where to do your work on a typical day? (R)	... decide where to do your work in a typical week? (R)	
Performance			
<i>In your current job, to what degree can you...^a</i>	... plan the work yourself in the short range?	... plan the work yourself in the long range?	
<i>In your current job, to what degree does your organisation...</i>	... plan the work for you in the short range? (R)	... plan the work for you in the long range? (R)	
<i>My current job...^c</i>	... gives me a chance to use my personal initiative or judgement in carrying out the work.	... allows me to make a lot of decisions on my own.	... provides me with significant autonomy in making decisions.
	... allows me to make decisions about what methods I use to complete my work.	... gives me considerable opportunity for independence and freedom in how I do the work.	... allows me to decide on my own how to go about doing my work.
Collaboration			
<i>In your current job, to what degree can you...^a</i>	... freely choose your informers and collaborators for your work?		
<i>In your current job, to what degree does your organisation...</i>	... restrict who you work with or are informed by in your work (e.g. people in the same department)? (R)		
	To get my work done, I can freely decide who I want to collaborate with.		

Notes. (R) = Item was reverse coded. All newly created and added items were based on definitions by Allvin et al. (2013).

^a Items based on Allvin et al. (2013)

^b Items from Kossek et al. (2006)

^c Items from Morgeson and Humphrey (2006)