FINANCIAL REWARDS AND INTRINSIC MOTIVATION:

A SELF-DETERMINATION PERSPECTIVE

by

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ABSTRACT

The relationship between work motivation and rewards has long been considered in organisational studies, and yet literature examining the impact of extrinsic rewards on intrinsic motivation has remained largely inconclusive, showing evidence for both positive (crowding in) effects and negative (crowding out) effects. The aim of this research is to reconcile these important debates in the literature by considering the influence of several factors that can help explain the divergent findings. Drawing on self-determination theory, this study considers the role of autonomy, competence and relatedness need satisfaction in mediating the relationship between performance-continent rewards and intrinsic motivation. In addition, it further examines the role of two contextual factors (intrinsically-motivating job characteristics and managerial support) and one person-specific factor (individual causality orientations reflecting specific approaches to behaviour regulation) in moderating this relationship.

Quantitative survey data was collected from more than 800 participants working across a range of different industries in the UK, and several hypotheses were tested through structural equation modelling (SEM). Results show that performance-contingent pay is negatively related to employees' satisfaction with each of the three basic needs for autonomy, competence and relatedness, which, in turn, leads to decreased intrinsic motivation. In addition, results show that intrinsically-motivating job characteristics and individual causality orientations significantly moderate this relationship. These findings therefore deepen our understanding of the conditions in which intrinsic motivation is supported vs hindered by performance-contingent rewards, and suggest a means of reconciling key debates in the motivation literature. Furthermore, these results provide important implications for organisations relying on reward contingencies to motivate staff, drawing attention to alternative means of compensation that can effectively sustain intrinsic motivation.

Table of Contents

Table of Tables

Table of Figures

Author's declaration

I declare that, except where explicit reference is made to the contribution of others, that this dissertation is the result of my own work and has not been submitted for any other degree at the University of Glasgow or any other institution.

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CHAPTER 1

INTRODUCTION

The notion that compensation is a key function of any work organisation has been widely acknowledged in the management literature for several decades. Yet designing an effective compensation package that can successfully attract and motivate employees still poses a challenge for a large number of modern organisations. For example, many employers across the world are facing difficulties in recruiting and retaining workers in a competitive and globalised context (Biswas et al, 2017), which has brought increased attention to the design of effective reward systems in recent years (e.g. Antoni et al, 2015; Brown, 2014). In addition, the situation is further complicated by the fact that employment relationships themselves are undergoing significant changes (Pirson, 2017). It has been suggested, for instance, that the prospect of having a meaningful job and developing supportive relationships at work may now be even more important in determining individuals' choice of employment and in driving their performance, compared to financial security alone (e.g. Anchor et al, 2018; Gallie et al, 2018; Hu and Hirsh, 2017). The question that follows is what can organisations do, from a compensation perspective, to maintain their agility while at the same time attending to their employees' needs? What are the most effective ways to motivate employees? And what role do financial rewards play in this process? At present, these and other important questions remain contentious and largely unresolved, not least because existing empirical studies have yielded inconsistent findings showing mixed evidence for the motivational effect of extrinsic rewards.

Although remuneration has long been recognised as instrumental in supporting employees' work motivation and performance, more recent theoretical developments in behavioural economics (e.g. Frey and Jegen, 2001) and social psychology (e.g. Ryan and Deci, 2000) suggest that the relationship between financial rewards and different types of work motivation is more nuanced than previously understood. In particular, the motivational effect of payments provided for attaining specific levels of performance (known as performance-contingent rewards) has been disputed on the basis that such incentives tend to be perceived as controlling, and that they tend to undermine an individual's interest in the work itself, i.e. their intrinsic motivation (e.g. Gagné and Deci, 2005; Huffman and Bognanno, 2017; Pouliakas, 2010; Qian and He, 2018; Ryan et al, 1983). Nevertheless, the conditions under which the undermining effect occurs are currently not well understood. Furthermore, evidence for the positive effect of performance-contingent rewards in sustaining different

forms of employee motivation and driving higher levels of performance is equally ample (e.g. Burgess et al, 2010; Garbers and Konradt, 2014; Gerhart and Fang, 2015; Hennig-Schmidt et al, 2011; Stazyk, 2013).

This research seeks to reconcile the key debates in the motivation literature regarding the use of performance-related financial rewards and their impact on intrinsic motivation, and to uncover the specific circumstances under which incentives will sustain (or alternatively, diminish) intrinsically-motivated behaviour (Gneezy et al, 2011; Pokorny, 2008; Promberger and Marteau, 2013). Considering recent studies documenting the strong links between intrinsic motivation and job satisfaction (Raza et al, 2015), as well as between intrinsic motivation and high levels of performance in tasks that require personal investment and work engagement (Cerasoli et al, 2014), resolving these conceptual and empirical debates indeed becomes critical if organisations are to remain competitive in the long-term.

In order to better appreciate the importance of effective reward practice, the following sections consider the prevalence of performance-contingent rewards in the UK, before discussing in more depth the wider benefits of intrinsic work motivation for individuals and organisations alike. Then, the key debates surrounding the interaction between extrinsic rewards and intrinsic motivation are reviewed, followed by an account of the gap in the extant literature. The intended contribution to knowledge is outlined towards the end of this chapter, followed by a brief overview of the thesis structure.

1.1. Reward practice – incidence, financial investment and impact of performance-related rewards in the UK

The premise of using performance-related reward schemes is to encourage employees to meet and exceed specific performance targets (Condly et al, 2003), increase productivity (Lazear, 2000; Milkovich and Newman, 2017), and better align individual interests with organisational goals (Pulakos and O'Leary, 2011; Pulakos et al, 2015). The percentage of employees exposed to incentive pay schemes ranges from around 10% in European countries such as Portugal and Greece to over 40% in Scandinavian countries (Sweden and Finland) and the US (Bryson et al, 2012). The UK seems to be placed somewhere in between these figures. For instance, in studies using data from the 2011 Workplace Employment Relations Survey (WERS), almost a quarter of employees reported receiving some form of pay-for-performance at work (Bryson et al, 2017). The prevalence of performance pay seems to be stronger in the UK private sector, with nearly 27% of private sector employees rewarded on the basis of performance, compared to 7% in the public sector. This percentage gap,

however, seems to be explained by differences in the types of occupations prevalent in the two sectors, as it narrows considerably when comparing employees in the same occupation group (Bryson et al, 2017).

Such data is indeed significant, especially if we take into account the associated expenses linked with reward provision. Recent reports show that US organisations, for example, spend around $90 billion a year on reward and recognition programmes (Employee Benefits, 2019). In the UK, the actual budgets spent on employee compensation have not been estimated as such, although results from CIPD reward surveys (Marriott and Perkins, 2018) show that 97% of UK employers intend to make similar - if not higher - investments on staff benefits over the next two years, compared to investments made at the time of the survey. Some of the most frequently cited reasons for reward and recognition campaigns in the UK are to attract, recruit and retain employees to support current and future business needs; to promote work-life balance; and to motivate desired behaviours and performance (Marriott and Perkins, 2018) – although data on the effectiveness of such schemes in attaining these outcomes is rather difficult to come by.

In fact, despite the growing investment in reward programmes, and the envisioned increases in motivation and performance, the existing empirical literature has yielded inconclusive findings about the relative value of different reward schemes used in organisational settings and the different ways in which they impact organisational participants. One of the key criticisms of performance-related schemes, in particular, is that they tend to decrease individuals' satisfaction with the work itself - i.e. their intrinsic motivation, offering few chances for individuals to demonstrate their commitment to the task in the absence of such rewards (Ariely et al, 2009; Ryan and Deci, 2000). If this is the case, the implications are indeed quite significant, especially if we consider the many favourable outcomes associated with intrinsic motivation. The following section provides an account of the importance of examining intrinsic motivation in workplace contexts, before discussing current debates in the rewards literature.

1.2. The importance of intrinsic motivation

In setting the scene for this research, it is important to review the main reasons why organisations should be interested in understanding and supporting their employees' intrinsic motivation. For example, it has been suggested that employee motivation, regardless of its form, is closely linked to performance (e.g. Cerasoli et al, 2014). Yet the

impact of intrinsic motivation is not limited to increases in productivity and economic benefits. In fact, there is strong evidence to suggest that intrinsic forms of motivation are linked to additional positive outcomes such as increased mental wellbeing (Burton et al, 2006), higher creativity and innovation (Amabile, 1993; Fischer et al, 2019), and higher quality of performance (Cerasoli et al, 2016). In contrast, an excessive preoccupation with extrinsic rewards has been associated with lower psychological wellbeing (Ryan and Deci, 2000), high turnover intentions (Kuvaas et al, 2016), greater risk for deviant and unethical behaviour (Murphy, 2004), as well as disregard for unrewarded tasks (Osterloh, 2014). In addition, even when rewards do motivate behaviour, the effect is argued to be short-lived (e.g. Deci et al, 1999; Gubler et al, 2016), and, as individuals get accustomed to their compensation, increasingly higher rewards are required to maintain the same level of motivation over time.

Indeed, motivating individuals solely through the provision of external performance-contingent rewards and through monitoring their behaviours becomes a difficult exercise, not only for practical reasons (for example, it is difficult to imagine how an organisation could reward *all* activities leading to higher performance), but also because an exclusive focus on external rewards can lead to unintended consequences, as mentioned above. Nonetheless, extrinsic rewards are still very much part of organisational reality, and there are arguments to suggest that many employees will be *expecting* such rewards in recognition for their performance (Fang et al, 2013). It follows, therefore, that gaining an in-depth understanding of the ways in which extrinsic rewards can interact successfully with intrinsic motivation is critical for leveraging the best possible outcomes for both individuals and the organisation. Current empirical research in the field, however, shows that it is not clear whether, and under which circumstances, extrinsic rewards are effective in sustaining – or at the very least not harming - intrinsic motivation.

1.3. Debates around extrinsic rewards and intrinsic motivation and gap in the literature

Over the years, different theoretical perspectives have been invoked in an attempt to explain the key sources of motivation, and the ways in which financial rewards act as effective drivers of specific behaviours. Nevertheless, the assumptions of these theories differ according to the type of motivation they target (i.e. extrinsic, intrinsic or total motivation), and whether they consider extrinsic and intrinsic motivation as interactive (denoting negative effects whereby external rewards diminish intrinsic interest) or additive (denoting

positive effects whereby external rewards reinforce intrinsic interest). To better situate the focus of this thesis in the extant motivation literature, this section will briefly review each of these perspectives.

Perspectives that view motivation as a unitary phenomenon – for example, reinforcement theory (Skinner, 1953) and expectancy theory (Vroom, 1964) – are generally concerned with predicting increases in the amount of motivation as a whole, rather than understanding nuances in the quality of motivation and the intrinsic-type stimuli that drive behaviour. According to Frey and Jegen (2001), the reasons for discounting intrinsic motivation are varied, for instance the fact that it is difficult to distinguish and separate an individual's intrinsic motivation from their total motivation to perform. In addition, in contrast with extrinsic motivation, which is relatively easy to control and influence, it is much more difficult to design an incentive system to regulate intrinsic motivation (Frey and Jegen, 2001). Nevertheless, the fact that this stream of motivation literature does not distinguish between different sources of motivation is problematic given that not all human behaviour is driven by extrinsic factors. According to Fehr and Falk (2002, p.688), "powerful non-pecuniary motives like the desire to reciprocate or the desire to avoid social disapproval, also shape human behaviour". In consequence, if researchers choose to neglect these motives, they may fail to understand not only the role of intrinsic motivation in shaping behaviour, but also the full impact of economic incentives on motivation and performance.

A different stream of literature suggests that extrinsic rewards can indeed relate in important ways with intrinsic motivation. On the one hand, perspectives such as cognitive evaluation theory (Deci, 1975) and motivation crowding theory (Frey and Jegen, 2001) assume that performance-contingent rewards can be especially harmful to intrinsic motivation. For instance, such interventions are argued to be experienced as highly controlling and to prompt behaviour to be pursued for external reasons (such as receiving the reward) rather than for the self-determined interest in the task itself (e.g. Calder and Staw, 1975; Deci, 1971; Lepper et al, 1973). On the other hand, evidence for the positive effect of external interventions on intrinsic motivation (the crowding in effect) has also been documented in the management literature (e.g. Jacobsen and Andersen, 2017; Jacobsen et al, 2014; Pedersen, 2018). What this implies is that performance-related rewards may not be as detrimental as suggested by advocates of the undermining effect.

How can we reconcile these conflicting views? What are the key considerations currently missing in the literature that prevent us from explaining these mixed results? In answering

these questions, I argue that one overriding weakness of extant research has been a failure to consider the effect of extrinsic rewards 'in context'; i.e. to take adequate account of the specific organisational and individual-level factors that play a role in the motivation process and influence how external rewards are perceived. The lack of research in this area is particularly concerning given that the relationship between organisational rewards and intrinsic work motivation does not operate in isolation from these factors. For example, contextual factors such as job design characteristics and managerial support have been found to play an important role in facilitating different forms of employee motivation (Baard et al, 2004; Hackman and Oldham, 1976; Moreau and Mageau, 2012; Olafsen et al, 2015; Williams et al 2014), and yet the impact of such factors on the relationship between extrinsic incentives and intrinsic motivation is currently not well understood.

Moreover, the impact of individual differences in this relationship is equally important, because even within the same culture or the same organisation, people will interpret external interventions differently (Jacobsen et al, 2014). Individual biases, subjective preferences, value orientations and personality traits may indeed affect how different rewards are perceived. Nevertheless, only a very limited number of studies to date have considered the impact of personal characteristics on the relationship between extrinsic rewards and motivation (e.g. Alexy and Leitner, 2011; Hagger and Chatzisarantis, 2011), and still very little is known about the psychological processes that mediate this impact. In spite of continued calls for research to address this gap (e.g. Gerhart and Fang, 2015; Gneezy et al, 2011; Pokorny, 2008; Promberger and Marteau, 2013), extant literature is still limited in identifying the key moderating factors that can help explain the divergent findings.

In order to address this gap, this study draws on the assumptions of self-determination theory (SDT), which offers an important framework for reconciling the controversial state of the literature. In contrast to alternative perspectives which have generally failed to consider the background factors impacting reward perceptions, SDT stands critical in two important respects. First, the theory informs us of an important underlying mechanism mediating the relationship between financial rewards and intrinsic motivation: the satisfaction with three basic psychological needs for autonomy, competence and relatedness. Second, SDT assumes that contextual and individual-level factors which facilitate need satisfaction can also help moderate the undermining effect of financial rewards, allowing individuals to become more attuned to the positive, competence-affirming message implied by performance-related reward interventions. Nonetheless, these theoretical postulations have remained largely untested in the extant rewards literature, hence the contribution of the present thesis.

1.4. Research aim and objectives

The aim of this research is thus to provide a more complete and nuanced understanding of the relationship between performance-contingent financial rewards and intrinsic work motivation, by simultaneously examining the key socio-contextual and individual-level factors affecting this relationship, and by considering the mediating role of basic need satisfaction in this process.

Research question:

To what extent do socio-contextual factors and individual-level factors jointly influence the relationship between performance-contingent financial rewards and intrinsic work motivation?

Research objectives:

1. To examine the relationship between performance-contingent rewards and intrinsic motivation in organisational settings;

2. To investigate the mediating role of basic need satisfaction in the relationship between performance-contingent rewards and intrinsic motivation;

3. To advance an understanding of how job characteristics, managerial support and individual differences can act as moderators to the relationship between performance-contingent rewards and basic needs satisfaction;

4. To examine the role of socio-contextual and individual-level factors affecting both basic need satisfaction as well as different forms of work motivation.

1.5. Intended contribution of the study

The value of this thesis lies in identifying specific factors that can influence – and better explain - the relationship between extrinsic rewards and intrinsic motivation. To the best of my knowledge, this is the first study to date to consider the *joint* contribution of contextual and individual factors in moderating the undermining effect of performance-related rewards. This study thus brings attention to the underlying mechanisms that mediate the link between external rewards and intrinsic motivation – i.e. the satisfaction with the needs for autonomy,

competence and relatedness, as well as the particular organisational and individual-level factors which can further impact reward perceptions.

Regarding this study's contribution to practice, having an enhanced understanding of the circumstances when performance-contingent incentive schemes will lead to a positive (as opposed to negative) effect on feelings of autonomy, competence, and relatedness at work – and implicitly on intrinsic motivation, can help organisations become more selective in using such schemes, with the ultimate goal of increasing organisational performance, as well as reducing costs related to deviant behaviour, absenteeism and turnover.

1.6. Thesis structure

In chapter 2, I first present an overview of the key definitions and classifications of extrinsic and intrinsic motivation, before critically reviewing the extant literature showing evidence for both a negative (crowding out) effect of extrinsic rewards on intrinsic motivation, as well as a positive (crowding in) effect. I discuss how these inconsistencies prevent us from drawing any strong conclusions regarding the motivational effect of extrinsic rewards, both in general experimental settings as well as work-related settings. Then, I review key theoretical perspectives that have been put forward to explain the divergent effects, including the self-perception theory and motivation crowding theory, and show how these perspectives are currently limited, and fail to provide us with sufficient depth of understanding regarding the interplay between extrinsic rewards and intrinsic motivation.

In chapter 3, I discuss in depth the assumptions underlying self-determination theory, and show how these assumptions offer opportunities to settle the main debates in the rewards literature. Several significant contributions of SDT are discussed in depth, including the self-determination continuum of motivation, as well as the notion of basic need satisfaction and behaviour internalisation. This is followed by a review of the literature on the key socio-contextual and individual-level factors argued to affect intrinsic motivation, and a discussion of performance-related financial rewards in the context of SDT. The conceptual model of the thesis is then introduced, and several hypotheses are put forward.

Chapter 4 discusses the research design of the study and the role of positivism as a key research philosophy that has shaped the direction for data collection and analysis. The chapter presents the development of the questionnaire that was used for data collection, and several key considerations in relation to sampling and sampling strategy. Decisions related

to the recruitment of participants through Qualtrics opt-in research panels are then reviewed, along with the main stages of questionnaire administration following best practice recommendations in online survey research.

The main steps in data analysis are then presented in Chapter 5, starting with measures for ensuring the robustness of data, including checking for unengaged participants and outliers, and testing for the normality of data, the linearity of relationships and for multicollinearity. Results of tests for internal consistency are also reported, before presenting the outcome of exploratory and confirmatory factor analysis. In the remainder of the chapter, I discuss the development of several structural equation models that serve as a basis for hypothesis testing. Specifically, I first examine the influence of performance rewards on basic need satisfaction in the absence of contextual and person-specific moderators, so as to determine the direct relationship between these variables. Then, I consider the individual effect of each of the proposed moderators, before combining them into a single, final test model that is used as a key point of reference for the discussion of findings.

In chapter 6, I provide a critical discussion of the results of this study, making explicit links with previous literature, as well as showing the important ways in which my research advances our present understanding of reward effects. In particular, I explain the direct influence of performance-related rewards on feelings of autonomy, competence and relatedness, before reviewing how these relationships change across different job settings and for individuals with specific causality orientations. The chapter then discusses the direct links between need satisfaction and different forms of motivation, as well as the motivational effect of supportive workplace factors and individual differences.

Finally, Chapter 7 summarises the general conclusions of this study, and discusses the key implications for both theory and practice. In addition, it outlines the limitations of this research, particularly in light of its cross-sectional design and the use of single-source, self-reported data. The chapter ends with proposing several directions for future research, including, for example, testing for additional moderators in new research contexts, and the use of experimental data to gain confidence in the causal nature of the relationships examined in this study.

1.7. Conclusion

This chapter has introduced the rationale for the study, related to several inconsistencies in the reward literature. It has then reviewed evidence for the extensive use of performance-contingent rewards the in the UK, and has discussed the positive impact of intrinsic motivation in relation to both individual and organisational outcomes. The main limitations and gaps in the current literature have then been considered, followed by an account of the important ways in which my thesis aims to address shortcomings of existing studies whilst also having significant practical implications.

CHAPTER 2

EXTRINSIC REWARDS AND INTRINSIC MOTIVATION: A CRITICAL REVIEW OF THEORY AND EVIDENCE TO DATE

2.1. Introduction

The concepts of motivation and rewards have been at the centre of organisational studies for several decades, and yet, interest in motivation research is as pronounced as ever. The questions of how to effectively motivate employees and what rewards to administer under what circumstances are still largely left unanswered by studies yielding inconsistent findings and not taking account of the very specific organisational and individual-level factors that play a role in the motivation process. This chapter reviews the extant literature on the relationship between organisational rewards and work motivation, and begins by considering the definitions and classifications of the two concepts. It then discusses the existing empirical evidence on the positive and negative consequences of external interventions on intrinsic motivation, and the main theories that have been used to explain the psychological mechanisms underlying these contrasting effects. A critique of why these theoretical perspectives are currently deficient is further advanced, ultimately highlighting the need of a new framework to be employed in the study of reward interventions.

2.2. The nature of motivation and rewards

2.2.1. General definitions

In management studies, motivation is generally understood as "the set of energetic forces that originate both within as well as beyond an individual's being, to initiate work-related behaviour, and to determine its form, direction, intensity, and duration" (Pinder, 1998; p.11). While variations of this definition do exist (see Kleinginna and Kleinginna, 1981 for a review of classifications emphasising different aspects of motivation in different disciplines), Pinder's definition appears to offer one important advantage over alternative conceptualisations. Central for the premise of the current study, Pinder acknowledges behaviour to be driven not only by inner processes such as individual needs and intentions, but also by external factors "beyond an individual's being" - for instance organisational reward systems or the nature of the work itself (Ambrose and Kulik, 1999). This definition therefore accepts that motivation cannot be studied without consideration of the context in which it occurs and in fact, it points to the idea that motivation results at the interaction

between the individual and the environment (Latham and Pinder, 2005). In addition, the 'form', 'direction', 'intensity' and 'duration' dimensions of this definition are consistent with earlier conceptualisations (e.g. Beck, 1978; Hall, 1961; Locke et al, 1981) - recognising important issues in our understanding of motivation, including the different types and manifestations of motivation (form); the specific goals which motivated energy aims to attain (direction); the differences in the magnitude (intensity) of motivation; and the level of persistence (duration) involved in sustaining motivation over time. In consequence, given its comprehensiveness and its extensive use in theoretical and empirical research (e.g. Battistelli et al, 2013; Gerhart and Fang, 2015; Meyer et al, 2004), Pinder's conceptualisation will be used as the working definition of motivation in the present thesis.

Work rewards have likewise been defined in various ways over the years, for example as "the intrinsic and extrinsic benefits that workers receive from their jobs" (Mottaz, 1986, p.360); "the monetary, non-monetary and psychological payments that an organisation provides for its employees in exchange for a bundle of valued work-related behaviours" (Bratton and Gold, 2007, p.364), or, following a more general perspective, as "everything that employees value in the employment relationship, i.e. everything an employee gets as a result of working for the company" (Davis, 2007). An important point which is common to all these definitions is that rewards refer not only to tangible monetary returns such as financial compensation, but may also include symbolic non-cash awards, intangible rewards such as recognition, praise and promotion opportunities, as well as rewards that the organisation may provide indirectly, such as a stimulating work environment and supportive social relationships with colleagues and supervisors.

Moreover, the criteria for reward provision are equally varied, with some people being rewarded for their role regardless of their performance (also known as 'task-noncontingent rewards' such as benefits and base salaries), while others receiving rewards that are contingent on engagement with- or completion of certain tasks (also known as 'task-contingent rewards' such as piece-rate systems), or alternatively, conditional on attaining a certain standard of performance (also known as 'performance-contingent rewards' such as performance bonuses or merit pay systems) (Ryan and Deci, 2018). To this we can add considerations related to the timing of rewards (e.g. performance-contingent pay being provided on a regular vs ad hoc basis), intensity of rewards (e.g. the size of the payment itself) and whether rewards should be offered for individual, group or organisational performance, with various end goals envisioned by each strategy (Gagné and Forest, 2008).

Indeed, there is no easy way to group together the diversity of rewards typically provided in an organisational context, the consequences of which will be discussed in more depth in the subsequent sections of this chapter. For now, however, it is important to clarify that while rewards are generally acknowledged to serve several purposes in the organisation, from attracting employees at the right times for the right jobs, to motivating individuals, and retaining key performers by acknowledging their contribution and performance (Shields et al, 2015), the focus of this thesis will be on the *motivational function* of rewards; that is, the role of rewards in eliciting work effort and task performance. This is primarily because the main aim of this thesis is to shed light on the theoretical and empirical inconsistencies in the *rewards – motivation* literature specifically. At the same time, the strong links between motivation, performance and employee retention have already been well documented in the literature (e.g. Kuvaas et al, 2016; Thibault Landry et al, 2019). What this implies is that gaining a better understanding of the ways in which rewards affect employee motivation may indeed be an important first step in addressing questions related to retention and performance as well. In order to better appreciate the motivational function of rewards, the next section considers the most common classification of rewards and motivation – the intrinsic/extrinsic dichotomy.

2.2.2. Classifications of rewards and motivation – the intrinsic/extrinsic dichotomy

To date, the most common approach for distinguishing between different types of rewards and motivation is through the intrinsic/extrinsic dichotomy. In earlier decades, scholars have relied on different criteria to define intrinsic and extrinsic rewards and predict how they lead to corresponding forms of intrinsic and extrinsic motivation. As summarised in the work of Guzzo (1979), definitions can be grouped by considering whether intrinsic and extrinsic rewards, respectively:

a) are directly related to the task vs derived from the environment, a.k.a. the reward-environment relationship (e.g. Herzberg, 1966; Saleh and Grygier, 1969);
b) are ends in themselves vs means to an end, a.k.a. the activity-reward relationship (e.g. Deci, 1971);
c) are self-mediated vs provided by an external agent, a.k.a. the social mediation perspective (e.g. Deci, 1972); and/or
d) fulfil ‘higher order’ vs ‘lower order’ needs, a.k.a. the need fulfilment function of rewards (e.g. Lawler, 1969; Slocum, 1971).

Starting with the reward-environment relationship, Herzberg (1966) distinguishes between "motivator" (intrinsic) factors that are related to the content of the work itself (and the worker's relationship to it), and "hygiene" (extrinsic) factors which are related to the surrounding context of the job. Motivator factors include responsibility, autonomy in doing the work, and satisfaction arising from the accomplishment of difficult tasks. In contrast, hygiene factors include wages, security, and general working conditions, which are said to operate primarily as *de-motivators* if they are insufficient. This is consistent with the perspective of Saleh and Grygier (1969, p.446), who define intrinsic factors as "those directly related to the actual performance of the job" and extrinsic factors as "those related to the environment in which the job is being performed".

Following the activity-reward relationship, on the other hand, Deci (1971, p.105) argues that "one is said to be intrinsically motivated to perform an activity when one receives no apparent reward except the activity itself", while extrinsic motivation requires the performance of an activity because it leads to some separate external outcomes such as status and approval. Deci (1972) then adds another dimension to this definition, adopting the social mediation perspective. Specifically, Deci (1972) argues that extrinsic rewards are "mediated outside of the person" (p.217), i.e. they are provided by an external agent, while intrinsic rewards are self-administered and "mediated by the person himself" (p. 219). Examples of externally-mediated rewards include, for example, monetary incentives, non-cash benefits and promotion opportunities, whereas self-mediated rewards include feelings of satisfaction and self-esteem resulting from successful performance in a challenging task.

Still others (e.g. Lawler, 1969; Slocum, 1971) distinguish rewards on the basis of the different needs they fulfil. This classification draws from Maslow's (1943) theory of motivation which ranks human needs in an ascending order of importance, starting with lower-order physiological needs (e.g. food, water, shelter), advancing to safety needs (e.g. need for security), belongingness needs (e.g. the need to be part of a community) and ego needs (e.g. the need for self-esteem), and culminating with an individual's need for self-actualisation. Although Maslow did not explicitly include a discussion on rewards in this theory, his work provided grounds for researchers to classify extrinsic rewards as those that satisfy lower-level needs such as physiological and safety needs, which provide the basis for extrinsic motivation, and intrinsic rewards as those that satisfy higher-order needs such as self-esteem and self-actualisation (e.g. Lawler, 1969; Slocum, 1971), which provide the basis for intrinsic motivation.

A major problem with these different criteria for the classification of intrinsic and extrinsic rewards and motivation is that the corresponding definitions are not always compatible with one another, particularly considering inconsistencies between the reward-environment relationship and the social mediation perspective (e.g. Dyer and Parker, 1975; Guzzo, 1979; Kanungo and Hartwick, 1987). For instance, it is not difficult to find examples of work rewards that are self-administered (and therefore, intrinsic) but not necessarily directly associated with a particular task (and therefore, extrinsic) (Kanungo and Hartwick, 1987). Feelings of self-esteem, for example, may certainly be directly derived from successful performance in a project at work and are indeed self-mediated, but they may equally be related to the wider context of the job, such as the self-esteem stemming from advancing to a position of higher responsibility or working for a well-known organisation. On the contrary, other work rewards that are administered by others (and therefore, extrinsic) may be directly connected to one's activities (and therefore, intrinsic). Following the social mediation perspective, recognition for one's performance in a task will clearly trigger extrinsic motivation, as it can only be provided by an external agent. Nevertheless, because it is also directly related to the activity in question rather than the wider environment of the job, it can equally be viewed as an intrinsic factor. The implication is that the social mediation perspective and the reward-environment relationship are conflicting foundations for distinguishing between intrinsic and extrinsic rewards, with researchers questioning their theoretical and practical use in predicting corresponding forms of intrinsic and extrinsic motivation (e.g. Broedling, 1977; Kanungo and Hartwick, 1987).

Further, arguments have been made that it is similarly inadequate to maintain that activities can become ends in themselves and that they can be pursued for no apparent reward other than the task itself (e.g. Berlyne, 1971; Guzzo, 1979; Stroebe and Frey, 1982). According to Berlyne (1971, p.13 – as cited in Deci, 1975, p.23), "an activity cannot in any meaningful sense reinforce itself, but rather, what it can do is bring about certain internal consequences" that the individual perceives as rewarding. Even though these consequences are private, invisible or intangible, we still cannot ascertain that the activity will be pursued without any consideration to these rewards (Guzzo, 1979). As such, a more complete and meaningful definition was needed to take account of the internal mechanisms predicting intrinsic motivation (Deci, 1975).

Finally, the need-fulfilment function of rewards has received pronounced criticism, on the basis that there is no definite limit between lower-level and higher-level needs, thus hindering any assumptions about which need level a reward can serve (Whittington and Evans, 2005). An illustrative example in this sense is the classic study by Dyer and Parker (1975) where participants who were asked to categorise different motivators as *either* intrinsic or extrinsic labelled respect of fellow workers as an extrinsic reward (perhaps more in line with the social mediation perspective), even though this could be considered as satisfying the higher order need of self-esteem. In addition, they classified other factors, such as the use and development of one's skills, inconsistently as both intrinsic and extrinsic – further questioning the validity of need levels as a basis for the intrinsic/extrinsic dichotomy. Additionally, researchers such as Lawler (1971) suggested that rewards can actually satisfy more than one need of the individual. Money, for example, can certainly be considered an extrinsic motivator, as it helps fulfil lower-level physiological needs, but at the same time, the acquisition of money also serves a symbolic function (Long and Shields, 2010), enhancing an individual's feelings of achievement and self-esteem. Another example is verbal praise, which satisfies not only lower-level belongingness needs, but also ego needs and self-actualisation (Guzzo, 1979). Because these incentive effects are not unique to a single need level, the need-fulfilment model has been criticised as being too simplistic to allow for a clear-cut grouping of different reward types (Guzzo, 1979).

With a view of resolving this conceptual debate, a more robust definition of intrinsic and extrinsic motivation was put forward by Deci and Ryan who view intrinsic motivation as "doing something because it is inherently interesting or enjoyable" (Ryan and Deci, 2000, p.55), whereas extrinsic motivation refers to doing something for reasons "other than an interest in the activity itself" (Deci and Ryan, 1985a, p.35). Extrinsic rewards, it follows, are those valued outcomes that are separate from feelings of satisfaction with the task itself, regardless of whether or not they are externally mediated. Intrinsic rewards, on the other hand, are not only connected to the activity itself rather than the wider context of the task (as suggested by Herzberg (1966)), but they actually involve a degree of "*interest and enjoyment"* for the activity in question (Deci and Ryan 1985a, p.34). This definition thus addresses previous criticisms regarding the idea that an activity cannot, on its own, reinforce itself (e.g. Berlyne, 1971), by acknowledging that it is the experience of being interested in and enjoying the task at hand that energises behaviour. In addition, while recognising that intrinsic motivation will be inherently autonomous and self-mediated (as feelings of interest and satisfaction are by default internal to the individual), this definition does not necessarily attribute extrinsic motivation to an external source, in other words accepting that extrinsic

motivation such as performing a task to boost one's self-esteem may indeed be internalised. As Deci and Ryan's theorisation addresses previous conceptual inconsistencies, and given that it has also been widely used in more recent motivation research (e.g. Amabile, 1993; Deci et al, 2017; Gagné and Deci, 2005; Gerhart and Fang, 2015; Ryan and Deci, 2000), it is this conceptualisation of the intrinsic / extrinsic dichotomy that will be used in the present thesis.[1]

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Having defined the constructs central to the present study, the next section of this review introduces the literature on the interaction between extrinsic rewards and intrinsic motivation. The study of this interaction is important because while intrinsic motivation does not require the presence of external incentives (as seen from the above definitions), the provision of monetary payments, as well as non-cash tangible rewards and feedback is still an important part of organisational reality that cannot be ignored. The question therefore arises whether intrinsic motivation and extrinsic rewards will work additively (i.e. in support of one another) or interactively (i.e. in opposition to one another), and what consequences can be expected regarding work outcomes such as performance and individual well-being. The current state of the literature, however, is far from being clear in this regard and, in fact, strong evidence for both a positive and a negative effect of extrinsic rewards on intrinsic motivation has been accumulating over the years. To critically examine both the additive and the interactive perspective, this review will draw on economics, psychology and management research, i.e. the main disciplines concerned with the study of human motivation and behaviour.

2.3. The relationship between performance pay and intrinsic motivation

As noted above, the extant literature on the relationship between extrinsic rewards and intrinsic motivation is, at the moment, rather inconclusive. While a large body of research points out that extrinsic rewards tend to undermine intrinsic motivation (Bellé, 2015; Deci et al, 1999; Georgellis et al, 2011; Jacobsen et al, 2014), the contrasting notion that extrinsic rewards can actually enhance intrinsic motivation has also gained empirical support in several recent studies (Kampkötter, 2017; Liu and Tang, 2011; Stazyk, 2013). The following

[1] I admit, however, that not all empirical studies reviewed in the subsequent sections of this chapter used the same operationalisation of extrinsic and intrinsic motivation. Where relevant, clarification of differences in the measurement of these constructs will be made explicit.

sub-sections of this chapter provide a critical review of the empirical evidence in favour of each perspective.

2.3.1. Evidence for the undermining effect

The undermining effect of extrinsic rewards on intrinsic motivation (also referred to as the 'motivation crowding out' effect) has been reported in a variety of settings, for instance in relation to altruistic behaviour and charitable donations (e.g. Newman and Shen, 2012; Titmuss, 1970), volunteering efforts (e.g. Frey and Götte, 1999; Reeson and Tisdell, 2008), performance in creative and interesting tasks[2] (e.g. Calder and Staw, 1975; Deci, 1971; Lepper et al, 1973), as well as in relation to work motivation and performance, both in the private and the public sectors (Bellé and Cantarelli, 2015; Georgellis et al, 2011; Jordan, 1986; Kuvaas, 2006; Markova and Ford, 2011; Pouliakas, 2010). While the effect has been documented mostly in laboratory experiments (e.g. Deci, 1971; Gneezy and Rustichini, 2000a; Heyman and Ariely, 2004; Reeson and Tisdell, 2008), observations from secondary data (e.g. Georgellis et al, 2011; Pouliakas, 2010; Titmuss, 1970), field experiments (e.g. Gubler et al, 2016; Huffman and Bognanno, 2017) and surveys (e.g. Huang et al, 2014; Kuvaas, 2006) have generated further evidence in support of the undermining effect. Negative outcomes were observed predominantly in the case of providing monetary rewards contingent on engagement with specific tasks (e.g. Frey and Götte, 1999) or attaining certain levels of performance (e.g. Gneezy and Rustichini, 2000b), however non-cash incentives were sometimes found to have comparable effects (e.g. Kruglanski et al, 1971; Newman and Shen, 2012). In the majority of these studies, intrinsic motivation was measured through self-reports of satisfaction with the task itself, differences in performance levels across different reward conditions, or through the 'free choice' method, whereby the time spent on unrewarded tasks for which rewards had initially been provided was regarded as a proxy for intrinsic interest. The following review begins with an account of studies documenting the crowding out effect in general (non-organisational) settings, and then moves towards a more focused discussion of the effect of financial rewards on intrinsic motivation at work.

2.3.1.1. Review of the empirical 'crowding out' literature in non-work settings

In one of the earliest studies in support of the motivation crowding out effect, Titmuss (1970) examined the blood donation system in the UK, the US and the Soviet Union and argued

[2] Following Weibel et al (2010), in this thesis interesting tasks are defined as those that are "challenging, enjoyable and/or purposeful" (p.390).

that paying for blood donations could have negative consequences regarding the supply of blood donors, the quality of donations, as well as individuals' altruistic reasons for donating blood. Titmuss's (1970) assumptions were initially criticised for lacking strong empirical support, however recent studies examining the consequences of incentivising charitable actions such as blood donations seem to support the idea that intrinsic altruistic motives are crowded out by extrinsic incentives, particularly through the provision of *cash* incentives, as opposed to vouchers of the same nominal value (e.g. Lacetera and Macis, 2010). Moreover, research on external interventions for other cases of charitable donations brings further evidence in favour of the undermining effect. Meier (2007), for instance, showed that interventions such as matching charitable giving by an external party increases donations for the period in which the matching is offered, however the effect is short-lived, and what is more, if the matching is removed, people's willingness to contribute decreases below the original level. Similarly, Newman and Shen (2012) investigated the effects of thank-you gifts on charitable giving and found that offering such incentives also tends to reduce charitable donations, regardless of the perceived desirability and value of the gift or the degree of participants' familiarity with the charity organisations, an indication of the pervasiveness of the effect.

A similar effect is reported in relation to volunteering and civic spirit, where research by Frey and Götte (1999) shows that paying volunteers for their work reduces their volunteering efforts by approximately four hours per month compared to a group which received no payment. Frey and Oberholzer-Gee (1997) similarly found that financial incentives can have a detrimental impact on individuals' willingness to accept a nuclear waste repository being built in their community, while Gneezy and Rustichini (2000a) showed that introducing a fine for parents who were late in picking up their children from an Israeli day care centre actually led to a significant increase in the number of late-coming parents. As the relationship between parents and teachers changed from a non-monetary to a monetary one, the explanation that has been put forward to describe such effects is the parents were able to justify their behaviour through the fact that they are 'paying' for the extra time that teachers would spend with their children (Frey and Jegen, 2001). In addition, in a different experiment involving the collection of public donations, Gneezy and Rustichini (2000b) revealed that high-school students who were promised no payment raised more money than students who were promised performance-contingent rewards comprising of a certain percentage (either 1% or 10%) of the amount collected. In a similar vein, Heyman and Ariely (2004) examined students' likelihood to help with a move and showed that monetary

incentives (as opposed to no payments or payments in the form of gifts) often diminished the perception of the interaction as social and in turn reduced the amount of help provided.

The crowding out effect, furthermore, is reported in relation to persistence and performance in interesting, creative or complex tasks, i.e. tasks that are not necessarily altruistic or prosocially oriented, but which are nevertheless intrinsically motivating. In a now classic experiment by Deci (1971), undergraduate students were invited to work on an interesting puzzle in three sessions over three different days. While half of the students received $1 for each puzzle completed in session 2 (the experimental group), the other half received no payment at all (the control group). For a period of eight minutes during each session, the experiment was 'paused' and students were free to do whatever they wanted, including solving more puzzles, reading magazines or doing nothing at all. Intrinsic motivation was measured as the amount of time students spent on solving the puzzle during this free choice period. As predicted, compared to the control group, students in the reward group spent more time working on the puzzles in session 2 compared to session 1, but significantly less time in session 3, when the reward was removed.

Comparable undermining effects were then reported in a large number of subsequent experiments involving pre-school children, high school students or university students, particularly in the case where the rewards provided were either task-contingent or performance-contingent (e.g. Calder and Staw, 1975; Deci, 1972; Gneezy and Rustichini, 2000b; Greene and Lepper, 1974; Greene et al, 1976; Harackiewicz, 1979; Kruglanski et al, 1971; Lepper and Greene, 1975; Lepper et al, 1973; Pinder, 1976; Pritchard et al, 1977; Ross, 1975). To give just a few examples, Kruglanski et al (1971) found that compared to a control group, high-school students involved in memory tasks and creative tasks showed decreased performance and lower levels of self-reported enjoyment of the activities when they were promised an extrinsic task-contingent reward, even though the reward was non-monetary (a visit around the university campus where the experiment was conducted). Similarly, Lepper et al (1973) conducted a study with preschool children who showed base-line interest in a drawing activity and who were asked to perform the activity either with the expectation of receiving a certificate or without any promises of receiving extrinsic rewards. Consistent with previous findings, students in the expected-award condition showed lower levels of interest in the drawing activity compared to groups that had no knowledge of the certificate until after they had finished the activity, or groups that did not receive the award at all. Furthermore, in a set of experiments by Gneezy and Rustichini (2000b), undergraduate students who were paid a small amount of money for each correct answer on an IQ test

performed more poorly compared to those who received no payment (although performance did improve for those who were paid a larger amount) – overall indicating that it may be more advisable not to pay at all than rely on small incentives for improving performance.

In spite of the breadth of experimental evidence in support of the motivation crowding out hypothesis, studies such as the ones reviewed above have been critiqued as not being applicable to organisational settings. Deci's work incurred criticism particularly regarding his measure of intrinsic motivation during the 'free choice' period after the reward was removed. According to Fehr and Falk (2002), changes in time spent doing an activity can be interpreted in different ways, including, for instance, being disappointed with the monetary rewards being removed. The disappointment effect can be quite powerful when people think that they are entitled to a reward but do not receive it, and thus, they may reduce their time spent on the activity not because of their intrinsic motivation being crowded out, but rather because of loss aversion (Fehr and Falk, 2002). In the workplace, however, such a situation where rewards are administered and then quickly removed is rather rare, and as a result, experimental studies have been criticised for lack of external validity. In addition, when Deci collected self-reported measures of intrinsic motivation, he showed that both the control group and the experimental group reported high levels of enjoyment of the tasks not only before the provision of rewards, but after their removal, too. While this serves to show that the experimenters were right in assuming that solving the puzzle would be sufficiently interesting in itself to trigger intrinsic motivation, the discrepancy between the behavioural measure and the self-reported measure of intrinsic motivation casts further doubt on the validity of this experimental research (Fehr and Falk, 2002).

Furthermore, while the undermining effect of extrinsic rewards may indeed occur for highly interesting activities, this effect is arguably less prominent in organisational settings, where employees typically perform a range of interesting as well as non-interesting tasks. Similarly, while providing incentives for tasks which are not normally incentivised (including puzzles, drawing activities and altruistic donations) may indeed cause a cognitive shift and signal that the activity is not worth pursuing in the absence of rewards, the situation is likely to be different in settings such as work organisations where payment is the norm (Fehr and Falk, 2002). Additionally, the majority of the studies cited above were carried out with students or children, who were arguably more susceptible to the motivation crowding out effect (Kohn, 1993), as their ability to rationalise the receipt of rewards is not completely developed. Adults, on the other hand, are said to have a different response to extrinsic incentives, and indeed to expect such incentives in employment settings, which again

suggests that the results of previous experiments may not to be directly applicable to management research. Nevertheless, as will be noted below, studies carried out in organisational contexts continued to report mixed findings regarding the impact of financial rewards on intrinsic work motivation, indicating that new theoretical insights are needed to account for such effects.

2.3.1.2. Review of the empirical 'crowding out' literature in organisational settings

In organisational settings, evidence for the undermining effect has attracted considerable debate regarding the effectiveness of using extrinsic incentives at work, and, consistent with previous research by Deci (1971), there are studies to suggest that performance-contingent rewards are particularly detrimental to intrinsic work motivation. While it remains certain that earning money is a basic premise for people in employment, and that rewards will always be present in the employment relationship in some form (e.g. general wages, promotion opportunities, non-cash awards etc.) (Jacobsen, 2012), performance-contingent rewards have been critiqued for their 'hidden costs' - in particular for their negative effects on feelings of satisfaction with the work itself (the motivation crowding out effect), their 'spillover effects' (negative impact on related behaviours that were not initially targeted by the incentive scheme) and for encouraging goal displacement (such as exclusively focusing on rewarded behaviours and ignoring important but unrewarded tasks) and 'gaming behaviour' (which refers to individuals manipulating the system so that they are sure to obtain the predicted rewards, sometimes through unethical means).

In line with the research objectives of this study, this review focuses mainly on the motivation crowding out effect, examining studies using different proxies for intrinsic motivation, including but not limited to, time spent at work (e.g. Markova and Ford, 2011), task performance (e.g. Huffman and Bognanno, 2017; Kuvaas, 2006), satisfaction with the work itself (e.g. Pouliakas, 2010), intended work efforts (e.g. Bellé and Cantarelli, 2015) and quality of performance (e.g. Qian and He, 2018). These measures were chosen partly due to difficulties in measuring intrinsic motivation through means other than quantitative surveys, however the advantage of using these alternative methods is that the results of these studies can - at least in some cases - be directly compared against findings of previous experimental work in non-organisational settings (e.g. Deci (1971) vs Huffman and Bognanno (2017)). In addition, some of these methodologies and research contexts can be easily matched with studies finding evidence for the *crowding in* effect (e.g. Qian and He (2018) vs Hennig-Schmidt et al (2011)), indicating that differences in results cannot - at least

not entirely - be attributed to differences in methodologies and operationalisation issues. Alternative explanations for discrepancies in results, as well as an in-depth discussion of the theoretical reasons why performance-contingent incentives have differential effects from non-contingent rewards will be provided in the subsequent sections of this chapter. For now, however, let us consider the existing empirical evidence in support of the undermining hypothesis in typical workplace settings.

Starting with early research, Jordan (1986) was one of the first studies to show that the mere expectation of receiving performance-contingent rewards was associated with lower intrinsic motivation for a group of US health care technicians, even without them knowing the specific value of bonuses to be received. Consistent results were then reported in more recent studies, for example by Markova and Ford (2011) who surveyed a sample of R&D knowledge workers and found non- monetary rewards to be strongly associated with intrinsic motivation as manifested by longer work hours, while monetary performance-contingent rewards, in contrast, showed no significant relationship with work time. Kuvaas (2006) similarly looked at the differential impact of base pay and bonus levels on work performance and affective unit commitment, and found only non-contingent base pay to be positively related to self-reported work performance and affective unit commitment. In a similar manner, Pouliakas (2010) used a large representative UK sample and showed that small bonus payments are negatively related with satisfaction with the work itself – an alternative measure for intrinsic interest. In fact, job satisfaction was found to increase only in response to large financial incentives, in line with the 'pay enough or don't pay at all' hypothesis of Gneezy and Rustichini (2000b), whereas the withdrawal of a bonus from one year to the next was found to lead to lower job satisfaction, in line with previous experimental results such as Deci (1971).

Comparable findings were then reported in a more recent field experiment by Huffman and Bognanno (2017), where two groups of workers employed by a start-up company were given the task of encouraging people to sign up to the company's database. While both groups started with the same wage expectations, at one point in time the treatment group was informed that, for a limited time only, they would be receiving an extra payment for each new person they managed to recruit. The results showed that workers receiving these piece rates indeed performed better than their non-rewarded counterparts while the reward system was in place, but once the incentives were removed, they exhibited progressively lower output over time relative to the control group. The findings of both Pouliakas (2010) and Huffman and Bognanno (2017), therefore, are line with arguments that long-term costs from

demotivation following the removal of rewards may be even greater than the short-term gains from the introduction of incentives (Deci, 1971; Kohn, 1993; Meier, 2007).

Evidence for the undermining effect of performance-contingent rewards has also been reported in the public sector (e.g. Bellé, 2015; Frey et al, 2013; Georgellis et al, 2011; Pouliakas, 2010), with scholars suggesting that the crowding out effect is indeed expected to be quite pronounced for public sector workers given the prosocial nature of their work (Ariely et al, 2009; Bénabou and Tirole, 2006). It has been argued, for instance, that when employees work on projects where they need to 'show' their care for others and display a certain level of altruism in their work, being able to demonstrate these attributes in the absence of an external incentive is actually more important than tangible rewards. A recent example in this sense is provided by Bellé (2015) who showed that performance-related pay for public sector nurses had a larger effect on task performance when the reward level was kept *secret* than *disclosed*. Moreover, the negative interaction between performance-related pay and visibility was stronger among participants who were had direct contact with service beneficiaries, "which heightened their perception of making a positive difference in other people's lives" (Bellé, 2015, p.230). Such findings are further supported by Ariely et al (2009), who demonstrated that monetary incentives are more appropriate for motivating *private* rather than *public* prosocial activities. According to their study, there is a social incentive for people to be seen as doing good in the absence of any extrinsic rewards. In consequence, when such rewards are introduced and are visible to everyone, the signal of a prosocial act is reduced, as individuals may be perceived as behaving prosocially only to acquire the reward (Ariely et al, 2009; Bénabou and Tirole, 2006). Interestingly, in Bellé's (2015) study, no crowding-out effects were experienced when the monetary incentives were replaced with symbolic rewards, meaning that non-financial rewards which acknowledge employee's dedication towards public service may still have a positive impact on motivation.

Georgellis et al (2011) offer further evidence in support of the motivation crowding out hypothesis in the public sector by showing that individuals considering the transition from private to public sector jobs are more attracted by intrinsic rewards (i.e. satisfaction with the nature of the work itself), rather than extrinsic job attributes such as payment and job security. In the case where public organisations offer higher extrinsic rewards compared to those provided in the private sector, these extrinsic incentives are found to reduce the tendency of intrinsically-motivated individuals to accept employment in the public sector (Georgellis et al, 2011). Cho and Perry (2012) similarly found extrinsic reward expectancy to negatively affect the relationship between intrinsic motivation and employee satisfaction

for a large sample of US federal employees, whereas Bellé and Cantarelli (2015) further discovered that monetary rewards had no significant effect on the intended effort of executives working for the Italian central government, and that, additionally, this relationship was negatively moderated by the intrinsic motivation of participants. Eberts et al (2002) likewise showed that performance-contingent pay for the teachers of an American high school did not bring about any improvements in the academic success of the pupils, while a recent study by Qian and He (2018) revealed that the extensive use of bonuses for a sample of clinical physicians in China resulted in motivation crowding out as well as a decline in the quality of services provided.

Taken together, these findings appear to have important implications for organisations using performance-contingent reward schemes to increase employees' motivation and quality of performance. Specifically, in light of the evidence presented above, it seems that any potential increases in extrinsic motivation gained through the provision of extrinsic rewards come at the expense of reduced intrinsic motivation and job satisfaction for both private and public sector employees. Nevertheless, the effect of extrinsic rewards on intrinsic motivation is not as straightforward as claimed by advocates of the undermining hypothesis, and the idea of a positive, crowding in effect, has also received empirical support over the years, as shall be discussed in the following section of this literature review.

2.3.2. Evidence for the 'crowding in' effect

Having considered the empirical evidence for the undermining effect of extrinsic rewards on intrinsic motivation in both organisational and non-organisational settings, this section will examine studies in support of the positive, crowding in effect across the same domains. Similarly to the undermining effect, the crowding in effect has been reported in a wide range of research contexts, using analogous proxies for measuring intrinsic motivation such as contributions to prosocial behaviours and volunteering (e.g. d'Adda, 2011; Fiorillo, 2011; Mellström and Johannesson, 2008), performance in interesting and creative experimental tasks (e.g. Farr, 1976), self-reported interest in the task (e.g. Karniol and Ross, 1977), indicators of increased individual and organisational performance (e.g. Burgess et al, 2010; Lazear, 2000) and self-reported satisfaction with the work itself (e.g. Green and Heywood, 2008). While not always equivalent to the construct of intrinsic motivation as defined by this study, these measures are nevertheless comparable to the literature on the undermining effect, again suggesting that differences in results are not exclusively attributable to methodological considerations. Following the same structure as in the previous section, the

following review will first consider the empirical literature supporting the crowding in hypothesis in non-work settings, before examining evidence of positive effects in organisational contexts.

2.3.2.1. Review of the empirical 'crowding in' literature in non-work settings

Starting with the effect of extrinsic incentives in promoting altruistic behaviours such as charitable donations, there is evidence to suggest that the undermining effect is not as widespread as Titmuss (1970) had predicted. Mellström and Johannesson (2008), for example, conducted a field experiment to assess the effect of monetary payments on blood donations, and found the motivation crowding out effect to be limited to female rather than male donors - potentially due to women being more sensitive to the implicit social expectation of performing altruistic acts in the absence of external incentives (e.g. Croson and Gneezy, 2009). What is more, any negative consequences from the provision of monetary incentives were found to be offset through the simple act of allowing participants to donate their payment to charity (Mellström and Johannesson, 2008) - implying that financial rewards can, under certain circumstances, support prosocial motivation. Similar conclusions are reported in research studies examining other types of prosocial behaviour, including contributions towards environmental conservation and public service co-production. An experimental study by d'Adda (2011), for example, showed that external interventions designed to prime individuals towards environmental protection had differential effects on civic engagement, depending on individuals' civic values prior to the intervention. Specifically, while external incentives were found to crowd out contributions of civically-engaged participants, they helped *increase* altruistic choices of selfish individuals. More recently, Voorberg et al (2018) found that while financial rewards are not an effective mechanism for stimulating co-production of public services (assessed through a sample of Dutch students' willingness to teach language courses to refugees), they do not necessarily crowd out prosocial motivation either, indicating, once more, that the undermining effects of extrinsic rewards are not as pervasive as initially understood.

Regarding the positive impact of incentives in relation to volunteering, Fiorillo (2011) examined survey data from Italian volunteers and showed that those who were both intrinsically motivated *and* rewarded financially for their work tended to volunteer for longer hours than those who were intrinsically motivated but did not receive monetary payments. In a similar vein, Kasteng et al (2016) found that while volunteers for community health worker programmes in sub-Saharan Africa reported valuing intrinsic factors such as the

opportunity to make a social contribution, they still expected additional incentives or paid work in the future. While these expectations might be limited to the context in which the study was carried out (i.e. low income communities with few opportunities for formal work), it still points towards the role of individual expectations in explaining differential effects in motivation crowding. According to Kasteng et al (2016), if these expectations remain unmet, they may, over time, become a source of dissatisfaction, meaning that it is the *lack of rewards* that ultimately undermines intrinsic motivation.

Further evidence of positive incentive effects has been reported in relation to performance in creative and interesting tasks, where Farr (1976) was one of the first to reveal that performance-contingent financial rewards for an experimental assembly task results in higher levels of productivity compared to hourly pay (i.e. non-performance-contingent rewards). In a similar vein, Ross et al (1976) showed that task-contingent rewards in the form of candy made children engage more in a drawing task (as cited in Deci et al, 1999, p.636), potentially due to the fact that these rewards were indeed more valued by children compared to financial rewards. Furthermore, studies by Karniol and Ross (1977) and Enzle and Ross (1978) found that performance-contingent rewards are less detrimental to task interest compared to rewards provided for mere engagement with the task, presumably due to performance-contingent rewards conveying more positive information regarding one's competence. In addition, in a recent experimental study examining factors stimulating consumer creativity in crowdsourcing initiatives, Acar (2018) revealed that while monetary rewards did not contribute to increasing the number of product ideas generated by participants, or to improving the novelty of these ideas, they effectively encouraged more consumers to take part in the crowdsourcing initiatives, and furthermore, they helped improve the appropriateness (i.e. usefulness and effectiveness) of the ideas generated.

In addition, several meta-analyses (Cameron, 2001; Cameron and Pierce, 1994; 1996; Eisenberger and Cameron, 1996) came in direct conflict with research on the undermining effect (e.g. Deci, 1971; Deci et al, 1999), concluding that the negative effect is "limited to a specific set of circumstances" as well as "easily avoidable" (Cameron, 2001, p.29). The difference in results, however, seems to depend on methodological decisions, "in particular which studies to include in the meta-analyses, and which study characteristics are considered to be moderators" (Promberger and Marteau, 2013, p.952). Authors who were not directly involved in the debate indeed appeared, at the time, to incline towards evidence on the crowding out effect (e.g. Lepper et al, 1999). Still, more recent meta-analytical research brought additional support to the notion that rewards are not always detrimental to intrinsic

motivation. One example in this sense is the meta-analysis of Byron and Khazanchi (2012), who showed that certain types of contingent rewards can effectively increase creative performance. Specifically, the use of extrinsic incentives contingent on creativity resulted in positive (not negative) effects on creative performance, especially when individuals were given positive performance feedback and were provided with choice rather than being controlled.

Again, an argument could be made that such findings are not directly applicable to organisational settings, considering the types of activities examined (altruistic behaviours and highly interesting tasks which are not characteristic of typical jobs), norms regarding the expectations of monetary payment (which are seldom present in relation to the above-mentioned activities, but which are nonetheless important in employment relationships), as well as experiments involving children and students as research participants. In addition, some of these studies appear to identify specific limits in which the crowding in effect could be expected (for example, specific individual differences (e.g. d'Adda, 2011), or specific types of performance (e.g. Acar, 2018)). Nevertheless, research documenting the positive effect of performance-contingent rewards in supporting intrinsic motivation at work appears to further corroborate the validity of the motivation crowding in phenomenon. This represents the focus of the following section of this literature review.

2.3.2.2. Review of the empirical 'crowding in' literature in organisational settings

In organisational settings, the provision of extrinsic rewards such as piece rate systems, performance-related pay, merit pay increases and performance bonuses has long been recognised as one of the key 'high performance' work practices (Pfeffer, 1994) to support increases in productivity and performance. Illustrative in this regard is the study by Lazear (2000), who showed that switching from hourly wages to performance-contingent piece rates resulted in a significant productivity increase (44%) for employees working in a large manufacturing company, due in equal measure to incentive effects (increases in motivation) and sorting effects (whereby poor performers were replaced, over time, with more productive workers). In line with earlier studies (e.g. Wallin, 1976), the main theoretical argument put forward to explain these positive effects was that performance bonuses are indeed necessary for employees performing repetitive mechanical jobs, i.e. jobs that are not intrinsically motivating to begin with. Given that intrinsic interest for such tasks is inherently low, extrinsic rewards cannot, in any meaningful way, displace feelings of satisfaction with the work itself, and thus there are no subsequent undermining effects. This appears to be

further consistent with a more recent meta-analysis by Weibel et al (2010), who similarly revealed that pay-for-performance reward schemes have a strong, positive effect on performance in the case of non-interesting tasks, whereas the opposite is true in the case of interesting tasks.

An important point to note, nevertheless, is that these findings do not explain the motivation crowding in effect per se, but rather that extrinsic incentives can have an overall positive effect on one's *total motivation* (i.e. their combined intrinsic and extrinsic motivation) to perform, in situations where intrinsic motivation is already low. This is not necessarily surprising given that in such situations, the potential crowding out effect of intrinsic motivation is relatively weak compared to increases in extrinsic motivation (Weibel et al, 2010). But increased total motivation to perform does not equal increased intrinsic motivation. To examine the crowding in effect more specifically, therefore, one needs to consider evidence of extrinsic rewards boosting *intrinsic* motivation, rather than total motivation and overall performance.

More recent studies in the rewards literature appear to address this particular concern, showing that positive reward effects are not limited to simple, straightforward and repetitive tasks, and that performance bonuses or salary increases can effectively enhance intrinsic motivation in a wider range of jobs and industries. An example in this sense is a study by Grandey et al (2013), who examined the use of financial rewards for jobs high in emotional labour and showed that rewards contingent on service performance enhanced (rather than undermined) the satisfaction from having a job that requires positive customer contact. In a similar vein, Putra et al (2017) tested the motivation crowding out effect using a sample of hospitality employees, but found no evidence of extrinsic rewards undermining intrinsic motivation and its role in predicting work engagement. In fact, intrinsic motivation continued to show positive associations with the three dimensions of engagement (i.e. vigour, dedication and absorption) even when extrinsic rewards were included in the study's test model, pointing towards the additive nature of intrinsic and extrinsic motivation.

Similar positive results have been reported in the public sector literature as well. Research by Stazyk (2013), for example, revealed that performance-related pay is associated with greater job satisfaction for employees in local government jurisdictions in the US, particularly for those who possess stronger public service (intrinsic) motivation. This is therefore in disagreement with previous studies predicting the crowding out of intrinsic motivation when individuals who work in public sector roles are provided with salient

extrinsic rewards (e.g. Ariely et al, 2009; Bénabou and Tirole, 2006). Other public sector studies were less focused on measuring public sector motivation or intrinsic motivation as such, but the research design of these studies is nevertheless comparable to those in support of the crowding out effect. Burgess et al (2010), for example, showed that the introduction of team-based performance pay resulted in improved team performance in a large governmental agency in the UK, raising individual productivity as well as leading to the reallocation of efficient workers towards the incentivised tasks. Likewise, Figlio and Kenny (2007) revealed that students' academic performance is higher in schools that pay their teachers in line with their performance (thus, in opposition with findings by Eberts et al (2002) cited above), whereas Jacobsen and Andersen (2017) similarly found that the use of contingent rewards was related to higher self-efficacy and organisational performance for a sample of Danish high school teachers. Furthermore, in contrast with the study by Qian and He (2018) introduced previously, which showed that financial bonuses can lead to crowding out effects as well as lower-quality services in the healthcare sector, Hennig-Schmidt et al (2011) revealed that physicians provided significantly more services under a fee-for-service scheme than under a general wage system. Furthermore, this increase in service provision did not necessarily undermine the quality of care, but was rather beneficial especially for patients with a high need of medical services[3].

In addition, further evidence in contradiction of the undermining effect comes from longitudinal panel studies and meta-analyses. Specifically, in a larger-scale study using a representative UK dataset, Green and Heywood (2008) found performance-related pay to be associated not only with extrinsic job factors (such as satisfaction with pay, satisfaction with job security and satisfaction with work hours), but with overall job satisfaction as well. Perhaps more importantly for the purposes of this discussion, any negative correlations between piece rate systems and satisfaction with the work itself (used as a proxy for intrinsic motivation) disappeared when controlling for individual fixed effects (such as risk aversion). This therefore casts doubt on the extensiveness of the motivation crowding out effect, especially when examining the role of performance-contingent rewards over the years and controlling for sorting effects. In addition, meta-analyses such as Condly et al (2003) and Garbers and Konradt (2014) bring further evidence regarding the strong positive effects of

[3] While the different results in these latter two studies could also be explained by cultural differences, it should be noted that inconsistencies have also been highlighted in studies conducted in the same cultural context, for example, in Anglo-Saxon countries (Eberts et al, 2002 vs Georgellis et al, 2011). The national context alone, therefore, seems to be unsuited for explaining these divergent findings in full.

performance-contingent incentives, including instances of increased performance quality, as opposed to mere quantity, especially in complex, as opposed to simple tasks.

2.4. A review of theoretical perspectives explaining the undermining effect

The current state of the empirical literature, as seen from the above review, does not allow us to draw strong generalizable conclusions regarding the effect of extrinsic rewards on intrinsic motivation, either in general settings or at work. With a view of explaining the mechanisms underlying these differential effects, a range of theoretical frameworks has been invoked, from psychological perspectives such as self-perception theory (Bem, 1972) and the over-justification effect (Lepper et al, 1973) to behaviour economics perspectives such as motivation crowding theory (Frey, 1994; Frey and Jegen, 2001). On the one hand, these frameworks significantly advance our knowledge of the relationship between rewards and motivation beyond classic motivational theories such as reinforcement theory (Skinner, 1958) and expectancy theory (Vroom, 1964), as the latter are not particularly concerned with examining interactions between extrinsic and intrinsic motivation. On the other hand, as will be explained below, these frameworks are limited in several important respects, which ultimately highlights the need for adopting a new theoretical perspective in the field.

2.4.1. Self-perception theory and the over-justification effect

Self-perception theory (SPT) (Bem, 1972) starts from the assumption that individuals come to understand their attitudes and 'inner states' primarily from *observations* of their behaviour and the context / circumstances surrounding their behaviour (Bem, 1972, p.2). In relation to the motivation process, SPT proposes that individuals do not have perfect knowledge regarding their reasons for performing a task, and so they will tend to use cues from the external environment to determine whether their motivation is of an intrinsic or extrinsic nature. As explained by Fehr and Falk (2002, p. 714):

> *If the external incentives for a task are so strong that they would ordinarily cause the individual to perform regardless of the hedonic characteristics of the task, the individual is likely to infer that his or her behaviour is extrinsically motivated. If, in contrast, a task is performed despite the fact that the external incentives are low and non-salient, the individual is likely to infer that his or her behaviour is intrinsically motivated.*

An interesting case arises, therefore, when the task is sufficiently rewarding in itself and salient extrinsic rewards (such as expected task-contingent or performance-contingent ones) are also provided. In this situation, because the intrinsic features of the task are generally more uncertain (and not directly observable), whereas the extrinsic features are more salient, expected and/ or visible, the 'over-justification effect' arises, and the individual comes to attribute their behaviour to the extrinsic factors rather than his or her own interest in the activity (Lepper et al, 1973; Pittman et al, 1983). In other words, the reward becomes the main reason for performing the behaviour, and as a result, any intent of performing the task for its inherent satisfaction is replaced by a focus on short-term extrinsic gains.

According to these theoretical assumptions, it seems that there are two important conditions leading to the undermining effect. First, the task needs to be sufficiently rewarding in itself so that it triggers intrinsic motivation. Second, the incentives need to be salient, such as the case of large bonuses, expected tangible rewards, and incentives contingent on specific standards of performance. As discussed in the above review, there is a large body of literature (e.g. Deci, 1971; Greene and Lepper, 1974; Pittman et al, 1977; Tang and Hall, 1995) which supports the over-justification hypothesis, showing that when baseline intrinsic motivation is high and rewards are expected and performance-contingent, they will usually prompt an external justification for behaviour and undermine intrinsic motivation. In contrast, when tasks are non-interesting (Weibel et al, 2010) or when performance-contingent rewards are replaced with unexpected bonuses or intangible rewards such as verbal praise and positive feedback, the over-justification effect is less likely to occur (Deci et al, 1999). Given the less salient nature of these incentives and the fact that they become known and visible only after the activity has already been completed, they are arguably less likely to trigger perceptions of external control.

Yet in spite of the empirical support in favour of the over-justification effect, there is sufficient evidence – as seen previously - to show that extrinsic rewards will not always crowd out intrinsic motivation in interesting tasks, particularly in organisational settings (e.g. Grandey et al, 2013; Hennig-Schmidt et al, 2011; Jacobsen and Andersen, 2017). In addition, the over-justification effect fails to explain why highly salient rewards such as performance-contingent ones can, in some cases, increase intrinsic motivation to an even greater extent than non-performance-contingent rewards (e.g. Enzle and Ross, 1978; Farr, 1976). Furthermore, self-perception theory has been criticised more widely for downplaying self-awareness and the subjective knowledge that individuals may possess regarding their motivation (Deci and Ryan, 1985a). Looking solely at external forces facilitating or

hindering people's performance says little about individuals' knowledge of their own internal states and the ways in which they may come to internalise the value of extrinsic incentives. This theory, in fact, ignores the role of individual preferences altogether, an important oversight given that even in the same contexts, people will tend to interpret external interventions differently (Nishil et al, 2008). In light of these limitations, self-perception theory appears to be an unsuitable candidate for explaining the effect of extrinsic rewards on intrinsic motivation.

2.4.2. Motivation crowding theory (MCT)

Developed in the field of behavioural economics, motivation crowding theory (MCT) (Frey, 1994; Frey and Jegen, 2001) is a more recent theory of motivation which seeks to explain the mechanisms underlying the undermining effect, as well as the circumstances in which extrinsic rewards can either crowd in or crowd out intrinsic motivation. MCT starts from the assumption that two psychological processes are important for explaining the motivation crowding out effect: impaired self-determination and impaired self-esteem. To this end, MCT proposes that interventions which undermine self-determination will lead individuals to a shift in their locus of causality (deCharms, 1968) from internal to external, meaning that any intent of performing the task for its inherent satisfaction (signalling an independent choice to engage in the activity and thus an internal locus of causality) is replaced with a focus on obtaining the external reward. In a similar manner, interventions which hinder an individual's ability to demonstrate their natural interest in an activity will trigger perceptions of their competence and commitment not being appreciated, and ultimately undermine intrinsic motivation through reduced self-esteem. On the basis of these processes, two psychosocial conditions leading to either the crowding out or the crowding in effect are then identified: a) "external interventions crowd out intrinsic motivation if the individuals affected perceive them as *controlling*" (as this leads to impaired self-determination); and b) "external interventions will crowd in intrinsic motivation if the individual concerned perceived them as *supportive*" of their self-determination and self-esteem (Frey and Jegen, 2001, p.594-95).

The general assumptions of MCT are largely well supported by empirical evidence, with studies such as Jacobsen et al (2014) showing that school teachers who perceive mandatory

student plans[4] as controlling display lower intrinsic motivation and public service motivation compared to those with more supportive perceptions. Similarly, Jacobsen and Andersen (2014) discovered that researchers produce more articles when publication command systems[5] are seen as supportive, whereas the opposite is true when the command systems are perceived as management control mechanisms. Consistent with these findings, Pedersen et al (2018) more recently found that the introduction of a mandatory accreditation system for Danish general practitioners crowded in (rather than undermined) their intrinsic motivation, particularly for those who perceived accreditation as an instrument for quality improvement.

The question that arises from MCT, therefore, is what the specific factors that will trigger perceptions of control vs support are, i.e. what are the specific conditions that will lead to a crowding out vs a crowding in effect. Frey (1994) initially proposed several factors that intervene in the motivation process, including, among others, the type of activity (i.e. interesting vs non-interesting tasks), individuals' level of participation in decisions of control, the level of closeness between principals and agents, the uniformity of external interventions, the contingency of rewards on performance, and the message implied by the external intervention. Nevertheless, some of these factors, as discussed previously, are not suitable candidates to explain differences in reward effects. For example, Frey (1994) assumes - similarly to SPT - that extrinsic incentives are better suited to simple, repetitive and dull tasks, and yet there is evidence to show positive incentive effects in the case of interesting tasks as well (e.g. Grandey et al, 2013; Putra et al, 2017). Likewise, MCT assumes performance-contingent rewards (as opposed to non-performance-contingent ones) to crowd out intrinsic motivation, but again, empirical research highlights that this is not always the case (e.g. Stazyk, 2013).

Furthermore, some of the MCT propositions are rather vague, for example Frey's (1994, p. 347) assertion that "the more strongly an external intervention implies an acknowledgement of the agent's intrinsic motivation, the more strongly it fosters intrinsic motivation". What exactly this type of acknowledgement involves is not adequately described or explained, which may be one of the reasons why some of these propositions remained untested over

[4] Individual student plans that teachers need to complete for each student in their class, to consider their individual learning outcomes, their expectations and the services required. These student plans are mandatory in Denmark (Jacobsen et el, 2014, p.795).

[5] Systems that "specify the minimum number of journal articles from each researcher, combined with principles for how this is monitored and sanctioned" (Jacobsen and Andersen, 2014, p.85).

the years. More broadly, this lack of conceptual clarity implies that while MCT may indeed be useful for allowing us to better understand the psychological conditions leading to an undermining vs a positive reward effect, the framework currently lacks adequate empirical evidence for mapping the range of factors that can affect perceptions of control versus support. According to Jacobsen et al (2014, p.803):

> *One pressing question is how the perception of the command systems[6] is formed. The same command system can be perceived completely differently by employees working within the same field, and even [those] within the same organization have different perceptions. The motivation crowding literature only deals with this question superficially (...).*

In fact, this latter notion that even employees within the same organisational context may have different ways of interpreting external interventions highlights another important limitation of MCT, specifically the idea that this theory - similarly to SPT and the over-justification framework - does not consider the role of individual differences in moderating perceptions of control vs support. Indeed, a large number of empirical studies acknowledge that factors such as intrinsic vs extrinsic work goals (e.g. Van den Broeck et al, 2010; Vansteenkiste et al, 2010), specific reward orientations (e.g. Malik et al, 2015), risk tolerance (Cadsby et al, 2007) and even specific personality traits (e.g. Covington and Müeller, 2001; Kampkötter, 2017) can moderate the effect of extrinsic rewards on intrinsic motivation. Covington and Müeller (2001), for instance, find that extrinsic rewards and intrinsic motivation are complementary and additive for success-oriented individuals, whereas Kampkötter (2017) more recently reveals that employees who score high on openness to new experiences and who have an internal locus of control experience higher job satisfaction in the presence (rather than absence) of external rewards. Nevertheless, the study of individual differences is not within the scope of MCT, pointing towards the limitation of this theory in predicting the full range of variables that can limit or even counter the undermining effect.

[6] Command systems are indeed relevant when discussing issues of motivation crowding, as both command systems and reward systems are examples of external interventions that managers use to control the behaviour of employees, i.e. to make them more in line with the interests of the organisation. Both systems, furthermore, can impact intrinsic motivation, and furthermore, both can be seen as either supportive or controlling depending on the impact of specific contextual and individual-level factors.

2.5. Conclusion – the need for adopting a new theoretical perspective

What follows from the above analysis is that frameworks such as SPT and MCT do not currently provide us with sufficient depth of understanding regarding the interplay between extrinsic rewards and intrinsic motivation. In the context of work organisations, there are several factors that will simultaneously affect an employees' motivation at work, including job design characteristics, relationships with managers, as well as individual differences. The ways in which different rewards are perceived, and their subsequent impact on motivation, will likely depend on all of these dynamics, and yet the above theories do not provide a comprehensive account of contextual as well as person-specific factors moderating the undermining effect. According to several authors (e.g. Gneezy et al, 2011; Pokorny, 2008; Promberger and Marteau, 2013), the conditions in which the undermining effect occurs are currently not well understood, and more studies are needed to uncover the circumstances under which behaviour is not in line with incentives.

In order to address this gap in the literature, and provide a more nuanced explanation of the undermining effect, this study draws on the logic of a more comprehensive theory of motivation and development, known as self-determination theory (SDT) (Deci, 1975; Deci and Ryan, 1985a). While consistent with MCT in the way it acknowledges the role of self-determination and self-esteem in promoting intrinsic motivation (albeit using a slightly different terminology), SDT goes beyond existing frameworks by providing a more detailed account of the factors that can moderate the undermining effect. In fact, in contrast to alternative perspectives, this theory acknowledges both individual differences and socio-contextual factors as important for facilitating intrinsic motivation, thus addressing the limitations of previous frameworks which have failed to consider individual predispositions affecting reward interventions. The following chapter introduces the assumptions of SDT and provides a comprehensive account of the critical ways in which it can help reconcile the existing inconsistencies in motivation crowding research.

CHAPTER 3

REFRAMING THE FIELD VIA SELF-DETERMINATION THEORY

Self-determination theory (SDT) is an empirically-based theory of human motivation and behaviour, centrally concerned with the social conditions that can either sustain or hinder individual development, including one's motivation, psychological growth and general well-being. Building on the assumptions of a previous framework known as cognitive evaluation theory (CET), SDT expanded on this initial framework over the years, and in doing so, it became much broader in scope. In particular, SDT introduced additional theoretical concepts such as the notion of behaviour internalisation, basic need satisfaction and general causality orientations, all of which, as will be discussed in the following sections of this chapter, become important in addressing the notion that performance-contingent extrinsic rewards need not always be detrimental to intrinsic motivation. Starting with an overview of CET as the basis for the more recent SDT theoretical advances, the aim of this chapter is to introduce the key assumptions of the self-determination framework, which will serve as the theoretical foundation of the present thesis.

3.1. Cognitive evaluation theory (CET) - initial assumptions regarding the role of external interventions affecting intrinsic motivation

Building on the experimental work of Deci and Ryan examined previously in this literature review (e.g. Deci, 1971; Deci and Ryan, 1975), CET (Deci, 1975) was developed to explain the ways in which intrinsic motivation is impacted by external interventions such as rewards, deadlines, feedback and monitoring. The theory starts from the assumption that there are two basic factors underlying intrinsic motivation, namely the psychological needs for autonomy and competence[7]. In the context of this model, autonomy refers to "being the perceived origin or source of one's own behaviour" (deCharms, 1968; Deci and Ryan, 2002, p.8), and it involves the idea of "acting with a sense of volition and having the experience of choice" (Gagné and Deci, 2005, p.333). Competence, on the other hand, refers to "feeling effective in one's own interactions with the social environment and experiencing opportunities to exercise and express one's capacities" (Deci, 1975; Deci and Ryan, 2002, p.7). In this sense, the need for competence is argued to lead people to seek optimal

[7] This is conceptually close to the MCT assumption that it is self-determination and self-esteem that facilitate intrinsic motivation, not least because MCT was developed to mediate between psychological perspectives such as CET and standard economic perspectives that were generally less concerned with the role of intrinsic motivation in explaining behaviour (Frey and Jegen, 2001).

challenges that will enhance their skills and abilities and promote a sense of confidence and self-efficacy (Deci and Ryan, 2002).

In light of the assumption that both autonomy and competence are essential for facilitating intrinsic motivation, CET then argues that events which allow need satisfaction tend to increase intrinsic motivation, whereas those that thwart need satisfaction tend to decrease intrinsic motivation (Deci, 1975; Deci et al, 1999). Taking the example of organisational settings, it is not difficult to think of external factors that undermine satisfaction with the need for autonomy and competence, especially when supervisors are primarily concerned with restricting undesirable behaviours rather than supporting employees' initiative and self-sufficiency in decision-making. Managerial practices such as close monitoring, external deadlines, imposed goals, directives and sanctions, for instance, are all highly controlling in the way they operate and furthermore, they offer little recognition regarding one's abilities to perform on the job. Their negative impact on intrinsic motivation has furthermore been well documented in a wide range of studies over the years (e.g. Enzle and Anderson, 1993; Holmås et al, 2010; Lepper and Greene, 1975), which offers strong empirical support for the assumptions of this framework regarding the use of such restrictive interventions.

In the case of performance-contingent rewards, however, the situation is arguably less clear. On the one hand, performance-contingent rewards are assumed to convey information regarding one's abilities and effectiveness in various situations (Harackiewicz et al, 1987) – thus enhancing feelings of competence. On the other hand, they are argued to be equally detrimental to individuals' need for autonomy as they prevent individuals from demonstrating their self-determined interest in the task in the absence of such incentives. It appears, therefore, that when presented with performance-contingent rewards, individuals experience an internal conflict between feelings of increased competence and feelings of decreased autonomy all at the same time. An important point to note in solving this conundrum, however, is that although both autonomy and competence are essential for facilitating intrinsic motivation, CET assumes competence need satisfaction to promote intrinsic motivation *only* to the extent that such feelings of efficacy are experienced in relation to self-determined (as opposed to externally-imposed) tasks. In other words, the need for autonomy is the more significant between the two, and feelings of competence - alone - cannot successfully sustain intrinsic motivation. In consequence, given the more important role of autonomy in promoting intrinsic motivation, CET initially assumed the controlling effect of performance-contingent rewards to be stronger, leading to an overall decrease in intrinsic motivation.

The problem with these initial propositions, parallel to what has been discussed in relation to SPT and MCT, is that empirical evidence does not support the notion that performance-contingent rewards will always thwart feelings of autonomy and undermine intrinsic motivation, particularly in workplace contexts. In fact, many of the empirical studies that led to the development of CET were generally conducted in experimental settings remote from the intricacies of organisational reality, implying that the assumptions of this theory may be less suited to situations where payment is the norm and where individuals expect to be rewarded for their performance (e.g. Fang and Gerhart, 2012). Moreover, it is difficult to compare intrinsic motivation resulting from experimental tasks with intrinsic motivation associated with typical work activities. While experimental tasks are *designed* to be interesting, fun and/or challenging, most activities employees are confronted with on a daily basis are arguably not as enjoyable, and will furthermore be carried out alongside other, more repetitive administrative tasks. As such, equating undermining effects observed in experimental vs non-experimental settings is a rather difficult exercise.

In addition, even though performance-contingent rewards can be perceived, on average, as a way for managers and external others to achieve their own agendas and performance targets through directing employees' efforts to certain pre-determined tasks, there are still cases when the performance appraisal process (and implicitly, the provision of performance-contingent rewards) is conducted in a supportive, rather than a controlling or even neutral manner. In a similar vein, individual differences in performance and/ or motivational orientations may further affect the functional significance that employees assign to different incentives. Such factors, as will be explained below, become particularly important for explaining the differential effects in the extant motivation crowding literature.

Furthermore, considering the assumption that extrinsic rewards and intrinsic motivation are in opposition to one another, CET seems to imply that managers will be forced to choose between: a) fostering intrinsic motivation through empowerment and participation in decision making (and thus minimising the use of extrinsic factors); or b) maximising extrinsic motivation through rewards and other external contingencies while ignoring the importance of intrinsic motivation (Gagné and Deci, 2005). This, again, has clear limitations for the applicability of CET in the context of organisations where opportunities for empowerment and participation may not always be feasible (Gagné and Deci, 2005), and yet behaviours will not automatically become externally-driven.

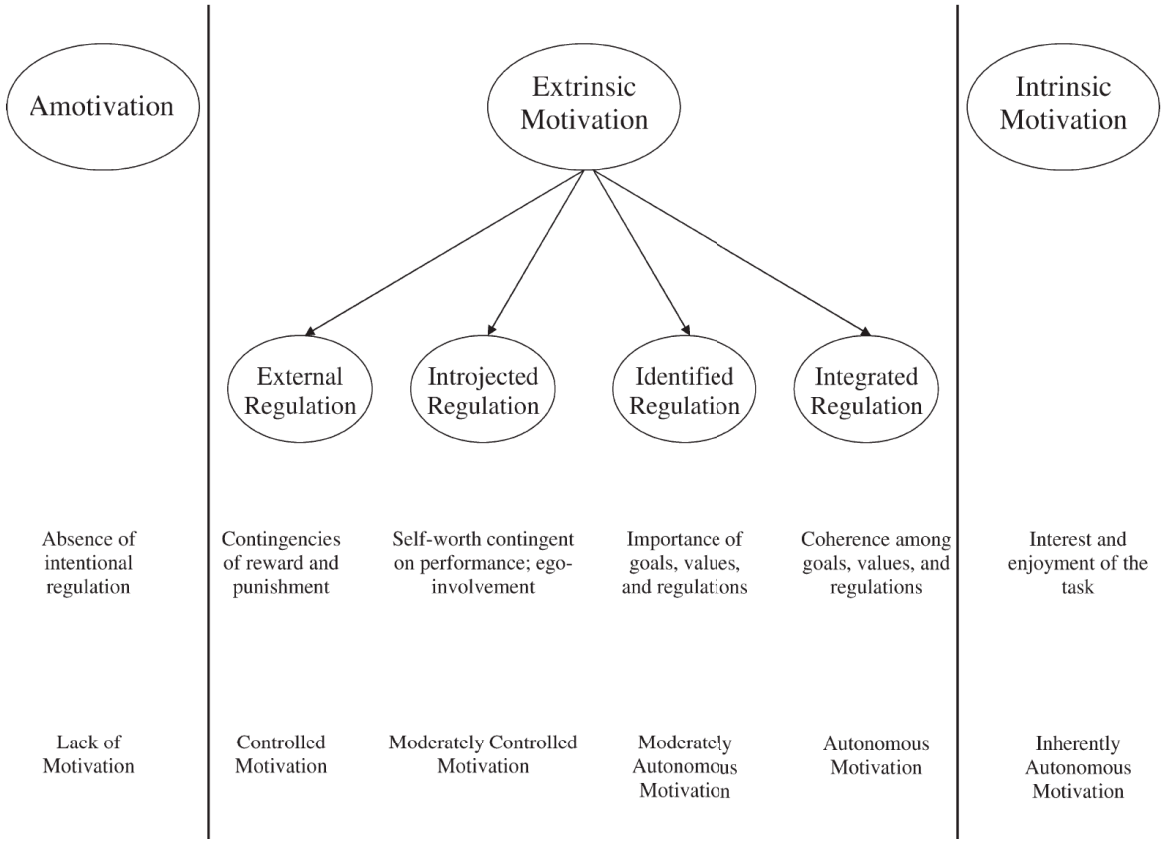
3.2. Self-determination theory (SDT) – key developments from CET

With the view of addressing the above criticisms, SDT (Deci and Ryan, 1985) expanded on the initial CET assumptions, recognising that rewards do not operate in a vacuum, and that their effect on intrinsic motivation is likely to be influenced by contextual factors affecting the functional meaning of rewards, as well as individual differences affecting how rewards are perceived. Furthermore, the self-determination perspective acknowledges that individuals are proactive in their interactions with the environment and that they have the capacity to internalise the value of their external experiences. In this sense, the theory recognises that not all externally-motivated behaviours are the same, and that in fact, extrinsic motivation can become autonomous as long as individuals 'take in' the values, goals, and structures of extrinsic motivation as their own. This notion of internalised (autonomous) motivation, in turn, has important implications for how motivation is understood in workplace contexts, and the different strategies that managers can use (including extrinsic factors) to promote more adaptive forms of motivation. The following paragraphs expand on each of these important theoretical advances, starting with the distinction between autonomous and controlled motivation, introducing the notion of behaviour internalisation, and then considering the specific role of both socio-contextual and person-specific factors in facilitating intrinsic motivation and moderating the undermining effect.

3.2.1. The self-determination continuum of motivation

One of the most significant contributions of SDT, as stated previously, is the proposition that extrinsic motivation need not be an invariably controlled form of motivation and that individuals can, under certain optimal conditions, fully integrate the value of their external experiences (Deci and Ryan, 1985; Ryan and Connell, 1989). To this end, SDT places motivation on a continuum (Figure 3-1) ranging from amotivation (referring to a total lack of motivation) to intrinsic motivation, with four different types of extrinsic regulation in between, varying in their inherent level of autonomy. These are known as external regulation (which is completely controlled), introjection (moderately controlled), identification (moderately autonomous) and integration (completely autonomous). The following paragraphs present a brief overview of the self-determination continuum of motivation, introducing the key characteristics of controlled vs autonomous motivation, and reassessing their distinction from intrinsic motivation.

Figure 3 - 1: The motivation continuum under self-determination theory



Source: Gagné and Deci (2005) Self-determination theory and work motivation. Journal of Organizational Behavior*, 26, pp.331-362.*

As illustrated in Figure 3-1, the self-determination continuum of motivation starts from the distinction between *amotivation*, which refers to not having an intention to act at all, and *motivation*, which involves intentionality of behaviour, regardless of whether this behaviour is externally controlled, partially internalised or inherently autonomous. In terms of motivation per se, Ryan and Deci (2000) maintain the idea of an extrinsic/ intrinsic dichotomy, but assume extrinsic motivation to be reflected in four distinctive forms. The first is known as *external regulation* which occurs when behaviour is only initiated and maintained through rewards and other interventions that are external to the self. When individuals are externally-regulated, they typically seek to obtain desired separate outcomes (or avoid undesired consequences) so that behaviour is energised into action only when their actions are instrumental to those ends (e.g. working for pay or to avoid sanctions). The second type of extrinsic motivation, on the other hand, *introjected regulation*, is only moderately controlled and it is manifested through more integrated contingencies of self-esteem and ego involvement (e.g. working to feel good about oneself). In other words, while people do not necessarily identify with the value of their behaviour and their actions are still

only energised through the contingencies involved, these contingencies become slightly more internalised compared to the case of externally-regulated behaviour, which is completely non-autonomous (controlled).

Further along the motivation continuum is *identified regulation*, where people begin to strongly identify with their actions, perceiving the behaviour as more congruent with their personal goals and identities, and thus experiencing greater self-determination. Understanding the importance of the activity becomes paramount in this case, although the activity need not be interesting in itself (and thus not intrinsically motivating). An example in this sense could be the motivation to perform an uninteresting activity for the wider benefit of the organisation, where the behaviour becomes integral to an individual's personal goals of showing responsibility in their work. An even higher degree of congruence among personal values, goals and regulations of behaviour, however, is expected in the case of *integrated regulation*. This is the fullest type of autonomous extrinsic motivation and requires people to have "the full sense that their behaviour is an integral part of who they are and that it emanates from their sense of self" (Gagné and Deci, 2005, p.335). To this end, integrated motivation differs from identified regulation by requiring people not only to identify with the value of their actions, but also for those actions to become integrated with other aspects of oneself, for example the profession becoming central to one's identity.

Importantly, this model retains the assumption that central to intrinsic motivation are feelings of enjoyment of- and interest in the activity itself, thus following Deci's (1971) original definition. In this sense, the framework assumes a distinction between intrinsic motivation and autonomous extrinsic motivation, explained through the idea that autonomous extrinsic motivation does not stem from satisfaction with the activity itself, but instead "requires people to either identify with the value of the behaviour for self-determined goals" (in the case of identified regulation) or to view it "as an integral part of who they are" (in the case of integrated regulation) (Gagné and Deci, 2005, pp.334-335). In these latter cases, the activity is still instrumentally important for personal goals, rather than enjoyed for its own sake, thus still showing an example of extrinsic, rather than intrinsic, motivation.

3.2.2. Behaviour internalisation and basic need satisfaction

Considering the model presented above, an important advantage of SDT is that it allows for an understanding of how people can come to integrate different types of extrinsic regulations, and therefore minimise the implicit negative effects resulting from perceptions

of external control. While SDT is not a 'stage' theory and does not suggest that people must invariantly move through these autonomy 'stages' with respect to particular behaviours (Gagné and Deci, 2005, p.335), it does propose that, under optimal conditions, people can fully integrate and internalise the value of external interventions and thus adopt more autonomous forms of motivation. This represents a significant development from both a theoretical and practical perspective, for several key reasons. First, the SDT continuum of motivation reflects the broader range of reasons why individuals may choose to exert effort in their jobs, thus moving away from the narrower intrinsic/ extrinsic dichotomy. In other words, SDT acknowledges that people may work for reasons other than either: a) obtaining money and related external gains; or b) for their inherent interest in the job role; which offers a more realistic view of the complexity of motivation in applied contexts.

In addition, the notion of behaviour internalisation offers an important (and hitherto overlooked) mechanism through which one can attain more adaptive work outcomes. Specifically, the self-determination literature maintains that there are strong links between the more integrated forms of regulation and positive outcomes such as increased job satisfaction and work engagement (e.g. Deci et al, 2001), greater psychological adjustment (e.g. De Cooman et al, 2013), lower levels of stress and emotional exhaustion (e.g. Richer et al, 2002), improved quality of performance (e.g. Cerasoli et al, 2016), improved work commitment (Fernet et al, 2012), decreased turnover intentions (e.g. Olafsen et al, 2015), and fewer instances of organisational deviance such as intentionally working slowly and lying about one's performance (e.g. Bureau et al, 2018). In light of this evidence, it appears that the more autonomous (i.e. internalised) one's regulation, the more positive the expected outcomes, thus offering a way forward towards understanding the types of motivation that both individuals and organisations could benefit from the most.

Furthermore, the notion of behaviour internalisation brings the more practical advantage of allowing managers to invest in opportunities for development, empowerment and autonomy, while not necessarily excluding the provision of extrinsic rewards. In fact, in contrast to previous theoretical frameworks, SDT proposes that extrinsic rewards are not necessarily detrimental to intrinsic motivation, to the extent that they are provided in a supportive context. Two emerging questions hence need to be considered. The first is concerned with the specific ways in which managers and other external agents (such as work colleagues) can help support one's autonomous motivation. The second question is what are the optimal conditions to facilitate positive outcomes from external interventions, i.e. what exactly is meant by 'a supportive context'.

In addressing both issues, SDT builds upon previous propositions regarding the role of autonomy and competence as basic psychological needs which are important for facilitating intrinsic motivation, and suggests a similar mechanism for supporting behaviour internalisation. For example, having the experience of choice when engaging with certain activities will allow people to move beyond extrinsic and introjected motivation towards more fully understanding the value of their chosen behaviours and the ways in which they reflect other aspects of their identity. Similarly, satisfaction with the need for competence is an equally important pre-requisite of internalisation as individual will be more likely to internalise practices and behaviours in relation to which they feel effective, and reject those beyond their understanding or capacity (Ryan and Deci, 2018).

The main difference between the facilitation of behaviour internalisation compared to intrinsic motivation, however, is that the former requires the consideration of a third basic[8] need, known as the need for relatedness. In broad terms, relatedness can be defined as 'caring for and being cared for by others, and having a sense of belongingness to groups, communities or organizations' (Deci and Ryan 2002, p.7). While not necessarily required for initiating intrinsic motivation per se (for example, engaging in an interesting task such as solving a complex puzzle does not necessarily require social endorsement), having a sense of belongingness to particular groups can help individuals *internalise* the values and beliefs of those groups, overall leading to more autonomous forms of motivation.

Although the concept of psychological needs is certainly not new to organisational studies (e.g. Alderfer, 1969; McClelland and Burnham, 1976), previous needs conceptualisations have primarily emphasised differences in need *strength* for different individuals, and have examined how this strength affects motivation and related work outcomes. Nevertheless, SDT focuses "not on the consequences of the strength of those needs for different individuals, but rather on the consequences of the extent to which individuals are able to *satisfy* the needs within social environments" (Gagné and Deci, 2005, p.337). As such, in the self-determination literature, both contextual and person-specific factors are characterised in terms of the degree to which they are either need supportive or need frustrating, which will differentially affect behaviour internalisation. Specifically, the more supportive the social and intrapersonal factors, the greater one's basic need satisfaction and the greater their autonomous (as opposed to controlled) motivation. Furthermore, as

[8] All of these three needs are argued to be universal to all individuals and essential for optimal human development, hence the term 'basic' needs (Ryan and Deci, 2018).

indicated previously, the notion of basic need satisfaction has important implications for gaining a more nuanced understanding of the undermining effect, and the supportive (i.e. need fulfilling) conditions in which performance-contingent rewards can enhance, rather than crowd out, intrinsic motivation. Before centring this discussion to the specific case of performance-related pay within SDT, however, the following section will focus on examining the key factors supporting basic need satisfaction and intrinsic motivation in the workplace, with the aim of describing the main characteristics of supportive socio-contextual and intrapersonal factors.

3.2.3. Socio-contextual factors affecting intrinsic motivation and behaviour internalisation

Recent reviews considering the application of SDT in the context of work organisations (e.g. Deci et al, 2017; Gagné and Deci, 2005; Gerhart and Fang, 2015) acknowledge that specific aspects of the social environment are central to facilitating basic need satisfaction and autonomous motivation in the workplace. Autonomy-supportive contexts are generally defined as those encouraging self-initiation, minimising pressures and controls, and providing individuals with relevant information that enhances their perceptions of choice and their feelings of relatedness and competence (Deci et al 1994; Gagné and Deci 2005). Examples include contextual variables such as job resources and intrinsically-motivating job characteristics, as well as work climate considerations, including the degree of need support from managers as well as peers. The following paragraphs present a review of the available literature regarding the role of such factors in promoting both intrinsic motivation and behaviour internalisation more broadly.

3.2.3.1. Job design considerations

The notion that particular aspects of work design are strongly related to intrinsic motivation can be traced back to Hackman and Oldham's (1976) job characteristics model (JCM), arguably one the most influential theories that links specific job dimensions to employee motivation. According to this theory, there are five job characteristics that facilitate intrinsic motivation, namely: a) *skills variety* – defined as the degree to which a job involves the use of a variety of different skills and talents; b) *task identity* – defined as the degree to which the job requires completion of a "whole" and identifiable piece of work; that is, doing a job from beginning to end with a visible outcome; c) *task significance* – defined as the degree to which the job has a substantial impact on the lives or work of other people; d) *autonomy* – defined as the degree to which the job provides freedom, independence and discretion to the individual in their work; and e) *feedback* – defined as the degree to which carrying out

the work activities required by the job results in the individual obtaining direct and clear information about the effectiveness of his or her performance (Hackman and Oldham, 1976, pp.257-258). These five job dimensions, in turn, are argued to lead to increased internal (intrinsic) motivation (thus sometimes referred to as 'intrinsic job characteristics'), as well as higher quality of work performance, and lower levels of absenteeism and turnover (Hackman and Oldham, 1976).

JCM has indeed received considerable empirical validation in early studies as well as more recently, and its key assumptions have also been adopted in the wider agenda of self-determination research (e.g. Gagné et al, 1997; Millette and Gagné, 2008). Indeed, one can easily expect the needs for autonomy and competence to be effectively supported through opportunities for discretion in decision-making, as well as feedback offering clear information regarding one's effectiveness at work, especially in cases where successful performance requires a variety of different skills and talents. In addition, feelings of task significance can arguably lead to relatedness need fulfilment, given that individuals can come to understand the impact of their work in relation to their wider community. Recent research in the self-determination literature brings empirical evidence to these assumptions, showing that intrinsic job characteristics are indeed positive predictors of work-related need satisfaction, and that need fulfilment, in turn, relates positively to intrinsic motivation, and negatively to controlled motivation (e.g. Van Hooff and van Hooft, 2017).

Furthermore, studies examining more general job features in the job demands-resources (JD-R) literature show comparable results. In broad terms, job demands are defined as "those aspects of the work context that tax employees' personal capacities" (thus often associated with negative outcomes) (Van den Broeck et al, 2008, p.278), whereas job resources are organizational aspects of the work context that can reduce the negative effects of job demands and stimulate professional growth (Schaufeli and Bakker, 2004). The expectation, therefore, is that job demands such as task interruptions, work-home interference, and role ambiguity will negatively affect need satisfaction and related outcomes, whereas job resources such as opportunities for skills utilisation, positive feedback and career progression will have the opposite effect. Once again, empirical research comes in support of this view (e.g. De Cooman et al, 2013; Trépanier et al, 2014; 2015; Van den Broeck et al 2008). To give just a few examples, studies such as Fernet et al (2013) revealed job demands and job resources to have distinctive effects in predicting basic need satisfaction and specific dimensions of employee burnout, whereas Trépanier et al (2014) found comparable results in relation to work engagement as well. In a similar vein, De Cooman et al (2013) showed

job demands and job resources to relate differently to basic need satisfaction, autonomous motivation and work performance – with particularly negative effects in the case of job demands perceived as energy-depleting hindrances (e.g. work-home interferences) rather than stimulating challenges (e.g. work pressure). Interestingly, the distinction between hindrances and challenges was further supported in more recent studies, with research such as Olafsen and Frølund (2018) showing that job challenges relate positively to autonomy and competence need satisfaction (as well as to autonomous work motivation and well-being), while job hindrances predict the opposite effect.

In light of such studies, there appears to be strong evidence for the positive role of intrinsic job characteristics and job resources in facilitating basic need fulfilment, autonomous motivation and work-related functioning, with the opposite being true for less supportive (and indeed detrimental) factors such as job demands and job hindrances. Nonetheless, when considering the work environment, one must examine not only the 'objective' aspects such as the ones introduced above, but the *interpersonal* factors as well, including support from managers and supervisors. As such, studies examining the notion of 'managerial need support' (sometimes also referred to as 'managerial autonomy support') become critical in this regard.

3.2.3.2. Managerial need support

Managerial need support is another contextual factor within SDT that is associated with basic need satisfaction and autonomous self-regulation at work, as well as more general indices of well-being and work performance (Gagné and Deci, 2005; Van den Broeck et al, 2010). As suggested by Baard et al (2004), the concept of managerial support describes the positive interpersonal climate created by supervisors in the work environment, thus being quite distinct from the notion of supportive job characteristics, and yet still part of the external context. As indicated previously, the concept can be defined in terms of managers understanding and acknowledging subordinates' perspectives, encouraging their autonomy and independence in decision-making, and providing them with relevant information such as constructive feedback that support their feelings of competence (Deci et al, 1994; Gagné and Deci, 2005).

The concept of managerial need support has received considerable attention in recent organisational research, with a large number of studies substantiating its positive impact on need satisfaction and autonomous motivation. Otis and Pelletier (2005), for instance,

examined a sample of police officers and showed that those who perceived their supervisors to be highly supportive of their need for autonomy reported higher levels of self-determined work motivation, which was, in turn, associated with higher intentions to remain in the job and fewer perceived daily hassles. Similarly, Williams et al (2014) showed that managerial need support is positively linked with autonomous motivation, and that this, in turn, is negatively related to undesirable work outcomes such as emotional exhaustion, turnover intention and somatic symptom burden (i.e. the experience of physical symptoms without a medical explanation). Nie et al (2015) correspondingly investigated a sample of public sector teachers in China, looking specifically at the relationship between perceived need support and different types of motivation and well-being. Consistent with SDT predictions and in line with prior research, they found perceived autonomy support to be positively related to autonomous motivation, and negatively related to external regulation and amotivation. Furthermore, autonomy support predicted job satisfaction, and was further negatively related to work stress and ill symptoms, both directly, and indirectly through the respective mediating roles of autonomous and external motivation. In a more recent meta-analytical review, Slemp et al (2018) found leader autonomy support to predict need satisfaction, autonomous work motivation and positive work outcomes, and to be unrelated to controlled work motivation. Interestingly, correlations became increasingly positive with the more integrated forms of work motivation, thus brining further support to the importance of supportive settings for facilitating behaviour internalisation.

Further evidence regarding the beneficial role of supportive work climates comes from studies examining the motivational impact of transformational vs transactional leadership, which similarly show that high-quality relationships between leaders and subordinates (such as in the case of transformational leadership) tend to facilitate psychological need satisfaction and autonomous motivation. Hetland et al (2011), for instance, found that transformational leadership was strongly and positively related to feelings of autonomy, competence and relatedness, whereas management by exception, focused on the active monitoring of employees, was negatively related to basic need fulfilment. Using a wide range of organisations in Germany and Switzerland, Kovjanic et al (2013) similarly examined the impact of transformational leadership on work engagement, task persistence and task performance, and found additional evidence of transformational leadership positively affecting such outcomes through the mediating role of basic need satisfaction. In addition, Wang and Gagné (2013) subsequently revealed perceptions of transformational leadership to be related to autonomous work motivation for employees in both China and

Canada, thus further substantiating the role of managerial need support beyond the impact of cross-cultural characteristics.

It appears, therefore, that contextual factors such as job resources and supportive social climates are important not only for supporting basic need fulfilment and autonomous work motivation, but also for predicting favourable effects such as work engagement, performance and job satisfaction, and limiting negative outcomes including burnout, stress, turnover intentions and psychological ill-being. Yet SDT suggests that contextual factors are not the only ones conducive to such effects. In fact, one of the assertions of SDT is that certain person-specific factors, known as general causality orientations, can additionally influence the process of behaviour internalisation. This represents the focus of discussion in the subsequent section of this chapter.

3.2.4. Person-specific factors affecting intrinsic motivation and behaviour internalisation – the role of general causality orientations

One of the assertions of SDT is that certain intrapersonal factors known as general causality orientations can impact need satisfaction and autonomous motivation *independently* of the degree of need support resulting from contextual variables (e.g. Baard et al, 2004; Su and Reeve, 2011). Divided into autonomy, controlled, and impersonal orientations, these are understood as relatively enduring aspects of personality, and theorised to exist within each individual to some degree. According to SDT, individuals that are autonomy-oriented "seek to engage in actions and behaviours out of choice and self-determination" and are likely to exhibit higher levels of intrinsic motivation (Hagger and Chatzisarantis, 2011, pp.485-486). They are oriented toward aspects of the environment that are optimally challenging and provide informational feedback, in other words aspects of the environment which are need supportive and intrinsically motivating. A controlled orientation, in contrast, is characterised "as a tendency to experience actions as controlled by external pressuring events", and to be driven by interventions such as rewards, deadlines, and other external incentives (Hagger and Chatzisarantis, 2011, p.486). When people are high in the controlled orientation, they tend to display more external and introjected forms of regulation, and will generally allow external judgement and contingencies to guide their actions, rather than their own values and interests (Ryan and Deci, 2018). Finally, impersonal orientations assess "the extent to which a person believes that attaining desired outcomes is beyond his or her control and that achievement is largely a matter of luck or fate" (Moller and Deci, 2009, p.46). In this sense, the impersonal orientation resembles an external locus of control, as individuals with this

causality predisposition tend to orient themselves towards *obstacles* to goal attainment, having little ability to cope with demands or changes (Ryan and Deci, 2018).

Regarding the available empirical research on general causality orientations, organisational studies have mainly focused on the impact of autonomy vs controlled causality orientations, showing that the former is relatively more need supportive and effective in predicting self-determined forms of motivation. Baard et al (2004), for example, was one of the first studies to examine the effect of autonomy causality orientations in the workplace, and showed that individuals' autonomy orientations predict satisfaction with the three basic needs independently from perceptions of managerial need support. In other words, those with higher autonomy causality orientations experienced greater need satisfaction (and in turn, greater psychological adjustment and more positive performance evaluations), independent of their social context. Lam and Gurland (2008) later examined the differential effects of autonomy vs controlled orientations in workplace settings, and showed that autonomy causality orientations are positive predictors of self-determined motivation (and in turn, job satisfaction and organisational commitment), whereas the opposite was observed for controlled orientations. In addition, Su and Reeve (2011) conducted a meta-analysis to determine the effect of training intervention programmes designed to help people become more need supportive, and showed not only that intervention programmes were indeed effective overall (thus supporting previous assumptions regarding the importance of contextual need support), but even more interestingly, that the programmes were relatively more effective when offered to individuals with an autonomy, rather than a control causality orientation.

Regarding studies examining the role of impersonal causality orientations, there is evidence to suggest that this type of orientation is generally the least healthy and effective, being associated with social anxiety, depressive symptoms, learned helplessness and lower self-esteem (Deci et al, 1985b; Koestner and Zuckerman, 1994). Nevertheless, few studies have looked at the effect of such orientations in the workplace-related contexts, largely suggesting that they are 'less relevant' in relation to motivation (e.g. Hagger and Chatzisarantis, 2011; Lam and Gurland, 2008). Yet considering the harmful effects of such predispositions, it becomes difficult to justify the lack of research surrounding impersonal orientations in workplace settings. For example, depression, anxiety and learned helplessness are likely to lead to unproductive behaviours, sick leave and absenteeism (e.g. Clumeck et al, 2009; Wedegaertner et al, 2013), and yet organisational research on the influence of impersonal orientations in predicting such outcomes is currently limited. In addition, we know little of

the role of need satisfaction in mediating these outcomes, thus indicating the need for more research in the field.

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To sum up the previous sections of this chapter, SDT literature brings an important contribution to the motivation literature in terms of acknowledging the impact of both contextual and intrapersonal factors in facilitating need satisfaction, autonomous forms of motivation (including intrinsic motivation), and related well-being and performance outcomes. Perhaps even more importantly for the purposes of this research, SDT further suggests that these supportive factors may also pay a role in moderating the undermining effect of extrinsic incentives. That is, to the extent to which rewards are provided in a supportive, need fulfilling context, the undermining effect is argued to be less pronounced (Ryan and Deci, 2018; Ryan et al, 1983). It should be noted, however, that compared to the abundant literature on factors affecting need satisfaction and behaviour internalisation more generally, relatively fewer studies have used the assumptions of this framework to empirically test for the impact of performance-contingent pay on intrinsic work motivation. The following section reviews the available evidence regarding the effect of performance-contingent incentives in self-determination research, and offers an account of the gaps still present in the existing rewards literature.

3.3. The case of pay-for performance in self-determination research – current knowledge and gaps in the literature

In the self-determination literature, there are several recent studies investigating the need frustrating/undermining impact of extrinsic rewards in both experimental settings (e.g. ; Hagger and Chatzisarantis, 2011; Muraven et al, 2007; Parker et al, 2019; Thibault Landry et al, 2019) and organisational settings (e.g. Hewett and Conway, 2016; Hewett and Leroy, 2019), as well as meta-analytical research (e.g. Cerasoli et al, 2014; 2016). In general, the majority of these studies bring robust evidence regarding the controlling effect of performance-contingent rewards, with relatively fewer studies examining the conditions which could help mitigate the undermining effect and lead to more positive outcomes.

To give just a few examples, Muraven et al (2007) examined the relationship between reward contingency and performance in a self-control experimental task, and found that participants who were given performance-contingent rewards performed more poorly on a subsequent test of self-control than participants who were given non-contingent rewards. In meta-

analytical research, Cerasoli et al (2014) examined findings from school, work, and physical domains, and showed that the relationship between intrinsic motivation and performance was stronger in the presence (rather than absence) of extrinsic rewards, particularly in workplace contexts. Nevertheless, intrinsic motivation was less important to performance when incentives were directly contingent on performance, compared to rewards indirectly linked to performance. In other words, while incentives and intrinsic motivation can be used in conjunction to improve performance, the more salient the incentives, the more they will crowd out intrinsic motivation. Cerasoli et al (2016) then conducted a second meta-analysis where they further explored the role of need satisfaction in relation to incentives and performance. What they showed was that need satisfaction is indeed strongly related to performance, whereas the provision of incentives per se has little impact on need satisfaction. What seems to matter more is again the salience of these incentives, such that when incentives were directly tied to performance, they tended to undermine need satisfaction, whereas those that were less directly linked to performance actually boosted need satisfaction.

These findings appear to be further supported in more recent studies conducted in organisational settings. For instance, Kuvaas et al (2016) examined the motivational effect of pay-for-performance schemes for a sample of salespeople in a Norwegian insurance company, and showed these to be related to controlled motivation, rather than autonomous (intrinsic and identified) motivation. These relationships, in turn, predicted higher turnover intentions and decreased work effort, and while this study did not consider the explicit role of basic need satisfaction in mediating these relationships, the overall results seem to support the undermining hypothesis of reward contingency. In addition, Kuvaas et al (2017) later assessed the different ways in which base pay and variable pay relate to social and economic exchange relationships and revealed that base pay was positively related to a social exchange relationship, whereas the amount of variable (performance-contingent) pay was positively related to an economic exchange relationship. While need satisfaction was not considered in this study either, it is possible that the transactional nature of performance-contingent pay will negatively affect perceptions of autonomy and competence as employees are compelled to perform only in return for external gains, and only to the level required for receiving the reward. In addition, perceptions of relatedness may equally be damaged due to lower "personal-based trust" (Kuvaas et al, 2017, p.6) that characterises economic exchange relationships.

Yet notwithstanding the important contributions these studies have brought in terms of uncovering the underlying mechanisms explaining the undermining effect, an argument could be made that the current SDT reward literature is still limited in important respects – particularly in relation to investigating the main factors affecting the link between performance-contingent pay and psychological need satisfaction. Considering the abundant literature documenting the positive impact of intrinsic job characteristics, managerial support and causality orientations towards autonomy rather than control, the fundamental question that follows is whether such factors could reflect a supportive enough environment for performance-contingent pay to crowd in, rather than crowd out, intrinsic motivation. The current literature, however, is silent in this regard, as I explain below.

First, while the notion that intrinsically motivating job characteristics have a positive effect in promoting need satisfaction has already received empirical support (e.g. Gagné et al, 1997; van Hooff and van Hooft, 2017), the role of work design in moderating the relationship between performance-contingent pay and intrinsic motivation at work is not currently well understood. In fact, while several meta-analyses (e.g. Cerasoli et al, 2014; Weibel et al, 2010) assume performance-contingent rewards to be better suited to repetitive, dull and boring tasks, i.e. those that are not intrinsically motivating, an alternative hypothesis has been put forward by Hennessey and Amabile (2010), who argue that performance rewards have a boosting effect on performance when intrinsic motivation is already strong. According to them, "rewards can actually enhance intrinsic motivation and creativity when they confirm competence, provide useful information in a supportive way, or enable people to do something that they were already intrinsically motivated to do" (p.581). This indeed comes close to the theoretical predictions regarding the positive effect of performance-contingent rewards in contexts where people have sufficient need support. In light of these conflicting hypotheses, Gerhart and Fang (2015, p.514) made a call for further research in this area, stating that more studies are needed to determine whether intrinsically motivating jobs will induce a motivation crowding out effect or whether, on the contrary, they will tend to boost the effects of pay-for-performance on intrinsic motivation.

In relation to managerial support, the literature appears to be somewhat better developed, although no studies to date, to the best of my knowledge, have specifically considered the moderating role of managerial need support in the relationship between performance-contingent rewards and need satisfaction/intrinsic motivation. What extant research has focused on instead is the ways in which rewards are presented and the corresponding perceptions they elicit. Thibault Landry et al (2017), for example, showed that it is not

necessarily the amount of cash rewards that predicts basic need (dis)satisfaction, but rather the ways in which the rewards are interpreted and perceived. To the extent that rewards had an 'informational functional significance' and were seen as supportive of individuals' efforts and participation in their work activities, strong associations were observed in relation to autonomy need satisfaction, self-determined motivation and subsequent measures of well-being, performance, and organisational commitment. On the other hand, when rewards were seen as a means for managers to coerce employees into meeting organisational requirements, i.e. when they had a 'controlling functional significance', they led not only with lower feelings of autonomy need satisfaction, but to experiences of basic need *frustration* as well. In other words, not only did the controlling significance reduce feelings of need satisfaction, but it further led to maladaptive feelings of oppression and inadequacy at work. These results are furthermore supported by more recent research such as Thibault Landry et al (2019) who showed in two experimental studies that rewards presented in an autonomy-supportive manner led to greater need satisfaction, intrinsic motivation and performance, whereas rewards presented in a controlling manner led to need frustration and extrinsic motivation. Yet in spite of the important developments these studies have brought in our understanding of the functional significance of rewards, further research is needed to investigate how the work climate more generally can influence reward perceptions, and furthermore, if and how this differs from the influence of job design and individual differences.

The current literature is furthermore underdeveloped regarding the effect of specific causality orientations that would allow performance-related pay to be perceived either as a simple mechanism of management control, or alternatively, as a useful initiative to help employees attain self-imposed performance goals. For example, although such factors have been found to affect perceptions of need satisfaction (e.g. Baard et al, 2004), the ways in which these causality orientations interact with reward contingencies to determine intrinsic motivation has received very little empirical consideration overall. In fact, the only available evidence in this regard is a study by Hagger and Chatzisarantis (2011), who examined the role of autonomy and control orientations in moderating the impact of performance-contingent rewards on the time spent on an interesting experimental task. In this study, control-oriented participants assigned to a reward condition tended to exhibit lower levels of intrinsic motivation compared to a group that did not receive any rewards, however autonomy-oriented participants showed no differences in intrinsic motivation levels across the two reward conditions. This study thus brings important evidence to the notion that an autonomy-oriented causality orientation may offer a degree of 'protection' from the undermining effect of rewards on intrinsic motivation (Hagger and Chatzisarantis, 2011).

Nonetheless, the experimental nature of this research limits its applicability to the work domain and does not allow for an understanding of the explicit role of psychological needs satisfaction in mediating this effect.

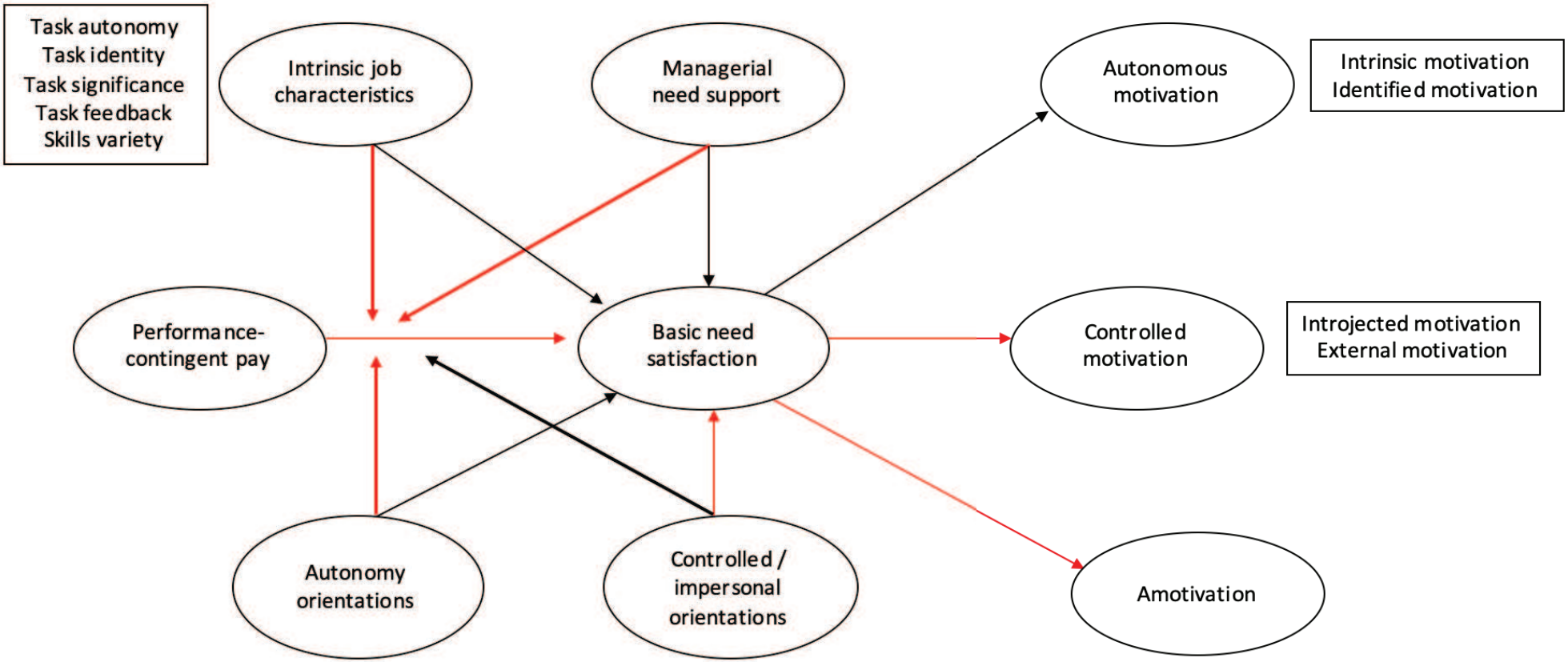
In sum, a major gap in the extant self-determination literature is related to the general lack of consideration to the way in which the relationship between performance-contingent rewards and basic need satisfaction is simultaneously affected by job characteristics, managerial support and individual differences. In organisational reality, the performance management process does not operate in isolation from these factors, and yet few studies have empirically considered the joint effect of these contextual and individual-level variables on perceptions of need support in the presence of performance-contingent rewards. The aim of the present thesis is thus to address these important gaps in the literature and examine the joint influence of key socio-contextual and person-specific factors affecting the relationship between performance-contingent incentives and work-related need satisfaction. This research is indeed called for, with authors such as Lam and Gurland (2008, p. 1114) suggesting that future SDT work should examine "social-contextual inputs together with individual difference variables". In mapping the range of factors moderating the motivation crowding out effect, this paper represents an important step towards clarifying the conceptual debate on the role of performance incentives in contemporary organisations, promoting a more in-depth understanding of the conditions when intrinsic motivation is supported vs hindered by external interventions.

3.4. Conceptual model of the thesis and hypotheses development

The conceptual model of the present thesis is presented in Figure 3-2. In line with previous research, this study starts from the premise that psychological need satisfaction is more positively related to autonomous work motivation, compared to controlled motivation. Furthermore, building on the existing body of literature, this study assumes that performance-contingent rewards will have, on average, a negative effect on basic need satisfaction (particularly autonomy and relatedness need satisfaction) due to the salient nature of these incentives, i.e. the fact that they are closely linked to specific performance standards that are externally-determined. Nevertheless, by including variables such as job design, managerial need support and individual causality orientations, this thesis goes beyond previous literature by acknowledging the joint influence of environmental and individual-level factors in mitigating this undermining effect. In other words, the proposed conceptual model assumes performance-contingent rewards to support, rather than

undermine, basic need satisfaction, provided that they are offered in supportive contexts, and that employees are sufficiently autonomous in their individual causality orientations. The sub-sections below will individually consider each of the hypotheses of the present study, and will explain how several of these hypotheses aim to address existing gaps in the current SDT literature.

Figure 3 - 2: Conceptual model illustrating the range of factors affecting basic need satisfaction and motivation at work



Note: bolded lines represent moderating relationships; red lines represent negative relationships.

3.4.1. The relationship between basic need satisfaction and work motivation

Considering the arguments that need fulfilment is key to facilitating more internalised forms of regulation, and in light of previous empirical results (e.g. van Hooff and van Hooft, 2017), this study starts from the premise that satisfaction with the needs for autonomy, competence and relatedness will be positively related to autonomous motivation, i.e. intrinsic and identified motivation, and negatively related to controlled forms of motivation at work, i.e. introjected and external motivation. Although it has been suggested that autonomous motivation could also impact feelings of need satisfaction, thus indicating reverse causality, a recent longitudinal study by Olafsen et al (2017) actually found that it is need satisfaction which predicts work motivation over time, rather than the opposite. The argument offered to explain these findings is that in contrast to other contexts where intrinsic enjoyment of an activity is more 'at hand' (e.g. sports), in the work domain employees will be relatively less intrinsically motivated and will thus require a higher degree of need support and need satisfaction to facilitate their autonomous motivation (Olafsen et al, 2017). While the present research does not allow for any predictions of causality due to its cross-sectional design, it relies on this longitudinal research as well as prior studies (e.g. Baard et al, 2004; De Cooman et al, 2013; Richer et al; 2002; van Hooff and van Hooft, 2017) in positing the following assumptions:

H1a: Satisfaction with the needs for autonomy, competence and relatedness will have a positive effect on autonomous forms of motivation at work, i.e. intrinsic and identified regulation.[9]

H1b: Satisfaction with the needs for autonomy, competence and relatedness will have a negative effect on controlled forms of motivation at work, i.e. introjected and external regulation.

In addition, the present study assumes that basic need satisfaction will safeguard against lack of motivation in the workplace. To the best of my knowledge, only a few studies so far (e.g. Gagné et al, 2015) have examined the link between need satisfaction and amotivation in workplace settings. As such, this research contributes to further advancing our knowledge

[9] I am not including integrated regulation as a form of autonomous motivation in this study, given that previously published scales (e.g., Mallett et al, 2007) show that it is difficult to separate integrated motivation from identified and intrinsic motivation subscales.

in the field by proposing that individuals who feel self-determined, competent and connected with others at work will be less likely to experience amotivation:

H1c: Satisfaction with the needs for autonomy, competence and relatedness will have a negative effect on amotivation.

3.4.2. The relationship between reward contingency and basic need satisfaction

Following the assumptions of CET and SDT, this study starts from the premise that performance-contingent rewards will tend, *on average*, to undermine an individual's satisfaction with the need for autonomy. In other words, when not considering the intervening effect of specific socio-contextual or person-specific moderators, it is predicted that the salience of performance-contingent rewards will thwart an individual's satisfaction with the need for self-determination, prompting a shift in an individual's locus of causality from internal to external. As such, individuals will experience feelings of pressure and tension in performing the task, and their need for autonomy will be frustrated, rather than satisfied:

H2a: Performance-contingent rewards will have a negative effect on autonomy need satisfaction at work.

On the other hand, performance-related pay has previously been hypothesised to have a positive informational effect with regards to an individual's abilities and skills. By definition, performance-contingent rewards are only provided as a result of "reaching a specific performance standard" (Ryan and Deci, 2018, p.132), and as such, they are hypothesised to lead to greater satisfaction with the need for competence (Grandey et al, 2013). This study adopts the same perspective, and posits that the higher the level of performance-related pay received, the greater one's feelings of self-efficacy in the job:

H2b: Performance-contingent rewards will have a positive effect on competence need satisfaction at work.

Regarding the role of performance-contingent rewards in relation to relatedness need satisfaction, the empirical SDT literature is generally less developed, however an argument could be made that performance-related pay can damage supportive relationships in the workplace. Previous studies outside of the SDT arena have shown, for instance, that incentive schemes which reward employees based on their individual performance can

indeed increase competition in the organisation (Deutsch, 1985), leading to lower levels of organisational commitment (e.g. Deckop et al, 1999), disregard for unrewarded, yet important tasks (e.g. Prendergast, 1999), and in some cases, lower levels of individual and organisational performance (e.g. Bloom, 1999; Shaw et al, 2002). Furthermore, even in situations where performance-related pay is provided on the basis of group performance, it could still affect feelings of collegiality if team members are not perceived to contribute equally to the task. To the best of my knowledge, however, these assumptions have not been empirically tested from the perspective of SDT, and more research is required to examine the effect of performance-related pay schemes in relation to relatedness need satisfaction. In an attempt to address this gap in the literature, this study adopts the proposition that:

H2c: Performance-contingent rewards will have a negative effect on relatedness need satisfaction at work.

3.4.3. Moderating factors of the relationship between performance-contingent pay and basic need satisfaction

3.4.3.1. Job characteristics

Work design is the first key factor that will be considered in the present thesis as a moderator to the relationship between performance-contingent rewards and basic need satisfaction. While several models of job design have previously been studied in the SDT literature, including considerations related to job demands, resources, challenges and hindrances (e.g. Olafsen and Frølund, 2018; Van den Broeck et al, 2008), this study will draw on Hackman and Oldham's (1976) JCM, which offers a relatively more systematic approach to operationalising the notion of a supportive job context. Within JCM, there are well-defined theoretical links between opportunities for autonomy in decision making and autonomy need satisfaction; effective feedback / skills variety and competence need satisfaction; and a sense of task significance and relatedness need satisfaction (Deci et al, 2017). However, to the best of my knowledge, the explicit effects of intrinsic job characteristics in relation to each of the three different types of need satisfaction have not been explored in empirical research as of yet. In addressing this research gap, this study adopts the following hypothesis:

H3a: Supportive job characteristics will have a positive effect on autonomy, competence and relatedness need satisfaction.

Furthermore, in line with SDT arguments that supportive context will lead to greater behaviour internalisation and thus more autonomous forms of regulation, it is assumed that intrinsic job characteristics will be related to work motivation in an integrated fashion, i.e. positively related to autonomous forms of motivation, and negatively related to controlled forms of motivation. This study thus builds on prior literature documenting the direct link between supportive job characteristics and autonomous motivation (e.g. De Cooman et al, 2013; Millette and Gagné, 2008; Olafsen and Halvari, 2017) but goes one step further in examining the impact of supportive contexts on controlled types of motivation as well. In addition, this research assumes intrinsic job characteristics to further prevent against lack of motivation in the workplace, creating an environment that facilitates, rather than hinders, intentional regulation. As such, the following propositions are put forward:

H3b: Supportive job characteristics will have a positive effect on autonomous forms of motivation, i.e. intrinsic and identified regulation.

H3c: Supportive job characteristics will have a negative effect on controlled forms of motivation, i.e. introjected and external regulation.

H3d: Supportive job characteristics will have a negative effect on amotivation.

Furthermore, the premise of this study is that a supportive job context which offers opportunities for autonomy in decision making, the use of different skills, effective feedback, and a sense of significance and identity in the job will help moderate the negative effect of performance-contingent pay on basic need satisfaction, and implicitly, on intrinsic motivation. In other words, performance-related pay will not be experienced as a pure control mechanism in such contexts, and will be seen as a way to further promote, rather than undermine, work-related basic need satisfaction. Therefore, the following hypothesis is adopted:

H3e: Supportive job characteristics will moderate the effect of performance-contingent rewards on basic need satisfaction in the workplace, such that performance-contingent rewards will have a more positive effect on feelings of autonomy, competence and relatedness in jobs high in intrinsic characteristics, compared to jobs low in intrinsic characteristics.

3.4.3.2. Managerial need support

As discussed in the previous sections of this chapter, job characteristics are not the only contextual factor argued to affect behaviour internalisation. In self-determination research, managerial need support is regarded as an equally important component of a supportive workplace context, and consequently, a second key predictor of basic need satisfaction and autonomous work motivation (e.g. Deci et al, 2017; Gagné and Deci, 2005; Nie et al, 2015; Otis and Pelletier, 2005; Williams et al, 2014). While assumed to act in similar ways to job-related characteristics, the notion of managerial need support refers to the *interpersonal* climate associated with the work environment, indicating the importance of examining both components in empirical research (Baard et al, 2004). It is true that self-determination research has also documented the positive role of colleague need support, in addition to managerial need support (Moreau and Mageau, 2012). However, for the purposes of this study, managerial need support is considered to be more relevant for moderating the undermining effect, as it is managers who are in charge of the performance appraisal process and decisions related to the provision of performance bonuses. In line with the predictions put forward in relation to the need fulfilling and motivational role of intrinsic job characteristics, similar hypotheses are adopted when considering the role of managerial need support:

H4a: Managerial need support will have a positive effect on autonomy, competence and relatedness need satisfaction.

H4b: Managerial need support will have a positive effect on autonomous forms of motivation, i.e. intrinsic and identified regulation.

H4c: Managerial need support will have a negative effect on controlled forms of motivation, i.e. introjected and external regulation.

H4d: Managerial need support will have a negative effect on amotivation.

Regarding the specific role of managerial need support in moderating the motivation crowding out effect, this research builds on the recent work of Thibault Landry and colleagues (e.g. 2017; 2019) as well as prior research by Ryan et al (1983), and predicts that rewards provided in an autonomy supportive manner will encourage individuals to become more attuned to the informational, rather than the controlling functional significance of rewards, thus further increasing their intrinsic motivation. Otherwise stated, when managers

are supportive of employees' needs for autonomy, competence and relatedness, performance-contingent incentives will be perceived as a helpful tool to become more engaged in their tasks, to further demonstrate their competence, and in some cases, to better relate to managers and peers, given that managerial support would arguably allow employees to further appreciate and internalise the value of their efforts and performance for the wider organisation. It is therefore assumed that:

H4e: Managerial need support will moderate the effect of performance-contingent rewards on basic need satisfaction in the workplace, such that performance-contingent rewards will have a more positive effect on feelings of autonomy, competence and relatedness under perceptions of high need support, compared to perceptions of low need support.

3.4.3.3. General causality orientations

Finally, regarding the role of general causality orientations, this study follows the SDT assumptions that individual orientations towards autonomy will have a positive effect on need satisfaction, whereas control and impersonal orientations will have a negative effect on need satisfaction. This is because individuals who are oriented towards aspects of the environment that stimulate intrinsic motivation will often engage in experiences that fulfil their need satisfaction in the process. In contrast, individuals high in controlled and impersonal orientations will either rely on external interventions to energise their behaviours, or alternatively, feel anxious and ineffective in their interactions with the environment (Ryan and Deci, 2018), indicating that in both cases, their needs for autonomy, competence and relatedness will be thwarted, rather than satisfied. As such, the following hypotheses are adopted:

H5a: A predominantly autonomous causality orientation will have a positive effect on autonomy, competence and relatedness need satisfaction.

H5a: A predominantly controlled causality orientation will have a negative effect on autonomy, competence and relatedness need satisfaction.

H5c: A predominantly impersonal causality orientation will have a negative effect on autonomy, competence and relatedness need satisfaction.

In addition, this study assumes that the three types of causality orientations will relate differently to different forms of motivation. While autonomy causality orientations are

predicted to lead to autonomous motivation by allowing people to take responsibility for their behaviour and seek activities that are interesting and challenging (Ryan and Deci, 1985b), controlled causality orientations will likely be associated with introjection and external motivation, prompting individuals to more readily respond to ego-involvements as well as the directives of others (Ryan and Deci, 2018b). Furthermore, impersonal causality orientations are assumed to predict a general lack of motivation, leaving people feeling helpless, incapable to perform, or failing to see the link between their efforts and desired outcomes (Ryan and Deci, 2018b). It is therefore projected that:

H5d: A predominantly autonomous causality orientation will have a positive effect on autonomous motivation at work, i.e. identified and intrinsic motivation.

H5e: A predominantly controlled causality orientation will have a positive effect on controlled motivation at work, i.e. introjected and external motivation.

H5f: A predominantly impersonal causality orientation will have a positive effect on amotivation at work.

Regarding the role of general causality orientations in moderating the motivation crowding effect, the present research assumes, in line with prior literature, that there are important interactions between environmental contingencies and individual orientations that may influence intrinsic motivation in particular contexts (Deci and Ryan, 1985b; Koestner and Zuckerman, 1994). Specifically, this study proposes that individual orientations towards autonomy will help moderate the undermining effect of extrinsic incentives, allowing individuals to interpret performance-contingent rewards as supportive of their three basic needs, and consequently, of their intrinsic motivation. On the other hand, individual orientations towards control and amotivation are assumed to further increase the negative effect of performance-contingent rewards on feelings of autonomy, competence and relatedness at work, and therefore, to further affect intrinsic motivation. In advancing these propositions, the current research builds upon previous studies such as Hagger and Chatzisarantis (2011) while further considering the mediating role of need satisfaction in predicting intrinsic motivation at the intersection of external contingencies and individual predispositions. The following hypotheses are put forward:

H5g: A predominantly autonomous causality orientation will moderate the effect of performance-contingent rewards on basic need satisfaction in the workplace, such that

performance-contingent rewards will have a more positive effect on feelings of autonomy, competence and relatedness for individuals high in the autonomous causality orientation, compared to individuals low in this type of orientation.

H5h: A predominantly controlled causality orientation will moderate the effect of performance-contingent rewards on basic need satisfaction in the workplace, such that performance-contingent rewards will have a more negative effect on feelings of autonomy, competence and relatedness for individuals high in the controlled causality orientation, compared to individuals low in this type of orientation.

H5i: A predominantly impersonal causality orientation will moderate the effect of performance-contingent rewards on basic need satisfaction in the workplace, such that performance-contingent rewards will have a more negative effect on feelings of autonomy, competence and relatedness for individuals high in the impersonal causality orientation, compared to individuals low in this type of orientation.

3.5. Conclusion

To conclude, Chapter 2 has introduced the intrinsic/extrinsic dichotomy, and has reviewed the key literature regarding the relationship between extrinsic performance-contingent rewards and intrinsic motivation, presenting evidence in favour of both a positive 'crowding in' effect of external incentives, as well as evidence in favour of a negative 'crowding out' effect. It has critically discussed the key theoretical perspectives that have been advanced to explain the differential effects, specifically self-perception theory, the over-justification effect and motivation crowding theory, and has exposed the key limitations of these frameworks in terms of effectively explaining the positive vs negative motivational impact of extrinsic incentives. Chapter 3 has then introduced the key assumptions of self-determination theory, suggesting that this perspective may be more suitable for reconciling the main inconsistencies in extant literature. Specifically, Chapter 3 has introduced the notion that external interventions need not be detrimental to intrinsic motivation if internalised through the help of supportive contextual and intrapersonal factors. Literature documenting the positive effects of such supportive factors has then been reviewed in terms of predicting need satisfaction, autonomous motivation as well as individual and work-related functioning. The following sections then reviewed extant research considering the motivational impact of performance-contingent rewards from a self-determination perspective, highlighting the key gaps still present in the literature. The chapter then

concluded with an account of the important ways in which the present research aims to address some of these important gaps, introducing the conceptual model of the thesis and the main hypotheses of this study.

CHAPTER 4

METHODOLOGY

4.1. Introduction

This chapter introduces the methodology of the present research, beginning with an overview of the positivist philosophy underpinning the strategy for inquiry adopted in this study. It then discusses several considerations related to the cross-sectional design of this research, and explains why the use of web-based self-administered questionnaires was deemed to be an appropriate research method to facilitate answers to this study's main research question. Decisions related to the recruitment of participants are then reviewed, before discussing the development and administration of the questionnaire itself, as well as the demographic characteristics of participants taking part in the study.

4.2. Research philosophy

Before presenting the general research design of the present thesis, it is important to first provide an overview of the research philosophy adopted. The notion of a research philosophy refers to a set of common beliefs and assumptions regarding what constitutes reality (ontology), the type of knowledge accepted within this reality (epistemology) and the position of the researcher in the enquiry process (axiology) (Hughes and Sharrok, 1997). According to Bryman (2003), it is these assumptions that influence not only the types of questions being investigated, but also the methodology used, and the type of knowledge produced. In relation to the present study, I adopt a positivist research philosophy, broadly defined as the position which accepts that the social world exists externally, independent of social actors, and that its properties should be measured through objective methods, rather than through subjective inferences (Benton and Craib, 2011; Easterby-Smith et al, 2012). In this section, I first consider the underlying ontological, epistemological and axiological assumptions of positivism from a general, theoretical perspective, and then discuss how this paradigm applies to my own research question.

In general terms, ontology refers to the nature of existence and reality (Gray, 2014). At one end of the ontological spectrum, which is known as subjectivism, there is view that reality is experienced differently by different people, and that scientific laws are socially created (Easterby-Smith et al, 2012). Under the assumptions of subjectivism, there is no 'one' objective reality, but rather multiple realities, which are shaped by different individuals

through their subjective experiences. At the other extreme lies objectivism, which assumes that the world is concrete and external, and that the objects of research exist independently of the observer. In other words, reality can be measured objectively, and the general laws governing reality can be scientifically determined. The positivist paradigm adopts this latter position, thus admitting the possibility of studying an objective and value-free reality. To this end, the aim is to uncover 'scientific' laws which are assumed to apply universally, irrespective of how different individuals perceive them. In consequence, the ability of the study to enable generalisable knowledge through logical proofs becomes paramount.

Epistemology is the second key component to discuss in relation to the philosophical stance of this study, and it refers to the researcher's view of what constitutes acceptable knowledge and "the best ways of inquiring into the nature of the world" (Easterby-Smith et al, 2012, p.60). At one end of the epistemological spectrum lies social constructionism, which, building on the assumption that reality is socially constructed and given meaning to by people (Easterby-Smith et al, 2012), seeks to generate fresh insights from individual subjective experiences, rather than test the general applicability of pre-determined hypotheses. To this end, research methods such as interviews and focus groups that seek to uncover deeper meanings and insights from the study participants are considered most appropriate, revealing individual perspectives that the more objective means of enquiry would otherwise not be able to probe into. At the other extreme, the positivist epistemology assumes that the outcome of research should be generalisations similar to those produced by the natural sciences (Benton and Craib, 2011; Hughes and Sharrock, 1997). In this sense, positivism maintains that solid knowledge can only be established through empirical experience, and that all inferences about reality should come from studying observable (factual) phenomena (Benton and Craib, 2011). As such, positivism aims to use existing theory to develop hypotheses and test these hypotheses through the rigor and technique of scientific methods, rather than enquire into the nature of subjective experiences. Studies using experimental designs are typical examples of research that adopts this scientific approach, aiming to reveal causal relationships between variables, although studies using inferential surveys also fall under the positivist paradigm.

Finally, the third factor we need to consider in discussing research philosophy - axiology - refers to judgements regarding researchers' own values and their level of engagement at all stages of the research process (Given, 2008). An engaged researcher, for instance, aims to get closer to the objects of study (Easterby-Smith al, 2012). He or she will be part of what is being observed, and, because they cannot be separated from the study, they will be

subjective in their interpretations. This is in line with an interpretivist philosophy which asserts that research is value bound, and thus even the researcher him/herself will shape the nature of what is being examined. Typical examples of involvement include altering the order of questions in an interview, to facilitate the collection of rich insights from participants, and relying on subjective judgements in interpreting qualitative data. In contrast, a positivist philosophy adopts a disengaged position, asserting that research should be undertaken in a value-free way. Positivist researchers therefore maintain an objective stance and strive to be independent from what they are investigating, implying that, in a positivist tradition, even "social facts must be observed from the outside" (Hughes and Sharrok, 1997, p.35). Examples of techniques to ensure such objectivity include collecting measurable, quantifiable data, and having a standardised procedure for data collection (e.g. identical survey questions with very specific response scales to choose from). In addition, positivist researchers rely on value-free approaches to data analysis, such as objective statistical tests for assessing the soundness of the hypotheses put forward.

Having considered the theoretical underpinnings of positivism, and the important ways in which it differs from subjectivism/social constructionism, I will now explain how the present study adopts a positivist stance. Firstly, in relation to ontology, the aim of this research is to uncover questions pertaining to an objective reality, namely the impact of financial rewards on different types of work motivation, and the key variables moderating this relationship. I am thus not interested in studying how the reality of different organisations is socially constructed, but rather the specific factors (including individual-level factors) that independently affect motivation. What is more, this research explicitly seeks to arrive at generalisable results, through the use of a sufficiently large and representative sample.

Secondly, in relation to epistemology, the collected data is used to test several key propositions developed on the basis of previous studies, ultimately serving to further advance the self-determination literature and lead to new hypotheses that can be either confirmed or rejected by future research. In this study, all the relevant concepts are operationalised so as to allow for quantitative measurement, which indeed follows the positivist view that reality can be measured through objective means. In addition, the sample is carefully selected and deemed to be of sufficient size in order to enable generalisation of findings, whereas the methodology itself is highly structured in order to facilitate replication (Gill and Johnson, 2010). Although constructs such as motivation, managerial support, basic needs satisfaction and individual causality orientations are not directly 'observable' per se, the assumption of this study is that there are still valid instruments that allow for the

measurement of these constructs with a high degree of accuracy in order to produce credible findings. In fact, to ensure valid and reliable results, all of the measurement instruments employed in this study are well-validated in prior research, and carefully examined in relation to their psychometric properties, for example though indicators of internal consistency, composite reliability and discriminant validity.

Furthermore, following the axiological assumptions of positivism, the research was undertaken in a value-free way. Through the use of online questionnaires, I was not in direct contact with participants at any one time, meaning that they were not a direct part of what was being observed, and that an objective stance was maintained. The data was also interpreted in a value-free way through the use of objective statistical tests, following well-established protocols that minimised the use of the researcher's judgements in the data analysis process, and ultimately ensured the replicability of findings.

4.3. Research design considerations

The concept of a research design refers to "the plan, structure and strategy of investigation conceived so as to obtain answers to research questions" (Blaikie, 2010, p.37). According to de Vaus (2013, p.9), "the function of a research design is to ensure that the evidence obtained enables us to answer the initial question as unambiguously as possible". In line with the positivist research paradigm, this study employed a cross-sectional survey research design involving online, self-administered questionnaires as the research method for data collection. Several issues had to be considered when planning the design of this research study. First, given the need to examine a complex research model within a relatively limited timeframe, data was collected at one point in time only. While longitudinal studies would have had the advantage of allowing me to get closer to establishing cause and effect relationships between the variables of interest, the complexity of the model was considered to be too prohibitive to be tested at multiple time points. In addition, maintaining the composition of the original sample over an extended period of time would have been difficult to achieve. As such, a cross-sectional design was adopted.

Second, this study followed a quantitative research strategy, which allowed for the discrete measurement of the constructs of interest, as well as the statistical testing of the conceptual model presented in the previous chapter. The aim of using such statistical measures was to determine how well the theoretical model fit the data and which of the hypothesised relationships were supported in the analysis. This was indeed consistent with the main

research objectives of this study, expressed in terms of investigating explicit relationships between several contextual variables and specific dimensions of work motivation. This research was consequently explanatory in nature because it aimed to *explain* a phenomenon (i.e. the undermining effect as moderated by relevant factors) using a set of well-defined theories and hypotheses, rather than *explore* relationships between variables without any prior assumptions.

At the same time, this study followed deductive reasoning because the purpose of the research was to *test* the validity of the theoretical propositions, rather than generate theories from the data (i.e. the premise of an inductive approach). According to Blaikie (2010), there are several steps to conducting deductive research - which this study followed closely, including: a) putting forward a set of hypotheses to inform a theory; b) examining the literature and specifying the exact conditions in which those hypotheses are expected to hold; c) testing the hypotheses using appropriate data to measure and analyse the key concepts and variables; and d) finding support for/ rejecting the initial hypotheses, depending on the results of the analysis of data. The strength of this deductive approach lies in highlighting relationships that might be generalisable to wider contexts, again consistent with the research aims of the present thesis and the assumptions of the positivist paradigm.

The choice of using online self-administered questionnaires as a research method was similarly motivated by several reasons. First, according to Baker (2001), questionnaires are considered one of the most appropriate tools to obtain data for hypothesis testing. By incorporating well-validated scales to measure each of the constructs in the test model, questionnaires allowed not only for assessments of validity and reliability of each construct, but for testing specific assumptions regarding the nature of the proposed relationships (Easterby-Smith et al, 2012; Klassen and Jacobs, 2001). Furthermore, given that all measurement scales were consistent with- or at least highly similar to measures used in prior literature, this particular research design demonstrated scientific rigour and enabled detailed comparisons with prior studies in the field, thus further consistent with positivist assumptions.

In addition, one of the key advantages of web-based questionnaires is their ability to accommodate a large sample size while maintaining, at the same time, a low likelihood of contamination or distortion of the respondent's answers (Das et al 2011). This is indeed in line with the positivist assumptions of research being undertaken in a value-free way, as is the fact that respondents were under less pressure to take part in the study compared to

surveys requiring human contact (Brace, 2004). Furthermore, because I was not present at the time of data collection, there was less social desirability bias (Basi, 1999; Kellner, 2004). Social desirability, as defined by Holtgraves (2004, p. 161), "refers to a tendency to respond in self-report items in a manner that makes the respondent look good rather than to respond in an accurate and truthful manner". This is a particularly important cause for concern when collecting data on sensitive or 'taboo' issues, including compensation (Brace, 2004). In consequence, the use of online questionnaires was deemed to be appropriate given the topic of this research study.

Furthermore, the use of web-based questionnaires had the advantage of including a variety of questions in different formats (e.g. dichotomous, multiple choice, scale, vignettes, and open-ended questions), where I was able to control the sequence of questions, so as to reduce survey bias and ensure that all questions were completed by all participants in the same order (Evans and Mathur, 2005). In addition, this wide range of question formats enabled online questionnaires to have visual appeal, and to keep respondents' attention for a longer time. By involving the respondents more, it was deemed that they would continue to provide good-quality data through to the end of the questionnaire, despite the surveys being rather long (Brace, 2004).

It should be noted, at the same time, that this research design and the choice of this research method are not without limitations. As mentioned previously, the cross-sectional nature of this study prevents us from drawing any strong conclusions regarding cause and effect relationships between the key variables of interest. Yet in light of the multifaceted design of the test model, and considering the more practical limitations of longitudinal research, including participant attrition rates and the need for an extended timeframe, a cross-sectional approach was considered to be suitable for this particular study. In addition, this strategy is further consistent with the fact that most of the extant SDT literature follows the same cross-sectional research design, thus facilitating meaningful comparisons with relevant studies.

As for the choice of using self-administered web-based questionnaires, one of the most important disadvantages refers to the researcher not being available to clarify any potential questions and misunderstanding that participants might have at the time of completing the questionnaires (Brace, 2004). Some measures were therefore adopted to minimise these risks. First, careful attention was paid to the instructions provided in the beginning of the survey as well as in relation to each question block, so as to eliminate confusion regarding the types of answers required in each section. The questionnaire was then pre-tested with

several respondents to assess the quality of the instructions, and several changes were made in response to their suggestions for improvement. In addition, no technical terms were used and detailed explanations were provided whenever questions could have been perceived as unclear. For example, detailed descriptions were provided to clarify what performance-related rewards refer to, and specific examples were provided to help respondents better understand what kind of pay data they should report. Finally, attention checks were introduced to assess the quality of data and to screen out inattentive participants and meaningless responses. A full discussion of the key measures taken to ensure best practice in survey research will be presented in the later sections of this chapter, when considering the specific steps in the administration of the questionnaires. For now, however, it is important to define the target population for the study and the specific sample from which inferences were drawn.

4.4. Sampling strategy

The target population for this research included UK employees in full-time and part-time employment, working across a range of different industries and occupations. At the time of data collection (September – November 2018), approximately 27.4 million people were estimated to be in employment in the UK. This excludes 4.8 million people who were self-employed (Office for National Statistics, 2018a), as self-employed individuals were not part of the population of interest[10]. The choice of studying individuals working in a range of different occupations rather than focusing on one single employment sector was to facilitate the generalisability of findings to the UK working population. Particularly in light of studies such as Georgellis et al (2011) which show evidence for industry effects, a decision was made not to limit the participant sample to a single professional sector and instead attempt to capture a greater diversity of work settings.

In order to gain access to such a diverse sample, participants were recruited through Qualtrics opt-in research panels, which are becoming increasingly used in management research (e.g. Porter et al, 2019). The choice of using Qualtrics was primarily based on the fact that panel members are profiled on a range of demographic details (Ford, 2017), so that I could tap into a diverse group of potential respondents. In line with the objectives stated

[10] There are two main reasons why self-employed people were excluded from the target population. First, it is difficult to think of any meaningful way in which self-employed individuals could self-administer performance-contingent rewards. In addition, they would have failed to respond to questions concerning their relationship with managers, thus omitting an important variable of interest in this study.

above, this offered the important advantage of ensuring greater representativeness of the sample to the wider UK population. In recent studies conducted in Western contexts, Qualtrics was indeed found to provide the most demographically representative samples compared to alternatives such as Amazon's Mechanical Turk (MTurk) and online recruitment via Facebook (Boas et al, 2018). While the selection of participants was still non-random, and thus still prone to bias, in the absence of an appropriate sampling frame (a complete list of all people in employment at the time of data collection to randomly choose from), few other alternatives would have led to the selection of a truly random sample. In addition, issues related to lack of access to diverse industries and organisations further prompted me to adopt non-probability convenience sampling for the recruitment of participants in this research study.

It should be noted that the use of commercial research platforms such as Qualtrics is not without controversy, with several studies identifying concerns such as the issue of non-naïve participants, lower sample representativeness compared to traditional sampling methods, and doubts over data quality such as decreased effect sizes due to respondents taking part in multiple related studies (e.g. Chandler et al, 2015). Nevertheless, more recent papers on the use of online panel data in management research (e.g. Brandon et al, 2014; Cheung, et al, 2017; Crone and Williams, 2017; Goodman and Paolacci, 2017; Porter et al, 2019; Schoenherr, 2015) present substantial evidence explaining how such concerns are either misplaced or how the risks for bad data can be easily mitigated. For example, in relation to the issue of non-naïve participants (also known as professional survey takers) who are assumed to often intuit the purpose of the research, studies have shown that these respondents are rather similar in their response patterns to more 'traditional' survey participants (Buhrmester et al, 2011). In addition, in relation to sample representativeness, a recent meta-analysis by Walter et al (2018) found panel data to be similar to data collected using traditional, conventionally-sourced samples, showing substantively similar effect sizes.

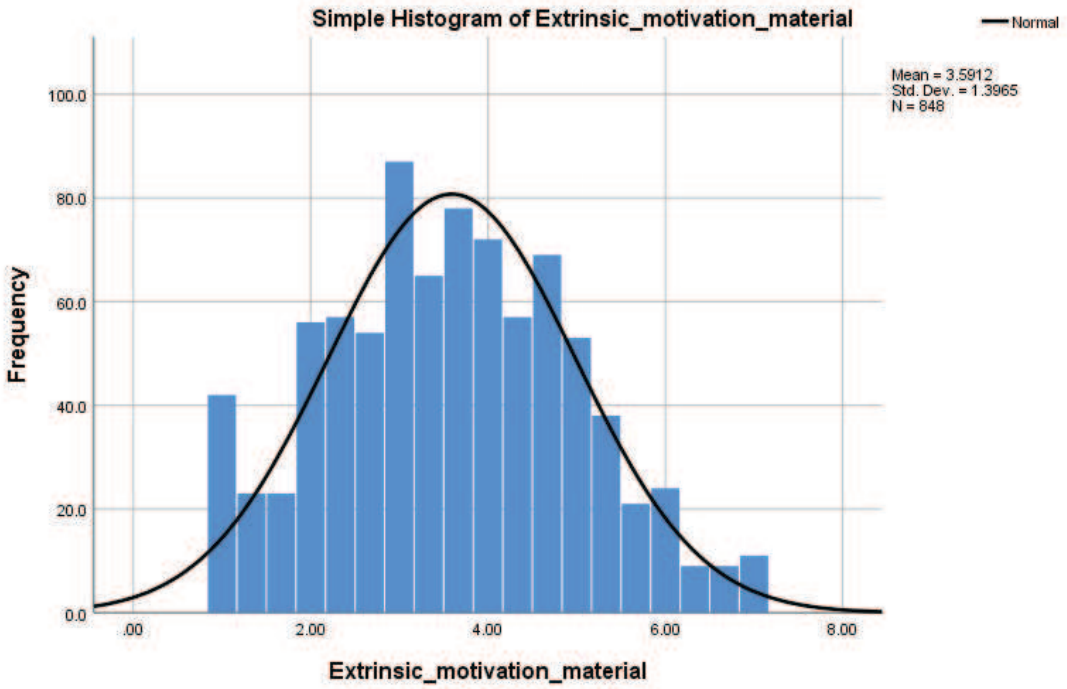
Furthermore, key screening questions can be included in the questionnaire, to identify those respondents who truly match the criteria for inclusion, and ensure that only targeted individuals are surveyed – options which are sometimes missing in the case of more traditional sampling methods. Regarding the issue of bad data, Qualtrics allows for the introduction of a minimum limit to survey completion time, as well as speeding checks and attention checks that automatically screen out inattentive participants (Ford, 2017). In addition, regarding concerns that participants may create multiple survey identities to take

part in the study, Qualtrics allows for the recording of respondents' IP addresses, meaning that potential repeat survey takers can be identified, and duplicate IP addresses can be removed from the final sample (Ford, 2017).

Considering all of these advantages, I decided to proceed with the proposed participant recruitment strategy. A total of 848 responses were collected from two different Qualtrics opt-in research panels. The first panel consisted of 376 participants recruited through gaming apps (e.g. puzzle games, word games, etc.), whereby respondents using the app were invited to take part in the survey and received virtual in-app prizes such as tokens and game points in return. The second data set consisted of 472 participants, who were invited to take part in the survey through e-mail invitations, phone alerts, banners and messages on the panel community sites. These respondents received panel points for completing the questionnaires, which they could later redeem as cash, vouchers and gifts.

The provision of incentives for participants taking part in this research was one of the requirements of using panel data which could not be negotiated, and which ensured fair treatment of respondents in relation to the time taken to complete the questionnaires. It was deemed that this did not pose an issue to the integrity of the sample for several reasons. First, both the overall context in which the rewards provided (i.e. outside of respondents' employment settings) and the very nature of these rewards (e.g. panel points and tokens) were fundamentally different from the incentives examined in the present research study – i.e. performance-related financial rewards provided in work contexts. Second, the use of data from two different panels ensured that the final sample included people with a diversity of motivations to take part in the research. Third, histograms examining respondents' extrinsic motivation for material gains did not show deviance from a normal distribution (Figure 4-1), thus further substantiating the notion that participants were not biased towards obtaining material benefits. The next section of this chapter details the development of the questionnaire employed in this study.

Figure 4 - 1: Normal distribution of extrinsic motivation



4.5. Questionnaire development and variable measurement

The questionnaire employed for data collection was developed from instruments extensively used and validated in prior research. Before deciding on the final scale for measuring each key variable, a number of different scales were evaluated and compared on the basis of several important criteria, for example how well the instruments reflected the theoretical definitions of constructs, the clarity and consistency of the items employed, and the number of items used in measuring each construct dimension (Hinkin, 1998; Maydeu-Olivares and McArdle, 2003). The responses were an intended mix of 7-point anchored Likert scores and answers to multiple choice and open-ended questions, which then provided the basis for the structural equation modelling (SEM) analysis. All questions employed, in the order they appeared in the survey, are presented in Appendix 1. This section outlines the operationalisation of the predictor, mediating and outcome variables of the present study.

4.5.1. Predictor variables

4.5.1.1. Job characteristics

To measure job characteristics as a key contextual factor affecting motivation, this study employed a revised version of Hackman and Oldham (1974)'s Job Diagnostic Survey (JDS),

which continues to be one of the most widely used measures of job design[11] (Fields, 2002). In line with the conceptual definition of supportive job features adopted by this study, JDS includes separate subscales to measure each of the five dimensions of intrinsic job characteristics: task autonomy; skills variety; task identity; task significance; and feedback derived from the job itself[12]. Several previous studies found support for the idea that the five job dimensions are empirically distinct (e.g. Renn and Vandenberg, 1995) and that employee affectivity does not significantly influence the measurement of these constructs (e.g. Munz et al, 1996). Nevertheless, analyses by Idaszak and Drasgow (1987) showed that the negative wording of some of the items included in the original JDS were likely to bias the validity of the scale, with negative statements clustering around a sixth, distinct factor. This led them to propose a revision to Hackman and Oldham's original questionnaire, whereby all reverse-scored items were replaced with positively-worded items, with the exception of one negatively-worded item measuring task variety which was kept in its original form. In light of evidence that this version of the scale represents an improvement in the validity of measurement (Idaszak and Drasgow, 1987), a decision was made to employ the revised survey items in the present research as well.

There are two sections in the questionnaire that measured the five job dimensions, each with separate instructions. The first section asked participants to report the degree to which they felt that the five characteristics *were present* in their jobs. The second section of the scale asked participants to report the degree to which a series of statements corresponding to the same job design dimensions represented an *accurate description* of their jobs. In sum, the use of both sections rendered a total of 3 items/construct dimension, i.e. 15 items in total. Indices of internal consistency for these items (i.e. Cronbach's alpha coefficients), as

[11] Although I initially considered using a newer scale for the measurement of this construct, specifically the Task Characteristics section of Morgeson and Humphrey's (2006) Work Design Questionnaire, insights from the pre-testing of this questionnaire (detailed in the following sub-sections) reflected that the length of this scale (24 items) was rather prohibitive, and that the wording of the statements was sometimes too similar and repetitive, creating confusion and leading participants to think that they had to respond to 'trick questions'. As a result, a decision was made to use Hackman and Oldham (1974)'s JDS instead, given its relatively shorter length (15 items), the more limited number of repetitive statements, and the available evidence regarding its strong psychometric properties.

[12] While Hackman and Oldham's original JDS also included a sixth job dimension concerning feedback from agents (i.e., feedback from colleagues and supervisors rather than from the job itself), this particular job characteristic was not included in the final questionnaire as it was considered to be conceptually too close to another key variable in the theoretical model, namely the construct of managerial need support. Given the conceptual overlap between the two, a decision was made to drop 'feedback from agents' from the job characteristics scale used in this study, and measure job design through the remaining five dimensions.

reported in previous studies, ranged from α = .65 to .78 for skill variety; α = .74 to.83 for task identity; α = .72 to. 83 for task significance; α = .68 to .77 for job autonomy; and α = .65 to.81 for job feedback (Munz et al, 1996; Renn and Vandenberg, 1995; Siegall and McDonald, 1995; Spector et al, 1995; Steel and Rentsch, 1997; Taber and Taylor, 1990, cited in Fields, 2002, p.70). These therefore exceed the minimum accepted threshold of α = .60 for internal consistency, and bring evidence regarding the scale's sound psychometric properties. In this study, the Cronbach's α coefficients[13] exceeded .75 for each of the five dimensions, thus showing comparable results.

4.5.1.2. Managerial need support

Managerial need support was measured using the 6-item version of the Work Climate Questionnaire (WCQ) (Baard et al, 2004), representing an adaptation of two similar questionnaires related to the health domain (Williams and Deci, 1996; Williams et al, 1996; α = 0.96 and α = 0.92, respectively – cited in Olafsen et al, 2015, p. 451). This section of the questionnaire asked participants to reflect on their encounters with their immediate manager or supervisor and report on the degree to which they felt that the statements included reflected the management style of their superiors. The choice of selecting the 6-item version of the questionnaire over the longer, 15-item version was due to considerations of the overall survey length and concerns regarding participants' fatigue and completion rate. This short version of the questionnaire has indeed been adopted in a range of recent self-determination studies (e.g. Güntert, 2015; Olafsen et al, 2015; Schultz et al, 2015), showing good psychometric properties and corresponding alpha values of α =.96; α =.94 and α = .92, respectively. This study found consistent results in relation to the internal consistency of these items, with Cronbach's α =.94 for the scale.

4.5.1.3. Individual causality orientations

Individual causality orientations – autonomy, controlled and impersonal orientations - were assessed through the General Causality Orientation Scale (GCOS) (Deci and Ryan, 1985). To the best of my knowledge, GCOS is the only available instrument to measure the construct of general causality orientations. The scale comprises 12 vignettes describing a series of social, work and achievement-related incidents. For each scenario, three different response options were provided, each reflecting a different causality orientation. Thus, each

[13] These coefficients will be presented under section "5.2. Consistency of measurements" in more detail. However, it was deemed important to present them here as well, to show that they are highly consistent with values reported in prior research.

of the three orientations were measured through a total of 12 items. Instructions prompted participants to consider each incident and indicate how likely it is that they would follow each response strategy. In previous research, Cronbach's alpha values were reported as α = .74 for autonomy orientations, α = .69 for controlled orientations and α = .74 for impersonal orientations (Deci and Ryan, 1985). In this study, the corresponding coefficients were rather similar, with α = .71 for the autonomy orientation; α = .59 for the controlled orientation and α = .79 for the impersonal orientation. This again indicates that participants in this research had similar response patterns to those documented in previous studies.

4.5.1.4. Reward variables

In terms of measuring financial rewards, the questionnaire included questions on both base pay and performance-contingent pay. The reason for including both types of rewards in the survey was twofold: first, to examine any differences in the effects of fixed pay vs variable pay on work motivation; and second, to capture the relative salience of performance-contingent rewards, an important variable in motivation crowding research. Several studies point out that reward salience is important in determining whether the undermining effect occurs (e.g. Deci et al, 2017; Frey, 1994), and yet extant research has mainly considered reward size (i.e. actual amount of pay received) as a proxy for salience. Nevertheless, this operationalisation has important limitations because the amount of performance-related pay received, in absolute terms, will not give an indication of reward salience unless it is compared with the relative level of base pay. In other words, receiving a performance bonus of £500 is likely to have a different motivational impact for an employee with a base salary of £20,000 vs an employee with a base salary of £80,000. In order to address this issue, the percentage of performance-related pay relative to base pay was used as the key predictor variable in this study, and the questionnaire therefore comprised questions on both the amount of base salary and the amount of performance-contingent rewards received by the study participants in a year.

For reporting their base pay, respondents were able to choose from different salary ranges, from less than £9,999 per year to £150,000 or more per year. For reporting their variable pay, participants were first asked to indicate whether they had received any form of performance-related pay within the last 12 months of working in their current jobs[14]. Those

[14] For respondents in Panel 1, this question was used in the beginning of the questionnaire (i.e. as a screening question) so as to ensure that the final sample consisted of a minimum of 150 participants who had received some form of performance-related pay within the previous 12 months (this was

who responded affirmatively to this question were directed to a separate section in the survey, where they were asked to report the type of pay received - i.e. whether it had been awarded for individual, group or organisational performance, and whether it had been distributed on a daily, weekly, monthly, quarterly or annual basis. Next, participants were prompted to specify the approximate amount of performance-related pay they received, on average, every time. For example, if they reported receiving this reward on a *monthly* basis, they were asked to indicate the typical amount they received every month. To ensure consistency of answers, a short description of what performance-contingent rewards entail was included in the questionnaire, and specific examples of how to report this information accompanied the relevant questions. To increase the likelihood of participants reporting this rather sensitive information, respondents were reminded that any questions regarding their income were included purely for research purposes.

4.5.2. Mediator Variables

4.5.2.1. Basic needs satisfaction

The Work-related Basic Needs Scale (W-BNS, Van den Broeck et al, 2010) was used to assess participants' level of satisfaction with the psychological needs for autonomy, competence and relatedness. While other instruments for measuring this construct are available, for example Deci et al (2001)'s Basic Psychological Need Satisfaction at Work Scale, this scale has been criticised on the basis of not being sufficiently validated (Van den Broeck et al, 2010). Moreover, some of the items included in Deci et al (2001)'s scale are argued not to reflect satisfaction with the basic needs per se, but rather job-related factors such as social support that are *antecedents* to need satisfaction (e.g. "People at work tell me that I am good at what I do") (Van den Broeck et al, 2010). Because the W-BNS addresses these criticisms, it is this scale that was chosen for measuring basic needs satisfaction in the present study.

For this section of the questionnaire, participants were asked to rate the degree to which they agreed with a number of 16 statements reflecting their experiences on the job. There were 6 items measuring satisfaction with the need for autonomy; 4 items measuring satisfaction with the need for competence; and 6 items measuring satisfaction with the need for relatedness. The scale has been used in recent empirical research (e.g. DeCooman et al, 2013;

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the agreement negotiated with the Qualtrics project managers). For Panel 2 respondents, this question was asked towards the end of the survey, together with the other pay questions.

Trépanier et al, 2013; 2015 - 16 item version; Chiniara and Bentein, 2016 – adapted version), with corresponding alpha values ranging between α = .80 and .83 for autonomy need satisfaction; between α = .83 and .88 for competence need satisfaction; and between α = .84 and .90 for relatedness need satisfaction. The present research is consistent with prior literature, showing similar indices of reliability for measures of satisfaction with the needs for: autonomy (α = .79); competence (α = .82); and relatedness (α = .88).

4.5.3. Outcome variables

Motivation variables were measured though the Multidimensional Motivation at Work Scale (Gagné et al, 2015). The scale has been adopted in recent self-determination research (e.g. Howard et al, 2016; Olafsen et al, 2015), and its factorial validity has been demonstrated for seven languages across nine country samples (Gagné et al, 2015). In this section of the questionnaire, participants were asked to report on the degree to which they felt that the statements presented in the questionnaire reflected the reasons why they exerted (or would exert) effort in their jobs. The scale includes 19 items assessing five distinct motivation types acknowledged by SDT: intrinsic, identified, introjected, extrinsic (the latter referring to the external-type regulation as defined in the original SDT continuum of motivation), and amotivation. Coefficient alpha values reported in previous studies ranged between α = .74 for introjected motivation to α = .90 for intrinsic motivation (Gagné et al, 2015), generally showing good internal consistency of test items. This was reflected in the present research as well, were all motivation types showed an internal consistency coefficient of .75 or above. In addition, one of the main advantages of the Multidimensional Motivation at Work Scale is that it adopts a more inclusive definition of external motivation, which can relate to both social and material factors. This reflects the wider range of extrinsic contingencies that can motivate work-related behaviour, in other words not only financial incentives and job security considerations, but social factors as well, for example the desire to perform to gain others' approval and respect. This operationalisation of extrinsic motivation was considered to be more balanced and comprehensive compared to previous conceptualisations, and thus to reflect a more valid approach towards measuring external regulations of behaviour.

4.5.4. Control variables

Several control variables were included in this study, both demographic and job-specific factors. Specifically, participants were asked to indicate their age, gender and highest level of education achieved. This is because there is evidence to suggest that performance-contingent rewards have a different impact on motivation depending on participants' age

(Deci et al, 1999), as well as their level of education (Scott et al, 2015). In addition, given that several studies found the motivation crowding out effect to be even more pronounced in specific occupations and industries (e.g. Bellé, 2015; Georgellis et al, 2011), participants were also asked to select from a range of different options their specific occupation, employment sector, industry, job level (e.g. managerial vs non-managerial) and job tenure.

4.6. Questionnaire pre-test

The questionnaire was pre-tested with a small group of respondents (4 females and 3 males) who were invited to comment on their overall experience of completing the survey, and asked to indicate whether any questions or instructions had been unclear. Following Bryman (2004), these respondents were chosen from the same target population as the main study participants, i.e. UK employees working in different industries and employment sectors. As a result of this pre-test, a few issues were reported regarding the clarity and ease of completing the questionnaires. First, with the exception of one participant, all respondents reported that they found the job characteristics statements from the first questionnaire initially employed for measuring job design (the Work Design Questionnaire, Morgeson and Humphrey, 2006) to be rather repetitive. In fact, some participants stated that they viewed some of these items as reflecting 'trick questions' designed to assess their attention and their consistency in the way they answered the relevant questions. Participants also stated that they found this particular section rather long, which was rather inconvenient especially since it was the first section of the overall questionnaire, and would have likely led participates to drop out of the survey much too soon. As a result, a decision was taken to employ Hackman and Oldham (1976)'s Job Diagnostic Survey (JDS) for measuring the job characteristics construct, involving fewer items without compromising on the quality of the scale.

The second issue identified from the pre-testing of the questionnaire referred to the clarity of instructions to the 12 vignettes included in the GCOS. Specifically, two respondents independently reported that the original instructions, which asked them to list the *first* response/strategy that came to their minds in relation to the twelve scenarios, were rather unclear. Specifically, participants reported that they found those instructions to reflect a *ranking* exercise rather than a Likert-type question, and suggested that clarity would improve if those guidelines were replaced with questions asking people to indicate their *likelihood* of choosing each of the three possible responses associated to each vignette. As a result of these comments, most of the scenario statements were changed to reflect better clarity of

instructions, although the wording depicting each indecent, and the response choices for each vignette remained unchanged.

Finally, a couple of minor issues were also highlighted, for instance the need to include a wider range of industries for participants to choose from when reporting their industry sector. Following these revisions, the questionnaire was discussed again with the same respondents, who confirmed the suitability of these improvements, and thus the questionnaire was finalised.

4.7. Questionnaire administration

The final questionnaire (Appendix 1) consisted of 7 sections, starting from general instructions and screening questions, and finishing with demographic questions. In the opening page of the questionnaire, participants were made aware of the purpose of this doctoral study, the key variables examined and what their participation involved. Following Podsakoff et al (2003), they were informed that their participation is anonymous and voluntary, and that they could withdraw at any time without providing any reasons and without any prejudice to their jobs. They were reminded of the confidentiality of their responses, and, in light of their anonymity in this study, they were encouraged to provide complete and accurate information. In particular, they were informed that some of the questions in this study would refer to their income, and that this was purely for research purposes.

The questionnaire started with a number of screening questions that limited survey participation to the relevant population. Specifically, only participants above the age of 18 were invited to participate[15]. In addition, only those who reported that they were employed at the time of taking the survey (either full-time or part-time, but not self-employed) were allowed to continue to the questionnaire. Several other questions were used to reach certain quotas, for example having an equal number of male and female participants. To ensure that respondents answered the screening questions honestly, no information was provided in the introduction regarding the preferred characteristics of the sample, making it difficult for respondents to "fake" their answers to qualify.

[15] This study did not collect data from individuals below the age of 18 as individuals had to be over the age of consent to take part in this study.

Regarding the structure and order of variables assessed, the questionnaire sought to introduce participants in the study by asking them to first reflect on the nature of their jobs (i.e. the two sections measuring job characteristics) and their relationship with managers (i.e. the section assessing managerial need support) before reflecting on their basic needs satisfaction at work and their motivation on the job. As such, the questionnaire asked participants to move from relatively objective observations regarding the characteristics of their jobs to subjective experiences regarding their social interactions at work and their key motives for exerting effort in their jobs. Demographic and reward questions (which were considered to reflect more sensitive topics) were introduced, wherever possible, towards the end. The online survey was designed so that all questions in one block had to be answered before proceeding to the next page. In this way, even with a relatively long survey, a completion rate of 100% was achieved. Each question block appeared on a different page, in an effort to maintain respondent interest and allow each section to be monitored for response quality – e.g. the number of questions answered in an identical way in a certain block. In order to reduce the likelihood of participants dropping out from the study, a progress bar was also visible on each page (Couper et al, 2001).

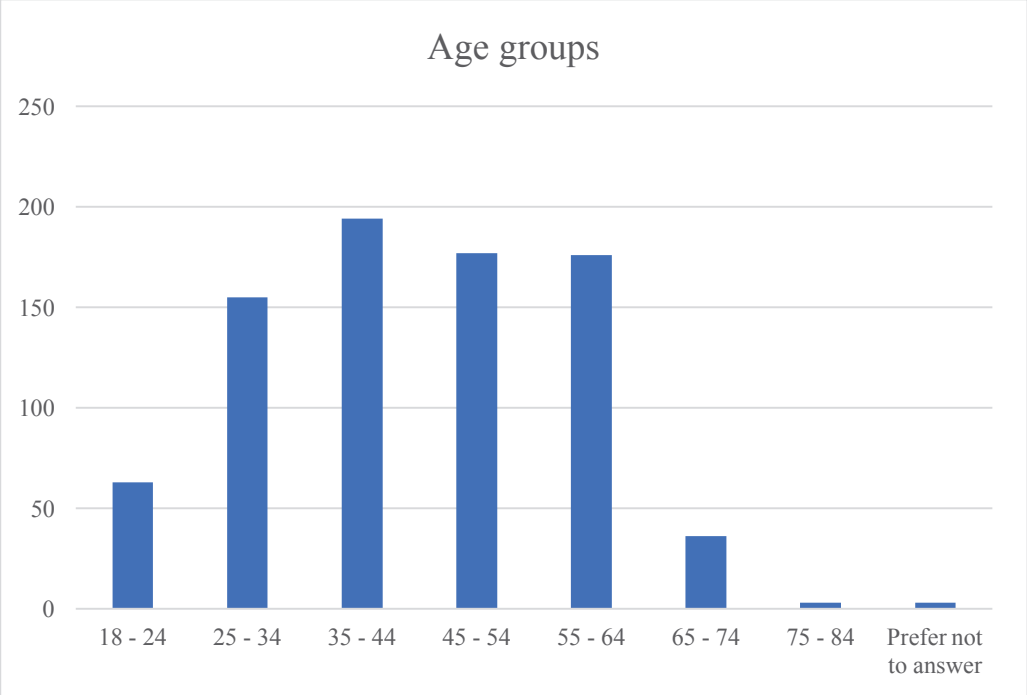
Finally, to enhance the quality of responses, two attention checks were used, asking participants to select specific answers on the Likert scale (e.g. 'strongly disagree') in two different locations in the survey (sections 2 and 7). Participants were informed that this was for survey validation purposes. These questions automatically screened out the inattentive respondents who failed to select the required answers. Once the data was collected, I checked the answers to ensure that there were no inconsistencies in responses, no irrelevant comments indicating carelessness, and no meaningless answers to open-ended questions (e.g., any further comments that participants had the option of providing regarding the performance management process in their jobs). It was only after these checks were performed that the data was accepted, and participants received their panel points. The following section presents the demographic characteristics of respondents taking part in this research, providing reassurance that the sample was largely representative of the wider UK target population.

4.8. Sample characteristics

Examination of sample characteristics showed that the data reflected well the categories of respondents targeted for this study. Specifically, there was an equal number of male (49.6%) and female (50.4%) participants, with the vast majority (90.75%) of participants aged

between 18 and 64 years old (Figure 4-2). This suitably reflected the typical working age in the UK which consists of people aged 16 to 64 years (Office for National Statistics, 2018b). Most respondents (64%) were married or living with a partner, and about a third reported having dependent children. The sample was overall highly educated, with 44.4% of respondents stating that they hold university degrees. This is again highly representative of the UK working population, given that out of 32 million people in employment (including those self-employed), approximately 14 million (43.75%) were reported to be university graduates in the most recent 2017 estimate (Office for National Statistics, 2017).

Figure 4 - 2: Age distribution for the overall sample

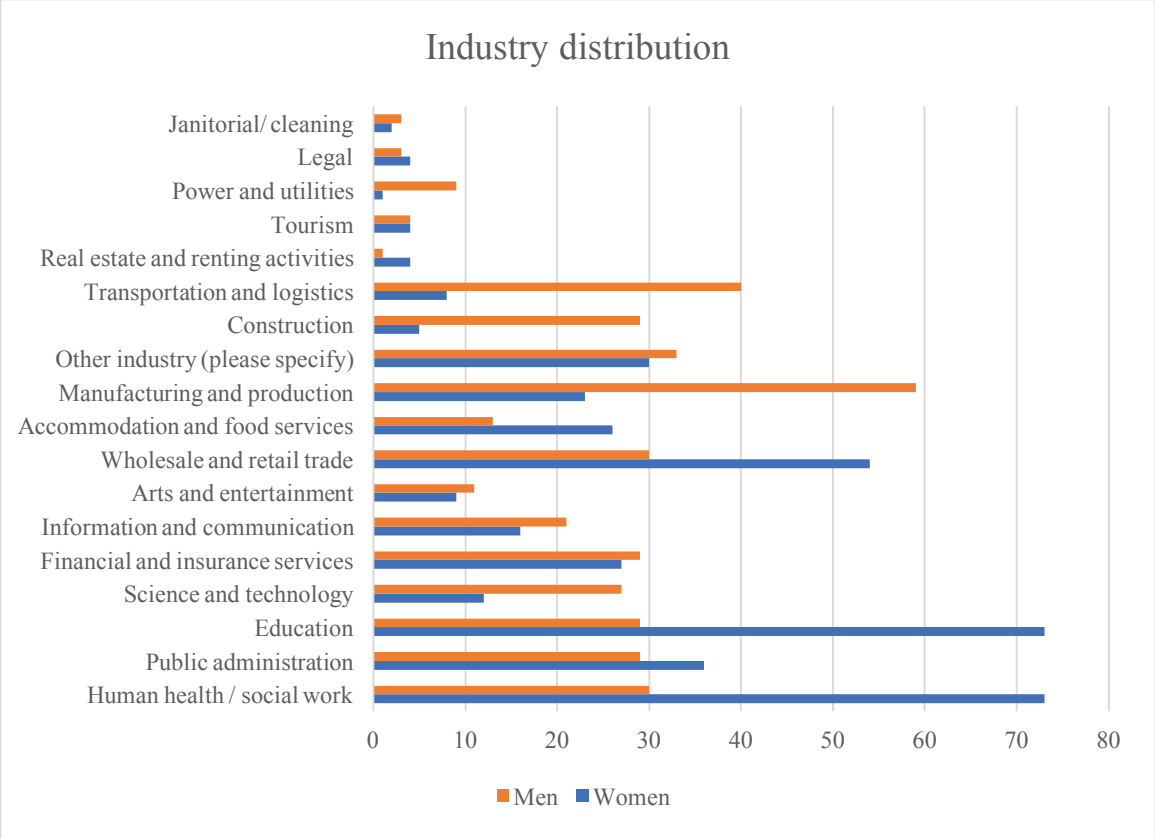


In terms of job-related variables, more employees reported working in the private sector (55%) compared to the public sector (37%). This reflects a slightly higher percentage of public sector employees compared to the UK labour market, where only 17% of all people in paid work were employed in the public sector at the time of data collection (Office for National Statistics, 2018c). Nevertheless, the larger proportion of participants working in the public sector proved to be especially useful for ensuring a rather balanced distribution of private and public sector workers in the present sample.

Regarding industry data, 131 respondents initially classified their industry as ‘other’ and provided their own accounts of the industry they worked in. Their responses were carefully reviewed and new categories were introduced whenever several responses clustered around

an industry that was not already provided as an option – e.g. legal services. Still, several industries could not be re-classified, mainly due to the fact that they represented a very small subgroup. The majority of men reported working in manufacturing and production, as well as transportation and logistics. The top three industries for women, on the other hand, were education; human health/social work; and wholesale and retail trade. Overall, the data shows that a diverse range of industries was represented in the study, as can be seen in Figure 4-3. Furthermore, the gender differences in employment by industry are consistent with the latest gender data available in parliamentary reports (e.g. Powell, 2019).

Figure 4 - 3: Industry statistics by gender



A third of respondents reported having worked in their job for 10 years or more (33%), with the remaining employees evenly spread across the other categories. About two thirds of participants stated that they worked full time (i.e. min 35-45 hours/week), while approximately one third reported working part-time. This is again comparable to the official UK labour statistics, given that approximately 8 million people (25% of the total UK workforce) were working part-time at the moment of data collection (Office for National Statistics 2018b).

To allow for more appropriate analysis of the reported wage data, all base salary categories were recoded, and mid values were taken for all categories, except the extremes. The average base salary was approximately £28,000 per year for the overall sample, with an average of: £17,000 per year for employees working part-time; £31,000 per year for those working full-time; and £41,750 per year for those working overtime (Table 4-1). The median base pay for the overall sample was £25,000, which is somewhat lower than the median full-time weekly earnings in the UK reported at £569 per week in 2018 (as reported by the Office for National Statistics, 2018d), i.e. £29,588 per year.

Table 4 - 1: Average base pay descriptive statistics for different types of work schedule

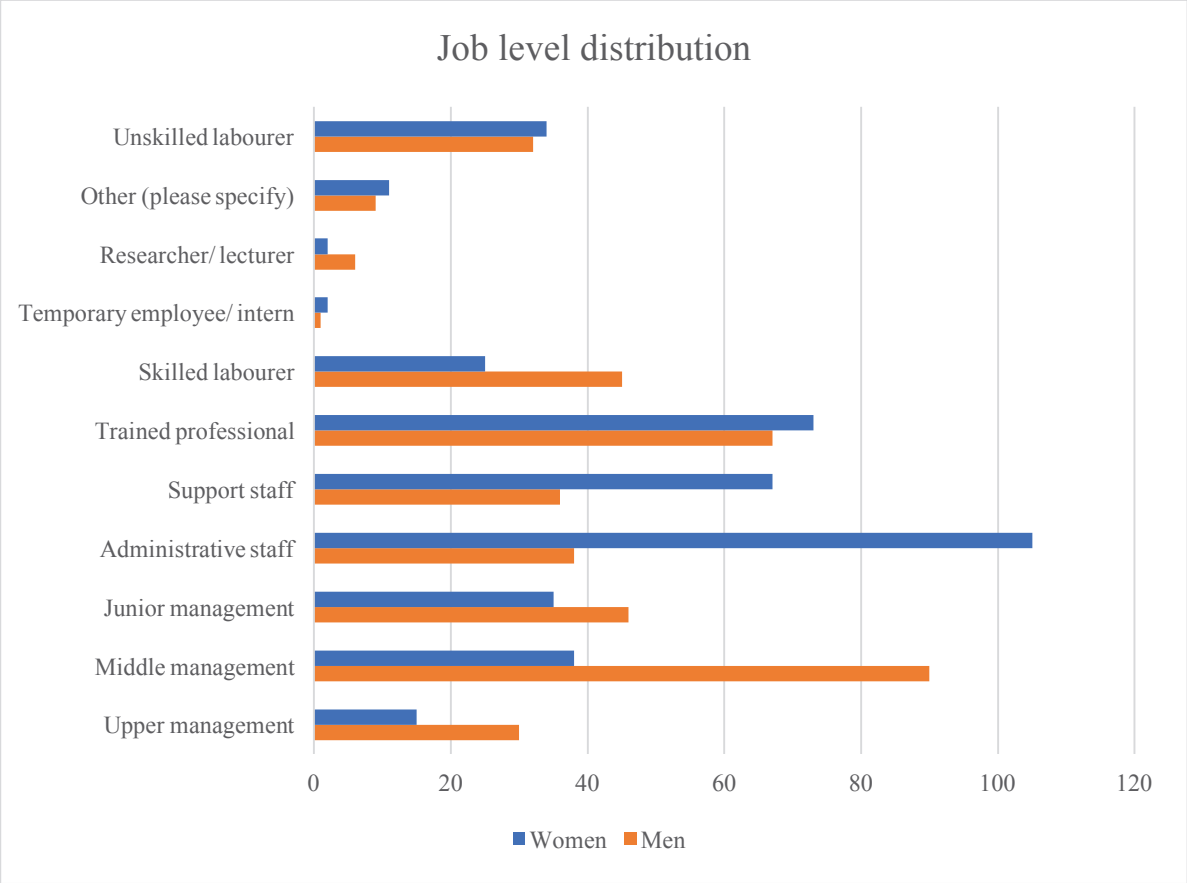
Work schedule		
Part-time (up to 35h/week)	N Valid	268
	Mean	17033.1604
	Median	15000.0000
	Mode	9999.00
Full-time (between 35-45h/week)	N Valid	413
	Mean	31041.1525
	Median	25000.0000
	Mode	25000.00
Over-time (more than 45h/week)	N Valid	126
	Mean	41746.0238
	Median	35000.0000
	Mode	25000.00

Looking at pay distributions in relation to gender, the average base salary for men was £32,700 per year, whereas the average base salary for women was £23,500 per year (Table 4-2) – thus reflecting a significant difference in salaries by gender, potentially due to women working in lower positions such as administrative and support roles, compared to managerial positions (Figure 4-4). Gender differences in annual earnings are further consistent with the results of the UK Annual Survey of Hours and Earnings (ASHE) - albeit the latter showing smaller variations than the ones identified in this research.

Table 4 - 2: Average base pay descriptive statistics for male and female participants

Gender		
Male	N Valid	400
	Mean	32712.44
	Median	25000
	Mode	25000.00
Female	N Valid	407
	Mean	23488.71
	Median	15000
	Mode	15000

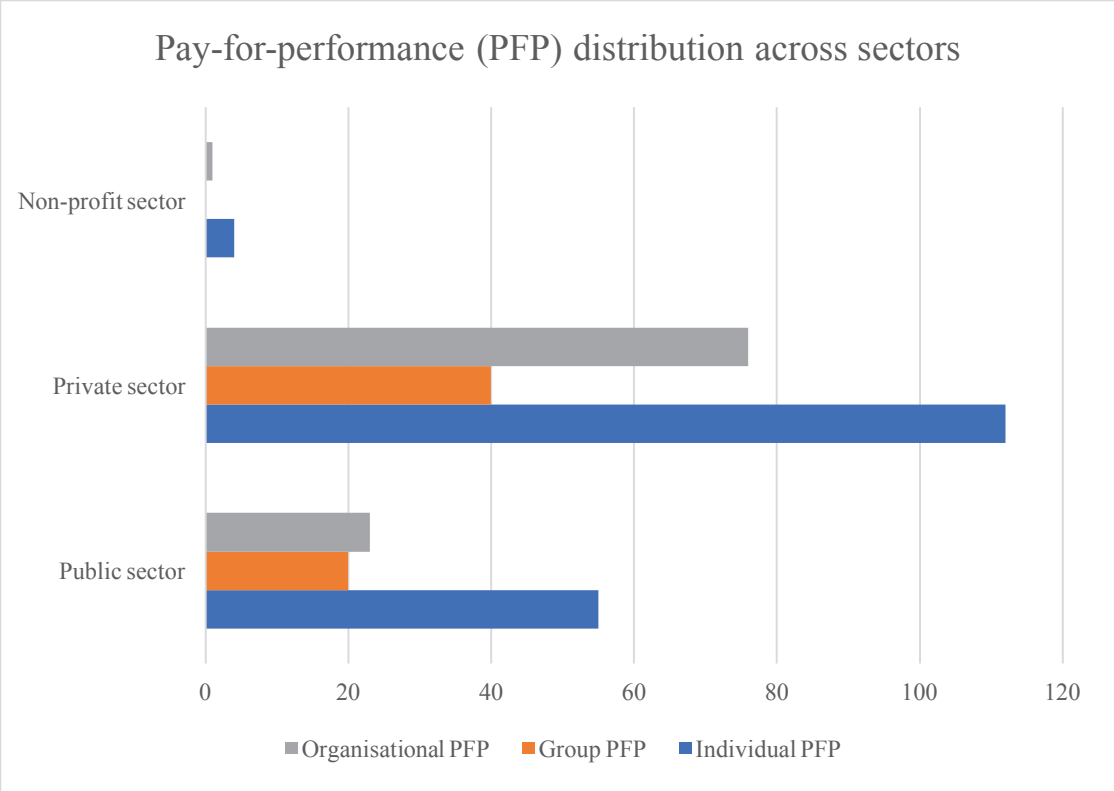
Figure 4 - 4: Job level statistics for men and women



A third of respondents (32.6%) reported receiving some form of pay-for-performance (PFP) in their jobs, including, but not limited to merit bonuses, sales commissions, piece rates, profit-sharing and gainsharing. The majority of participants (58.3%) reported receiving their performance rewards on an annual basis. The distribution of performance-related pay varied across sectors, with most performance bonuses being awarded in the private sector (Figure 4-5). This is in line with previous studies such as Bryson et al (2017) which used representative UK data and found that only 7% of public sector workers were rewarded

based on performance, compared to 27% of private sector workers. Across all sectors, individual bonuses appeared as the most common form of performance-related pay, followed by incentives for organisational and group performance. The percentage of pay-for-performance relative to base salaries was up to 2% for about 25% of respondents, between 2% and 10% for roughly half of the participants, and between 10% and 40% for approximately of 20%. A very small minority reported receiving performance rewards higher than 40% and (in two cases) up to three times their regular pay.

Figure 4 - 5: PFP distribution across employment sectors



Overall, having a good mix of employees receiving some form of performance-contingent pay at work and employees mainly rewarded on the basis of their base salaries ensured an appropriate reflection of the typical compensation patterns previously observed within the wider UK working population. Having considered the key characteristics of the sample employed in this research, the next chapter presents the main steps taken in relation to preparing the questionnaire data ahead of structural equation modelling (SEM).

4.9. Conclusion

This chapter has presented the methodology of the present study, starting with the research philosophy guiding decisions taken in relation to the cross-sectional survey research design,

and then discussing key considerations related to the recruitment of participants for the study using Qualtrics opt-in research panels. Then, it has explained the processes for developing and administering the questionnaire, following best practice guidelines. A summary of sample characteristics has then been presented, which overall show that the sample is largely representative of the UK working population.

CHAPTER 5

DATA ANALYSIS

The aim of this section is to introduce the key steps undertaken in data analysis, before discussing the main findings of this study. Specifically, the following sections begin by presenting the specific measures taken in relation to data cleaning. The validity and reliability of the measures included in the survey is then assessed through the results of Cronbach alpha tests for internal consistency, as well as the results of exploratory and confirmatory factor analyses. The final sections of this chapter present the results of hypotheses testing through several structural equation models.

5.1. Approach to data screening

Data screening was an essential step I undertook in preparation of the data prior to SEM analysis. Several aspects were taken into consideration when cleaning the data, including: a) checking for unengaged responses and cases of missing data; b) checking for the presence of outliers; c) assessing the normality of data; d) assessing the linearity of the relationships between the independent and the dependent variables; and e) testing for multicollinearity. The results of each of these tests are reported in detail in the subsequent sections of this chapter.

5.1.2. Checking for unengaged responses and missing data

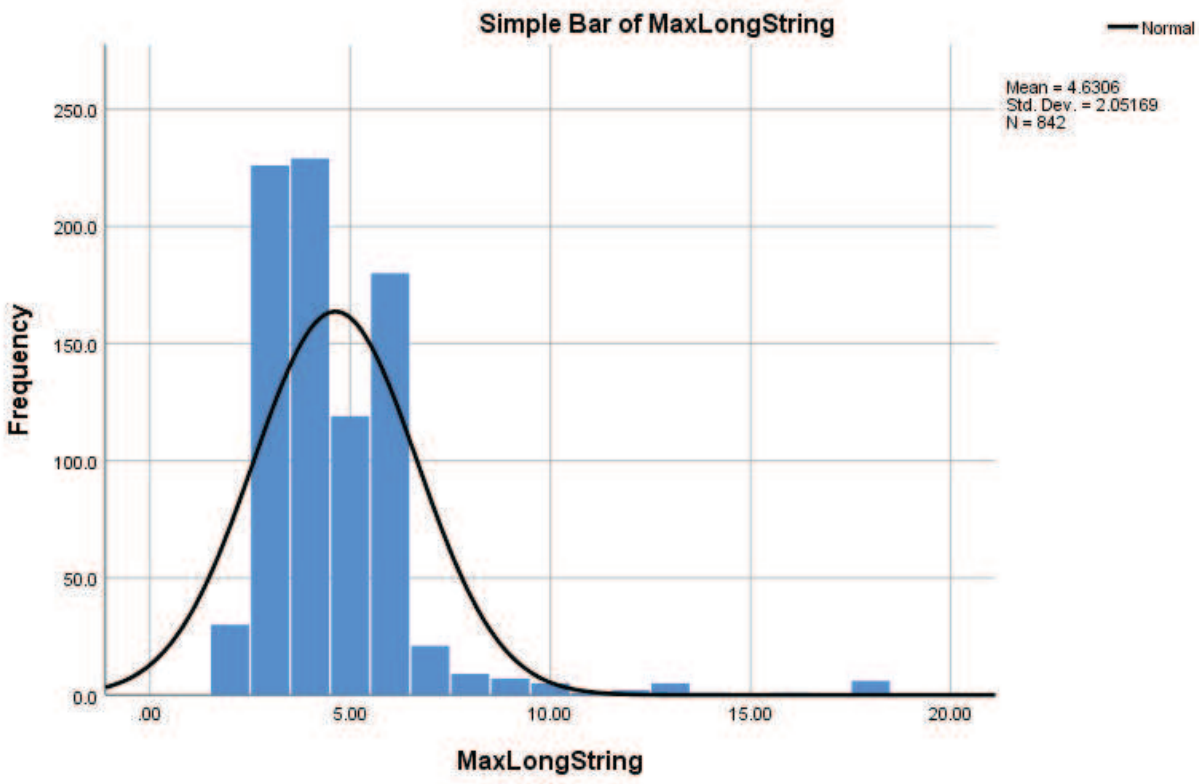
One of the most common issues in evaluating the quality of questionnaire data, especially in web-based questionnaires, refers to respondents providing inaccurate answers to survey questions due to inattentiveness, repeated participation, and/or careless response patterns. Following recommendations for best practice in online survey research (e.g. Chandler and Shapiro, 2016; Cheung et al, 2017; Meade and Craig, 2012), several measures were taken to identify and screen out unengaged participants, including: checking for speedy respondents; setting a minimum time for completing the survey (specifically, a minimum of 8 minutes/survey); using two instructed response items (whereby participants had to select specific answers to two questions in the survey); and carefully reviewing all answers provided to the open-ended questions. The first three of these measures automatically screened out participants who failed to meet the required inclusion criteria. The latter, however, required more subjective assessment on the part of the researcher. After inspecting the data, 4 cases were identified as unsuitable for being included in this research: one

participant who stated that the performance bonus they had reported was in relation to a previous job; one participant who identified himself as self-employed and was thus not within the population of interest; and two participants who reported difficulties in understanding the questions relating to their performance-related pay, which rendered their answers unusable. Although these cases did not reflect unengaged respondents as such, they still showed issues regarding the suitability of including these cases in the present study, and were therefore removed from the final sample.

Furthermore, I considered whether there was any evidence of repeated participation by checking for duplicate IP addresses. One such case was identified, and the two responses were then inspected in relation to their demographic variables. According to Cheung et al (2017), duplicated IP addresses do not necessarily represent an issue if two different people from the same household complete the survey. In this case, however, the data suggested that the two responses were completed by the same individual, as they provided identical answers to questions on gender, industry, occupation, and job tenure. The only variable that differed markedly between the two cases was the reported base salary, with a difference of £30,000 between the first and second response. Given that base pay is an important variable in the study, and given that the participant left no comments in the open-ended questions to clarify why they were taking the survey twice (they indeed started the second survey 1 second after completing the first one), a decision was made to delete both answers from the data.

Careless response patterns were further examined analytically, through the Maximum Long String method (Johnson, 2005). The Maximum Long String method is used to compute "the maximum number of consecutive items on a single page to which the respondent answered with the same response option." (Meade and Craig, 2012, p.7). For example, a respondent answering "7 – strongly agree" for 11 items in a row, while otherwise varying their answers, would have a maximum long string of 11. While a certain sequence of identical consecutive responses can certainly be expected in this survey, especially with items that are similarly worded, or with successive items referring to the exact same theoretical construct, the Maximum Long Sting method allows researchers to identify those participants who show excessively long series of identical responses for each question block. After computing the Maximum Long String for each respondent, a histogram was created to inspect values falling outside of a normal distribution of long strings (Figure 5-1). In this histogram, values of 10 or above were considered to fall outside of the normal distribution of maximum long strings. A total of 21 participants were therefore identified as careless respondents and ultimately removed from the data set.

Figure 5 - 1: Histogram showing the maximum number of consecutive questions for which participants provided identical answers



Regarding the issue of missing data, the survey was programmed in a way that respondents could not skip any questions in the survey (although they were able to select 'prefer not to answer' for all questions asking for demographic data). This method therefore allowed all questionnaires to be completed with no missing data. Nevertheless, 6 participants failed to provide the required information regarding the amount of performance-related pay they had received, either by reporting meaningless values (e.g. "3, 2, 1") or by commenting that they refuse to answer or simply that they do not know. Specifically, 5 participants refused to provide any meaningful performance-related pay information, whereas 1 participant reported the reward received for their group performance, but not for their individual performance (which they nonetheless indicated they received).

It is likely that the sensitive nature of this question prompted some of these participants to withhold this information, although another reason may be reflected in the fact that bonuses varied at random and were thus difficult to determine (with two participants providing specific comments in this sense). These 6 cases, however, represented only 2% of the performance-related pay data and 0.7% of the full data set – which is significantly below the 10% value normally considered to be a low amount of missing data (Kline, 1998, p.75 – cited in Byrne, 2010, p.353). Furthermore, these values seemed to be missing at random.

Upon examining the demographic and job-related characteristics of these 6 respondents, there was no clear indication that these participants were associated with a specific gender, age group, education level, employment sector, industry, job level or job tenue. I did consider replacing these missing values with alternative data, for example with the average pay-for-performance value reported in each category – i.e. individual, group and organisational performance. Nevertheless, basic descriptive statistics showed large standard deviations from the mean for each of these three categories - Table 5-1. As such, replacing these missing cases with alternative values was not considered an appropriate solution. In summary, given the fact that missing data represented less than 2% of the data, that these values seemed to be missing at random, and that there were difficulties in replacing these cases with alternative scores, a decision was made to delete the 5 responses which did not disclose any performance-related pay value, and keep the answers provided by the 6th respondent, but only consider their reported group performance-contingent pay.

Table 5 - 1: PFP basic descriptive statistics

	N		*Mean*	*Median*	*Mode*	*Std. Deviation*
	Valid	**Missing**				
Individual PFP	174	633	4017.85	1500	2000	9516.81
Group PFP	62	745	6361.42	1350	2000	18733.22
Organisational PFP	103	704	4614.66	1000	1000	12272.81

5.1.3. Examining outliers

The next step in evaluating the quality of the data was to check for the presence of univariate and multivariate outliers, which "can severely distort the estimation of population parameters" (Leys et al, 2018, p.150). Univariate outliers refer to cases of extreme values where specific variable scores are significantly different from the others. Common causes for outliers normally involve incorrect data entry, error in coding missing variables, and respondents outside of the population of interest (Tabachnick and Fidell, 2013). While the latter two cases are controlled for in this study, given the strict data collection and screening procedures used, incorrect data entry could still apply in this research. Even though all responses were inputted and stored electronically in real time - thus minimizing any errors in data entry on the part of the researcher - there was still the possibility of some participants misinterpreting the way in which they were required to report their performance bonuses. Despite the fact that detailed instructions and examples were provided to help clarify the

right way to report this data, there were still some instances where participants reported highly unlikely scenarios, for example receiving £50 per year distributed on a monthly basis (i.e. approximately £4 /month), or, at the other extreme, a sum of £1,500 received every week. A total of 8 such implausible cases were therefore deleted from the data. In addition, to further test for outliners, individual Z-scores were computed for individual, group and organisational performance-related pay, and the cases with Z-scores higher than +3 were carefully examined[16] in conjunction with respondents' demographic information, to determine whether the values reported were still plausible.

As a result of this analysis, only one case was deleted on the basis of their high Z-score, as this participant reported receiving a performance bonus of £25,000 per month, which seemed very unlikely given their demographic characteristics – a middle manager, working normal hours, aged between 25-34, with an average base salary between £40,000 - £49,999. Although other pay-for-performance outliers were identified through Z-scores, as well as through scatterplot and boxplot analyses, it was difficult to determine whether they were clearly the result of data entry errors, measurement errors or careless responses, or whether they represented the genuine pay that respondents received. As argued by Hair et al (2010), outlier cases should indeed not be removed unless the researcher can prove that the outliers fall outside of the target population. As such, given that all other performance-related pay values were deemed reasonable when considering participants' demographic data, no further cases were deleted.

The presence of multivariate outliers was then assessed using the Mahalanobis distance test. In contrast to univariate outliers which are used to examine extreme individual values, multivariate outliers refer to a mix of unusual scores on at least two variables. According to Kline (1998), detecting multivariate outliers is of particular interest in SEM analysis, given the influence of these outliers on indices of good fit. In the Mahalanobis distance test, the suggested probability value that would indicate multivariate outliers is $p < 0.001$ (Tabachnick and Fidell, 2013). In this study, however, the test showed that less than 2% of all observations had a significance value of $p < 0.001$. To gain further confidence that there are no influential cases in this data set, several multivariate regression analyses were performed for each mediator and dependent variable in the model, where values for Cook's distance were also examined. In general, points for which Cook's distance is higher than 1 are to be considered as influential, and therefore problematic (Cook and Weisberg, 1982).

[16] There were no Z-scores lower than -3.

In this study, however, the highest score for Cook's distance across all composite variables was 0.077, which is significantly lower than the recommended threshold. As a result, it was decided to keep all remaining cases without performing any transformations.

5.1.4. Normality of data

Another assumption that was tested in the process of data screening was that observations are drawn from a continuous and multivariate normal population. In order to assess the normality of data, the Kolmogorov-Smirnov and Shapiro-Wilk tests were performed. The interpretation of these tests is that any significance levels < 0.05 are indicators of non-normality, which was indeed the case with almost all of the constructs of this study. Nevertheless, authors such as Field (2009) and Tabachnick and Fidell, (2013) acknowledge that such tests are extremely sensitive in the case of large samples, indicating that the results of these checks may be irrelevant in this study.

In order to further test for violations of normality assumptions, descriptive statistics such as mean, median, mode, variance and standard deviation were calculated for all reflective items in this study, and skewness and kurtosis indices were also computed (Pallant, 2005). Results are presented in Appendix 2. Generally, the coefficients that would indicate departure from normality are skewness values outside of the [-1 to +1] range, and kurtosis values greater than 7. It is visible from Appendix 2 that the levels of kurtosis and skewness generally do not indicate significant violations from normality assumptions, with the exception of 1 item predicting autonomy causality orientations, thus overall causing little concern.

In addition, the histograms for each composite variable were also inspected, showing that all variables are roughly normally distributed (Appendix 3). The only variable that does seem to deviate from a normal distribution is amotivation. Nevertheless, this is to be expected. We would not predict normal levels of amotivation in this sample, as few amotivated individuals would still be in employment and qualify for answering this questionnaire. There are indeed several studies to suggest that amotivation is linked to turnover intentions and dropout (e.g. Gagné et al, 2015; Pelletier et al., 2001). Thereby, based on the findings of normality tests with regards to kurtosis and skewness values, which do not indicate strong violations of normality, it was decided not to take any data treatment for these theoretical variables.

Regarding performance-related pay statistics, levels of skewness and kurtosis showed slightly higher deviations from normality, however this was to be expected given that

percentages of performance pay relative to base pay do not generally follow a normal distribution. A decision was taken not to transform this data for the following reasons. First, the maximum likelihood estimator – which is the type of estimation used for the structural equation modelling in the present study - is considered to be relatively robust to violations of normality assumptions (Bollen, 1989; Diamantopoulos et al, 2000). Second, authors such as Hair et al (2010) argue that issues with normality may be ignored if the sample size exceeds 200, which indeed is the case in this study. Third, recent research (Changyong et al, 2014) highlights that using alternatives such as logarithmic transformations for non-normal data may lead to results that are not relevant for the original data, and introduce "new problems that are even more difficult to deal with than the problem of non-normal distribution of data" (p.105). As a result, a decision was taken to make no changes to the PFP data, either.

5.1.5. Linearity of relationships

Linearity refers to the assumption that the dependent variable can be calculated as a linear function of a specific set of independent variables (plus the error term). In a linear function, a one unit change in x (the independent variable) results in the same change in y (the dependent variable), regardless of the initial value of x. A nonlinear function, on the other hand, is characterized by the fact that the change in y for a given value x depends on the starting value of x (Wooldridge, 2013). The consequences of nonlinearity are parameter estimates that are not only biased, but also meaningless if the linear function cannot be interpreted as an approximation of a nonlinear function (Kennedy, 2008).

There are many ways to test for nonlinearities, two of which are: a) looking at matrix scatter plots to compare relationships between multiple pairs of variables, and b) looking at individual t-statistics (Pryce, 2011). While the visual inspection of scatter plots is indeed useful when there are only two or three variables in the regression model, when there are more than three variables, which is also the case of this study, it becomes far more complex and difficult to visually identify nonlinearities. Therefore, I employed the second strategy for detecting nonlinearities: looking at t-statistics of separate univariate regression analyses. The rationale behind considering t-statistics is that in light of the literature reviewed, independent variables are expected to have a strong effect on the dependent variables. If, however, there are low t-values for a particular factor, and thus a weak effect on the dependent variable, this might be an indicator of nonlinearities (Pryce, 2011). Results are presented in Appendix 4.

Generally, the majority of relationships did not show any problems, although for a few relationships, t-values were rather low and associated p-values did not appear as significant, particularly in relation to the impact of basic needs satisfaction on extrinsic motivation. Still, this was not necessarily surprising given that, from a theoretical point of view, basic need satisfaction are stronger predictors of autonomous motivation, rather than controlled motivation. In addition, almost all other t-coefficients showed strong values that were in line with theory, and as a result, I decided to proceed with the analysis without performing any transformations.

5.1.6. Multicollinearity

Multicollinearity refers to instances where there are linear relationships between the independent variables, i.e. cases where independent variables are highly correlated. According to Kennedy (2008), the assumption of no linear dependence between the explanatory variables is actually violated only in the case of exact (also known as perfect) multicollinearity. Perfect multicollinearity usually implies some sort of error in data entry on the researcher's part, and can easily be corrected once the cause of the error is understood. However, in light of the argument that even an approximate linear relationship among independent variables is likely to create estimating problems (Kennedy, 2008), I proceeded to test for multicollinearity more thoroughly. Specifically, the Variable Inflation Factor (VIF) was calculated for each explanatory variable after running several multivariate regression analyses. In general, VIF values close to 1 suggests that there is little multicollinearity, whereas values of 5 or more suggest a more serious problem with multicollinearity. In this study, no multicollinearity issues transpired from inspecting the VIF scores, with all values being lower than 3. Overall, we can conclude that there are no problems with correlations between independent variables, and that each predictor should be explaining unique variance in the dependent variable.

Having solved issues with unengaged respondents and outliers, and having found no major problems with the normality of data, with linear relationships between independent and dependent variables, and with multicollinearity, the next step in the analysis was to examine the consistency of measurements in the model.

5.2. Consistency of measurements (reliability assessment)

The reliability (internal consistency) of each composite variable was tested through Cronbach's alpha coefficients. The general rule of thumb for Cronbach's α is that

coefficients should be greater than 0.7 to show evidence of strong internal reliability (Pallant, 2005). As shown in the Appendix 5, all alpha coefficients were greater than 0.7, with the exception of controlled causality orientations, for which the Cronbach's α was slightly below the recommended threshold (α = 0.599). Nevertheless, this low coefficient is not necessarily alarming considering evidence from previous studies regarding the weaker psychometric properties of this construct compared to the other two types of causality orientations (Ryan and Deci, 1985b).

To further test for internal consistency, estimations of Cronbach's alpha "if item deleted" were performed, looking for evidence that the reliability of the scale would improve if particular items were deleted. Only two items showed improvements towards the scale if deleted (impersonal_causality_orientations_2 and compentence_need_4), but generally these corrections were extremely small and did not bring significant improvements over the 0.7 threshold values already achieved. Thus, these results were not seen as bringing strong evidence for item deletion.

Finally, the corrected item-total correlation index was estimated. Here, the general rule is that each value should be less than the overall Cronbach's alpha coefficient for the scale, but not lower than 0.3 (Nunnally and Bernstein, 1994). If this were the case, it would indicate that the item is not measuring the same construct as the overall scale (Pallant, 2005). Generally, the results show satisfactory values of item-total correlations, except for one item predicting impersonal causality orientations (impersonal_orientations_2); three items predicting autonomy causality orientations (autonomy_orientations_3, _4, and _12); and most items measuring controlled causality orientations (with the exception of controlled_orientations_5; _8 and _11). These results are shown in Appendix 5. In light of these issues, and considering the relatively low Cronbach's α coefficients for controlled causality orientations identified previously, a decision was made to drop these problematic items before proceeding to the next step in the analysis. Table 5-2 presents a summary of the descriptive statistics, coefficient alphas, and correlations between the key theoretical variables in this study.

Table 5 - 2: Descriptive statistics, Coefficient alphas (along the diagonal) and correlations between variables (N = 807)

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Job design	4.965	1.017	**.878**												
2. Managerial support	4.993	1.448	.468**	**.943**											
3. Impersonal causality orientations	3.765	0.981	-.266**	-.123**	**.802**										
4. Autonomy causality orientations	5.565	0.703	.284**	.187**	-.070*	**.698**									
5. Controlled causality orientations	3.478	1.136	.111**	0.064	0.01	0.019	**.500**								
6. Autonomy need satisfaction	4.561	1.089	.564**	.538**	-.357**	.197**	.106**	**.789**							
7. Competence need satisfaction	5.763	0.876	.403**	.286**	-.354**	.340**	.156**	.506**	**.816**						
8. Relatedness need satisfaction	4.827	1.337	.373**	.411**	-.305**	.272**	.075*	.546**	.441**	**.880**					
9. Amotivation	1.926	1.179	-.384**	-.287**	.298**	-.260**	.087*	-.470**	-.341**	-.372**	**.787**				
10. Extrinsic motivation	3.820	1.197	.106**	.186**	.234**	.107**	.230**	-0.043	-0.053	0.023	.104**	**.774**			
11. Introjected motivation	4.837	1.246	.228**	.185**	.114**	.375**	0.06	.161**	.218**	.085*	-.214**	.423**	**.755**		
12. Identified motivation	5.333	1.218	.541**	.358**	-.198**	.392**	.092**	.502**	.497**	.335**	-.450**	.179**	.596**	**.771**	
13. Intrinsic motivation	4.485	1.572	.637**	.462**	-.250**	.255**	.186**	.643**	.460**	.494**	-.358**	.169**	.362**	.679**	**.894**

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

5.3. Exploratory factor analysis

An exploratory factor analysis (EFA) was conducted ahead of testing the validity of the measurement model through confirmatory factor analysis (CFA). While EFA is normally conducted in cases when there are no prior assumptions regarding the data, for example when testing new survey instruments, a decision was made to perform EFA in this study as it has been shown "to contribute to a useful strategy for model specification prior to cross-validation with confirmatory factor analysis" (Gerbing and Hamilton, 1996, p.62). Especially in the case of large models involving many indicators, EFA can prove to be particularly effective in uncovering the structure of the measurement model (Gerbing and Hamilton, 1996). Given that this study indeed involved a complex model that otherwise might have required large-scale respecification, I decided to first examine the data factor structure through EFA.

In the process, the Maximum Likelihood estimation was chosen, so as to maintain consistency with the estimation method used in CFA. Then, considering insights derived from the literature, a condition was imposed for 17 factors to be extracted: 5 for each job design dimension, 1 for managerial support, 3 for each causality orientation, 3 for each need satisfaction variable, and finally 5 for each type of motivation (i.e. amotivation, as well as extrinsic, introjected, identified and intrinsic motivation). A Promax rotation was then performed on all factors, given that Promax is one of the most widely-used rotation methods which allows for correlations between factors (McLeod et al, 2001; Finch, 2006).

The first step in evaluating the results of the EFA was to check for the suitability of the sample size through Bartlett's test of sphericity and the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO). In Bartlett's test of sphericity, statistically significant results ($p < 0.05$) indicate that the resulting correlation matrix is not an identity matrix, i.e. that variables are related to one another and therefore suitable for structure detection. The second indicator for sampling adequacy, the KMO coefficient, shows the proportion of variance that might be caused by underlying factors. High values (close to 1.0) generally indicate that a factor analysis is indeed useful given the data, whereas values less than 0.50 indicate that the results will not be satisfactory. In this study, both thresholds were initially met, as shown in Table 5-3.

Table 5 - 3: KMO and Bartlett's Test Results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.927
Bartlett's Test of Sphericity	Approx. Chi-Square	32532.841
	df	3081
	Sig.	.000

The next step in the analysis was to examine communalities, where small values (lower than 0.4) indicate variables that do not fit well with the factor solution and might struggle to load significantly on any factor. In this study, most communalities were indeed above the 0.4 level, although several items measuring autonomy causality orientations indicated potentially problematic items. The initial factor structure explained 63.4% of the total variance, which met the minimum recommended threshold of 60% explained variance (Hair et al, 2010). Then, the factor correlation matrix was also examined, which revealed no non-diagonal values over 0.7, thus providing good evidence of discriminant validity between the different factors.

The strength of factor loadings was then assessed, where the general recommendation is that the majority of factor loadings should be greater 0.5 (Pallant, 2005). The initial pattern matrix correspondingly showed only a few coefficients between 0.3 - 0.5, with most factor loadings successfully meeting the recommended threshold. Nevertheless, while the expected factor structure was generally confirmed, there were a few issues with three autonomy need satisfaction items loading on the same factor as relatedness need satisfaction, intrinsic motivation and job autonomy (autonomy_need_1; autonomy_need_4; autonomy_need_5). These three items therefore had to be deleted from the analysis. Then, several other factors measuring general causality orientations failed to load significantly onto any factor and they too were removed from the analysis. In addition, two items predicting introjected motivation (introjected_1) and identified motivation (identified_3) failed to load on their corresponding factors, and were subsequently deleted.

An unexpected and rather problematic issue that still had to be addressed was that the remaining two items predicting identified motivation loaded on the same factor as intrinsic motivation. From a theoretical point of view, this is consistent with the assumptions that both identified and intrinsic motivation reflect autonomous forms of work motivation. Nevertheless, the fact that both constructs predicted a single factor prevented identified and

intrinsic motivation to be kept as separate variables in the test model. Given the central role that intrinsic motivation plays in this study – in relation to questions of motivation crowding in vs motivation crowding out, the model was hence re-specified to extract 16 factors, and identified motivation was excluded from the analysis. To further increase discriminant validity, a few variable items which cross-loaded on more than one factor were dropped from the model as well.

The final pattern matrix, as a result of all these iterations, is presented in Appendix 6. The KMO coefficient remained above 0.9 and the significance levels for the Bartlett's test of sphericity was also significant ($p < 0.001$). Percentage of total variance explained increased to 68% thus representing an improvement compared to the initial model. In addition, the factor correlation matrix showed no values over. 0.6, which overall indicated good factor structure and discriminant validity. It is this latter factor structure that was used in the subsequent confirmatory analysis of the measurement model.

5.4. Confirmatory factor analysis

Prior to testing the structural model, the validity of the measurement model was assessed through confirmatory factor analysis (CFA). In brief, the measurement model estimates relationships between latent variables (i.e. variables which cannot be observed directly – which is indeed the case for all theoretical variables included in this study) and their manifest indicators (Blunch, 2012) - assessing whether "the measurement of each latent variable is psychometrically sound" (Byrne, 2010, p.164). Before conducing the CFA analysis for the full measurement model, however, a separate confirmatory analysis was performed on the job characteristics construct, to assess whether it can be used as second-order factor in the final model. Table 5-4 presents the recommended values for indices of good fit that were followed in this study (Hu and Bentler, 1999; Kline, 1998; Bryne, 2010). In addition, the standardized regression weights (factor loadings) were inspected, where the recommendation is that values need to be greater than 0.5 for the model to be acceptable.

Table 5 - 4: Model fit indices cut-off points

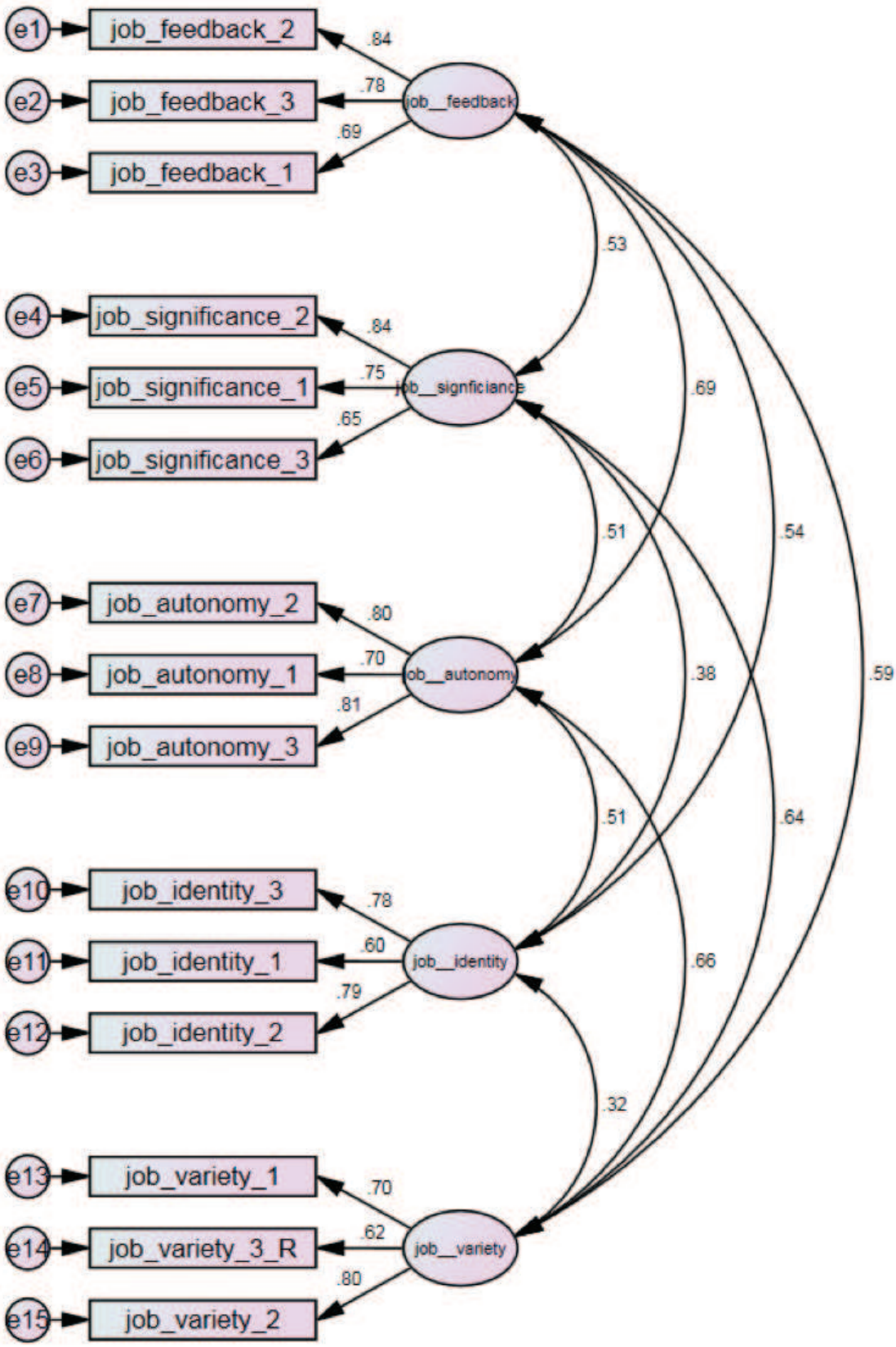
Model fit indices	Name	Cut-off for good fit
CMIN	Model Chi-square	The smaller, the better
CMIN/DF	Chi-square / degrees of freedom	< 2 – ideal, but still acceptable between 2 – 5
TLI	Tucker Lewis Index	> 0.9
NFI	Normed Fit Index	> 0.9
CFI	Comparative Fit Index	> 0.9 – acceptable, ideally > 0.95
(S)RMR	Standardised Root Mean Square Residual	< 0.08
RMSEA	Root Mean Square Error of Approximation	< 0.08, ideally < 0.05

In the job characteristics confirmatory analysis, job design was tested as a composite factor of task variety, identity, significance, autonomy and feedback (Figure 5-2). Indices of good fit generally all showed acceptable values - standardized RMR = .0513; CMIN = 556.5; NFI = .896; CFI = .909; RMSEA = .086; with the exception of CMIN/DF = 6.956 and TLI = .880. Nevertheless, the other values indicated acceptable fit when seen in conjunction (Hu and Bentler, 1999) and furthermore, all items showed very strong loadings of 0.6 or above (Table 5-5). As a result, a decision was made to proceed with using job characteristics as a second-order factor in the full measurement model.

Table 5 - 5: Standardised estimates for items predicting the five dimensions of supportive job characteristics

Items predicting the five job dimensions			Standardised Estimate (Factor loadings)
job_feedback_2	←	job__feedback	.841
job_feedback_3	←	job__feedback	.783
job_feedback_1	←	job__feedback	.685
job_significance_2	←	job__signficiance	.836
job_significance_1	←	job__signficiance	.754
job_significance_3	←	job__signficiance	.653
job_autonomy_2	←	job__autonomy	.803
job_autonomy_1	←	job__autonomy	.698
job_autonomy_3	←	job__autonomy	.813
job_identity_3	←	job__identity	.782
job_identity_1	←	job__identity	.602
job_identity_2	←	job__identity	.790
job_variety_1	←	job__variety	.698
job_variety_3_R	←	job__variety	.617
job_variety_2	←	job__variety	.797

Figure 5 - 2: CFA Model for Job Characteristics



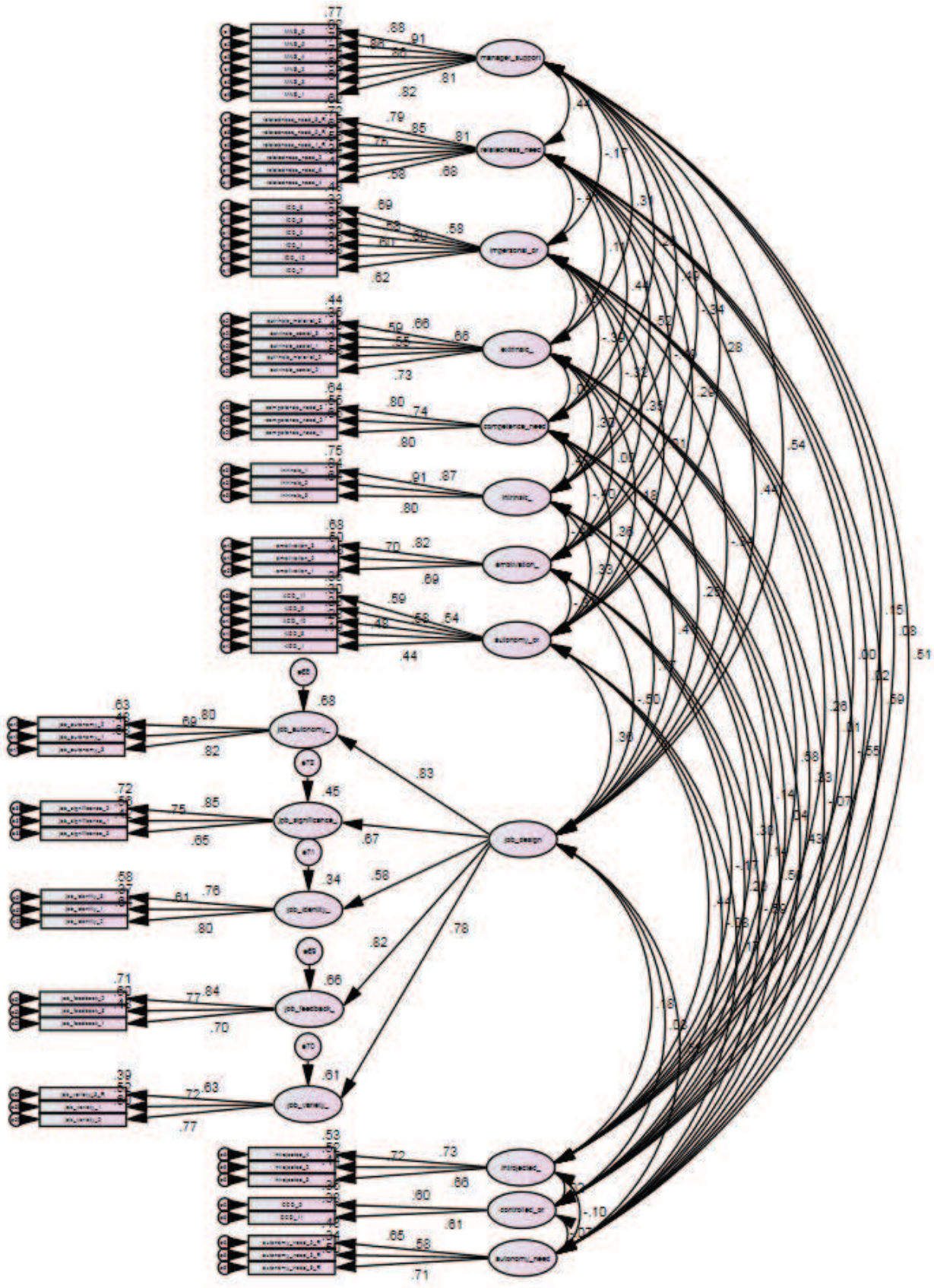
For the full measurement model (Figure 5-3), I followed the pattern structure identified in the EFA. Goodness of fit indices for the initial model overall showed mixed evidence regarding the ability of the model to explain the sample data, with several indices not meeting the recommended cut-off values. I then considered respecifying the model, starting from examining standardised regression weights, assessing the validity and reliability of the constructs included in the model, and examining modification indices for evidence of redundant items. Indices of good fit for the initial model, as well as for the respecified models are presented in Table 5-7.

The first step undertaken for improving the initial model was to examine the standardised regression coefficients, and determine whether there are any items with estimates lower than 0.5. Two such problematic items measuring autonomy causality orientations (_1 and _8) were detected and deleted from the model. While indices of good fit improved as a result of these changes, they still did not meet the required threshold values. The next step, therefore, was to consider the scores for convergent and discriminant validity for all constructs included in the model. The recommended indices followed in this study are presented in Table 5-6 below.

Table 5 - 6: Cut-off points for validity and reliability indices of good fit

	Measure	**Cut-off for good fit**
Convergent validity	AVE (Average Variance Extracted)	> 0.5
Convergent validity	CR (Composite Reliability)	> 0.7
Discriminant validity	Comparison of AVE and squared inter-item correlations (SIC)	AVE > SIC

Figure 5 - 3: CFA Full Measurement Model (Initial Model)



Both autonomy orientations and control causality orientations showed poor convergent reliability, with CR and AVE values significantly below the recommended thresholds. Therefore, these constructs had to be removed from the model. Next, the analysis showed low AVE values for the construct measuring impersonal causality orientations. As a result, the two lowest loading items for this construct were also deleted (_1 and _3), and the AVE score improved to 0.4. Although the AVE value is still below the recommended cut-off coefficient of 0.5, there are authors who suggest that AVE values greater than 0.4 still indicate acceptable convergent validity if CR values for the same construct are greater than 0.7 (Fornell and Larcker, 1981). Considering these suggestions, and in order to avoid deleting too many items from the original theoretical model, a decision was made to keep this construct, without performing any further transformations.

Then, the analysis showed discriminant validity issues between the intrinsic job design construct and intrinsic motivation. In order to address this issue, three items measuring intrinsic job characteristics – job_variety_3; job_autonomy_1 and job_feedback_1 had to be removed from the model. The result of these changes was that the AVE coefficient for the intrinsic job characteristics increased enough to become greater than squared inter-item correlations with intrinsic motivation. The results of convergent and discriminant validity tests for all constructs included in the model are presented in Appendix 7.

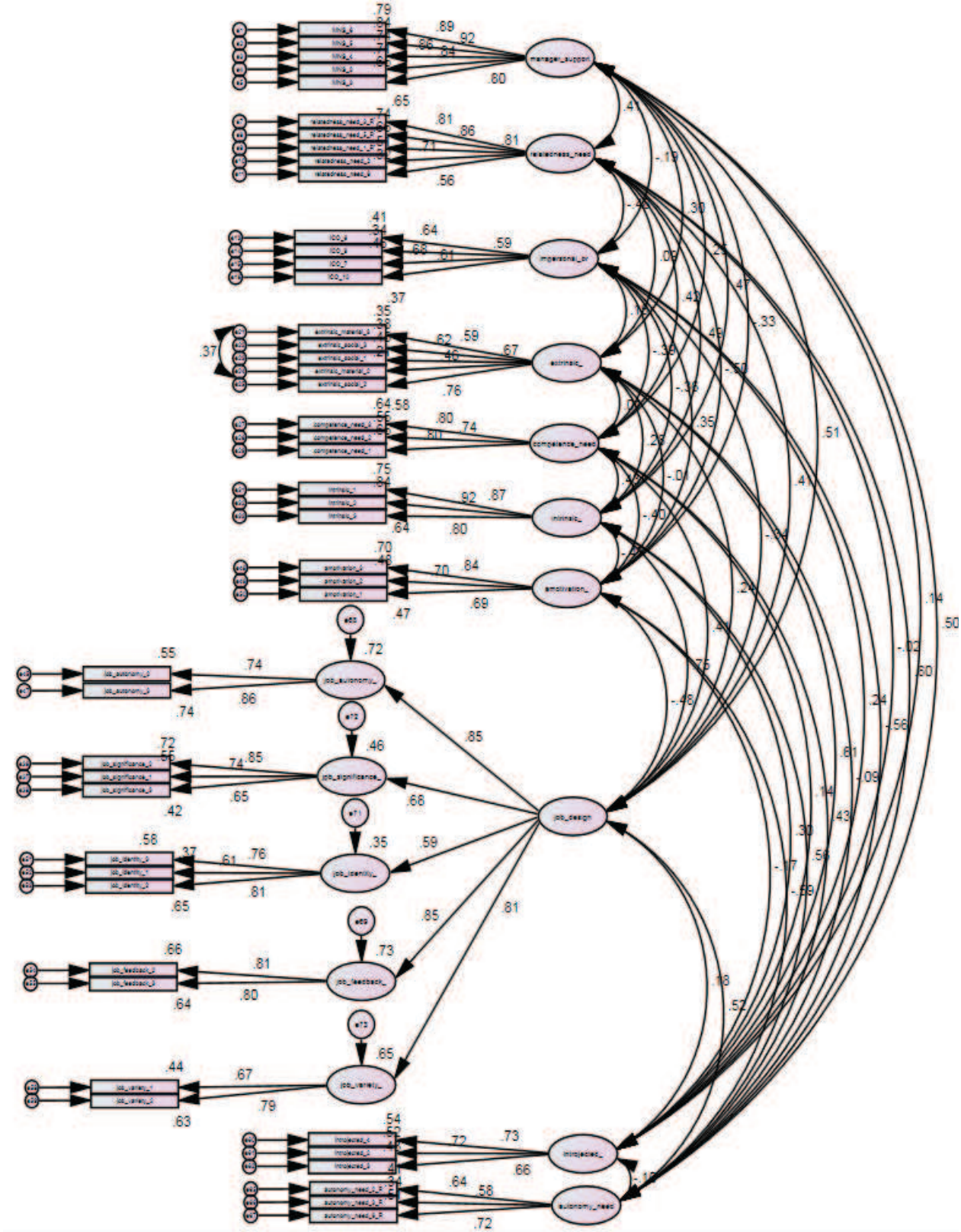
Finally, upon the examination of modification indices, an additional two items were further deleted from the analysis: relatedness need _4 and managerial need support_1. The high error correlations coefficients between these two items and the other items predicting relatedness need satisfaction and managerial support (respectively) indicated that relatedness need _4 and managerial need support_1 were redundant in the model. In addition, the error terms for the two dimensions of extrinsic material motivation were co-varied. This was deemed reasonable from a theoretical point of view, given that the material dimension of extrinsic motivation is indeed distinct from the remaining items predicting social extrinsic motivation (though still reflecting the same factor structure), and thus more likely to co-vary. This is how the final model was realised – Model 6. Standardised estimates for each indicator are presented in Appendix 8.

Table 5 - 7: CFA model respecification indices

	CFA model 1 – based on the initial EFA factor structure	CFA model 2 – deleting items with factor loadings <0.5	CFA model 3 – deleting autonomy & controlled causality orientations	CFA model 4 – deleting the two lowest loading items predicting impersonal orientations	CFA model 5 – after solving discriminant validity issues	CFA model 6 – after addressing modification indices issues
(S)RMR	.0561	.0564	.0584	.0584	.0573	.0559
CMIN	4409.515	4236.326	3768.423	3579.465	3118.244	2643.337
CMIN/DF	2.690	2.780	2.956	3.049	3.027	2.818
NFI	.822	.826	.839	.842	.853	.865
TLI	.870	.871	.877	.878	.886	.898
CFI	.880	.881	.887	.888	.896	.908
RMSEA	0.46	.047	.049	.050	.050	.047

Having arrived at the final measurement model (Figure 5-4), the threat of common method bias was assessed through the Harman (1976) single-factor test. The analysis revealed that when all variable items were loaded onto one single factor, this factor explained a relatively small percentage of the total variance (22% for the overall sample – which is significantly lower than the 68% total variance explained through EFA). These results, together with the overall good practice considerations in the design of the survey (i.e. piloting the questionnaire; ensuring anonymity and confidentiality of responses; and reassuring respondents that there are no right or wrong answers in completing the survey) indicate that the presence of common method bias is not a major source of concern in the present study (Johansson et al, 2016; Podsakoff et al, 2003).

Figure 5 - 4: CFA Full Measurement Model (Final Model)



5.5. Structural Equation Modelling – Hypothesis Testing

The next step in the analysis was to transform the CFA measurement model into a structural model by adding causal paths from the independent variables to the mediator and dependent variables, following the initial hypotheses of this study[17]. Independent variables were correlated, and error terms were added to all the endogenous variables in the model. Similarly, error terms are also added to the five dimensions of intrinsic job characteristics, used as a second-order variable. The structural model was then tested using the Maximum Likelihood estimation, using AMOS version 23.

Because SEM enables the simultaneous testing of relationships at multiple levels, the construct of basic need satisfaction was placed in the centre of the model, preceded by 4 antecedents (pay-for-performance, job design, managerial support and impersonal causality orientations) and leading to 4 motivational outcomes (amotivation, extrinsic motivation, introjected motivation and intrinsic motivation). While this study initially aimed to test for the impact of autonomy and controlled causality orientations and to examine identified motivation as well, issues with the validity and reliability of these constructs prevented these concepts from being included in the test model. The strategy undertaken in this study was to examine first and foremost the hypothesised relationships in the absence of any moderating factors, and then, to test for the individual impact of each of the three theorised moderators. All variables were thereafter included in a final model combining all three moderators, that was tested in the presence of several control factors as well. The following sections show all the steps taken in arriving at the final test model.

5.5.1. Model 1

The first model examined the influence of pay-for-performance (PFP) on basic need satisfaction in the absence of contextual and person-specific moderators, so as to determine the direct relationship between these variables. According to Andersson et al (2014, p.1065), "far too often, manuscripts simply start with an explanation of the interaction effect" while providing "no explanation of, or indeed theoretical justification for, the direct effect". As such, "it becomes unclear what baseline effect the interaction is supposed to modify". This is particularly problematic in cases where different theories specify different relationships between variables – such as the crowding in vs crowding out effect. To avoid this common

[17] In the interest of completeness, direct structural paths were added from PFP to both intrinsic and extrinsic motivation as well.

pitfall, the first model that was tested examined only the direct effects hypothesised in this research. To evaluate the model fit, a combination of model fit indices and chi-square statistics were used. Overall, these indices showed that the theoretical model fit the data well: CMIN = 2906.847, RMSEA = 0.049, CMIN/DF = 2.942, TLI = 0.881 and CFI = 0.896 – with the latter just slightly below the recommended cut-off values. In addition, squared multiple correlations, which indicate how well a given dependent variable is explained by the predictor variables in the model, showed equally acceptable values, between 0.3 and 0.7. Results depicting standardised regression weights and significance levels, as well as squared multiple correlations, are presented in Appendix 9 – Model 1.

As predicted, competence and relatedness need satisfaction were positive predictors of intrinsic motivation (H1a), and they were found to be positively linked with controlled forms of motivation as well, although generally to a lower extent (i.e. showing a lower effect size) compared to intrinsic motivation (H1b). All three types of need satisfaction were also negatively related to lack of motivation, thus showing the important role of need satisfaction in preventing situations where employees become amotivated. This is indeed in line with hypothesis H1c.

Autonomy need satisfaction, on the other hand, showed an unexpected result, being negatively linked not only with controlled forms of motivation, but with intrinsic motivation as well (although this latter effect was only significant at $\alpha = 10\%$). While this study predicted such negative relationships to occur in the case of extrinsic and introjected regulations, the notion that autonomy need satisfaction undermines intrinsic motivation was indeed unforeseen. This effect could, however, be explained through the fact that in this study, autonomy need satisfaction was measured through reverse-coded negatively-worded items. As mentioned previously, although reliability analyses initially showed strong convergent validity for the six items predicting autonomy need satisfaction (Cronbach's $\alpha = .789$), subsequent exploratory and confirmatory analyses showed that the construct related too strongly with intrinsic motivation. Given the importance of intrinsic motivation as the key dependent variable of this study, in order to solve this discriminant validity issue, the three positively-worded items predicting autonomy need satisfaction in the original scale had to be dropped. Yet it should be noted that the remaining negatively phrased items are conceptually closer to the notion of need *frustration*, rather than mere need dissatisfaction (the latter predicting needs which are simply unmet, rather than thwarted). As a result, it could be that the reverse of need frustration may have a qualitatively distinct influence on

motivational outcomes compared to need satisfaction. While this finding comes in support of previous research highlighting the importance of examining need satisfaction and need frustration as two distinct constructs relating with differential outcomes (e.g. Van den Broeck et al, 2010), it suggests, at the same time, that results pertaining to the motivational impact of autonomous need satisfaction in this study need to be interpreted with caution.

Percentage of performance pay relative to base pay was negatively related with satisfaction with the need for relatedness (H2c), although the impact of PFP on satisfaction with the need for autonomy (H2a), despite also being negative, remained insignificant. This, again, could be due to the relatively low validity of the autonomy need satisfaction construct – as indicated previously. Surprisingly, performance pay was found to be negatively related with competence need satisfaction as well, which provided support for an alternative hypothesis compared to the initial predictions regarding the positive role of performance-contingent rewards in promoting feelings of competence at work (H2b).

Regarding the role of socio-contextual factors impacting need satisfaction and intrinsic motivation, results showed that both intrinsic job characteristics and managerial support were positively related to all three types of need satisfaction (H3a; H4a) as well as different forms of work motivation, both autonomous (H3b; H4b) and controlled (H3c; H4c). This is with the exception of managerial need support which was found to be unrelated to feelings of competence need satisfaction. Job characteristics were further found to be negatively associated with amotivation (H3d), but no such effect was observed in the case of managerial need support (H4d). Finally, impersonal causality orientations were found to be negatively related to all three types of psychological need satisfaction (H5c), but unrelated to amotivation per se (H5f). This provides evidence for the important role of need satisfaction in mediating this relationship.

Overall, the initial test model provided empirical support for most of the hypothesised relationships of this study. Having established the theoretical soundness of the model, and having revealed the baseline effect of performance-contingent rewards on need satisfaction, I proceeded to examine the individual impact of each of the three proposed moderators: job characteristics, managerial support and impersonal causality orientations (Models 2-4, respectively). The reason for including them separately at first was to determine the differential effect of each moderator in the absence of the other two, and then examine if these effects remained the same when combining all intervening factors together. In order

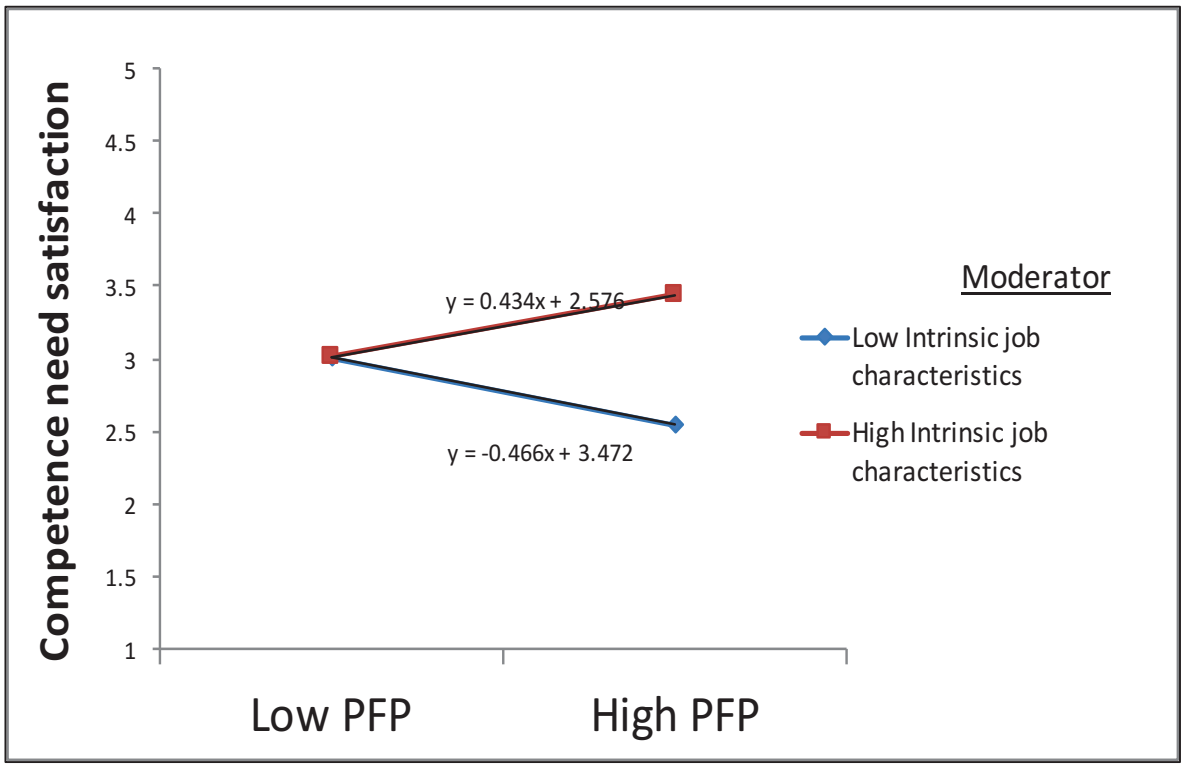
to compute these moderators, the appropriate variables were standardised, and then interactions were calculated between the standardised values of PFP and the standardised values of each of the three moderating variables. Three new relationships were thus added in each model, denoting causal links from each moderator to each of the three types of basic need satisfaction.

5.5.2. Model 2 – including intrinsic job characteristics as a moderator to the relationship between PFP and need satisfaction

Model 2 tested for the moderating role of intrinsic job characteristics to the relationship between PFP and basic need satisfaction. Indices of good fit again indicated that the model fit the data well: CMIN = 2945.128; RMSEA = 0.048, CMIN/DF = 2.865, TLI = 0.883 and CFI = 0.898. The main relationships remained unchanged in terms of their significance levels. Furthermore, the nature of the theorised relationships remained the same as shown in Model 1, with only slight differences in effect size, due to the inclusion of a new variable in the model. The results, including significance levels, standardised regression weights and squared multiple correlations are presented in Appendix 9 – Model 2.

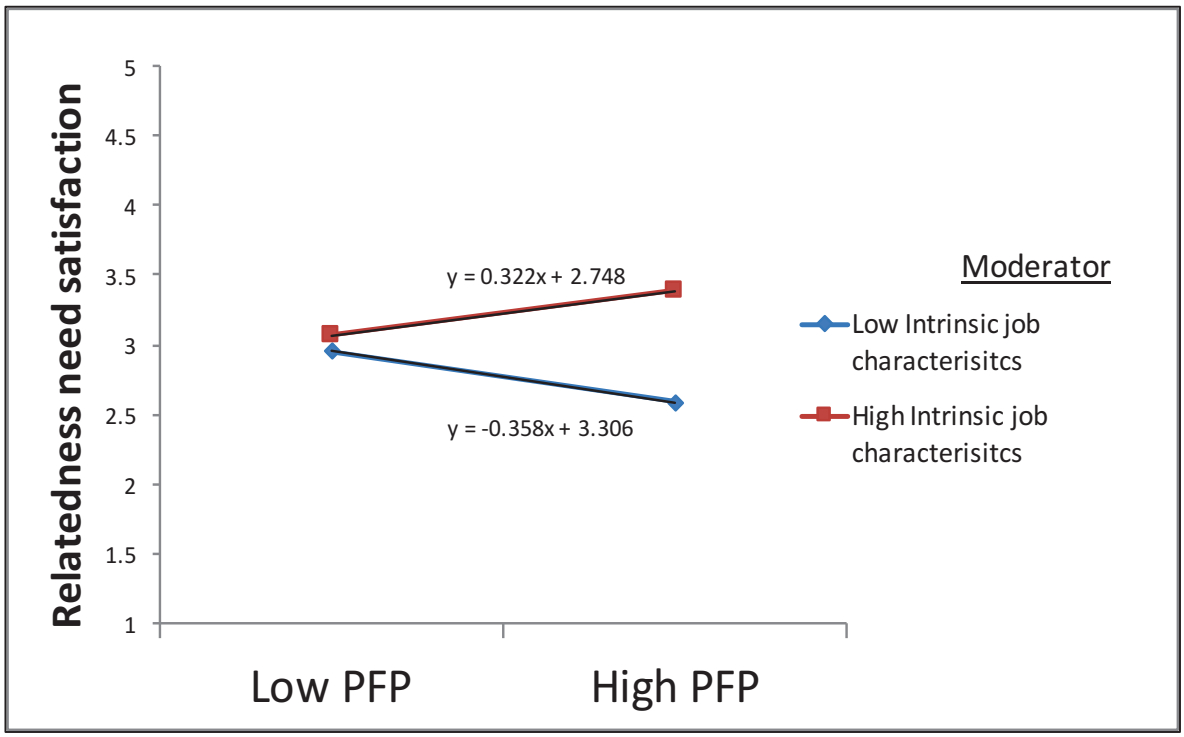
Importantly, the new structural model showed that job characteristics have a moderating impact on the link between PFP and competence need satisfaction ($p < 0.05$) as well as between PFP and relatedness need satisfaction ($p < 0.1$). As such, high levels of PFP provided in jobs that are high in intrinsic characteristics (task autonomy, variety, identity, significance and feedback) appear to have a more positive impact on competence and relatedness need satisfaction, compared to jobs that are low in intrinsic characteristics.

Figure 5 - 5: The interaction between PFP and intrinsic job characteristics affecting competence need satisfaction



The figure above shows that a high ratio of PFP relative to base pay can lead to more positive outcomes on competence need satisfaction for employees working in jobs high in intrinsic characteristics, compared to jobs low in intrinsic characteristics. This showcases the importance of need-supportive work contexts in moderating (in this case, enhancing) the informational, competence-affirming function of rewards.

Figure 5 - 6: The interaction between PFP and intrinsic job characteristics affecting relatedness need satisfaction



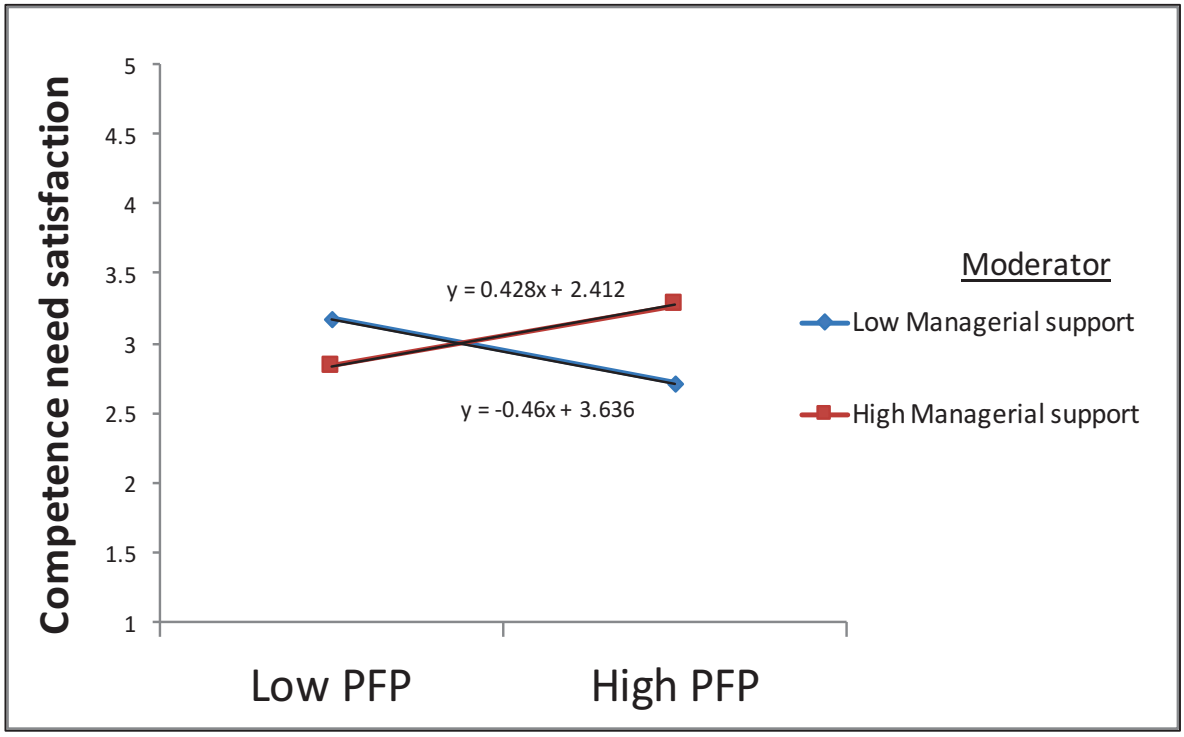
In a similar vein, the more intrinsically-motivating the job, the lower the negative effect of PFP on satisfaction with the need for relatedness. These findings therefore offer partial support for hypothesis H3e, and show the importance of context for successfully moderating the undermining effect of extrinsic rewards in workplace settings. While no significant effects were found in the case of autonomy need satisfaction, this might be explained through the methodological limitations formerly signposted.

5.5.3. Model 3 – including the managerial support moderator

In developing Model 3, I followed the same approach as indicated previously, this time testing for the individual effect of managerial need support in moderating the relationship between PFP and each of the three types of need satisfaction. Goodness of fit indices showed acceptable fit overall, with CMIN = 2957.637; RMSEA = 0.048, CMIN/DF = 2.877, TLI = 0.882 and CFI = 0.897. Similarly to the previous model assessing the role of intrinsic job characteristics in tempering negative baseline reward effects, all of the main relationships remained robust in terms of their significance levels, and consistent regarding the nature (positive vs negative) of the main hypothesised effects. Results are presented in Appendix 9 – Model 3. Regarding interaction effects, managerial need support was found to moderate

the link between PFP and competence need satisfaction, although no moderating effects were found in relation to the other two types of need satisfaction.

Figure 5 - 7: The interaction between PFP and managerial support affecting competence need satisfaction



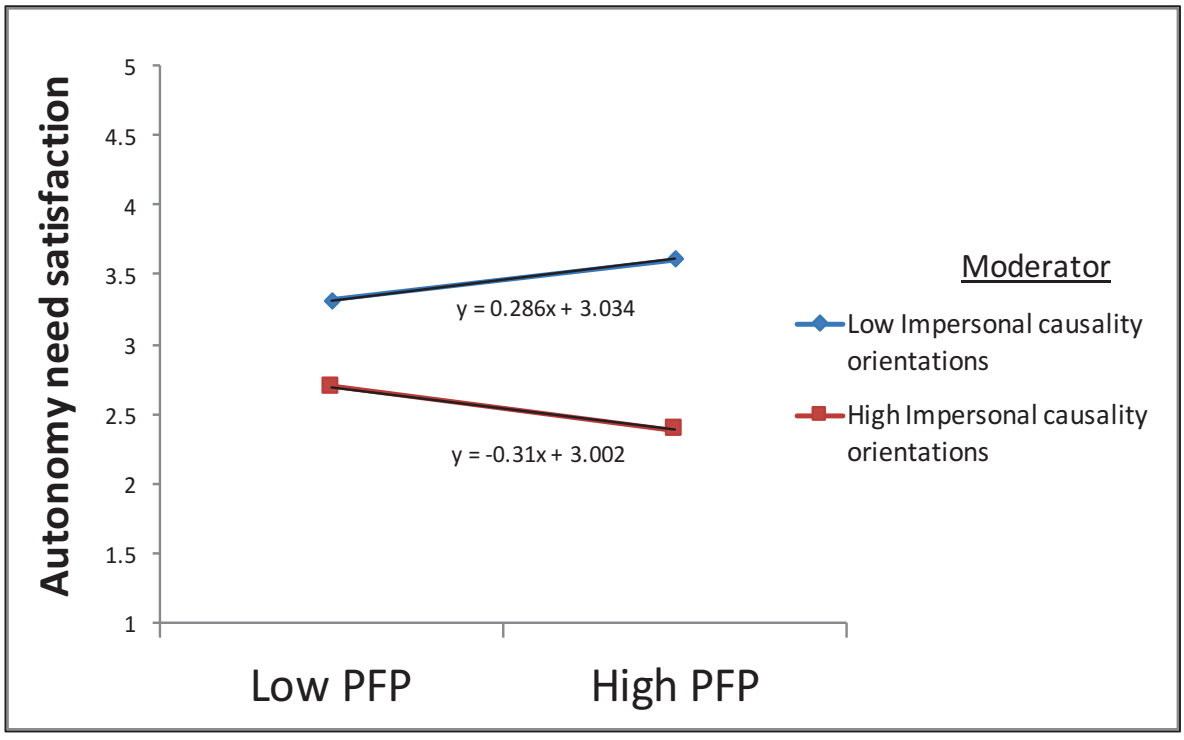
As shown Figure 5-7, high levels of managerial support were found to lead to greater competence need satisfaction in the presence of high PFP, compared to low levels of managerial support, thus offering partial support to hypothesis H4e. This further indicates the relatively more positive role of PFP in conditions of need support, and substantiates the importance of social factors in predicting positive reward effects. What is interesting about this interaction is that for low levels of PFP, high levels of managerial support seem to predict opposing effects. Specifically, high managerial support combined with low PFP appears to be more detrimental to perceptions of competence on the job, compared to receiving low PFP in conditions of low managerial support. This is perhaps an indication of the symbolic function of rewards as a means for supportive managers to demonstrate their appreciation for employees' performance.

5.5.4. Model 4 – including the impersonal orientations moderator

The third and last moderator of this research, referring to impersonal causality orientations, was subsequently examined in a fourth test model. Again, the initial aim of this study was

to test for the moderating impact of autonomy and controlled causality orientations as well, however the low validity and reliability coefficients for these constructs prevented them from being added in the test model. Indices of good fit again showed acceptable values, similar to the ones acknowledged in previous models: CMIN = 2947.901; RMSEA = 0.048, CMIN/DF = 2.868, TLI = 0.883 and CFI = 0.898. Standardised coefficients, significance levels and squared multiple correlations are presented in Appendix 9 – Model 4. Standardised coefficients and p-values remained largely consistent with those shown in previous models, with the addition that the negative relationship between PFP and autonomy need satisfaction now reached statistical significance as well. Results showed that impersonal causality orientations moderated (increased) the detrimental effect of PFP on all three types of need satisfaction, thus offering full support to hypothesis H5i.

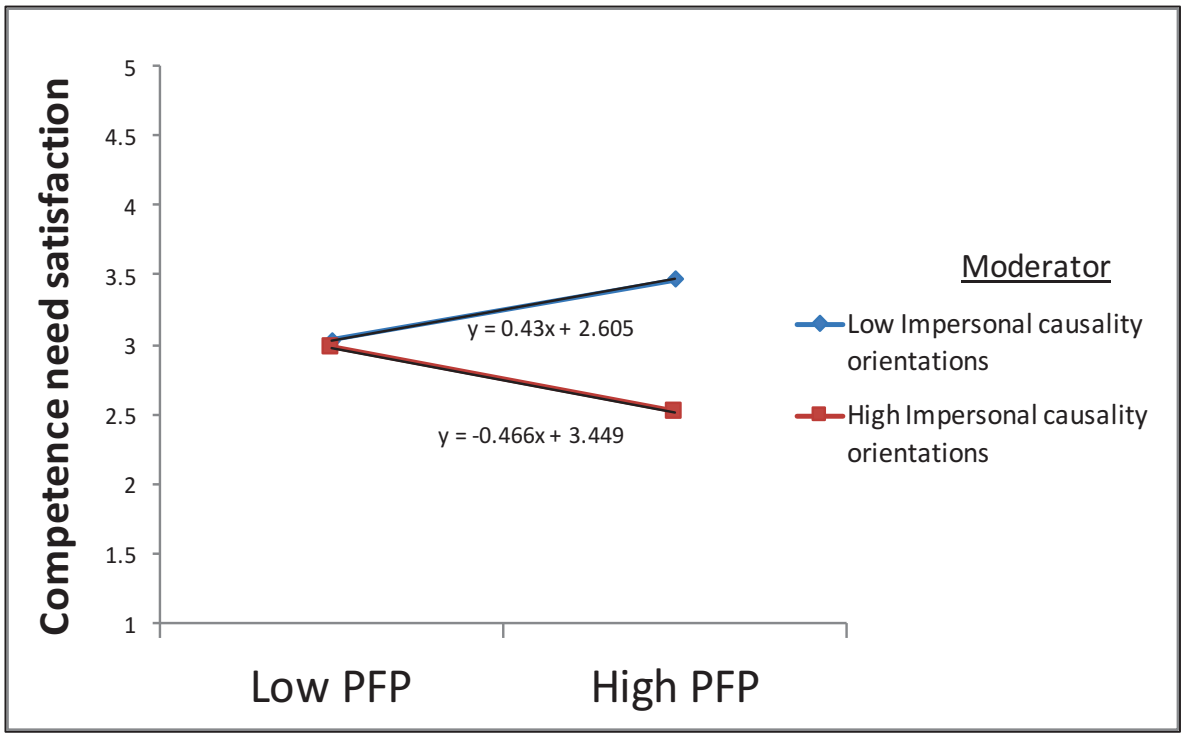
Figure 5 - 8: The interaction between PFP and impersonal causality orientations affecting autonomy need satisfaction



First, as shown in Figure 5-8, individuals with a strong impersonal causality orientation were found to have the lowest levels of autonomy need satisfaction in the presence of high PFP, whereas for those low in such orientations, high levels of PFP were associated with relatively greater autonomy need satisfaction. As such, there is evidence to suggest that person-specific predispositions can indeed further aggravate the controlling effect of extrinsic rewards. For low levels of PFP, individuals with high impersonal causality orientations again showed

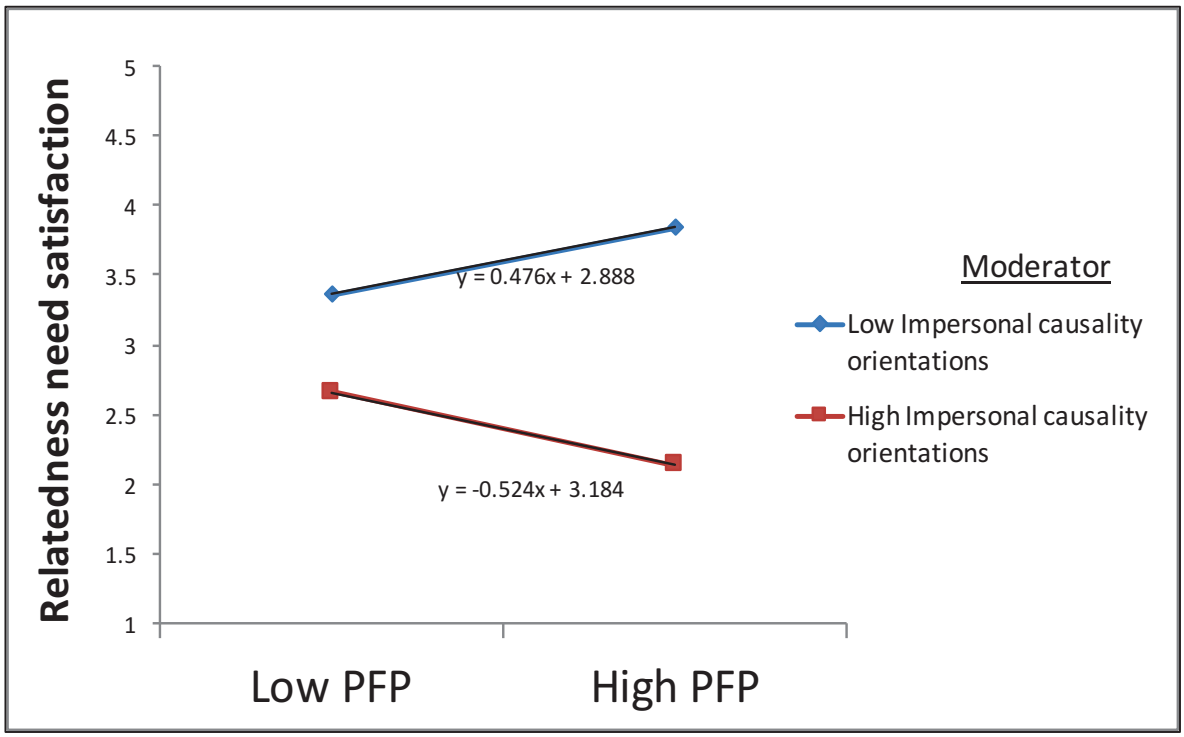
more detrimental effects on autonomy need satisfaction, compared to those less affected by such predispositions. This effect, however, was less pronounced than under conditions of high levels of PFP.

Figure 5 - 9: The interaction between PFP and impersonal causality orientations affecting competence need satisfaction



Similar effects were observed in relation to competence need satisfaction as well (Figure 5-9), where high impersonal causality orientations led to the lowest scores of competence need satisfaction in the presence of high levels of PFP. On the other hand, for individuals scoring low in impersonal causality orientations, high levels of PFP appear to lead to relatively better outcomes in terms of competence need satisfaction. In other words, the negative impact of performance-related pay on feelings of competence seems to be significantly more pronounced for individuals who are predominantly impersonally orientated.

Figure 5 - 10: The interaction between PFP and impersonal causality orientations affecting relatedness need satisfaction



Finally, impersonal causality orientations were found to further increase the negative impact of PFP on relatedness need satisfaction (Figure 5-10). While high impersonal causality orientations were associated with the lowest levels of relatedness need satisfaction in conditions of high PFP, the effect was less prominent for individuals scoring low in such orientations. For low PFP, strong impersonal orientations again led to relatively more damaging effects, although still not as prominent as in the case of high PFP. This represents a significant contribution to knowledge, given that up until now, there are no other studies to show evidence for the role of impersonal causality orientations in moderating the need frustrating impact of extrinsic performance-related rewards.

5.5.5. Model 5 – Final model including all three moderators

Having found (at least partial) support for all of this study's hypotheses vis-à-vis the role of both socio-contextual and individual-level factors in moderating the negative influence of extrinsic rewards on feelings of basic need satisfaction, the next step in the analysis was to test for the simultaneous influence of all three interaction factors in a single test model. The SEM indices of fit improved considerably as a result of adding all three moderators at the same time: CMIN = 3052.529; RMSEA = 0.047, CMIN/DF = 2.755, TIL = 0.886 and CFI = 0.901. Given the better indices of fit relative to previous models, as well as the fact that it reflects more fully the proposed conceptual model of the study, it is this model that will be considered as the basis for discussion of findings in the subsequent chapter of this thesis. For now, the tables below present a brief summary of which of the hypothesised relationships are supported by the data, or in contrast, refuted on the basis of low statistical significance. The full set of relationships are presented in Appendix 9 - Model 5 as well.

Regarding the relationship between PFP and need satisfaction (Table 5-8), results of the final structural model support initial assumptions regarding: a) the negative relationship between PFP and autonomy need satisfaction ($\beta = -.194$; $p < 0.05$); and b) the negative relationship between PFP and relatedness need satisfaction ($\beta = -.342$; $p < 0.001$). In addition, this study has found support for an alternative hypothesis regarding the influence of PFP on competence need satisfaction. While the initial prediction was that PFP will support feelings of competence at work, given their informational functional significance, this study found that PFP has a negative – as opposed to positive - impact on competence need satisfaction ($\beta = -.560$; $p < 0.001$). In addition, this study showed that PFP is unrelated to either intrinsic motivation ($\beta = .048$; $p = .280$) or extrinsic motivation ($\beta = .079$; $p = .225$). What this suggests is that extrinsic rewards are rather limited in their ability to impact motivation directly and that need satisfaction is indeed an essential mechanism mediating the influence of performance-related rewards on work motivation.

Table 5 - 8: PFP and need satisfaction / motivation

Hypotheses	**Standardised Beta**	**P**	**Result**
PFP -> autonomy need satisfaction	-.194	.049	Supported
PFP -> competence need satisfaction	-.560	***	Alternative supported
PFP -> relatedness need satisfaction	-.342	***	Supported
Additional paths relating to intrinsic and extrinsic motivation	**Standardised Beta**	**P**	**Result**
PFP -> intrinsic motivation	.048	.280	No sig relationship
PFP -> extrinsic motivation	.079	.225	No sig relationship

This study then advances a more nuanced understanding of the undermining effect, by showing that intrinsic job characteristics and impersonal causality orientations remain important moderators in the model. As shown in Table 5-9 below, the moderating effect of intrinsic job characteristics on the relationship between PFP and competence need satisfaction remained significant at $\alpha = 10\%$[18] ($\beta = .259$; $p < 0.1$), and the moderating role of impersonal causality orientations on all three types of need satisfaction remained significant at $\alpha = 5\%$ as well. Specifically, the standardised coefficients showing the interaction between impersonal orientations and performance-related rewards impacting need satisfaction were as follows: $\beta = -.401$ ($p < 0.01$) for autonomy need satisfaction; $\beta = -.293$ ($p < 0.05$) for competence need satisfaction; and $\beta = -.270$ ($p < 0.05$) for relatedness need satisfaction. The moderating effect of managerial need support, however, became insignificant, perhaps an indication that intrinsic job characteristics are more important for promoting feelings of competence in the presence of high performance bonuses, compared to the more subjective influence of managerial support.

[18] It is only moderation relationships that were accepted at $\alpha = 10\%$ (90% confidence intervals) in this study, given that interaction effects are relatively weaker than direct effects.

Table 5 - 9: Moderators to the relationship between PFP and need satisfaction

Hypotheses	Standardised Beta	P	Result
Job design x PFP -> autonomy need satisfaction	-.102	.387	Rejected
Job design x PFP -> competence need satisfaction	.259	.066	Supported
Job design x PFP -> relatedness need satisfaction	.054	.673	Rejected
Manager support x PFP -> autonomy need satisfaction	-.186	.138	Rejected
Manager x PFP -> competence need satisfaction	-.060	.690	Rejected
Manager support x PFP -> relatedness need satisfaction	-.101	.465	Rejected
Impersonal orientations x PFP -> autonomy need satisfaction	-.401	.001	Supported
Impersonal orientations x PFP -> competence need satisfaction	-.293	.044	Supported
Impersonal orientations x PFP -> relatedness need satisfaction	-.270	.044	Supported

The relationship between need satisfaction and motivation (Table 5-10), on the other hand, showed mixed results and only partially supported the initial hypotheses. Autonomy need satisfaction was - as predicted - negatively related to both extrinsic regulation ($\beta = -.966$, $p < 0.001$) and introjected regulation ($\beta = -.893$, $p < 0.001$), but unrelated to intrinsic motivation. This, as mentioned previously, is likely due to methodological limitations in the measurement of this construct. In contrast, both competence and relatedness need satisfaction were positively related to intrinsic motivation ($\beta = .098$, $p < 0.05$ and $\beta = .186$, $p < 0.001$, respectively), results which are indeed consistent with the initial assumption of this research. Both types of need satisfaction, furthermore, were found to relate to different forms of controlled motivation as well, thus finding support for alternative hypotheses regarding the role of competence and relatedness for predicting introjected regulation ($\beta = .216$, $p <0.001$) and extrinsic regulation ($\beta = .220$, $p <0.001$), respectively. All three types of need satisfaction were found to relate negatively to amotivation, which is consistent with the initial propositions of this research.

Table 5 - 10: Need satisfaction and motivation

Hypotheses	Standardised Beta	P	Result
Autonomy need satisfaction -> intrinsic motivation	-.092	.070	Rejected
Autonomy need satisfaction -> introjected motivation	-.893	***	Supported
Autonomy need satisfaction -> extrinsic motivation	-.966	***	Supported
Autonomy need satisfaction -> amotivation	-.266	.002	Supported
Competence need satisfaction -> intrinsic motivation	.098	.006	Supported
Competence need satisfaction -> introjected motivation	.216	***	Alternative supported
Competence need satisfaction -> extrinsic motivation	.029	.567	Rejected
Competence need satisfaction -> amotivation	-.130	.004	Supported
Relatedness need satisfaction -> intrinsic motivation	.186	***	Supported
Relatedness need satisfaction -> introjected motivation	.063	.236	Rejected
Relatedness need satisfaction -> extrinsic motivation	.220	***	Alternative supported
Relatedness need satisfaction -> amotivation	-.262	***	Supported

Next, regarding the role of contextual factors affecting need satisfaction (Table 5-11), all hypotheses were supported, with the exception of the proposition that managerial need support will facilitate competence need satisfaction, which did not emerge as statistically significant. On the other hand, managerial need support was found to promote autonomy need satisfaction ($\beta = .240$, $p < 0.001$) and relatedness need satisfaction ($\beta = .236$, $p < 0.001$), as predicted. In addition, intrinsic job characteristics were positively related to all three types of need satisfaction, whereas impersonal causality orientations showed contrasting effects, impacting all three forms of need satisfaction negatively. This again is in line with the initial hypotheses of this study.

Table 5 - 11: Contextual factors affecting need satisfaction

Hypotheses	Standardised Beta	P	Result
Job characteristics -> autonomy need satisfaction	.325	***	Supported
Job characteristics -> competence need satisfaction	.319	***	Supported
Job characteristics -> relatedness need satisfaction	.155	.003	Supported
Managerial support -> autonomy need satisfaction	.240	***	Supported
Managerial support -> competence need satisfaction	.031	.596	Rejected
Managerial support -> relatedness need satisfaction	.236	***	Supported
Impersonal orientations -> autonomy need satisfaction	-.572	***	Supported
Impersonal orientations -> competence need satisfaction	-.408	***	Supported
Impersonal orientations -> relatedness need satisfaction	-.511	***	Supported

Finally, hypotheses concerning the role of contextual factors affecting different types of motivation received mixed support (Table 5-12). First, both intrinsic job characteristics and managerial support were found to facilitate controlled motivation, thus offering alternative support to the initial predictions of this study. Then, only job characteristics were found to impact intrinsic motivation ($\beta = .681$, $p < 0.001$) and amotivation ($\beta = -.228$, $p < 0.001$). This means that the hypotheses regarding the role of managerial support in promoting intrinsic motivation and reducing employees' lack of motivation failed to receive statistical support. At the same time, impersonal orientations did not emerge as direct predictors of amotivation.

Table 5 - 12: Contextual factors affecting motivation

Hypotheses	Standardised Beta	P	Result
Job characteristics -> intrinsic motivation	.681	***	Supported
Job characteristics -> introjected motivation	.575	***	Alternative supported
Job characteristics -> extrinsic motivation	.561	***	Alternative supported
Job characteristics -> amotivation	-.228	***	Supported
Managerial support -> intrinsic motivation	.068	.060	Rejected
Managerial support -> introjected motivation	.251	***	Alternative supported
Managerial support -> extrinsic motivation	.431	***	Alternative supported
Managerial support -> amotivation	0.56	.271	Rejected
Impersonal orientations -> amotivation	-.070	.329	Rejected

As an additional test in the analysis, to formally test for mediation effects, I used bootstrapping[19] (Bollen and Stine, 1990; Shrout and Bolger, 2002) to determine (1) whether basic need satisfaction mediated the paths between PFP and intrinsic work motivation; and (2) whether basic need satisfaction mediated the paths between impersonal causality orientations and amotivation. Bias-corrected bootstrap 95% confidence intervals were computed from 10,000 bootstrap samples. Significant mediation effects are indicated when confidence intervals do not cross zero. In other words, if zero is not within the interval, then the researcher can be confident that the indirect effect is different from zero.

Results showed significant indirect relationships between PFP and intrinsic work motivation through basic need satisfaction, and between impersonal causality orientations and amotivation through basic need satisfaction. Specifically, the analysis revealed a significant indirect effect between PFP and intrinsic motivation (ab = -.015, SE = .006; 95% LLCI [20]= -.029; 95% ULCI[21] = -.003). As predicted, PFP lowers satisfaction with the three basic needs, which in turn decreases intrinsic motivation. In addition, the analysis revealed a significant indirect effect between impersonal causality orientations and amotivation (ab = .302, SE = .077; 95% LLCI = .160; 95% ULCI = .460). As predicted, impersonal causality orientations decrease satisfaction with the three basic needs, which in turn increases amotivation.

5.5.6. Model 6 – testing for the robustness of the model by including control factors

For model 6, the final structural model considered in this study, I took an additional step for ensuring the robustness of findings, and introduced several demographic and job-related control factors in the model. Specifically, the following factors were included: age, gender, education, job level (managerial vs non-managerial), job tenure, employment sector (public/ private), hours of work (part-time vs full-time), average base pay, and the panel from which the data was sourced. These control factors were co-varied with the exogenous variables in the model, and then paths were drawn from each control variable to the endogenous

[19] For this particular test, PFP variables that were not reported were included in the test model as zero, rather than treated as missing variables, due to the fact that bootstrap analysis in AMOS cannot be performed with missing data.
[20] LLCI = lower level confidence interval
[21] ULCI = upper level confidence interval

variables. Relationships remained robust when including these factors[22], which further substantiates the validity of the model. The indices of fit eroded slightly as a result of adding these paths, which is likely the effect of several insignificant relationships between the control factors and the mediator and outcome variables of this study: CMIN = 3758.927; RMSEA = 0.044, CMIN/DF = 2.561, TIL = 0.867 and CFI = 0.893. Indeed, with very few exceptions, control factors did not appear to significantly impact either need satisfaction or motivation. The fact that control factors did not affect the hypothesised relationships reassures us of the robustness of the initial model. This is why I proceed with the final model without including these factors, i.e. I am retaining Model 5 introduced above. This final model (Model 5) is furthermore in line with the conceptual framework put forward and shows the best fit with the data across all 6 developed models (Table 5-13).

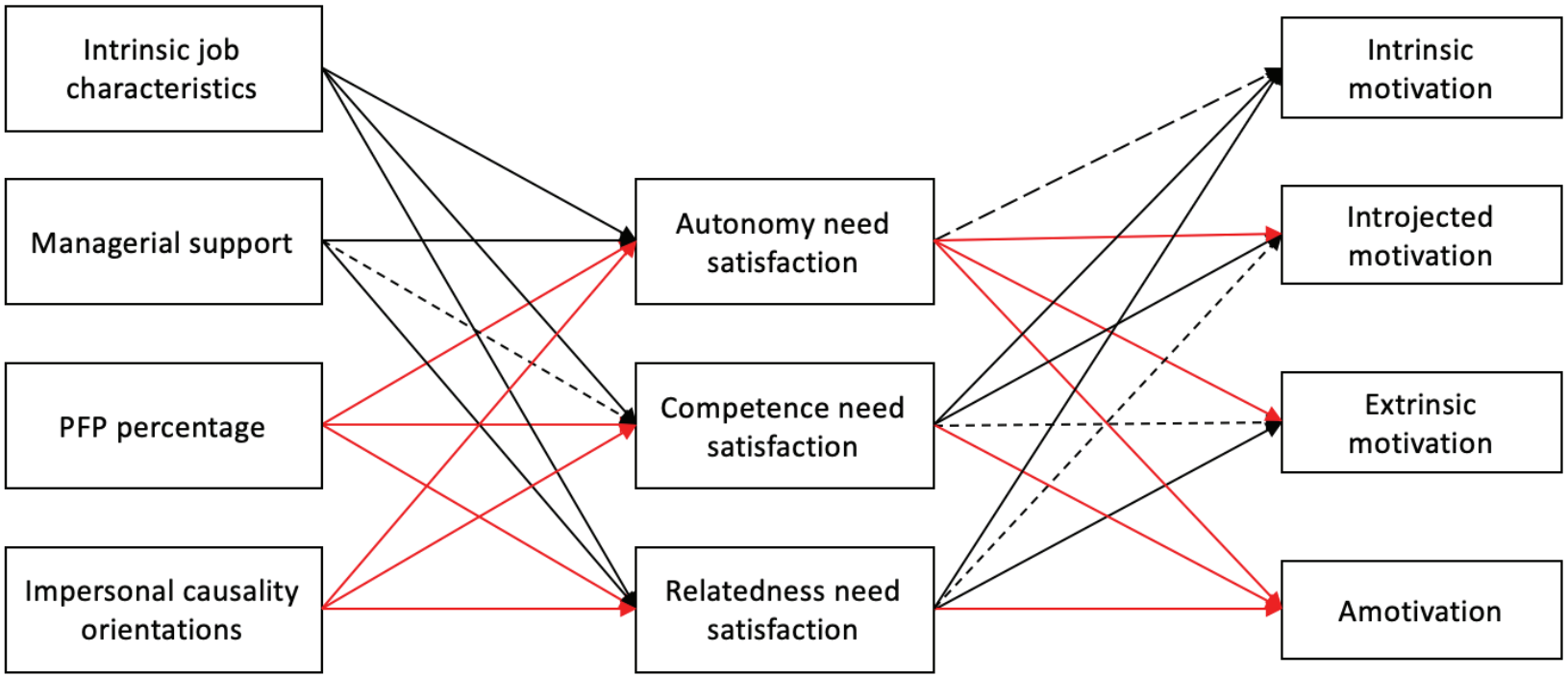
Table 5 - 13: SEM model development (goodness of fit indices)

	SEM model 1 – Based on the initial CFA factor structure	**SEM model 2 – including job design as a moderator**	**SEM model 3 – including managerial support as a moderator**	**SEM model 4 – including impersonal orientations as a moderator**	**SEM model 5 – including all three moderators - preferred model**	**SEM model 6 – including control factors**
CMIN	2906.847	2945.128	2957.637	2947.901	**3052.529**	3758.927
CMIN/DF	2.942	2.865	2.877	2.868	**2.755**	2.561
NFI	.852	.852	.852	.852	**.854**	.867
TLI	.881	.883	.882	.883	**.886**	.867
CFI	.896	.898	.897	.898	**.901**	.893
RMSEA	.049	.048	.048	.048	**.047**	.044

Figure 5-11 presents a summary of structural paths based on Model 5, showing the impact of intrinsic job characteristics, managerial support, reward variables and impersonal causality orientations on basic need satisfaction and the different types of autonomous and controlled work motivation examined in this study.

[22] With the exception of one relationship predicting the moderating role of impersonal causality orientations on feelings of relatedness need satisfaction in the presence of high PFP, which now becomes insignificant.

Figure 5 - 11: Summary of structural paths showing the impact of contextual, individual-specific and reward variables on basic need satisfaction and different types of autonomous and controlled work motivation, as well as amotivation



Note: The figure shows structural paths after moderation analysis. Solid lines show significant relationships; dashed lines show insignificant results; red lines show negative relationships.

5.6. Conclusion

This chapter has reviewed the main steps taken to ensure the robustness of data, including removing outliners, responses from inattentive participants, and testing for the normality of data and linearity of relationships in the test model. Then, results from exploratory and confirmatory analyses were reported, as well as the key tests to assess the validity and reliability of measurements. Then, the chapter introduced the process of generating several test models using SEM, which showed the initial baseline effects of extrinsic rewards on need satisfaction, before examining the separate as well as the joint impact of the three hypothesised moderators of this research. Results support the majority of the hypotheses of this study, which are discussed in more depth in the following chapter of the thesis.

CHAPTER 6

DISCUSSION OF FINDINGS

6.1. Introduction

This chapter discusses the study's results relating to the overarching research question posed and the specific hypotheses tested. It also reflects on links with existing studies and identifies the study's main theoretical contributions. The chapter opens by evaluating the relationship between performance-contingent financial rewards and work motivation, as mediated by satisfaction with the basic psychological needs for autonomy, competence and relatedness. It discusses the relevance of these results for addressing current mixed findings in the field, accentuating the study's contribution to providing a more nuanced understanding of the undermining effect. Then, it considers the impact of supportive contextual and intrapersonal factors both as moderators of the relationship between extrinsic rewards and work-related basic need satisfaction, and also in their capacity to predict need satisfaction and motivation.

6.2. Performance-related pay and psychological need satisfaction

One of the first and most important research objectives that this study has sought to address is to clarify the nature of the relationship between performance-contingent rewards and intrinsic work motivation, as mediated by satisfaction with the psychological needs for autonomy, competence and relatedness. This was tested first in the absence of supportive (unsupportive) moderators, in order to determine the baseline effect of extrinsic rewards in relation to need satisfaction. While the extant literature has long hypothesised that the value of performance-related pay will - on average - negatively affect satisfaction with all three psychological needs, few prior studies have produced empirical evidence in this regard.

This study has found that while performance-related pay is not significantly related to intrinsic motivation directly, it does negatively affect satisfaction with all three need types.[23] This corroborates two of my initial hypotheses (the predicted negative impact of PFP on feelings of autonomy and relatedness), while finding support for an alternative hypothesis regarding the impact of PFP on competence need satisfaction. While previous studies have focussed chiefly on the influence of extrinsic incentives on the concept of basic need

[23] Satisfaction with the need for autonomy remained insignificant in initial models, but reached the required significance levels in the final model involving all three moderators.

satisfaction as a whole (e.g. Olafsen et al, 2015), this study advances knowledge in the field by examining the *differential* impact of performance-related incentives on *each of the three* types of need satisfaction, thus further responding to calls for research along these lines by Cerasoli et al (2016). Each of these relationships will now be discussed in turn.

6.2.1 Autonomy

Regarding the impact of PFP on autonomy need satisfaction, results of initial structural models did not find support for the hypothesis that feelings of autonomy will be thwarted by performance-contingent pay. While the effect was indeed negative (as predicted), the relationship between PFP and autonomy need satisfaction did not reach statistical significance, either in models that evaluated the direct effect in the absence of moderators, or in models that tested the separate impact of the three moderating factors affecting this relationship. Nevertheless, when considering all moderators affecting need satisfaction together – which indeed reflects the conceptual model of this thesis – the relationship between PFP and autonomy need satisfaction did reach statistical significance ($\beta = -.194$; $p < 0.05$). In other words, results showed that salient performance-contingent rewards expressed as a percentage of base pay may indeed displace feelings of self-determination that individuals may have initially had in relation to their work.

For the following reasons, a decision was taken to retain the results of this particular structural model and interpret the negative relationship between PFP and autonomy need satisfaction as supported by data. First, it is this preferred test model that showed the best indices of fit to the data and that reflected the conceptual model of the study. Second, these results remained robust when including several control factors in the model ($\beta = -.199$; $p = 0.052$), thus offering further support for the study's initial hypothesis. Third, in all test models, the relationship between PFP and autonomy need satisfaction remained negative, regardless of their significance levels. As such, it is clear that the baseline effect supported the undermining hypothesis in all models, and that they were not in conflict, even if the relationships in the final models were significant, while those in the initial models were not (Amrhein et al, 2019). Having discussed this rationale, the following paragraphs will now situate these findings in the context of previous literature.

The study's findings are consistent with motivation crowding theory and SDT predictions that performance-contingent rewards will frustrate satisfaction with the need for self-determination, prompting individuals to (often unconsciously) re-assess their motives for

performing the task. For example, employees who would normally invest effort in their jobs because they enjoy the work itself and/or identity with the goals of their activities, may, when provided with salient performance-contingent rewards, shift their perspective and adjust their efforts towards obtaining the anticipated rewards. This reflects a change in their locus of causality from internal to external, implying that the design of extrinsic incentives may indeed be seen as a form of external control over the individual employee (Greene, 2011).

The available literature suggests that not all extrinsic rewards will prompt this cognitive reassessment. It has been suggested that non-tangible rewards such as positive feedback and unanticipated (ex-post) tangible rewards such as unexpected bonuses, are unlikely to undermine feelings of autonomy since the recipient is not made aware in advance of the reward or its form (Balkin et al, 2015; Deci et al, 1999). In other words, in such circumstances, individuals cannot meaningfully work with the aim of obtaining the reward since, as far as they are aware, there is no reward in prospect in the first place. In addition, it has been suggested that non-performance contingent rewards such as base salaries are equally unlikely to promote this frustration with the need for autonomy (e.g. Olafsen et al, 2015), given that they stipulate no limits to employees' self-determination in the job and do not divert individuals' efforts towards pre-determined, externally-imposed tasks. Indeed, in this study, there were no significant relationships between participants' base salary levels and any of the three types of psychological need satisfaction.

As my results indicate, the situation is different in the case of rewards that are explicitly performance-contingent. First, this is because these rewards are typically known in advance, meaning that they are provided for precisely defined performance goals that trigger expectations regarding the type of pay available and the ways to obtain it (Balkin et al, 2015) Second, performance-contingent rewards are often provided for attaining standards of performance that are externally-imposed. As explained by Ryan and Deci (2018), "performance-contingent rewards have a strong risk of having controlling functional significance insofar as one feels pressured to meet an externally specified standard to get the reward" (p.133). This type of controlling functional significance implies that people no longer feel in control of the tasks that they consider important, but rather begin to shift their attention to those tasks that would dictate their reward allocation. This tendency of restricting employees' attention to work outcomes that are linked to pay ultimately limit

their autonomy and discretion in the way work is carried out (Balkin et al, 2015; Manganelli et al, 2018).

The findings are therefore consistent with previous theoretical views. In addition, they are in line with recent empirical meta-analyses such as that by Cerasoli et al (2016) which found that while the provision of extrinsic rewards per se had little impact on need satisfaction, the fulfilment of basic needs was lower when incentives were directly (as opposed to indirectly) performance salient. In other words, rewards that were not directly contingent on performance showed no detrimental effects, while performance-contingent rewards were indeed found to thwart satisfaction with the three basic needs. My results lend support to these propositions.

Further, my results support the notion that it is not only low levels of pay that can be perceived as controlling. While research by McCausland et al (2005) and Pouliakas (2010) showed negative associations between *small* (as opposed to large) bonus payments and employees' satisfaction with the job itself (i.e. their self-determined motivation), my findings indicate that even those who receive high levels of performance pay can sometimes feel controlled by those payments. Specifically, the results of my research indicate that the higher the percentage of performance pay relative to base pay, the lower one's satisfaction with the need for autonomy. Moller and Deci (2014, p.193) explain this phenomenon by suggesting that once employees become accustomed to high bonuses, "they may feel psychologically trapped by an unwillingness to make the sacrifices associated with earning less—that is, they feel as though they cannot afford to leave". While this study did not include measures of turnover intentions and feelings of anxiety and tension at work – measures that would have allowed for a direct testing of such propositions – my study shows clearly that even high levels of performance-related pay may affect satisfaction with the need for autonomy, and crowd out the utility that employees derive from the work itself (i.e. the 'hidden cost of reward') (McCausland et al, 2005).

It is important to note that my findings regarding the need for autonomy are in conflict with studies showing evidence for an alternative hypothesis, namely that when employees are rewarded on the basis of performance, they perceive they have more, not less, autonomy (e.g. DeVaro and Kurtulus, 2010; Eisenberger et al, 1999; Fang and Gerhart, 2012). There is an important operationalisation issue to clarify here, however, as none of these studies measured perceived autonomy as defined by SDT, and indeed, as defined by this study, i.e.

as a sense of volition and the absence of external pressures and controls experienced at an affective (psychological) level. Instead, Fang and Gerhart (2012) examined perceived *decision-making autonomy in the job* using one item from Hackman and Oldham's Job Characteristics Model, whereas DeVaro and Kurtulus (2010) examined autonomy (using the term 'authority') as perceptions of relative "*influence over the range of tasks present in one's job*". These measures of autonomy, however, reflect aspects related to the work environment itself (i.e. level of structural autonomy in the job), rather than satisfaction with the psychological need for autonomy (i.e. the experience of volition and feeling free from external commands and controls). As shown in the results section, and as will be further explained in subsequent sections of this chapter, autonomy in one's job, together with other related intrinsic job characteristics can act as important moderators to the relationship between performance-contingent pay and basic need satisfaction. Nevertheless, this type of *decision-making autonomy* is conceptually different from the notion of *autonomy need satisfaction*.

Further, as suggested by Houlfort et al (2002), when examining the potential undermining effects of performance-related pay, we need to distinguish between affective and decisional measures of autonomy. While affective measures of autonomy would imply an absence of pressure and tension, which may well be negatively affected by PFP, feelings of decisional autonomy would imply a perception of *choice over job-related aspects*, which is less likely to be undermined in the presence of PFP. This is further supported by Balkin et al (2015), who distinguish between 'structural job autonomy' and the experience of 'autonomy [as] a cognition … at the individual level' (p.386), the latter aligning more closely to the concept of autonomy need satisfaction. It thus follows that the findings of this study are not necessarily in conflict with previous research that examined the relationship between performance-contingent rewards and decisional, rather than affective, autonomy. Instead, this research appears to be consistent with studies showing that performance-contingent rewards have a negative impact on affective autonomy, but leave decisional autonomy unaffected (Houlfort et al, 2002).

6.2.2. Competence

Regarding the impact of PFP on satisfaction with the basic need for competence, I hypothesised that performance-related pay would have a positive impact on feelings of competence at work, given that, by their very nature, such rewards convey positive information regarding one's effectiveness to perform on the job. This is known as the

informational effect of performance-contingent rewards (e.g. Enzle and Ross, 1978; Fang and Gerhart, 2012) – which is argued to facilitate satisfaction with one's need for competence. Nevertheless, I find the that performance-related pay actually has an opposite effect, which is rather unexpected.

This finding comes counter to initial predictions, and yet, it is not necessarily surprising if we consider the fact that autonomy need satisfaction was found to be negatively affected by performance-related pay. If employees feel controlled by such bonuses, their feelings of competence may equally be affected, given that they will face the pressure of constantly having to 'prove' their abilities. According to Dysvik et al (2013), for example, competence need satisfaction can only be supported when satisfaction with the need for autonomy is already high. In addition, previous SDT research (Deci and Ryan, 1985) supports the notion that the need for autonomy is the more salient of the three, and that feelings of competence can *only* be promoted through supportive contextual factors when the activity is self-determined to begin with:

> *In many circumstances, needs for relatedness and competence are dependent for their fulfilment on the person's capacity and freedom to self-organise actions. (...) Autonomy, that is, is essential to the initiation and regulation of behaviour through which other needs are better realised. It allows persons to pursue what they deem most valuable, and this will typically include maintaining important relationships and developing their skills (Alkire, 2007)* (Ryan and Deci, 2018, p.250).

The present study brings further empirical support to these assumptions, by showing that dissatisfaction with the need for autonomy may not allow for satisfaction with competence needs in the presence of performance-related pay. As such, the findings are partially consistent with Houlfort et al (2002) who showed that performance-contingent rewards do increase perceived competence relative to their impact on affective autonomy, and yet these feelings of competence did not safeguard against feelings of anxiety and tension at work, which presumably result from the pressure to attain certain pre-determined standards. In other words, higher levels of competence were accompanied by high levels of anxiety and pressure to perform, which again indicate that the informational function of rewards cannot fully compensate for dissatisfaction with the need for autonomy (Deci and Ryan, 1985). In fact, even rewards as supportive as positive feedback have been found to increase intrinsic

motivation only when people experienced an internal perceived locus of causality over their behaviour and a sense of ownership over their performance (Fisher, 1978; Ryan et al, 1991 – cited in Ryan and Deci, 2018, p.155), i.e. when their satisfaction with autonomy needs was already high.

Another important point to consider in explaining the negative impact of performance rewards on competence need satisfaction is that information conveyed by such rewards may be *negative* rather than positive if employees expect a higher reward compared to the actual value of the bonus received (i.e. irrespective of how large the awarded bonus is). According to Gagné and Forest (2008, p.226), "performance contingent rewards in real-life contexts will often result in many individuals failing to receive the reward because their performance does not meet the required criteria". Yet even with (relatively) high performance-related pay, individuals' feelings of competence may still be thwarted unless the reward appropriately reflects employees' expected (or desired) level of performance. Meyer (1975) was one of the first to argue that performance-contingent reward schemes are likely to threaten the self-esteem of most employees, as individuals will seldom receive the rewards that they feel justify their performance.

In light of studies showing that most employees consider their performance to be better than average (Meyer, 1975), as well as meta-analyses showing that self-ratings of performance are generally higher than both peer and supervisor ratings (Harris and Schaubroeck, 1988), an argument could be made that promoting positive competence feedback through performance-related pay schemes may quickly become a challenging task. If most employees believe they deserve better performance-related pay than the reward received, the informational function of rewards may, in fact, frustrate - rather than support - one's perception of work-related competence. Consistent with this line of thinking, experimental research by Daniel and Esser (1980) shows that rewards implying sub-optimal performance lead to the largest undermining effects on intrinsic motivation. In a similar vein, Schaubroeck et al (2008) showed that when merit raises fall short of expectations, employees are likely to experience pay-level dissatisfaction and intentions to quit the organisation.

Certainly, such undesired effects would depend on employees' initial expectations, with these being shaped, amongst other factors, by individual differences in achievement orientations, self-efficacy beliefs and performance goals. In addition, effective communication practices in organisations may also come into play to influence employees'

expectations so that the potential negative effects of perceived under-reward might be avoided. Nevertheless, in the case where organisations communicate "overly optimistic information to employees" (Schaubroeck et al (2008, p.433), this may create harmful effects on feelings of competence for those who fail to achieve the expected rewards.

6.2.3. Relatedness

My results show that performance-contingent pay can impact not only autonomy and competence need satisfaction, but also feelings of relatedness at work. To the best of my knowledge, this relationship has not yet been explored in the extant literature. As such, the study makes an important additional contribution to our understanding of how performance-based compensation practices influence feelings of cooperation at work. One possible explanation for the observed negative relationship may be that PFP promotes a competitive culture in the workplace, thus hindering employees' ability to develop positive social relationships at work. Research on money priming shows that simply thinking about money increases individuals' focus on maximising personal outcomes and decreases their concern for others (DeVoe and Pfeffer, 2007; Pfeffer and DeVoe, 2009; Vohs et al, 2006). Especially in the case of reward schemes where performance is contingent on *individual* input, collaborative arrangements can be seen as counterproductive to one's ability to differentiate their own performance from others', and thus to achieve their desired level of individual bonus or merit pay (Glassman et al, 2010). Indeed, in my study, the majority of employees reported receiving payments for individual performance, rather than group and organisational performance, which can subsequently explain the negative impact on relatedness need satisfaction.

My results therefore support previous literature suggesting that incentive schemes which reward employees based on individual performance can increase competition in the organisation (Deutsch, 1985; Forest and Gagné, 2008; Meyer, 1975). Further, according to Larkin et al (2012), individual performance-based compensation is associated with important psychological costs from social comparison and overconfidence, which ultimately reduce the effectiveness of the reward scheme and arguably affect satisfaction with relatedness needs. Specifically, the premise of social comparison effects is that when deciding how much effort to exert, employees consider not only their own pay, but the relative compensation of their peers as well. In the case where peers' performance is difficult to measure, or their inputs are not directly observable, perceptions of inequity can quickly emerge (Gerhart and Fang, 2017; Larkin et al, 2012). This results not only in decreased

effort, but also, according to Larkin et al (2012, p.1201), in "behaviours grounded in envy, attrition, and the tendency to sabotage other workers within the same organisation (Bartling and von Siemens, 2010; Nickerson and Zenger, 2008)". In addition, overconfidence – a form of bias whereby individuals commonly overestimate their own ability over others' - may further increase views of inequity (Larkin et al, 2012). Such perceptions, in turn, can result in reduced effort and cooperation, thus frustrating satisfaction with the need for relatedness.

Given the notion that relatedness is particularly important for developing strong collaborative relationships at work, it follows that performance-related pay schemes based on individual effort may be particularly detrimental to jobs where collaborative work is key. According to Gerhart and Fang (2017, p. 235) "an exclusive focus on individual performance may not elicit the level of cooperation and teamwork necessary in organisations". In fact, not only will satisfaction with the need for relatedness be affected, but given the highly collaborative nature of most present-day jobs (O'Neill and Salas, 2018; Salas et al, 2015), and the importance of relatedness for autonomous forms of motivation (Ryan and Deci, 2018), intrinsic interest for the work itself is likely to be further undermined.

6.3. Performance-related pay and intrinsic motivation

As reported in the previous chapter, I found no evidence of a statistically significant direct relationship between PFP and intrinsic motivation at work. This is consistent with the notion that performance-contingent pay does not have a direct motivating effect on intrinsic motivation per se, but rather, that this effect is transmitted through satisfaction with psychological needs. This lends weight to previous meta-analytical research by Cerasoli et al (2016) which showed that need satisfaction is a more proximal outcome of extrinsic rewards compared to intrinsic motivation, and that it is need satisfaction which mediates the relationship between performance incentives and intrinsic motivation. This has two important implications for our current understanding of reward effects.

First, it appears that any effects of performance-contingent rewards on intrinsic motivation - whether positive or negative - will depend primarily on the way in which these rewards affect the satisfaction of competence and relatedness needs, and, based on the weight of empirical evidence from previous studies, satisfaction with the need for autonomy as well. Young et al (2012), for instance, showed that pay-for-performance schemes introduced in professional organisations were associated with improved performance only to the extent that employees did not perceive the incentive program as a threat to their autonomy. Similar

findings are reported by Jacobsen and Jensen (2017), who showed that performance-related pay positively affects organizational citizenship behaviour, but that the effect is reduced significantly when rewards are perceived as a control factor. In other words, PFP is not inherently good or inherently bad, but, in line with the assumptions of motivation crowding theory and SDT, the specific way in which performance-related pay affects intrinsic motivation will depend on whether it triggers perceptions of support rather than control.

The average effect observed in this study was that pay-for-performance will be experienced as rather controlling, triggering a salient element of external causality, and promoting lower feelings of competence and belongingness to social groups at work. As discussed previously, this could be due to employees feeling anxiety and pressure to perform to externally-imposed standards, experiencing negative feedback due to under-met performance expectations, and exerting lower collaborative efforts in the presence of incentives targeted to assess their individual contributions.

Nevertheless, there are many factors that can "temper these 'on average' effects" (Ryan and Deci, 2018, p.159), and this is the second important point of discussion here. My results suggest that both the external environment and individual predispositions will impact the extent to which PFP affects basic need satisfaction. Specifically, in intrinsically-motivating job contexts, PFP was found to be perceived as relatively more supportive of competence needs, thus ultimately limiting the undermining effect, and facilitating intrinsic motivation. In addition, impersonal causality orientations were found to further increase the negative impact of PFP on all three types of need satisfaction, thus offering further evidence for the important role of person-specific factors in moderating the motivation crowding out effect. The next section details the specific moderators identified in this study to affect the relationship between performance-related rewards and psychological need satisfaction.

6.4. Moderators to the relationship between performance-related pay and psychological need satisfaction

One of the key objectives of this study was to determine the specific conditions under which performance-contingent rewards have a positive vs negative effect on psychological need satisfaction and subsequently, on intrinsic motivation. In order to address this aim, this study tested for the moderating effect of two contextual factors – intrinsic job characteristics and managerial need support, as well as the effect of impersonal causality orientations. The results of my research provide evidence for two important moderating factors: a) job

characteristics, which reduce the negative effect of PFP on competence need satisfaction; and b) impersonal causality orientations, which further increase the negative effect of PFP on all three types of need satisfaction. This section discusses both moderators in more detail and provides an explanation as to why no significant effects were observed in the case of managerial need support. According to Gagné (2014, p. 419), empirical work on factors such as the ones identified above is "critically lacking in the area of compensation" an sorely needed to help us: a) distinguish the positive vs negative effects of different compensation schemes; and b) better understand why these effects are occurring, i.e. what are the conditions leading to either motivation crowding in or motivation crowding out, and what are the underlying mechanisms that can explain these differential effects. This study both responds to this call and affords evidence that stands to assist in resolving current conceptual controversies in the field.

6.4.1. Job characteristics

Regarding the moderating role of job characteristics, my findings reveal that the more intrinsically-motivating the job is, the lower the negative impact of performance-related pay on employees' competence need satisfaction. This effect was found to be significant both in the structural model testing the individual moderating effect of job characteristics (Model 2) and in the final test model including all three moderators. Two important inferences can be drawn from this finding. The first is that in line with the initial hypotheses, having a need-supportive job context can help limit the undermining effect of performance-related pay, especially the negative impact that such rewards can have on feelings of competence at work. In other words, when employees derive sufficient psychological support from job environments that promote task autonomy, variety, identity and significance, and where individuals are able to derive feedback from the work itself, performance-contingent rewards are likely to support their mastery of different skills and accomplishment of difficult tasks. On the other hand, in jobs that are low in intrinsic characteristics (i.e. where employees are not able to derive sufficient need satisfaction from the work context itself), performance-contingent rewards may not be a useful tool for conveying positive competence information, indicating that in such a circumstance, the controlling function is more likely to prevail.

One possible explanation for this conditional positive effect is that in intrinsically-motivating jobs, which by definition, are complex and include opportunities for demonstrating a wide variety of skills across different challenging tasks, PFP will serve to acknowledge the higher levels of commitment, efforts and contribution required from

employees. Performance criteria in such contexts are arguably more difficult to attain, and as a result, PFP will fulfil not only its basic monetary role, but will serve a symbol of recognition for employees' successful accomplishment of intricate, difficult tasks. To the extent that characteristics of the job itself support autonomous motivation, employees may therefore perceive PFP not as a restrictive practice, but rather as a way for them to further demonstrate their ability to navigate complex responsibilities that are optimally challenging and interesting in themselves. Recent reports by CIPD (Williams and Zhou, 2016) support this view, showing that PFP for tasks that are highly "varied, diffuse and often difficult to define" (p.3) will benefit employees not only financially, but will serve to encourage extra effort and motivation though a symbolic, 'gift exchange' function. In contrast, in routine occupations "where tasks are less varied, often repetitive, and narrowly defined" (Williams and Zhou, 2016, p.3), the role of PFP in acknowledging employees' contribution and promoting feelings of competence is likely to be less significant.

Another explanation for the supporting role of PFP in intrinsically-motivating jobs relates to Gagné and Deci's (2005, p.354) assumption that "rewards must perceived as equitable in order not to have negative effects". Indeed, following the assumptions of equity theory (Adams, 1963), it is likely that PFP provided for complex tasks will be perceived as fair, compensating for the extra capability input and work effort employees need to demonstrate in such roles. On the other hand, for non-intrinsically motivating tasks, which typically require less specialist knowledge, PFP is less likely to convey meaningful competence feedback (Glassman et al, 2010). Furthermore, given that feelings of autonomy are severely thwarted in such contexts, and in light of arguments regarding the interdependency of these needs (Ryan and Deci, 2018), it is reasonable to assume that PFP may not promote feelings of competence in non-intrinsically satisfying tasks.

This leads us to the second important implication of these findings, specifically that in the context of non-intrinsically motivating jobs, monetary incentives may not be as effective as previously understood, at least not in terms of effectively conveying information regarding employees' abilities. On the one hand, the idea that PFP is not particularly appropriate to non-intrinsically motivating jobs appears to be in conflict with a number of previous studies. Weibel et al (2010), for example, showed that performance-related pay was more suited to non-interesting tasks, and that it has a detrimental effect on performance in the case of tasks that are intrinsically-rewarding. Similarly, Cerasoli et al (2014, p.998) showed that performance incentives are best suited for improving performance quantity, rather than

performance quality, implying that "tasks that are straightforward, highly repetitive, and perhaps less inherently enjoyable, should be more closely linked to extrinsic incentives", whereas the opposite is true for tasks that require a great deal of absorption, personal investment, complexity, and overall quality.

On the other hand, it is important to remember that these studies did not account for the role of basic need satisfaction in mediating the relationship between PFP and intrinsic motivation and performance. In other words, these studies did not explicitly measure the impact of PFP on feelings of autonomy, competence, and relatedness at work, meaning that results are not directly comparable. In fact, while the present research found performance-contingent rewards to predict higher perceived *competence* in the case of intrinsically-motivating tasks, job characteristics were *not* found to significantly moderate the relationship between PFP and the other two types of need satisfaction in this study. In other words, although PFP can serve to affirm competence in inherently challenging jobs, in such a context it is still difficult for these rewards to effectively promote autonomy and relatedness need satisfaction. Such a conclusion suggests that the overall effect of PFP on intrinsic motivation is more nuanced, contingent and complex than has previously been proposed, and requires further investigation.

6.4.2. Impersonal causality orientations

Regarding the role of individual differences in moderating the undermining effect of performance-contingent rewards, my results show that the stronger an individual's impersonal causality orientation, the greater the negative impact of performance-related pay all three types of need satisfaction. In other words, the more individuals experience their behaviour as initiated by forces other than personal choice (Deci and Ryan, 1985), the more likely it is that they will interpret PFP as controlling, rather than supportive, and the more will they experience competence and relatedness need dissatisfaction in the presence of PFP. This is in line with the initial hypotheses, and shows that it is not only the external context that can affect motivation and need satisfaction, but person-specific factors as well.

According to SDT, consideration of individual-level factors is particularly important given that although research has repeatedly confirmed the influence of social contexts on motivation and behaviour, there is still evidence that interpersonal (external) contexts will impact different individuals in different ways. For example, "people in controlling contexts are not always controlled (some are resilient) and people in autonomy-supportive contexts

are not always autonomous (some are highly vulnerable)" (Ryan and Deci, 2018, p. 219). As mentioned previously, it is the psychological meaning that people assign to specific contexts that will determine how they react to different situations, which can naturally stem from differences in personality traits, goals and motivational predispositions. It follows that "individual differences in causality orientations are expected to account for some of the variance in people's motivation, behaviour and well-being at any given time and often to moderate the effects of social events" (Ryan and Deci, 2018, p.219) – including, in this case, the positive vs negative effects of performance-contingent rewards.

From a theoretical perspective, the idea that PFP has a stronger need frustrating effect for individuals with an impersonal causality orientation is not necessarily surprising given that they are often described as having an external locus of control (Deci and Ryan, 1985a; 2018). Starting from this premise, an argument could be made that such individuals lack the necessary regulatory processes to successfully integrate extrinsic motivators and internalise the value of external controls, in this case, PFP. To the extent that people lack directionality in behaviour, they will arguably perceive PFP in terms of its controlling function, rather than as a mechanism to enable them to further pursue their interest in the rewarded tasks – given that such feelings of self-determination are lacking to begin with. To this end, this study provides evidence that impersonal orientations can act in similar ways to control orientations, in terms of leading people to experience external situations as more controlling than they would otherwise appear on average. This is consistent with previous research showing positive correlation coefficients between control and impersonal causality orientations (e.g. Deci and Ryan, 1985b; Fulmer and Shaw, 2018), denoting that in response to particular situations, they may indeed act in comparative ways.

In addition, the interaction between high PFP and impersonal causality orientations was found to further affect feelings of competence and relatedness need satisfaction. The stronger an individual's impersonal orientation, the lower their feelings of competence in the presence of PFP. Previous studies (e.g. Koestner and Zuckerman, 1994) have indeed found both controlled and impersonal causality orientations to be associated with performance, rather than learning goals, meaning that people are normally concerned with proving themselves to others, rather than deeply engaging with and mastering the task at hand. The key difference between the two is the level of confidence in ability that people with different causality orientations demonstrate, with the lowest confidence displayed by individuals high

in impersonal, rather than controlled orientations. This may explain why competence need satisfaction was diminished for those scoring high in impersonal causality orientations.

Furthermore, evidence of maladaptive outcomes resulting from impersonal orientations has been reported in previous studies associating these individual predispositions with anxiety, public self-consciousness, negative self-evaluations and low self-esteem (Deci and Ryan, 1985). In other words, in contrast with overconfidence effects explained previously - which are common among most individuals (Moore and Healy, 2008) - individuals high in impersonal orientations may demonstrate biases at the other extreme. But it is possible that these latter maladaptive mechanisms will also affect individuals' ability to positively connect with fellow workers, prompting them to experience performance-related rewards as even more detrimental to their relatedness need satisfaction than would otherwise be the case. For instance, individuals may perceive a high proportion of variable pay as a signal that the organisation may only value their contribution for as long as they can 'prove' their performance, thus further damaging their feelings of relatedness with the organisation itself. Furthermore, given that impersonal causality orientations are associated with a tendency to make self-defeating performance attributions (Koestner and Zuckerman, 1994), this may further accentuate feelings of tension in their relations with colleagues. For example, individuals may experience guilt and anxiety over not disappointing others, which is unlikely to provide an appropriate basis for supportive work relationships.

Since few studies thus far have focused on examining the role of impersonal causality orientations in affecting perceptions of performance-related pay, these findings too make a significant contribution to knowledge in the field. For example, while research by Hagger and Chatzisarantis (2011) found autonomy orientations to reduce the undermining effect of performance-contingent rewards on intrinsic motivation compared to controlled orientations, the extant literature has generally overlooked the role of impersonal orientations in predicting such outcomes. This study contributes to remedying this gap in the literature by showing that individuals high in impersonal orientations can be particularly susceptible to the negative effect of PFP on autonomy, competence and relatedness need satisfaction.

An important point to highlight, however, is the SDT assumption that people differ in the *relative* strengths of the three causality orientations, meaning that they do not exclusively have one orientation; rather, they have some degree of each of the three orientations (Ryan

and Deci, 2018). For methodological reasons, in this study it was difficult to determine exactly how each of these three orientations interact to moderate the relationship between PFP and psychological need satisfaction, and subsequently, what impact they independently have on intrinsic motivation. As will be discussed in the subsequent chapter, measuring an individual's profile in terms of the relative strength of their different motivational orientations may be an important direction for future research.

6.4.3. Managerial need support

Contrary to expectations, no statistically significant moderating effect was found in relation to managerial need support. While managerial support was found to moderate the link between PFP and competence need satisfaction when tested as a separate moderator, this effect became non-significant when considered alongside other moderators. This is rather unexpected considering that early studies, such as those by Harackiewicz (1979) and Ryan et al (1983), show that performance-contingent rewards have less of an undermining effect when provided in an autonomy supportive social context. More recent studies appear to support this notion, too. Thibault Landry et al (2017), for instance, showed that managerial styles focused on autonomy support rather than control, can determine cash rewards to be perceived as informational, rather than controlling, leading to healthier and more self-determined forms of motivation.

Nevertheless, the key difference between my study and studies such as those by Ryan et al (1983) and Thibault Landry et al (2017) is that I did not examine the specific case of how *rewards* were perceived in light of contextual support. Rather, I measured managerial support at the generic level, meaning that the items predicting this variable were not specifically designed to examine how autonomy supportive managers were *in relation to administering performance-related rewards specifically*. For example, the items did not assess whether managers rewarded employees to encourage their involvement and participation, or alternatively, to coerce them to engage in specific behaviours (which is more in line with the measures used by Thibault Landry et al, 2017). Rather, the items used in this research reflected need support more generally in the work domain; for example, whether managers considered employees' perspectives and encouraged their self-initiation in more general day-to-day interactions. While managerial support at this relatively broad scale could indeed be related to the ways in which managers deal with performance appraisals and reward management too, this construct may still lack the required discriminant validity and predictive power to act as a significant moderator in the present

study. Future investigation is therefore required before we can draw any definitive conclusions in this regard.

Another possible explanation for the insignificant results here is that I did not examine whether managers were perceived as fair in distributing performance bonuses. Indeed, in the SDT literature, studies have repeatedly confirmed the role of fairness perceptions as well as procedural and distributive justice in explaining the positive vs negative effect of different types of compensation practices and incentive schemes. For example, Olafsen et al (2015) showed that while the amount of pay is significantly related to distributive justice, it was only managerial need support that was related to need satisfaction, both directly, and indirectly through procedural justice perceptions. More recently, Hewett and Leroy (2019) similarly showed that bonuses can predict intrinsic motivation indirectly through procedural fairness, as long as managers are perceived to have sufficient discretion in awarding these bonuses. In other words, managers play an important role in determining how bonuses are perceived, with justice perceptions mediating this relationship. Nevertheless, the present research did not specifically test for either justice/fairness perceptions or for levels of managerial discretion in administering performance bonuses, which could, at least in part, explain the non-significant effects.

6.5. Psychological need satisfaction and work motivation

My findings also shed new light on the link between psychological need satisfaction and four types of motivation: amotivation, extrinsic motivation, introjected motivation and intrinsic motivation. While initial studies have mainly been concerned with the distinction between intrinsic motivation (completely self-determined) and extrinsic motivation (completely controlled), SDT introduces the notion of introjected motivation as a moderately controlled form of regulation, primarily based on contingencies of self-worth. The initial hypotheses assumed that satisfaction with the three basic needs would relate negatively to amotivation and controlled motivation, and positively to autonomous (in this case, intrinsic) motivation. The results of this study support, in part, these initial assumptions, as will be discussed below.

First, regarding the link between psychological need satisfaction and amotivation, this study found evidence that all three types of need fulfilment were negatively related to amotivation. In other words, to the extent that individuals feel self-determined and competent in their jobs, and to the extent that they experience a sense of connection with their colleagues at

work, they will likely experience some form of motivation, either controlled or autonomous, depending on their degree of basic need satisfaction. This is in line with previous studies such that by as Gagné et al (2015), who found comparable results regarding the negative connection between each of the three basic needs and amotivation. These findings are thus not surprising if we consider that feelings of self-determination and competence are indeed essential catalysts of intentional motivation (Deci and Ryan, 2000). In contrast, in situations where people feel constrained in their actions, where they fail to see the link between their efforts and desired outcomes, or where they feel unable to enact the requisite behaviours, they would likely experience amotivation (Ryan and Deci, 2018). This is consistent with frameworks such as expectancy theory (Lawler and Suttle, 1973) and social-cognitive theory (Bandura, 1996), both of which implicitly recognise the importance of individuals feeling autonomous and effective in social situations in order to maintain their motivation. At the same time, this study shows that feelings of acceptance from social groups can further impact amotivation, thus bringing important additional evidence to bear on the significance of all three types of need satisfaction for allowing employees to remain motivated in the workplace.

Regarding the link between need satisfaction and the remaining three types of motivation, my results become slightly more complex to interpret. First, in relation to the role of autonomy need satisfaction, I found that it is negatively related to both extrinsic and introjected motivation, which is consistent with results reported in previous research (e.g. Van den Broeck et al, 2010). Activities that are personally endorsed and for which employees take full ownership are indeed unlikely to trigger perceptions of the behaviour being controlled by external contingencies. On the other hand, autonomy need satisfaction was not found to relate significantly to intrinsic motivation, which was rather surprising. Nevertheless, it is important to remember that autonomy need satisfaction was measured using reverse-coded negatively-worded items, suggesting that results pertaining to the motivational impact of autonomous need satisfaction in this study need to be interpreted with caution. As such, this study does not maintain that the autonomy need is unimportant for facilitating intrinsic motivation; rather, I observe only that methodological issues prevented us from achieving the expected results in hypothesis testing.

Regarding the motivational impact of competence need satisfaction, results showed that feelings of competence and effectiveness at work are positive predictors of introjected motivation, and non-significant predictors of extrinsic motivation. Although van Hooff and

van Hooft (2017) found basic need satisfaction as a whole to relate negatively to introjected and external motivation, Gagné et al (2015) found competence need satisfaction to relate positively to introjected motivation, which substantiates the results reported in the present study. A possible explanation for these findings is that introjection involves perceptions of self-worth, which are likely to be conditional, at least in part, on perceptions of competence and self-efficacy. On the other hand, competence need satisfaction is less likely to predict extrinsic motivation, as feeling skilled and proficient in one's role does not relate to the social dimension of extrinsic motivation, and furthermore, is likely to transcend material motives such as working to maintain one's job security. When employees feel truly confident in their skills and abilities, achieving minimum standards such as maintaining one's job is unlikely to act as a main motivator to perform. Instead, individuals will tend to orient themselves towards ever more complex tasks, and direct their motivation towards aspects of the environment that allow them to further demonstrate their efficacy. As such, an argument can be made that competence need satisfaction is a key predictor of more internalised forms of motivation, given that the more effective the employee feels in their interactions with their work environment, the more they will pursue optimally challenging and internally-motivating tasks, and successfully integrate satisfactions resulting from such activities in the form of more autonomous regulations (Ryan and Deci, 2018).

Relatedness need satisfaction, in contrast, shows opposite effects in terms of predicting extrinsic and introjected motivation, compared to competence need satisfaction. Specifically, relatedness need satisfaction was found to be a positive predictor of extrinsic motivation (although modest in its effect size), but unrelated to introjected motivation. One explanation for these contrasting effects is that relatedness need satisfaction reflected a positive association with the social dimensions of extrinsic motivation measured in this study. Specifically, my measurement of extrinsic motivation involved both a material component (e.g. desire for job security) as well as a social component (e.g. desire for social approval). This measure was chosen specifically because it reflects the more complete range of extrinsic motives that people may consider important when deciding to exert effort in their jobs (Gagné et al, 2015; Stajkovic and Luthans, 1997). It is reasonable to assume, therefore, that as a result of using this particular measure of external regulation, relatedness need satisfaction could indeed be linked to extrinsic motivation. For example, having a sense of belongingness with others at work may influence individuals to perform so as to further develop (e.g. maintain others' respect) and not harm these social relationships (e.g. avoid criticism from others).

In contrast, relatedness is not a significant predictor of introjected motivation given that feelings of contingent self-worth implicit in this type of regulation do not necessarily require a supportive social context. While positive social comparisons can undoubtedly increase perceptions of self-worth, introjections such as working to prove oneself to others are arguably unrelated to positive perceptions of social support at work, especially feelings of connectedness that are *not conditional* on how well individuals perform in their roles. Furthermore, although SDT generally assumes that introjection depends on some basic levels of satisfaction with both competence and relatedness needs (Ryan and Deci, 2018), recent empirical studies highlight problems with the measurement of the introjection construct (e.g. Assor et al, 2009; Gagné et al, 2015). Before we can draw strong conclusions in this regard, operationalisations for introjected regulation may indeed require additional investigation (Gagné et al, 2015).

Finally, as predicted, competence and relatedness need satisfaction were both positive predictors of intrinsic motivation, substantiating the role of both need types in eliciting intrinsic motivation, and promoting feelings of satisfaction with the activity itself. In fact, relatedness need satisfaction was a stronger predictor of intrinsic motivation compared to competence need satisfaction, which furnishes empirical evidence of the role of relatedness in promoting self-determined forms of motivation in settings highly reliant on effective social interactions (e.g. between different employees, with different client groups, etc.), which is the case of most organisational contexts. While previous research assumed that it was mainly satisfaction with autonomy and competence needs which are critical for facilitating intrinsic motivation, evidence that relatedness need satisfaction is similarly important is particularly insightful. In fact, while competence need satisfaction was positively related to intrinsic motivation (as hypothesised), the effect size was smaller relative to its impact on introjected motivation, which is rather unexpected. Future research may therefore need to consider this difference in more depth, particularly in light of studies such as Gagné et al (1997), which found that feelings of competence can sometimes *negatively* relate to intrinsic motivation. While no negative correlations were found in this study, such findings do suggest that future research may need to examine the relationship between competence need satisfaction and intrinsic vs introjected motivation more closely.

To sum up the discussion on this particular set of findings, this study broadens our understanding regarding the links between need fulfilment and different types of motivation that vary in their level of autonomy. In particular, the research shows that satisfaction with

competence and relatedness needs can effectively support not only intrinsic motivation – as acknowledged in the literature - but in some cases, controlled forms of motivation as well. While this goes counter to empirical studies such as van Hooff and van Hooft (2017), the divergent results could be explained through the fact that my research used differential indicators of need fulfilment, whereas van Hooff and van Hooft (2017) used the composite measure of basic need satisfaction. Yet given that autonomy need satisfaction was found to relate negatively to controlled motivation in my study as well, it could be that studies measuring basic need satisfaction as a whole may indeed disguise the unique, positive contribution of relatedness and competence needs to controlled forms of motivation. Nevertheless, to gain further confidence in the nature of these relationships, additional research examining the specific links between different types of need satisfaction and different types of work motivation is warranted.

6.6. Contextual and individual-level factors affecting need satisfaction and work motivation

Finally, regarding the role of socio-contextual and person-specific factors in predicting need satisfaction and work motivation, findings appear to generally support the initial hypotheses. First, there is strong evidence that intrinsically motivating job characteristics positively predict all forms of motivation, both directly, and indirectly through the mediating role of psychological need satisfaction. While the initial hypotheses of this study assumed that intrinsic job characteristics would relate negatively to extrinsic and introjected motivation, the present findings are nevertheless consistent with the assumption that need supportive work contexts - such as jobs that afford sufficient opportunities for autonomy, competence and relatedness - will be stronger predictors of *autonomous* intrinsic motivation, rather than controlled motivation.

The fact that intrinsically motivating jobs are strong predictors of self-determined motivation has been documented in various studies over the years, from Hackman and Oldham (1976) to more recent research such as Gagné et al (1997) and Millette and Gagné (2008). Gagné et al (1997), for example, showed that task significance, feedback and autonomy support are positively linked with specific dimensions of empowerment, (namely meaningfulness, impact and autonomy) which are conceptually similar to the notion of psychological need satisfaction used in this study, and which were found to differentially affect intrinsic motivation. Millete and Gagné (2008) found similar links between intrinsic job characteristics and autonomous motivation, although in their case, job characteristics did not

predict any of the controlled types of motivation. This study thus differs from Millete and Gagné (2008) by showing that intrinsic job characteristics not only predict self-determined regulations but also support *all* forms of motivation, including extrinsic and introjected regulation, albeit to a lower extent compared to internal regulation, as expected. In addition, this study shows that intrinsically-motivating job contexts are negatively related to amotivation, thus further demonstrating the role of supporting job characteristics in mitigating against lack of work motivation.

Managerial need support was also found to be associated with two types of need satisfaction, namely autonomy and relatedness needs, but not with competence need satisfaction. The positive relationship with feelings of autonomy at work is in line with this study's hypotheses, given that a supportive interpersonal climate involves behaviours such as understanding and acknowledging subordinates' perspectives, encouraging their self-initiation, and minimising pressures and controls – all of which are positive contributors to autonomy need satisfaction (Deci et al, 1994). Similarly, supportive managers are likely to enable feelings of relatedness at work, where individuals feel appreciated, respected and valued in their social groups involving not only their peers, but supervisors as well. These findings therefore support previous contentions that supportive interpersonal climates can enhance feelings of *both* autonomy and relatedness:

> *When people are being autonomy supportive, they tend to take the other's frame of reference, which is then experienced as caring. Autonomy and relatedness support thus tend to co-occur in any interpersonal climate and to operate synergistically (Deci et al, 2006; La Guardia et al, 2000). (Ryan and Deci, 2018, p.167).*

The fact that there was no statistically significant relationship with competence need satisfaction, on the other hand, goes counter to initial predictions and fails to support several previous studies (e.g. Baard et al, 2004). Nonetheless, this could be explained through the fact that the short version of the Work Climate Questionnaire used to measure managerial need support in this study included only one item relating to competence need support ("My manager conveyed confidence in my ability to do well at my job"), which may have been insufficient to capture the full extent to which participants felt supported by their managers in their ability to perform at work. By comparison, Baard et al (2004) used the full 15-item

version of the Work Climate Questionnaire in their study and were indeed able to find a significant positive effect of supervisor support on competence need satisfaction. Another possible explanation for the null results is that feelings of competence may emerge more readily from feedback that employees are able to gather from the job itself, rather than from external agents. In fact, given that job-related measures of feedback may be more objective in nature, they may serve to convey greater and perhaps more reliable competence information than mangers who are predisposed to subjective biases that they may (albeit unconsciously) display.

Furthermore, my results are consistent with several studies examining the effect of supervisor support on need satisfaction (Rothmann et al, 2013) which similarly identified managerial support to affect only autonomy and relatedness needs, and to leave satisfaction with competence needs unaffected. One of the arguments they put forward in explaining the insignificant results is that managers themselves might not be sufficiently skilled in conveying positive competence information (Bandura, 1997; 2000). Indeed, the influence that managers can exercise over employees' feelings of competence is likely to be contingent on their own level of training on helping employees set challenging yet attainable goals, providing constructive feedback, and offering optimal opportunities for skills development (Williams et al, 2014). The design of the current study, however, did not include measurements of managers' own training regarding these behaviours, which may, in part, explain the non-significant findings.

In terms of motivational outcomes, I found that while managerial support was related to both extrinsic and introjected motivation, it was not significantly linked with intrinsic motivation, which again was rather unexpected. Previous self-determination literature (e.g. Nie et al, 2015; Olafsen et al, 2015; Slemp et al, 2018) has documented a strong relationship between managerial need support and intrinsic motivation. The fact that this study has failed to replicate such findings, however, may indicate that compared to an intrinsically motivating job context, supportive interpersonal climates may be less important for predicting satisfaction with the work itself, particularly given the complexity of supervisor – employee relations in organisational contexts. In other words, while supportive interpersonal climates can be critical for behavioural internalisation, i.e. helping employees move along the motivation continuum from extrinsic to introjected and identified regulation, such climates may still fail (at least in some cases) to promote intrinsic motivation by themselves.

This is reasonable to assume especially if we consider that intrinsic motivation is defined as satisfaction *with the activity itself*, which may stem more readily from characteristics of job design rather than subjective perceptions of social support. In addition, even if managers demonstrate high levels of autonomy support, there may still be other aspects of the supervision relationship that prevent employees from developing strong intrinsic motivation (e.g. feelings of pressure to perform due to supervisors being perceived as overly involved). My study did not test for the frequency of interactions between employees and supervisors, which could be another important factor mediating the impact of managerial support on competence need satisfaction and intrinsic motivation. Aspects of job design, on the other hand, which are arguably more conspicuous as they relate to employees' everyday activities, could represent better predictors of psychological need support and intrinsic motivation, by comparison.

On the other hand, the fact that managerial support was positively related to controlled forms of motivation is particularly noteworthy. Regarding the relatively strong link between supervisor support and extrinsic motivation, one explanation is that the more employees feel acknowledged by their supervisors at work, the more they feel the need to perform so as to maintain their supervisors' respect, i.e. the more they will relate to the social dimensions of extrinsic motivation. In this study, both the social and the material dimensions of extrinsic motivation were combined into a single variable, so clear conclusions in this sense are limited and future studies may need to examine this relationship more closely. Similarly, the fact that managerial need support was positively related to introjected motivation indicates that positive interpersonal climates may help with behaviour internalisation, but only up to a certain extent, in that it may lead individuals to perform mainly for considerations of maintaining their status and reputation in the eyes of external agents. These results are consistent with findings reported by Gagné et al (2015) who similarly found managerial support to be positively related to introjected motivation. Yet, in contrast to Gagné et al (2015) who found managerial support to be negatively related to amotivation, the results of this study found no statistical significance for this relationship. Again, this may indicate that considerations related to the job itself may be more important for predicting positive job outcomes and mitigating against negative effects.

Finally, impersonal causality orientations were not found to relate to amotivation directly, but rather indirectly, through the mediating role of basic needs satisfaction. This partially supports the initial hypotheses of my study by showing that individuals with an external

locus of control are unlikely to experience satisfaction with their needs for autonomy, competence and relatedness, which is what ultimately leads to lack of motivation. It follows, therefore, that impersonal causality orientations are important indirect predictors of amotivation, an effect which, up until now, was mainly theoretically hypothesised, but lacked adequate empirical support in organisational settings.

6.7. Conclusion

In this chapter, I have discussed the key findings of this study, starting with the effect of performance-related pay on psychological need satisfaction. On average, performance rewards were found to affect all three types of need satisfaction, which, in turn, were differentially linked with both intrinsic and controlled forms of motivation. I then examined the effects of contextual and individual-level moderators impacting the relationship between performance-contingent pay and psychological need satisfaction, with a view to determining the specific conditions under which a motivation crowding in vs a motivation crowding out effect would occur. In addition, I considered the role of job characteristics and managerial support in influencing both intrinsic, as well as controlled forms of motivation. Finally, the predictors of amotivation were also considered, in order to identify the key ways in which managers could help limit employees becoming disengaged with their activities at work. Along the way, I have specified how these findings both support and challenge existing theory and evidence in the field. The following chapter considers the theoretical contribution of my study in more depth, and notes a number of methodological limitations and areas for further investigation.

CHAPTER 7

CONCLUSION

7.1. Theoretical contribution

This study contributes to the wider rewards-motivation literature in two important ways. First, it provides empirical evidence that performance-contingent rewards have differential effects on individuals' satisfaction with each of the three basic needs for autonomy, competence and relatedness. Second, it shows that such negative effects are moderated by both contextual and individual-specific factors, thus addressing important gaps in the literature regarding the particular conditions in which rewards can lead to perceptions of support vs control. The following paragraphs will present each of these contributions in more depth.

To begin with, my research shows that the provision of performance-contingent rewards tends to be perceived as controlling, and to undermine feelings of competence and relatedness in the workplace at the same time. Considering the positive links between basic need satisfaction and intrinsic motivation (especially, in this case, competence and relatedness needs), what this ultimately entails is that the negative effect of extrinsic rewards on intrinsic motivation is indeed mediated through basic need fulfilment. While previous literature does show evidence for the controlling baseline effect of performance-related rewards (e.g. Deci, 1972), this evidence has mainly been based on experimental studies, rather than studies conducted in work settings, thus raising concerns over the applicability of such findings in the context of modern organisations (e.g. Fehr and Falk, 2002; Gerhart and Fang, 2015; Rynes et al, 2005). My research thus brings further evidence regarding the incidence of controlling effects in workplace settings, showing that reward schemes based on specific standards of performance can indeed diminish individuals' feelings of autonomy at work.

In addition, regarding the impact of performance-related pay on competence need satisfaction, the general assumption in the SDT literature is that such schemes lead to increases in feelings of effectiveness in the workplace. This is because the implicit information conveyed by the receipt of such rewards is that individuals are performing well in their tasks and are indeed matching some specific standard of excellence (Ryan and Deci,

2018). Nevertheless, my study brings evidence for an opposite effect, showing that the performance-contingent rewards are likely to undermine, rather than support, feelings of competence at work. This is an important advancement in our understanding of incentive effects, supporting previous conceptualisations that feelings of competence can be only sustained when individuals experience high levels of *autonomy* need satisfaction as well (Houlfort et al, 2002). To the extent that the controlling effect is more salient, it follows that the competence-affirming aspect of performance rewards may indeed become less apparent.

Furthermore, my research shows that performance-contingent rewards can diminish satisfaction with the need for relatedness as well, an important effect which, to the best of my knowledge, has not been empirically considered in the existing literature. As performance-contingent rewards may lead to increased competition in the organisation (Meyer, 1975), as well as negative social comparisons (Larkin et al, 2012), it follows that fostering collegiality and cooperative behaviours may become a difficult task for organisations adopting this reward practice. Especially if performance incentives are provided for individual, rather than team achievement, feelings of belongingness and social connection may subsequently be undermined.

My study has shown, moreover, that such negative effects can be moderated by contextual factors, as well as person-specific predispositions. While performance-contingent rewards tend, on average, to undermine intrinsic motivation through the mediating role of decreased need satisfaction, this baseline effect was found to be moderated under specific conditions, as previously proposed by several authors (e.g. Frey and Jegen, 2001; Gagné and Deci, 2005; Ryan and Deci, 2018). In particular, my study shows that performance-related pay can have a relatively more positive effect on feelings of competence in intrinsically-motivating work environments, rather than jobs low in intrinsic characteristics. This could be explained through the notion that individuals working in such jobs are more likely to interpret performance-related rewards as supportive tools that recognise their efforts in activities that are suitably complex and challenging, thus justifying the provision of such schemes. These findings thus challenge our current understanding of the types of contexts where performance-reward schemes are effective. While previous literature finds evidence of such incentives to work best in routine, dull and repetitive tasks (e.g. Weibel, 2010), my study shows that rewards may not lead to competence information in such settings, thus warranting more attention from managers who wish to use such tools to improve employee motivation.

Furthermore, impersonal causality orientations were found to increase the negative effect of rewards on feelings of autonomy, competence and relatedness in the workplace, indicating that it is not only the external context that can affect how rewards are interpreted and perceived, but characteristics specific to the individuals themselves. Specifically, individuals high in impersonal causality orientations are likely to perceive performance rewards as more controlling than counterparts low in this causality orientation, given that they tend to lack the necessary regulatory processes to successfully integrate extrinsic motivation and internalise the value of external controls. In addition, similar effects are observed in the case of competence and relatedness need satisfaction as well, effects which have not been empirically considered in prior research. This again supports the predictions of SDT that the ways in which individuals experience external events – including reward interventions - is likely to depend on both contextual factors and one's internal motivational orientations.

Taking all this into account, the contribution of my doctoral study lies in identifying specific variables that can influence – and better explain - the relationship between extrinsic rewards and intrinsic work motivation. To the best of my knowledge, this is the only study to date to consider the joint impact of socio-contextual as well as individual-specific factors in moderating the undermining effect of performance-contingent rewards. As it stands, my research challenges established assumptions regarding the positive role of performance-contingent compensation practices in supporting employee motivation and well-being, and provides a more comprehensive framework for explaining as well as mitigating the negative outcomes associated with specific external interventions.

7.2. Managerial implications

The results of my research have important implications for organisations relying on reward contingencies to motivate staff. Given the negative influence of performance-related pay on basic need satisfaction observed in this study, it follows that the use of such incentive schemes may not be an appropriate organisational tool for supporting employees' wellbeing and motivation. Managers are therefore advised to consider alternative means of compensation, and incorporate non-cash recognition in their reward management systems. Non-cash rewards such as gift certificates, paid travel and earned time off (Long and Shields, 2010) may indeed have a more symbolic, less transactional value compared to monetary payments (Silverman, 2004), thus leading to feelings of appreciation without diminishing autonomy need satisfaction. Furthermore, managers should consider providing these rewards for generalised, rather than specific performance outcomes, as well as on an ex-post

basis, rather than ex-ante (Balkin et al, 2015). With generalised performance outcomes, it is likely that employees will have more discretion over their work tasks, thus experiencing an internal – rather than external - locus of causality. Similarly, with an ex-post basis for reward provision, whereby employees are not made aware of the value, form and timing of the rewards in advance, the controlling effect is likely to be less salient, whereas the positive, competence-affirming effect is still retained (Balkin et al, 2015).

Intangible rewards such as opportunities for training and development, as well as informational feedback may be another suitable mechanism for showing recognition and appreciation for employees' performance. Such practices would allow organisations to follow a 'total reward' strategy including both financial and nonfinancial benefits, with the ultimate aim of increasing employee engagement and meeting the needs of an increasingly diverse workforce (Brown and Reilly, 2013). In addition, in light of studies predicting the experience of choice as critical for promoting higher levels of performance (Caza et al, 2015), it is recommended that managers allow employees to choose their own compensation package, e.g. monetary rewards, healthcare cover, days of annual leave. It is likely that by choosing their own rewards for strong performance, individuals will be less affected by the controlling functional significance of extrinsic rewards, and be in a better position to use these incentives to suit their particular financial and social situations. As such, organisations are highly encouraged to allow employees to design their own reward systems, while offering the appropriate level of support in the process, and ensuring that the available options are perceived as sufficiently attractive (Caza et al, 2015).

In addition, increasing base salaries that are not contingent on individual performance may be yet another suitable alternative to performance-related pay (Frey and Osterloh, 2005). Given that such rewards are not offered for attaining a set level of performance, they are less likely to be perceived as controlling, and thus less likely to frustrate an individual's basic psychological needs. Furthermore, there is evidence to suggest that unlike performance-related pay, base pay is positively related to both self-reported work performance and affective commitment (Kuvaas, 2006). What this indicates is that providing slightly higher base salaries as a way to attract, motivate and retain employees may be a more effective approach to compensation, relative to providing rewards contingent on attaining specified levels of performance. In fact, recent studies considering the effectiveness of the performance appraisal process more broadly suggest that performance is often difficult to measure in a meaningful, reliable way (Murphy, 2019). Especially if the requirements for

performance-based pay are perceived as a hindrance, rather than a beneficial challenge that can help employees demonstrate and further develop their skills (Parker et al, 2019), alternative means of compensation may indeed be justified.

Regarding the role of job characteristics both in terms of moderating undermining reward effects and in terms of supporting intrinsic motivation directly, it is recommended that managers should invest in creating more positive work environments that ensure greater task autonomy, identity, significance, variety and feedback. As discussed previously, relying exclusively on extrinsic features such as performance-contingent rewards to improve motivation is not likely to result in the desired effects, even in jobs where this is the main driver for performance. As such, greater consideration is required to the design of the job itself, so as to promote a more supportive work environment where employees feel empowered in carrying out their activities and are able to demonstrate their skills in a wide range of tasks.

Finally, organisations should consider strategies for helping employees step away from feelings of helplessness and anxiety stemming from their impersonal causality orientations and embrace more functional motivational orientations instead. According to self-determination research, causality orientations are the result of individuals internalising their supportive or controlling environments over time, and adopting specific ways for dealing with such environments (Ryan and Deci, 2018). Nevertheless, these predispositions are not completely rigid. In fact, there is evidence to suggest that people can be primed to adopt more effective motivational orientations in particular settings that in turn, further support their intrinsic motivation (e.g. Levesque and Pelletier, 2003). It follows, therefore, that managers' efforts to help employees adopt more functional orientations towards autonomous motivation, either in the form of intrinsic, integrated or identified motivation, may not be futile. While the present study did not consider the antecedents of causality orientations, examining the interaction between managerial autonomy support and changes in motivational orientations over time may be a fruitful avenue for future research.

7.3. Limitations and directions for future research

There are several limitations associated with this study. First, the cross-sectional research design prevents us from drawing any conclusions regarding the causal nature of the relationships observed in this study. In fact, with cross-sectional data it is difficult to determine whether it is performance-related rewards that impact motivation, or whether

alternatively, those with low intrinsic motivation exert less effort in their jobs, and thus receive lower bonuses due to initial levels of low motivation. While studies such as Olafsen et al (2017) suggest that it is need satisfaction that impacts motivation over time (rather than vice versa), it is advisable that future work in this area should focus on testing the relationship between performance rewards, need satisfaction and intrinsic motivation in additional longitudinal studies, to gain further confidence in the observed effects. In addition, a potentially fruitful research avenue could be to examine these effects in intervention studies across different organisations, particularly given that employers will need evidence rooted in 'real-life' settings to challenge long-standing beliefs regarding the effectiveness of performance-contingent rewards schemes.

The cross-sectional design of this study further implies that we cannot exclude the influence of common method bias. In this study, this has been minimised, as much as possible, by adopting principles of best practice in survey research. Procedures such as carefully phrasing the questions and piloting the questionnaire, informing participants of the anonymity and confidentiality of their responses, and assuring them that there are no right or wrong answers in responding to the questions of this survey are indeed considered procedural remedies for addressing common method variance (Podsakoff et al, 2003; Johansson et al, 2016). In addition, formal statistical tests such as Harman's single factor test have furthermore produced satisfactory results. Yet because my research has only used one informant per unit of observation, we still cannot completely exclude the influence of common method bias. As the study relied on self-reported data, it is difficult to determine whether participants expressed their true beliefs regarding their motivation at work, as well as their true perceptions of managerial support, due to social desirability effects. Future studies including reward and performance data sourced from third-parties could be one of the ways to address this particular limitation. Especially in the case of self-reported *pay* data, it is difficult to ascertain whether participants were completely accurate in their answers, and as such, further field studies relying on more objective compensation data are required.

An additional limitation is that my research did not test for the separate effects of rewards based on individual, group and organisational performance. This was the result of participants in this study being rewarded primarily on the basis of individual performance, with considerably fewer respondents reporting instances where they received rewards for team or organisational performance. Given the unequal distribution of this data, it ultimately limited the option of conducting any meaningful comparisons between these three groups.

Likewise, my study did not separate performance rewards based on different systems such as merit pay increases, performance bonuses, commission pay, piece rate systems, gainsharing and profit sharing. Again this was due to considerations over the number of responses that I would have been able to obtain in each category. Yet studies such as Gagné and Forest (2008) suggest that differences in compensation plans are important to consider, given that different reward criteria could lead to distinctive outcomes in relation to need satisfaction and motivation. For example, while commission-based pay could breed more competition in the organisation and diminish feelings of autonomy and relatedness, profit sharing schemes, which are awarded for collective effort, are more likely to foster relatedness need satisfaction (Gagné and Forest, 2008). It follows that future research that differentiates between individual vs collective pay, as well as between different criteria for the provision of performance rewards (e.g. merit pay increases vs commission pay systems) may significantly expand our current understanding of reward effects.

In addition, it is important to point out that this study has been conducted with employees working in the UK only, meaning that generalisations beyond the UK population should be undertaken with caution. While my findings are comparable to research conducted in other cultural settings (e.g. Deci et al, 2001; Gagné et al, 1997; Houlfort et al, 2002; Kuvaas et al, 2016; Thibault Landry et al, 2017), to further test for the universality claims of SDT, more studies examining the effects of performance-related rewards across different economic and cultural contexts may be needed. Especially for employees working in low income countries, the provision of financial incentives may have a relatively more positive effect in terms of boosting their motivation (Kasteng et al, 2016). At present, however, empirical evidence in this regard is rather limited, so additional studies examining the impact of the wider economic environment on reward perceptions are necessary to further advance the field.

Another – conceptual - limitation is that this study did not examine identified and integrated motivation, which are equally important when considering the full range of reasons why people choose to exert effort in their jobs. In particular, identified regulation has been argued to be strong motivator in the workplace (Zhang et al, 2016) as it fosters greater persistence in non-interesting, but important tasks (Burton et al, 2006; Koestner and Losier, 2002). Examining how extrinsic rewards affect the ways in which individuals identify with the organisation's goals and values could therefore be an important avenue for future research. Furthermore, it is important to note that individuals can hold different types of motivation simultaneously. For instance, employees may be motivated to contribute to the organisation

and society more widely, and at the same time earn a decent amount of pay that would support their self-esteem. Recent advancements in self-determination research have indeed started exploring the concept of motivational profiles at work – a person-centred approach whereby different profiles are configured for individuals who vary in their combined levels of autonomous and controlled regulation (Howard et al, 2016). In consequence, examining the undermining effect not necessarily in relation to intrinsic motivation, but in relation to specific motivational profiles that differ in their levels of self-determined regulation could potentially advance an even deeper understanding of the crowding out effect.

Furthermore, given that the general causality orientations scale did not meet the required thresholds for validity and reliability in this study, it is recommended that future studies further investigate the psychometric soundness of this scale. In prior studies, the internal consistency of the controlled orientations scale has indeed been lower compared to the scale measuring autonomy orientations (Deci and Ryan, 1985b). In light of this, Lam and Gurland (2008) asserted that "the [controlled orientations] scale itself is due for a re-examination of its psychometric properties" – and yet no progress has been made in this regard in the last decade. Additionally, future studies could look into alternative measures of individual differences, for example self-efficacy beliefs as well as mastery vs performance orientations, which are especially relevant when testing for the effects of rewards involving performance considerations. This study has already exposed that it is not only the external context that will determine how rewards are received, but individual differences may further affect interpretations of the functional significance of rewards, i.e. perceptions of control vs support. Examining other types of individual differences could therefore significantly advance our knowledge in the field.

In addition, future studies should consider additional contextual moderators, including factors more closely related to the performance management process (and indeed, to the incentive literature), such as the instrumentality of rewards in relation to performance, the ways in which the performance appraisal process is conducted, and whether the organisation adopts an inclusive vs exclusive approach to talent management. Examining such aspects would bring the motivation and rewards literatures even closer, and would serve to elucidate whether characteristics of the reward management process itself can further impact the informational vs controlling functional significance of rewards. Similarly, it would be particularly valuable if future studies examined the impact of allowing employees to choose their own incentives as part of their 'total rewards' package. While there is theoretical

justification that such initiatives would allow employees to satisfy their needs for self-determination, and thus help limit the undermining effect of extrinsic rewards on intrinsic motivation, research studies offering strong empirical support in this sense are, at the moment, rather scarce.

Finally, future studies should examine more closely the link between managerial support and the positive vs negative effects of performance-contingent rewards. While this research found no moderating effect of managerial need support on the relationship between performance pay and need satisfaction, there are studies to suggest that the informational vs controlling meaning of rewards – closely linked to how supportive vs controlling managers are in administering performance-contingent pay - will indeed lead to differential outcomes (Thibault Landry et al, 2017). More studies are therefore needed to look at the role of managers in eliciting feelings of support vs control in relation to reward provision specifically. Furthermore, future studies should also look at additional outcomes of need satisfaction, including variables such as intra-role and extra-role performance, and positive and negative affect outside of the work domain. In particular, it would be interesting to examine whether the effects of performance-contingent pay would spill over into other domains, such as relationships outside work, and work-life balance.

7.4. Conclusion

To conclude, this study has brought an important contribution to the rewards and motivation literature by showing that the motivation crowding out effect can be better understood by taking account of several contextual and individual-level factors that affect how rewards are interpreted and perceived. In particular, my results contribute to reconciling inconsistent findings in the field, by showing that features such as job design and individual predispositions can significantly impact the relationship between extrinsic incentives and intrinsic motivation, through the mediating role of basic need satisfaction. Methodological limitations associated with the cross-sectional design of this research, however, indicate that future studies should examine these relationships using experimental and longitudinal designs, and consider additional variables for gaining an even more comprehensive understanding of the positive and negative outcomes associated with performance-related rewards.

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Appendix 1 – Final survey instrument

Financial Rewards and Intrinsic Work Motivation – A Self-determination Perspective

You are invited to participate in a PhD study aimed at gaining a better understanding of the relationship between financial incentives and work motivation. Participation in this research involves the completion of a questionnaire where you will be asked about the nature of your job, your relationship with managers, your motivation at work, as well as how you tend to interpret and respond to your work environment.

The questionnaire contains 7 sections and should take no more than 20 minutes to fill in. If you have any concerns regarding filling in this questionnaire at work, you are more than welcome to answer the survey in the comfort of your own home.

The questions at the end will ask you to report some information about your salary. This is purely for research purposes, so your ability to provide complete and accurate information is greatly appreciated. There are no right or wrong answers. Your participation is anonymous, and you have the right to withdraw at any time, without providing any reasons and without any prejudice to your job. Confidentiality will be respected subject to legal constraints and professional guidelines.

The data will only be used by the research team. The results will be presented within a PhD thesis, and may be disseminated in conference presentations and in peer-reviewed journal articles. The data for the completed questionnaires will be kept in secure storage for a maximum of 10 years in accordance with the University of Glasgow Research Guidelines. This project is funded by the Economic and Social Research Council and has been considered and approved by the College Research Ethics Committee at the University of Glasgow. For further information or any complaints, please contact the College of Social Sciences Ethics Officer, Dr Muir Houston, email: Muir.Houston@glasgow.ac.uk.

1. Bearing all this information in mind, do you consent to taking part in this study?

Yes / No

If the answer to this question was ‘no’ participants were directed to a new page displaying the message “Unfortunately, you are not eligible to take part in this study. Thank you for your understanding.”

2. Thank you for your interest in this study. Before we begin, are you 18 years old or above?

Yes / No

If the answer to this question was ‘no’ participants were directed to a new page displaying the same message as above.

3. Are you currently employed (either full-time or part-time)?

Yes / No

If the answer to this question was ‘no’ participants were directed to a new page displaying the same message as above.

4. In which country do you currently reside?

Participants were able to select from a drop-down menu of countries.

If the answer to this question was not ‘the UK’ participants were directed to a new page displaying the same message as above.

5. Are you self-employed?

Yes / No

If the answer to this question was ‘yes’ participants were directed to a new page displaying the same message as above.

6. Which gender do you identify with?

Male / Female

Great! We may now begin!

Section 1/7. The questions in the first part of the questionnaire ask you to describe your job, as objectively as you can. Please do not use this part of the questionnaire to show how much you like or dislike your job. Instead, try to make your descriptions as accurate and as objective as you possibly can. The responses are on a continuum from 1 to 7.

If you have more than one job, think of the job you work most hours in.

1 (very little)	2	3	4	5	6	7 (very much)

1. How much autonomy is there in your job? That is, to what extent does your job permit you to decide on your own how to go about doing the work?

2. To what extent does your job involve a "whole" and identifiable piece of work? That is, it the job a complete piece of work that has an obvious beginning and end? Or is it only a small part of an overall piece of work, which is finished by other people or by automatic machines?

3. How much variety is there in your job? That is, to what extent does the job require you to do many different things at work, using a variety of your skills and talents?

4. In general, how significant or important is your job? That is, are the results of your work likely to significantly affect the lives or well-being of other people?

5. To what extent does the job itself provide you with information about your work performance? That is, does the actual work itself provide clues about how well you are doing – aside from any feedback co-workers or supervisors may provide?

Section 2/7. Listed below are a number of statements which could be used to describe a job. Using the scale below, you are to indicate whether each statement is an accurate or inaccurate description of your main job. As with the previous section, please try to be as objective as you can.

1 (very inaccurate)	2	3	4	5	6	7 (very accurate)

1. The job requires me to use a number of complex or high-level skills.
2. The job provides me the chance to completely finish the pieces of work I begin.
3. The job itself is very significant and important in the broad scheme of things.
4. The job gives me considerable opportunity for independence and freedom in how I do the work.
5. Just doing the work required by the job provides chances for me to figure out how well I am doing.
6. The job is quite simple and repetitive. (Reverse coded)
7. For this statement, please select 'very inaccurate'. This is for survey validation purposes.
8. The job is arranged so that I can do an entire piece of work from beginning to end.
9. The job is one where a lot of people can be affected by how well the work gets done.
10. After I finish a job, I know whether I performed well.
11. The job gives me a chance to use my personal initiative and judgement in carrying out the work.

Section 3/7. This part of the questionnaire contains items that are related to your experience with the manager who is your most immediate supervisor in your main job. Managers have different styles in dealing with employees, and we would like to know more about how you have felt about your encounters with your manager. Your responses are confidential. Please be honest and candid.

1 (strongly disagree)	2	3	4	5	6	7 (strongly agree)

1. I feel that my manager provides me choices and options.
2. I feel understood by my manager.
3. My manager conveyed confidence in my ability to do well at my job.
4. My manager encouraged me to ask questions.
5. My manager listens to how I would like to do things.
6. My manager tries to understand how I see things before suggesting a new way to do things.

Section 4/7. The following items pertain to a series of 12 hypothetical sketches. Each sketch describes an incident and lists three ways of responding to it.

Please read each sketch, imagine yourself in that situation, and then consider each of the three possible responses. Think of each response option in terms of how likely it is that you would respond that way. We all respond in a variety of ways to situations, and probably most or all responses are at least slightly likely for you.

If it is very unlikely that you would respond the way described in a given response, you should circle answer 1 or 2. If it is moderately likely, you would select a number in the mid range, and if it is very likely that you would respond as described, you would choose answer 6 or 7.

1 (very unlikely)	2	3	4	5	6	7 (very likely)

1. You have been offered a new position in a company where you have worked for some time. What is the likelihood of each of these questions coming to your mind:

a) What if I can't live up to the new responsibility?
b) Will I make more at this position?
c) I wonder if the new work will be interesting

2. You have a school-age daughter. On parents' night the teacher tells you that your daughter is doing poorly and doesn't seem involved in the work. How likely are you to:

a) Talk it over with your daughter to understand further what the problem is.
b) Scold her and hope she does better.
c) Make sure she does the assignments, because she should be working harder

3. You had a job interview several weeks ago. In the mail you received a form letter which states that the position has been filled. How likely is it that you might think:

a) It's not what you know, but who you know.
b) I'm probably not good enough for the job.
c) Somehow they didn't see my qualifications as matching their needs.

4. You are a plant supervisor and have been charged with the task of allotting coffee breaks to three workers who cannot all break at once. How likely is it that you would handle this by:

a) Telling the three workers the situation and having them work with you on the schedule.
b) Simply assigning times that each can break to avoid any problems.
c) Find out from someone in authority what to do or do what was done in the past.

5. A close (same-sex) friend of yours has been moody lately, and a couple of times has become very angry with you over "nothing." How likely is it that you:

a) Share your observations with him/her and try to find out what is going on for him/her.
b) Ignore it because there's not much you can do about it anyway.
c) Tell him/her that you're willing to spend time together if and only if he/she makes more effort to control him/herself.

6. You have just received the results of a test you took, and you discovered that you did very poorly. How likely is it that you will have the following reactions:

a) "I can't do anything right," and feel sad.
b) "I wonder how it is I did so poorly," and feel disappointed
c) "That stupid test doesn't show anything," and feel angry.

7. You have been invited to a large party where you know very few people. As you look forward to the evening, how likely are you to expect that:

a) You'll try to fit in with whatever is happening in order to have a good time and not look bad.
b) You'll find some people with whom you can relate.
c) You'll probably feel somewhat isolated and unnoticed.

8. You are asked to plan a picnic for yourself and your fellow employees. How likely is it that you will adopt the following approaches:

a) Take charge: that is, you would make most of the major decisions yourself.
b) Follow precedent: you're not really up to the task so you'd do it the way it's been done before.
c) Seek participation: get inputs from others who want to make them before you make the final plans.

9. Recently a position opened up at your place of work that could have meant a promotion for you. However, a person you work with was offered the job rather than you. In evaluating the situation, how likely are you to think:

a) You didn't really expect the job; you frequently get passed over.
b) The other person probably "did the right things" politically to get the job.
c) You would probably take a look at factors in your own performance that led. you to be passed over.

10. You are embarking on a new career. How likely is that you have each of the following considerations:

a) Whether you can do the work without getting in over your head
b) How interested you are in that kind of work.
c) Whether there are good possibilities for advancement.

11. A woman who works for you has generally done an adequate job. However, for the past two weeks her work has not been up to par and she appears to be less actively interested in her work. How likely is it that you will react by:

a) Tell her that her work is below what is expected and that she should start working harder.
b) Ask her about the problem and let her know you are available to help work it out.
c) It's hard to know what to do to get her straightened out.

12. Your company has promoted you to a position in a city far from your present location. As you think about the move, how likely are you to:

a) Feel interested in the new challenge and a little nervous at the same time.
b) Feel excited about the higher status and salary that is involved.
c) Feel stressed and anxious about the upcoming changes.

Section 5/7. The following statements aim to tap into your personal experiences at work.

Please indicate the degree to which you agree with these statements. If you work multiple jobs, remember to think of the job you work most hours in.

1 (totally disagree)	2	3	4	5	6	7 (totally agree)

1. I feel like I can be myself at my job.
2. I really master my tasks at my job.
3. I don't really feel connected with other people at my job.
4. I feel competent at my job.
5. At work, I often feel like I have to follow other people's commands.
6. At work, I feel part of a group.
7. If I could choose, I would do things at work differently.
8. I am good at the things I do in my job.
9. I don't really mix with other people at my job.
10. The tasks I have to do at work are in line with what I really want to do.
11. At work, I can talk with people about things that really matter to me.
12. I have the feeling that I can even accomplish the most difficult tasks at work.
13. I feel free to do my job the way I think it could best be done.
14. I often feel alone when I am with my colleagues.
15. In my job, I feel forced to do things I do not want to do.
16. Some people I work with are close friends of mine.

Section 6/7. Nearly done! Using the scale below, please answer the following question:

Why do you or would you put effort into your current main job?

1 (not at all)	2	3	4	5	6	7 (completely)

1. Because I personally consider it important to put efforts in this job.
2. Because what I do in my work is exciting.
3. To get others' approval (e.g. supervisor, colleagues, family, clients ...).
4. Because I risk losing my job if I don't put enough effort in it.
5. Because it makes me feel proud of myself.
6. Because the work I do is interesting.
7. Because putting efforts in this job has personal significance to me.
8. Because otherwise I will feel bad about myself.
9. Because others offer me greater job security if I put enough effort in my job (e.g. employer, supervisor).
10. Because others will respect me more (e.g. supervisor, colleagues, family, clients).
11. Because others will reward me financially only if I put enough effort in my job (e.g. employer, supervisor ...).
12. Because I have to prove to myself that I can.
13. Because putting efforts in this job aligns with my personal values.
14. Because otherwise I will feel ashamed of myself.
15. Because I have fun doing my job.
16. To avoid being criticized by others (e.g. supervisor, colleagues, family, clients ...).

Section 7/7. Finally, a couple of questions about yourself. If none of the categories fit, please type in your own description under 'other'.

1. Which of the following categories best describes the industry you primarily work in (regardless of your actual position)?

- Human health/ social work
- Public administration
- Education
- Science and technology
- Financial and insurance activities
- Information and communication
- Arts and entertainment
- Administrative and support service
- Wholesale/ retail trade
- Accommodation/ food services
- Manufacturing
- Other (please specify)

2. Which of the following categories best describe your role in the industry?

- Upper management
- Middle management
- Junior management
- Administrative staff
- Support staff
- Student
- Trained professional
- Skilled labourer
- Consultant
- Temporary employee
- Researcher
- Self-employed/ Partner
- Other (please specify)

3. What sector do you work in?

- public
- private
- not-for-profit
- don't know

4. How many hours do you usually work in your main job each week, including overtime or extra hours? *Exclude meal breaks and time taken to travel to work.*

- Less than 10 hours/week
- 10-20 hours/week
- 21-34 hours/week
- 35-45 hours/week
- 46-50 hours/week
- 51-60 hours/week
- More than 60 hours/week

5. How many years in total have you been working in this job? Please report the years you have worked in your current position, not years with your current employer.

- Less than 1 year
- 1-2 years
- 3-4 years
- 5-6 years
- 7-8 years
- 8-10 years
- More than 10 years

6. What is your annual base salary before tax and other deductions are taken out? Do not include any bonuses or performance-related pay in reporting your base salary.

- Less than £9,999 per year
- £10,000 - £19,999 per year
- £20,000 - £29,999 per year
- £30,000 - £39,999 per year
- £40,000 - £49,999 per year
- £50,000 - £59,999 per year
- £60,000 - £69,999 per year
- £70,000 - £79,999 per year
- £80,000 - £89,999 per year
- £90,000 - £99,999 per year
- £100,000 - £149,999 per year
- £150,000 or more per year

7. In the last 12 months, have you received any type of financial reward based on your individual, group or organisational performance? Aside from your base wage.

i.e. In your main job, have you received any merit bonuses/ sales commissions/ piece rates/ profit-sharing/ gainsharing or any other types of pay for performance?

Yes/ No

8. If yes, which of the following do you receive? Tick all that apply.

a) Payments based on your individual performance or output
b) Payments based on the overall performance of a group or a team
c) Payments based on the overall performance of your workplace or organisation

9. How often did you receive these payments?

If your individual performance pay distribution was different from your group or organisational performance pay distribution, please specify this difference under 'other'.

- Daily
- Weekly
- Monthly
- Quarterly
- Annually
- Other (please specify)

10. What is the amount of performance related pay you received, every time, on average?

E.g. If you mentioned you received your performance pay on a monthly basis, what is the amount you normally received every month?

a) Amount of pay for your individual performance or output:
b) Amount of pay for the overall performance of a group or a team:
c) Amount of pay for the overall performance of your workplace or organisation:

[Optional]: If you have any further comments regarding how you perceive your performance-related pay or the general performance management process in your job, feel free to add them in the space below.

_____

11. In general, how satisfied are you with your performance pay?

1 (very dissatisfied)	2	3	4	5	6	7 (very satisfied)

12. In general, how satisfied are you with your overall pay?

1 (very dissatisfied)	2	3	4	5	6	7 (very satisfied)

13. How old are you?

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- 75-84
- 85 or older
- Prefer not to answer

14. Which of the following describes your current status?

- Single
- Married or living with partner
- Divorced
- Widowed
- Prefer not to answer

15. Do you have any dependent children?

Yes / No

16. What is the highest level of education achieved?

- High school graduate
- Some university, no degree
- First degree level qualification (e.g. Batchelor degree)
- Second degree level qualifications (e.g. Master's degree)
- Professional degree
- Doctorate
- Other academic qualifications (please specify)

17. To which of these groups do you consider you belong?

- White
- Mixed
- Asian or Asian British
- Black or Black British
- Other ethnic group

Thank you. This is the end of the questionnaire. If you have any questions or if you found any particular questions or sections confusing, please feel free to leave your comments below. Alternatively, you may wish to contact the research team at r.corduneanu.1@research.gla.ac.uk.

To exit the survey, please continue to the next page.

Appendix 2 – Descriptive statistics and normality assessment

Job characteristics

Item	*Mean*	*Median*	*Mode*	*Std. Deviation*	*Variance*	*Skewness*	*Std. Error of Skewness*	*Kurtosis*	*Std. Error of Kurtosis*
job_variety_1	4.58	4.00	4	1.820	3.311	-.284	.086	-.698	.172
job_variety_2	4.80	5.00	6	1.692	2.862	-.769	.086	-.398	.172
job_variety_3_R	4.24	5.00	3	1.952	3.810	-.095	.086	-1.290	.172
job_identity_1	4.79	5.00	7	1.897	3.600	-.465	.086	-.729	.172
job_identity_2	5.47	6.00	6	1.562	2.440	-1.216	.086	.839	.172
job_identity_3	4.96	5.00	6	1.742	3.035	-.736	.086	-.421	.172
job_significance_1	5.12	5.00	7	1.748	3.055	-.573	.086	-.480	.172
job_significance_2	5.31	6.00	6	1.509	2.278	-.968	.086	.473	.172
job_significance_3	5.49	6.00	6	1.484	2.203	-1.131	.086	.786	.172
job_autonomy_1	4.46	4.00	4	1.801	3.244	-.398	.086	-.606	.172
job_autonomy_2	4.99	5.00	5	1.658	2.748	-.827	.086	-.109	.172
job_autonomy_3	5.53	6.00	6	1.455	2.116	-1.297	.086	1.437	.172
job_feedback_1	4.49	4.00	4	1.671	2.794	-.272	.086	-.394	.172
job_feedback_2	4.93	5.00	5	1.502	2.256	-.798	.086	.209	.172
job_feedback_3	5.33	6.00	6	1.497	2.241	-1.062	.086	.738	.172

Managerial Need Support

Item	*Mean*	*Median*	*Mode*	*Std. Deviation*	*Variance*	*Skewness*	*Std. Error of Skewness*	*Kurtosis*	*Std. Error of Kurtosis*
MNS_1	4.78	5.00	5	1.603	2.568	-.701	.086	-.103	.172
MNS_2	4.97	5.00	6	1.682	2.829	-.861	.086	-.096	.172
MNS_3	5.41	6.00	6	1.560	2.434	-1.175	.086	.889	.172
MNS_4	5.06	5.00	6	1.653	2.732	-.805	.086	-.062	.172
MNS_5	4.95	5.00	5	1.674	2.803	-.818	.086	-.066	.172
MNS_6	4.79	5.00	6	1.677	2.813	-.707	.086	-.288	.172

Impersonal Causality Orientations

Item	*Mean*	*Median*	*Mode*	*Std. Deviation*	*Variance*	*Skewness*	*Std. Error of Skewness*	*Kurtosis*	*Std. Error of Kurtosis*
ICO_1	4.07	4.00	4	1.881	3.538	-.012	.086	-.995	.172
ICO_2	2.18	2.00	1	1.349	1.821	1.238	.086	1.459	.172
ICO_3	3.90	4.00	4	1.792	3.212	.014	.086	-.857	.172
ICO_4	3.24	3.00	4	1.681	2.827	.270	.086	-.746	.172
ICO_5	2.64	2.00	1	1.480	2.190	.659	.086	-.242	.172
ICO_6	3.40	3.00	1	1.867	3.486	.383	.086	-.881	.172
ICO_7	3.93	4.00	4	1.869	3.495	.095	.086	-.987	.172
ICO_8	3.56	4.00	4	1.519	2.309	.063	.086	-.440	.172
ICO_9	3.72	4.00	4	1.645	2.706	.220	.086	-.493	.172
ICO_10	5.20	5.00	5	1.471	2.164	-.715	.086	.194	.172
ICO_11	3.09	3.00	4	1.496	2.239	.326	.086	-.390	.172
ICO_12	4.66	5.00	7	1.834	3.362	-.381	.086	-.830	.172

Control Causality Orientations

Item	*Mean*	*Median*	*Mode*	*Std. Deviation*	*Variance*	*Skewness*	*Std. Error of Skewness*	*Kurtosis*	*Std. Error of Kurtosis*
CCO_1	5.37	6.00	7	1.502	2.257	-.896	.086	.502	.172
CCO_2	4.93	5.00	4	1.403	1.968	-.299	.086	-.196	.172
CCO_3	3.97	4.00	4	1.797	3.230	.006	.086	-.794	.172
CCO_4	4.11	4.00	4	1.759	3.094	.041	.086	-.803	.172
CCO_5	3.25	3.00	4	1.648	2.715	.249	.086	-.706	.172
CCO_6	2.59	2.00	1	1.531	2.344	.858	.086	.168	.172
CCO_7	4.48	4.00	4	1.585	2.513	-.342	.086	-.262	.172
CCO_8	4.08	4.00	4	1.688	2.849	-.078	.086	-.736	.172
CCO_9	4.44	5.00	4	1.601	2.565	-.306	.086	-.447	.172
CCO_10	5.40	6.00	6	1.295	1.677	-.526	.086	-.246	.172
CCO_11	3.10	3.00	3	1.474	2.174	.446	.086	-.183	.172
CCO_12	4.95	5.00	7	1.691	2.859	-.659	.086	-.188	.172

Autonomy Causality Orientations

Item	*Mean*	*Median*	*Mode*	*Std. Deviation*	*Variance*	*Skewness*	*Std. Error of Skewness*	*Kurtosis*	*Std. Error of Kurtosis*
ACO_1	5.41	6.00	7	1.447	2.093	-.961	.086	.827	.172
ACO_2	6.53	7.00	7	1.009	1.019	-3.030	.086	10.893	.172
ACO_3	4.68	5.00	4	1.571	2.467	-.451	.086	-.218	.172
ACO_4	5.84	6.00	7	1.457	2.122	-1.451	.086	1.796	.172
ACO_5	5.46	6.00	7	1.451	2.105	-.802	.086	.061	.172
ACO_6	5.13	5.00	5	1.420	2.016	-.649	.086	.271	.172
ACO_7	5.21	5.00	5	1.371	1.880	-.756	.086	.711	.172
ACO_8	5.66	6.00	6	1.201	1.443	-.951	.086	1.273	.172
ACO_9	4.96	5.00	5	1.427	2.036	-.560	.086	.229	.172
ACO_10	5.81	6.00	7	1.125	1.266	-.842	.086	.723	.172
ACO_11	5.91	6.00	7	1.162	1.350	-1.260	.086	2.030	.172
ACO_12	5.07	5.00	7	1.703	2.900	-.750	.086	-.123	.172

Basic needs satisfaction

Item	*Mean*	*Median*	*Mode*	*Std. Deviation*	*Variance*	*Skewness*	*Std. Error of Skewness*	*Kurtosis*	*Std. Error of Kurtosis*
autonomy_need_1	5.41	6.00	6	1.459	2.130	-1.105	.086	.999	.172
autonomy_need_2_R	3.92	4.00	3	1.597	2.551	.179	.086	-.636	.172
autonomy_need_3_R	3.63	4.00	4	1.496	2.237	.245	.086	-.437	.172
autonomy_need_4	4.62	5.00	6	1.632	2.662	-.581	.086	-.416	.172
autonomy_need_5	5.10	5.00	6	1.535	2.356	-.848	.086	.204	.172
autonomy_need_6_R	4.67	5.00	6	1.644	2.704	-.235	.086	-.888	.172
competence_need_1	5.72	6.00	6	1.020	1.040	-.751	.086	.672	.172
competence_need_2	5.96	6.00	6	1.067	1.138	-1.396	.086	2.970	.172
competence_need_3	6.07	6.00	6	.880	.775	-.722	.086	.220	.172
competence_need_4	5.29	6.00	6	1.343	1.803	-.910	.086	.731	.172
relatedness_need_1_R	4.83	5.00	6	1.713	2.933	-.492	.086	-.713	.172
relatedness_need_2	5.16	5.00	6	1.524	2.324	-.842	.086	.273	.172
relatedness_need_3_R	4.96	5.00	7	1.759	3.093	-.591	.086	-.667	.172
relatedness_need_4	4.72	5.00	6	1.651	2.725	-.563	.086	-.463	.172
relatedness_need_5_R	5.00	5.00	6	1.656	2.741	-.588	.086	-.566	.172
relatedness_need_6	4.30	5.00	5	1.827	3.338	-.287	.086	-.926	.172

Motivation

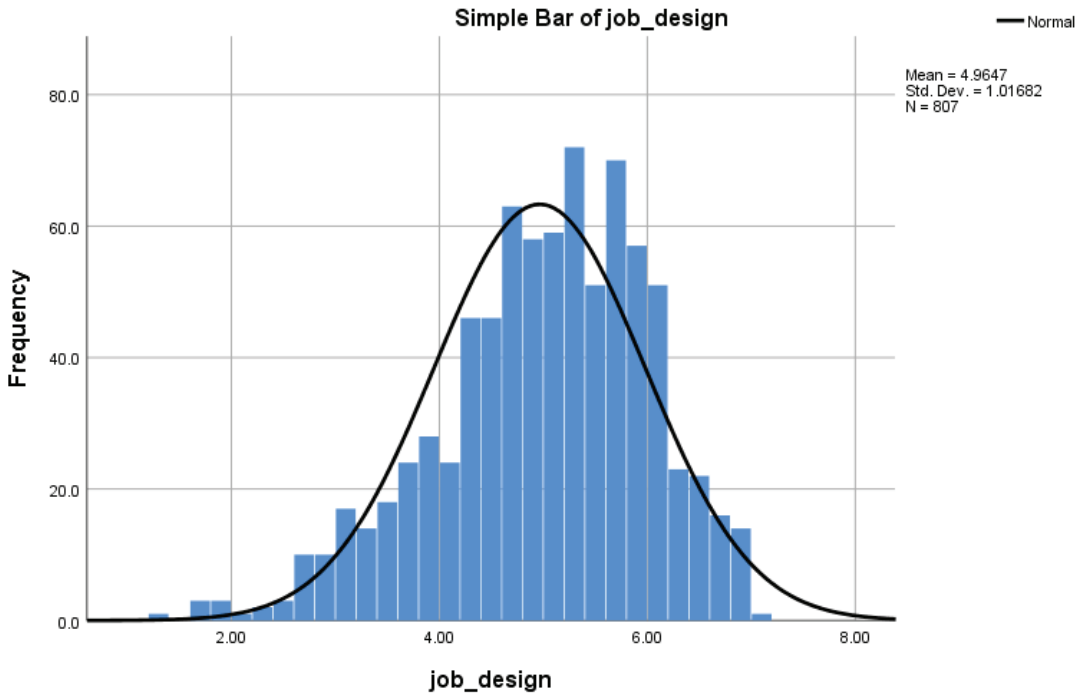
Item	*Mean*	*Median*	*Mode*	*Std. Deviation*	*Variance*	*Skewness*	*Std. Error of Skewness*	*Kurtosis*	*Std. Error of Kurtosis*
amotivation_1	2.06	1.00	1	1.464	2.143	1.514	.086	1.772	.172
amotivation_2	1.85	1.00	1	1.382	1.911	1.823	.086	2.717	.172
amotivation_3	1.87	1.00	1	1.377	1.896	1.735	.086	2.514	.172
extrinsic_material_1	3.56	4.00	1	1.876	3.520	.163	.086	-1.073	.172
extrinsic_material_2	3.33	3.00	1	1.899	3.607	.238	.086	-1.143	.172
extrinsic_material_3	3.85	4.00	4	1.708	2.917	-.113	.086	-.831	.172
extrinsic_social_1	4.04	4.00	4	1.578	2.491	-.192	.086	-.475	.172
extrinsic_social_2	4.28	4.00	5	1.648	2.716	-.449	.086	-.463	.172
extrinsic_social_3	3.87	4.00	4	1.746	3.050	-.105	.086	-.882	.172
introjected_1	5.56	6.00	7	1.293	1.671	-.827	.086	.554	.172
introjected_2	4.71	5.00	5	1.695	2.874	-.584	.086	-.351	.172
introjected_3	4.85	5.00	5	1.645	2.705	-.647	.086	-.144	.172
introjected_4	4.22	5.00	5	1.879	3.529	-.315	.086	-.942	.172
identified_1	5.85	6.00	7	1.175	1.380	-1.058	.086	1.341	.172
identified_2	5.00	5.00	5	1.642	2.695	-.703	.086	-.124	.172
identified_3	5.15	5.00	6	1.555	2.417	-.831	.086	.228	.172
intrinsic_1	4.31	4.00	4	1.707	2.915	-.212	.086	-.728	.172
intrinsic_2	4.71	5.00	5	1.757	3.089	-.503	.086	-.587	.172
intrinsic_3	4.44	4.00	4	1.729	2.991	-.270	.086	-.693	.172

Descriptive statistics for composite variables and pay for performance

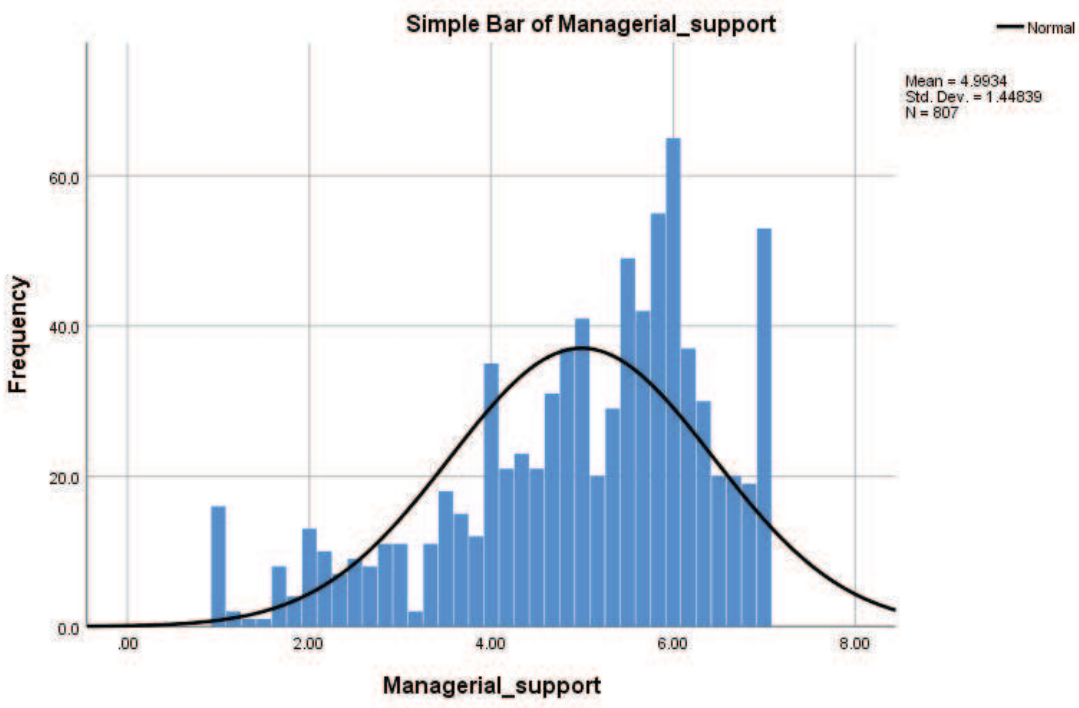
Variable	*N*		*Mean*	*Std. Deviation*	*Skewness*	*Std. Error of Skewness*	*Kurtosis*	*Std. Error of Kurtosis*
	Valid	*Missing*						
Intrinsic job characteristics	807	0	4.9647	1.01682	-0.584	0.086	0.187	0.172
Managerial need support	807	0	19.993	1.44839	-0.844	0.086	0.158	0.172
Impersonal causality orientations	807	0	3.633	0.93059	-0.142	0.086	-0.261	0.172
Autonomy causality orientations	807	0	5.472	0.67504	-0.264	0.086	0.138	0.172
Controlled causality orientations	807	0	4.223	0.68281	0.07	0.086	0.458	0.172
Autonomy need satisfaction	807	0	4.5609	1.08929	-0.355	0.086	0.083	0.172
Competence need satisfaction	807	0	5.762	0.87568	-0.706	0.086	0.462	0.172
Relatedness need satisfaction	807	0	4.8271	1.33714	-0.546	0.086	-0.25	0.172
Amotivation	807	0	1.9265	1.17896	1.553	0.086	2.35	0.172
Extrinsic motivation	807	0	3.8197	1.1972	-0.024	0.086	-0.247	0.172
Introjected motivation	807	0	4.8367	1.24605	-0.349	0.086	-0.147	0.172
Identified motivation	807	0	5.3333	1.21848	-0.636	0.086	0.129	0.172
Intrinsic motivation	807	0	4.4853	1.57227	-0.34	0.086	-0.584	0.172
PFP percent	263	544	16.6932	40.55854	4.971	0.15	28.098	0.299

Appendix 3 – Histograms showing the normal distribution of variables

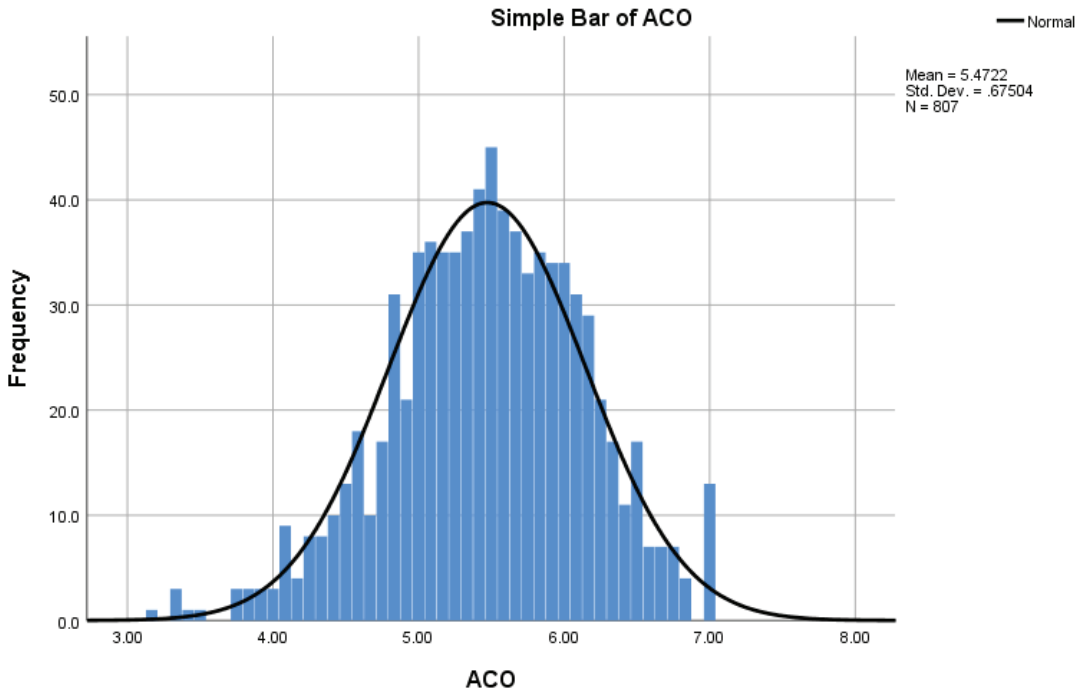
Job characteristics



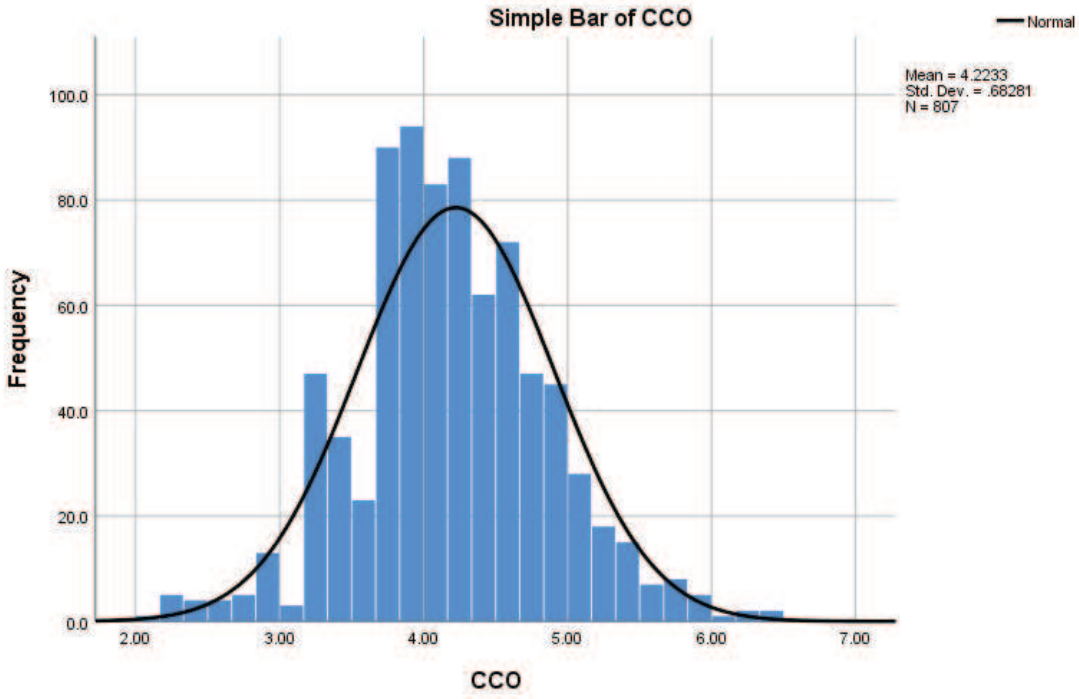
Managerial need support



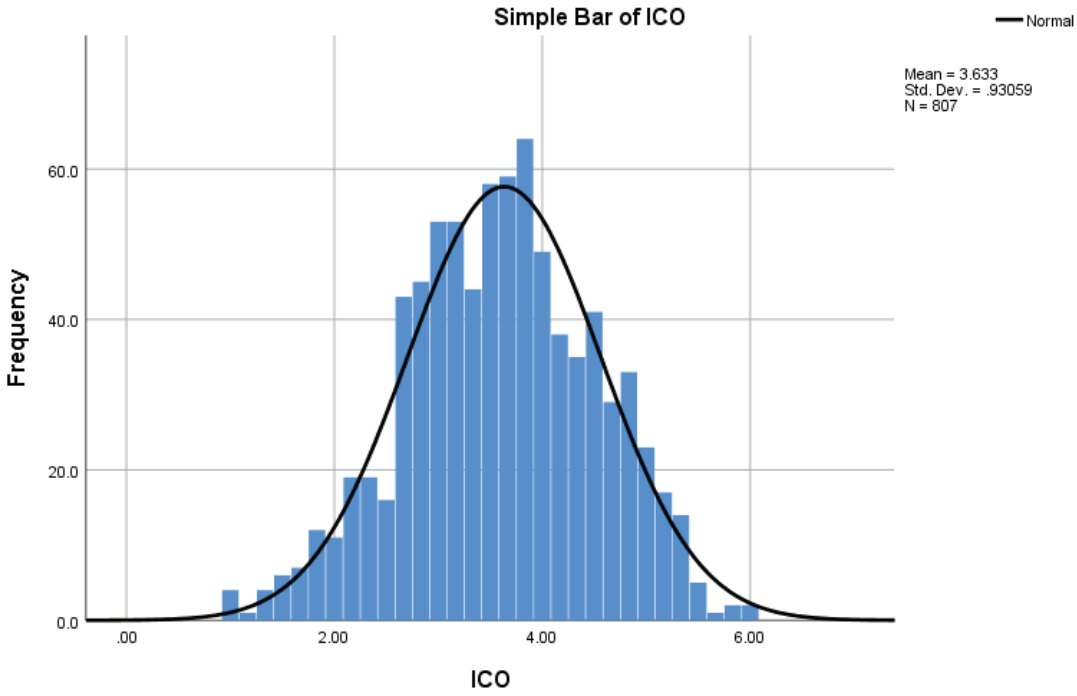
Autonomy causality orientations



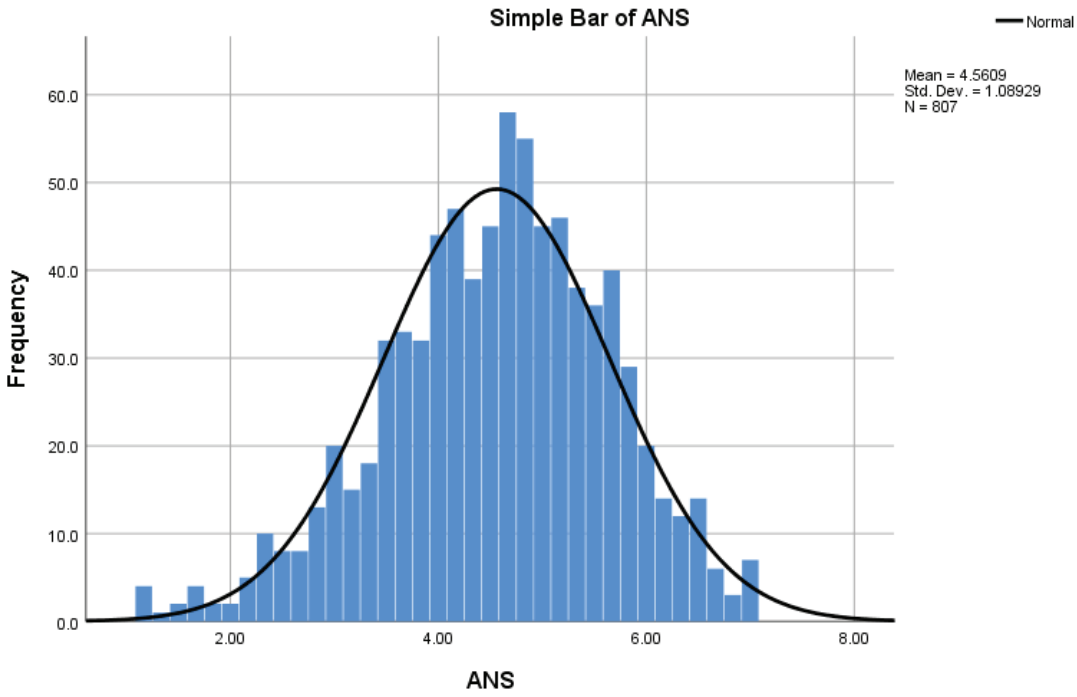
Controlled causality orientations



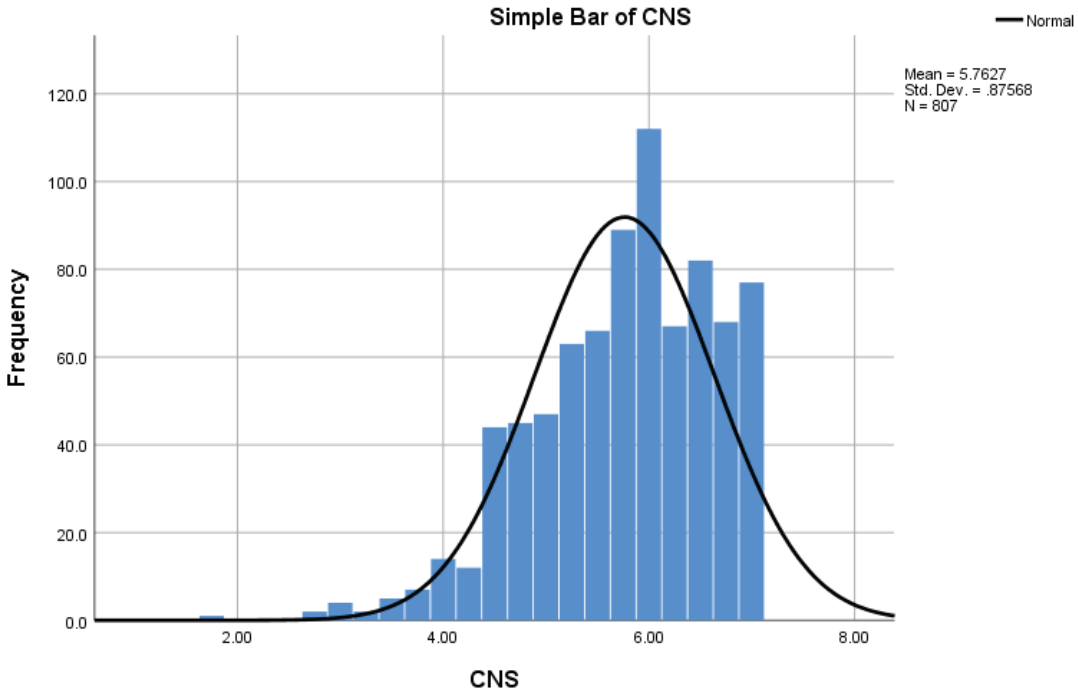
Impersonal causality orientations



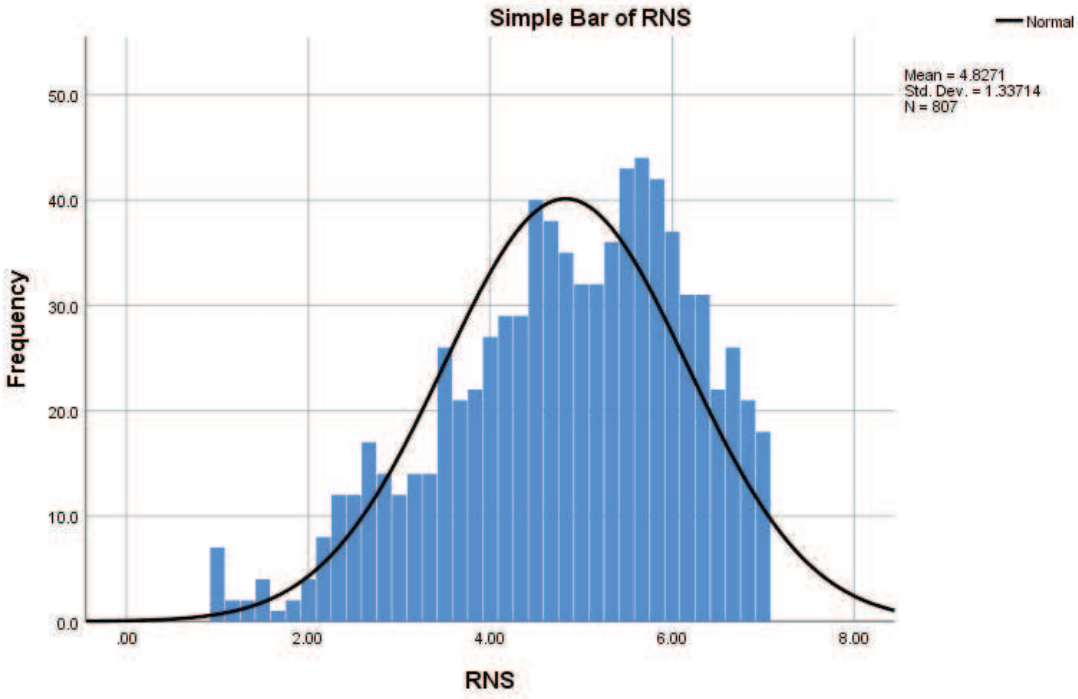
Autonomy need satisfaction



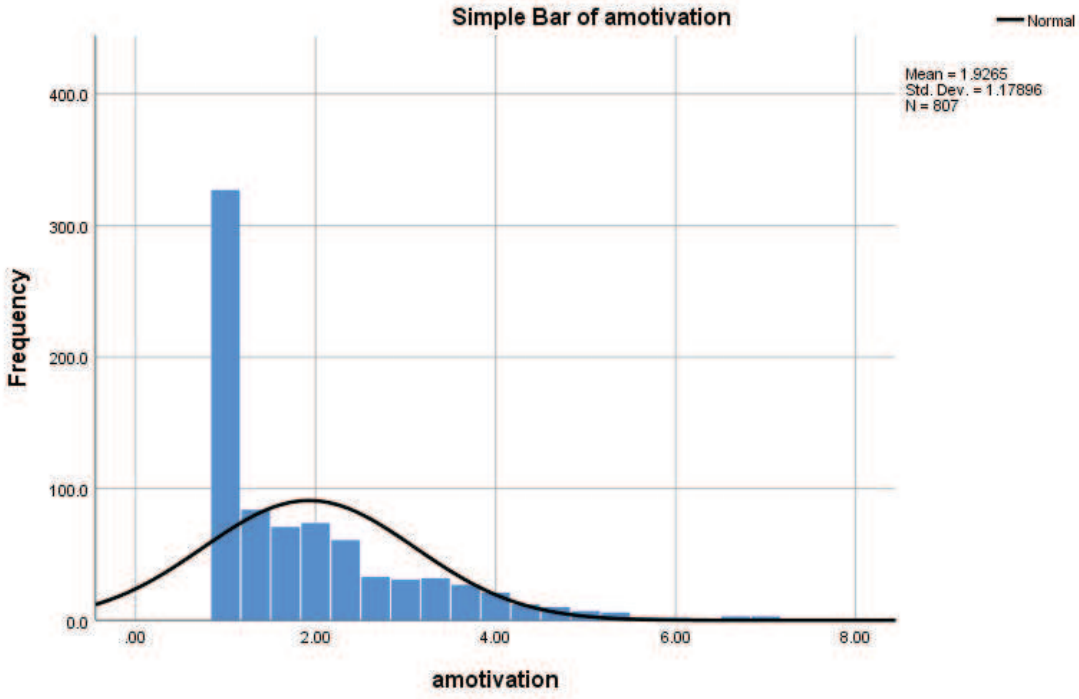
Competence need satisfaction



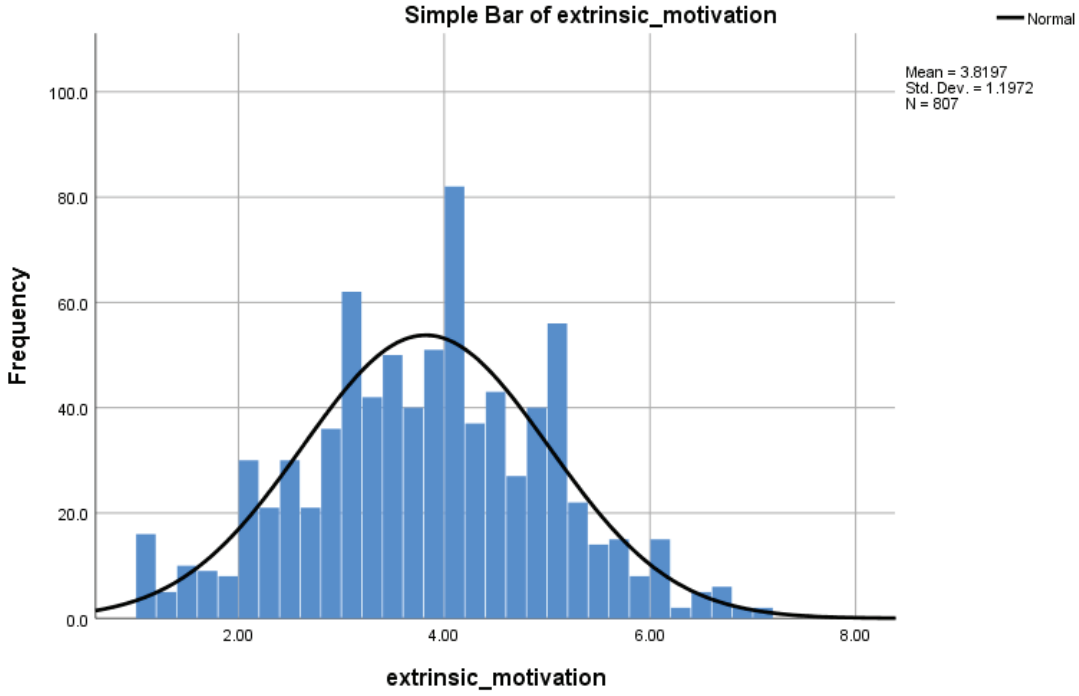
Relatedness need satisfaction



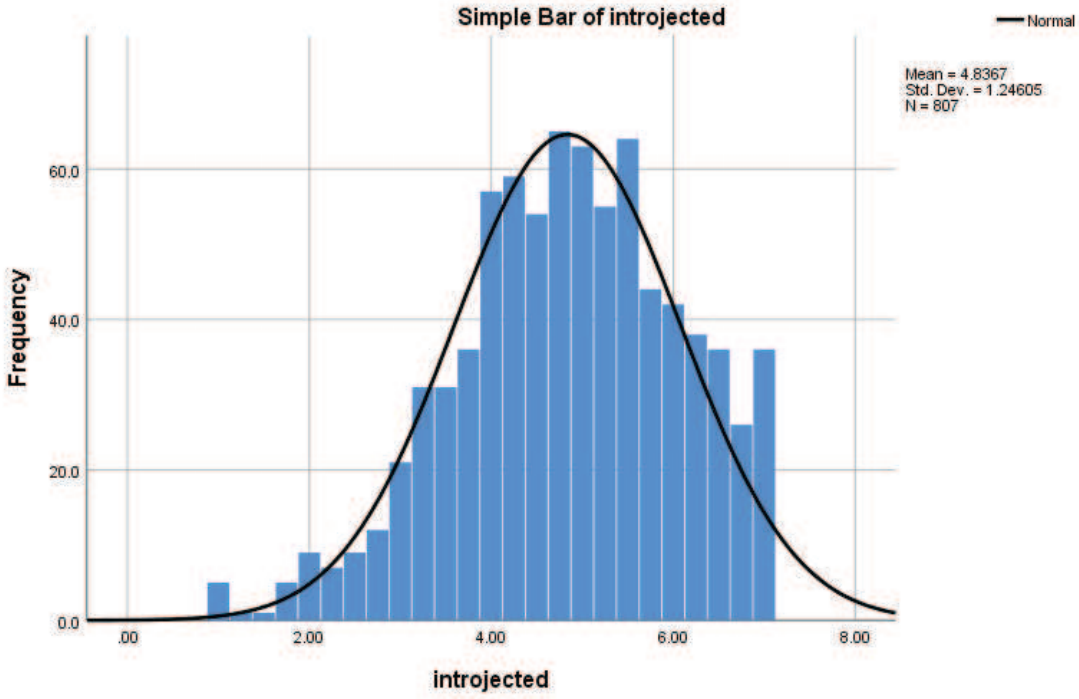
Amotivation



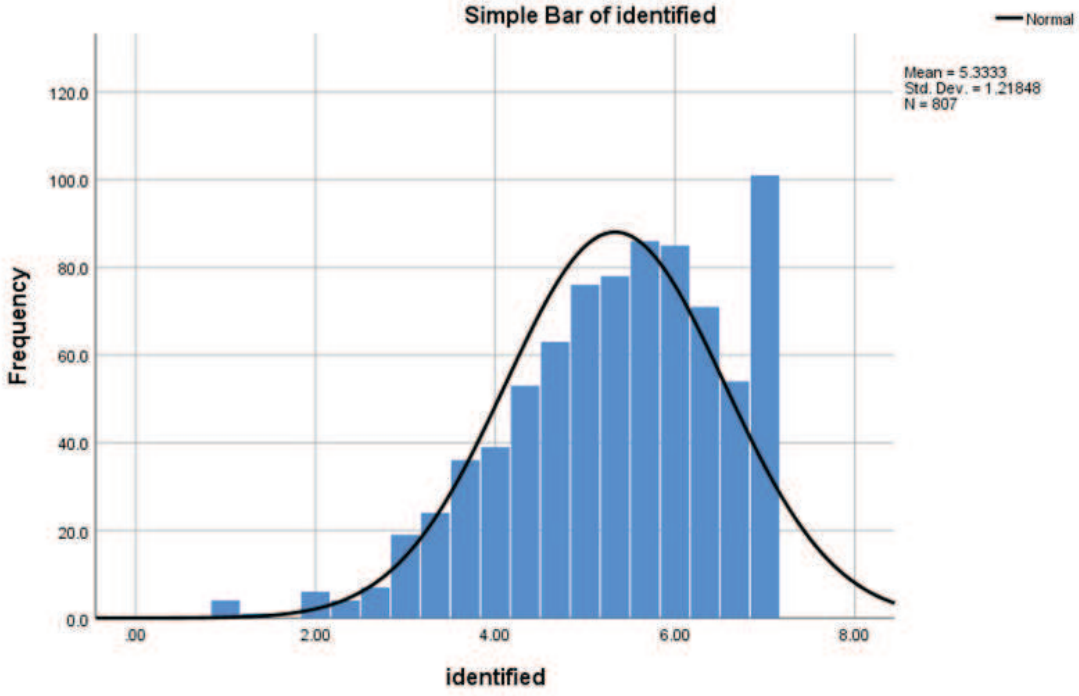
Extrinsic motivation



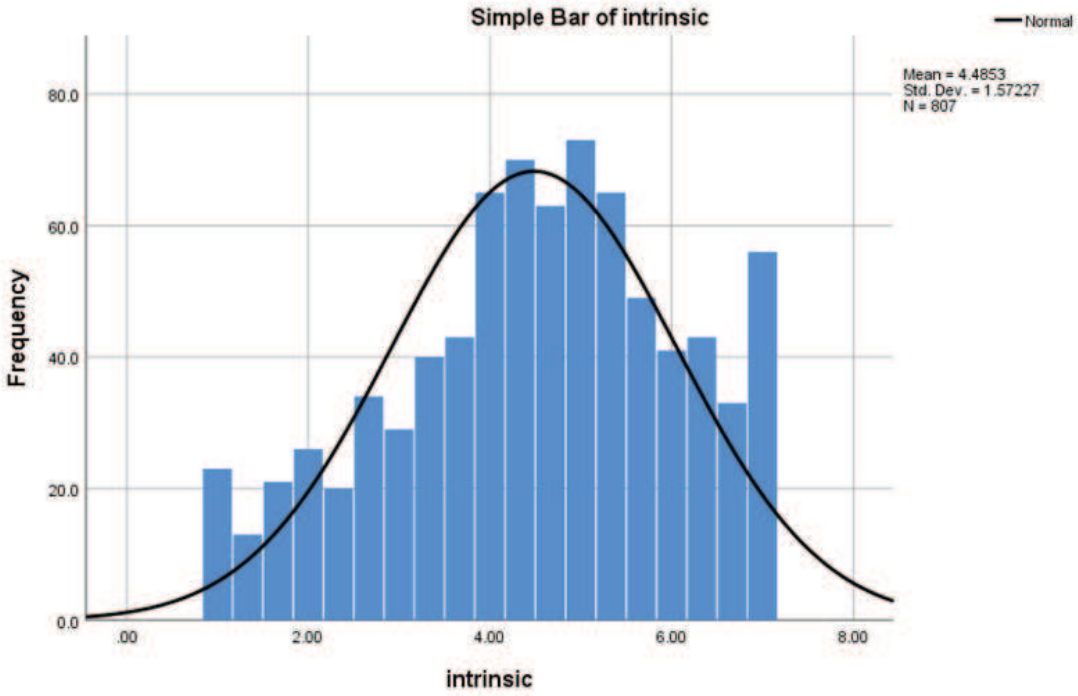
Introjected motivation



Identified motivation



Intrinsic motivation



Appendix 4 - Testing for non-linear relationships

Regression analyses – dependent variables

Items	*Amotivation*		*Extrinsic motivation*		*Introjected motivation*		*Identified motivation*		*Intrinsic motivation*	
	t-value	**p-value**	**t-value**	**p-value**	**t-value**	**p-value**	**t-value**	**p-value**	**t-value**	**p-value**
Job characteristics	-11.806	0.000	3.021	0.003	6.630	0.000	18.251	0.000	23.455	0.000
Managerial need support	-8.494	0.000	5.364	0.000	5.333	0.000	10.883	0.000	14.796	0.000
Impersonal orientations	9.093	0.000	6.875	0.000	3.287	0.001	-5.665	0.000	-7.096	0.000
Autonomy orientations	-7.205	0.000	3.516	0.000	12.185	0.000	12.521	0.000	7.825	0.000
Control orientations	3.667	0.000	10.381	0.000	4.081	0.000	2.862	0.004	3.864	0.000
Autonomy need satisfaction	-15.128	0.000	-1.210	0.226	4.624	0.000	16.490	0.000	23.794	0.000
Competence need satisfaction	-10.299	0.000	-1.500	0.134	6.329	0.000	16.263	0.000	14.695	0.000
Relatedness need satisfaction	-11.362	0.000	0.657	0.511	2.426	0.015	10.078	0.000	16.115	0.000

Regression analyses – mediator variables

Items	*Autonomy need satisfaction*		*Competence need satisfaction*		*Relatedness need satisfaction*	
	t-value	**p-value**	**t-value**	**p-value**	**t-value**	**p-value**
Job characteristics	19.403	0.000	12.478	0.000	11.401	0.000
Managerial need support	18.090	0.000	8.469	0.000	12.782	0.000
Impersonal orientations	-10.819	0.000	-10.612	0.000	-9.032	0.000
Autonomy orientations	5.575	0.000	10.514	0.000	7.047	0.000
Control orientations	0.809	0.419	5.462	0.000	1.694	0.091
PFP percent	2.849	0.005	0.857	0.392	1.511	0.132

Appendix 5 – Internal reliability coefficients

Job characteristics

Items	*Cronbach's Alpha*	*Corrected item-total correlation*	*Cronbach's Alpha if Item Deleted*
job_variety_1	**.753**	.602	.645
job_variety_2		.579	.675
job_variety_3_R		.568	.690
job_autonomy_1	**.812**	.640	.776
job_autonomy_2		.711	.691
job_autonomy_3		.654	.759
job_identity_1	**.762**	.537	.756
job_identity_2		.617	.663
job_identity_3		.640	.626
job_significance_1	**.784**	.638	.698
job_significance_2		.693	.635
job_significance_3		.553	.779
job_feedback_1	**.810**	.619	.786
job_feedback_2		.719	.679
job_feedback_3		.646	.753

Managerial need support

Items	*Cronbach's Alpha*	*Corrected item-total correlation*	*Cronbach's Alpha if Item Deleted*
Managerial_support_1	**.943**	.791	.937
Managerial_support_2		.845	.930
Managerial_support_3		.792	.936
Managerial_support_4		.826	.932
Managerial_support_5		.869	.927
Managerial_support_6		.840	.931

Autonomy Causality Orientations

Items	*Cronbach's Alpha*	*Corrected item-total correlation*	*Cronbach's Alpha if Item Deleted*
Autonomy_orientation_1	**.714**	.335	.697
Autonomy_orientation_2		.346	.697
*Autonomy_orientation_3**		.238	.713
*Autonomy_orientation_4**		.289	.704
Autonomy_orientation_5		.396	.688
Autonomy_orientation_6		.314	.700
Autonomy_orientation_7		.305	.701
Autonomy_orientation_8		.375	.692
Autonomy_orientation_9		.418	.685
Autonomy_orientation_10		.437	.686
Autonomy_orientation_11		.527	.674
*Autonomy_orientation_12**		.294	.706

* items removed from the analysis ahead of performing EFA

Control Causality Orientations

Items	*Cronbach's Alpha*	*Corrected item-total correlation*	*Cronbach's Alpha if Item Deleted*
*Control_orientation_1**	**.599**	.158	.597
*Control_orientation_2**		.154	.596
*Control_orientation_3**		.272	.574
*Control_orientation_4**		.250	.580
Control_orientation_5		.348	.558
*Control_orientation_6**		.199	.589
*Control_orientation_7**		.257	.578
Control_orientation_8		.317	.564
*Control_orientation_9**		.256	.578
*Control_orientation_10**		.256	.579
Control_orientation_11		.361	.558
*Control_orientation_12**		.218	.586

* items removed from the analysis ahead of performing EFA

Impersonal Causality Orientations

Items	*Cronbach's Alpha*	*Corrected item-total correlation*	*Cronbach's Alpha if Item Deleted*
Impersonal_orientation_1	**.799**	.511	.778
*Impersonal _orientation_2**		.219	.802
Impersonal _orientation_3		.492	.780
Impersonal _orientation_4		.368	.792
Impersonal _orientation_5		.382	.790
Impersonal _orientation_6		.572	.771
Impersonal _orientation_7		.528	.776
Impersonal _orientation_8		.442	.785
Impersonal _orientation_9		.483	.781
Impersonal _orientation_10		.362	.792
Impersonal _orientation_11		.403	.788
Impersonal _orientation_12		.505	.778

* items removed from the analysis ahead of performing EFA

Basic needs satisfaction

Items	*Cronbach's Alpha*	*Corrected item-total correlation*	*Cronbach's Alpha if Item Deleted*
autonomy_need_1	**.789**	.500	.766
autonomy_need_2_R		.527	.760
autonomy_need_3_R		.495	.767
autonomy_need_4		.541	.756
autonomy_need_5		.605	.741
autonomy_need_6_R		.569	.749
competence_need_1	**.816**	.675	.754
competence_need_2		.661	.758
competence_need_3		.702	.754
competence_need_4		.577	.820
relatedness_need_1_R	**.880**	.726	.853
relatedness_need_2		.712	.857
relatedness_need_3_R		.728	.853
relatedness_need_4		.651	.866
relatedness_need_5_R		.759	.848
relatedness_need_6		.572	.880

Motivation

Items	*Cronbach's Alpha*	*Corrected item-total correlation*	*Cronbach's Alpha if Item Deleted*
amotivation_1	**.787**	.609	.730
amotivation_2		.620	.717
amotivation_3		.650	.685
extrinsic_material_1	**.774**	.400	.773
extrinsic_material_2		.484	.751
extrinsic_material_3		.613	.717
extrinsic_social_1		.547	.735
extrinsic_social_2		.548	.734
extrinsic_social_3		.552	.732
introjected_1	**.755**	.468	.742
introjected_2		.601	.669
introjected_3		.554	.696
introjected_4		.605	.669
identified_1	**.771**	.646	.682
identified_2		.612	.695
identified_3		.599	.702
intrinsic_1	**.894**	.803	.838
intrinsic_2		.827	.816
intrinsic_3		.744	.888

Appendix 6 – Final EFA results (respecified model)

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.916
Bartlett's Test of Sphericity	Approx. Chi-Square	24191.285
	df	1770
	Sig.	.000

Communalities		
	Initial	**Extraction**
job_variety_1	.484	.545
job_identity_1	.430	.538
job_significance_1	.546	.578
job_autonomy_1	.490	.554
job_feedback_1	.497	.513
job_variety_2	.541	.552
job_identity_2	.511	.569
job_significance_2	.592	.811
job_autonomy_2	.604	.725
job_feedback_2	.616	.703
job_variety_3_R	.473	.543
job_identity_3	.535	.707
job_significance_3	.451	.466
job_feedback_3	.605	.682
job_autonomy_3	.598	.640
MNS_1	.720	.709
MNS_2	.762	.773
MNS_3	.683	.696
MNS_4	.733	.764
MNS_5	.804	.829
MNS_6	.766	.784
ICO_1	.374	.405
ACO_1	.211	.237
ICO_3	.356	.432
CCO_5	.272	.323
ICO_6	.432	.514
ICO_7	.417	.436
ACO_8	.251	.287
ICO_9	.370	.412

ACO_9	.264	.338
ACO_10	.304	.359
CCO_11	.266	.315
ACO_11	.297	.379
ICO_12	.356	.372
competence_need_1	.547	.611
relatedness_need_1_R	.620	.664
competence_need_2	.498	.560
autonomy_need_2_R	.469	.507
relatedness_need_2	.592	.648
autonomy_need_3_R	.362	.374
competence_need_3	.556	.722
relatedness_need_3_R	.626	.667
relatedness_need_4	.533	.566
relatedness_need_5_R	.685	.751
autonomy_need_6_R	.473	.533
relatedness_need_6	.420	.416
intrinsic_1	.721	.786
extrinsic_social_1	.434	.506
amotivation_1	.456	.506
intrinsic_2	.778	.862
extrinsic_material_2	.410	.457
introjected_2	.432	.493
extrinsic_material_3	.475	.559
amotivation_2	.460	.534
extrinsic_social_2	.517	.540
introjected_3	.453	.461
amotivation_3	.575	.711
introjected_4	.483	.740
intrinsic_3	.656	.681
extrinsic_social_3	.452	.529
Extraction Method: Maximum Likelihood.		

Total Variance Explained							
Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	12.970	21.616	21.616	12.478	20.797	20.797	8.043
2	4.623	7.705	29.321	3.319	5.531	26.328	7.336
3	3.164	5.273	34.594	3.452	5.753	32.081	4.665
4	2.915	4.858	39.452	2.570	4.283	36.364	3.609
5	2.435	4.059	43.511	1.704	2.839	39.204	5.607
6	2.020	3.366	46.877	1.611	2.685	41.889	6.605
7	1.876	3.127	50.005	1.445	2.409	44.298	4.820
8	1.605	2.674	52.679	1.249	2.081	46.379	3.934
9	1.460	2.433	55.112	.987	1.646	48.025	5.337
10	1.408	2.347	57.458	1.091	1.819	49.844	4.662
11	1.217	2.028	59.486	.711	1.185	51.029	3.722
12	1.175	1.958	61.444	.824	1.374	52.403	7.697
13	1.107	1.845	63.289	.665	1.109	53.512	8.471
14	1.022	1.703	64.992	.788	1.314	54.826	2.728
15	.967	1.612	66.604	.546	.910	55.737	1.864
16	.865	1.441	68.045	.434	.724	56.460	5.181
17	.817	1.361	69.407				
18	.798	1.330	70.737				
19	.762	1.269	72.006				
20	.745	1.242	73.248				
21	.720	1.200	74.448				
22	.690	1.150	75.598				
23	.669	1.114	76.712				
24	.643	1.072	77.784				
25	.635	1.058	78.842				
26	.594	.990	79.832				
27	.584	.973	80.805				
28	.554	.924	81.729				
29	.545	.909	82.637				
30	.531	.885	83.523				
31	.506	.843	84.365				
32	.495	.825	85.190				
33	.478	.796	85.986				
34	.462	.771	86.757				
35	.448	.747	87.504				

36	.433	.722	88.226				
37	.420	.701	88.927				
38	.402	.671	89.598				
39	.392	.653	90.251				
40	.387	.645	90.896				
41	.381	.635	91.530				
42	.366	.610	92.141				
43	.365	.608	92.748				
44	.351	.585	93.333				
45	.342	.570	93.902				
46	.340	.567	94.469				
47	.309	.515	94.984				
48	.304	.507	95.491				
49	.293	.489	95.980				
50	.285	.474	96.454				
51	.283	.472	96.927				
52	.259	.432	97.358				
53	.253	.422	97.780				
54	.242	.403	98.183				
55	.230	.383	98.566				
56	.212	.354	98.919				
57	.192	.321	99.240				
58	.168	.279	99.519				
59	.152	.253	99.772				
60	.137	.228	100.000				

Extraction Method: Maximum Likelihood.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Goodness-of-fit Test

Chi-Square	df	Sig.
1516.835	930	.000

Pattern Matrix[a]																
	Factor															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
MNS_6	.905															
MNS_5	.890															
MNS_4	.877															
MNS_2	.870															
MNS_3	.816															
MNS_1	.698															
relatedness_need_3_R		.801														
relatedness_need_5_R		.786														
relatedness_need_2		.768														
relatedness_need_1_R		.762														
relatedness_need_6		.691														
relatedness_need_4		.658														
ICO_6			.748													
ICO_3			.684													
ICO_9			.596													
ICO_1			.590													
ICO_12			.561													
ICO_7			.501													
extrinsic_social_1				.719												
extrinsic_social_2				.648												

extrinsic_social_3				.645												
extrinsic_material_3				.624												
extrinsic_material_2				.511												
job_significance_2					.955											
job_significance_1					.712											
job_significance_3					.579											
job_autonomy_2						.844										
job_autonomy_1						.718										
job_autonomy_3						.571										
competence_need_3							.874									
competence_need_1							.707									
competence_need_2							.704									
ACO_11								.591								
ACO_9								.587								
ACO_10								.551								
ACO_8								.463								
ACO_1								.445								
amotivation_3									-.783							
amotivation_2									-.709							
amotivation_1									-.673							
job_identity_3										.797						
job_identity_1										.741						
job_identity_2										.647						

job_variety_3_R											.624					
job_variety_1											.589					
job_variety_2											.419					
job_feedback_2												.795				
job_feedback_3												.775				
job_feedback_1												.673				
intrinsic_1													.871			
intrinsic_2													.856			
intrinsic_3													.644			
introjected_4														.902		
introjected_2														.597		
introjected_3														.358		
CCO_5															.561	
CCO_11															.553	
autonomy_need_3_R																.537
autonomy_need_6_R																.535
autonomy_need_2_R																.495

Extraction Method: Maximum Likelihood.

Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 9 iterations.

Factor Correlation Matrix																
Factor	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
1	1.000															
2	.413	1.000														
3	-.145	-.356	1.000													
4	.255	.087	.172	1.000												
5	.266	.266	-.150	.120	1.000											
6	.423	.276	-.227	.100	.473	1.000										
7	.231	.393	-.330	-.036	.300	.315	1.000									
8	.267	.313	.026	.218	.246	.295	.318	1.000								
9	.307	.450	-.267	-.012	.294	.340	.357	.342	1.000							
10	.364	.235	-.206	.129	.354	.413	.247	.204	.228	1.000						
11	.175	.158	-.257	.063	.400	.303	.139	.087	.231	.199	1.000					
12	.487	.407	-.245	.262	.543	.594	.312	.319	.345	.471	.333	1.000				
13	.488	.494	-.229	.255	.531	.552	.407	.337	.398	.339	.398	.567	1.000			
14	.121	-.052	.251	.443	.099	.090	.136	.357	.158	.008	.045	.091	.228	1.000		
15	.161	.045	-.072	.336	.129	.101	.100	-.086	-.174	.137	.065	.216	.266	.032	1.000	
16	.365	.412	-.524	-.049	.186	.332	.272	.107	.388	.324	.257	.277	.367	-.132	.074	1.000

Extraction Method: Maximum Likelihood.

Rotation Method: Promax with Kaiser Normalization.

Appendix 7 – CFA construct validity and reliability

		CR	AVE	MSV	MaxR(H)	1	2	3	4	5	6	7	8	9	10
1	*Introjected motivation*	0.75	0.50	0.34	0.75	**0.70**									
2	*Managerial support*	0.94	0.73	0.29	0.95	0.15	**0.86**								
3	*Relatedness need satisfaction*	0.88	0.56	0.35	0.90	0.00	0.44	**0.75**							
4	*Impersonal causality orientations*	0.73	0.40	0.31	0.73	0.24	-0.19	-0.46	**0.63**						
5	*Extrinsic motivation*	0.78	0.41	0.34	0.79	0.58	0.31	0.11	0.12	**0.64**					
6	*Competence need satisfaction*	0.83	0.61	0.19	0.83	0.14	0.26	0.44	-0.39	0.01	**0.78**				
7	*Intrinsic motivation*	0.90	0.74	0.56	0.91	0.30	0.49	0.52	-0.36	0.30	0.43	**0.86**			
8	*Amotivation*	0.78	0.55	0.35	0.81	-0.17	-0.35	-0.50	0.35	0.00	-0.40	-0.47	**0.74**		
9	*Autonomy need satisfaction*	0.69	0.42	0.35	0.70	-0.10	0.51	0.59	-0.56	-0.07	0.43	0.56	-0.59	**0.65**	
10	*Intrinsic job characteristics*	0.87	0.58	0.56	0.90	0.18	0.53	0.43	-0.34	0.25	0.41	0.75	-0.48	0.52	**0.76**

Validity concerns:

- The CR for autonomy need satisfaction is less than 0.70 – but still marginally close.
- AVE values for autonomy need satisfaction, impersonal orientations, extrinsic motivation and introjected motivation are all lower than 0.5 – however, their corresponding CR values are greater than 0.7, overall indicating adequate convergent validity

Appendix 8 – Standardised regression weights (CFA)

Standardized Regression Weights

			Estimate
*job_autonomy_*	←	job_design	.849
*jpb_significance_*	←	job_design	.678
*job_identity_*	←	job_design	.593
*job_feedback_*	←	job_design	.854
*job_variety_*	←	job_design	.805
MNS_6	←	manager_support	.891
MNS_5	←	manager_support	.917
MNS_4	←	manager_support	.862
MNS_2	←	manager_support	.842
MNS_3	←	manager_support	.804
relatedness_need_3_R	←	relatedness_need_satisfaction	.805
relatedness_need_5_R	←	relatedness_need_satisfaction	.862
relatedness_need_1_R	←	relatedness_need_satisfaction	.814
relatedness_need_2	←	relatedness_need_satisfaction	.715
relatedness_need_6	←	relatedness_need_satisfaction	.564
ICO_6	←	impersonal_orientations	.641
ICO_9	←	impersonal_ orientations	.587
ICO_12	←	impersonal_ orientations	.612
ICO_7	←	impersonal_ orientations	.680
extrinsic_material_3	←	extrinsic_motivation	.588
extrinsic_social_3	←	extrinsic_ motivation	.618
extrinsic_social_1	←	extrinsic_ motivation	.669
extrinsic_material_2	←	extrinsic_ motivation	.461
extrinsic_social_2	←	extrinsic_ motivation	.763
competence_need_3	←	competence_need_satisfaction	.801
competence_need_2	←	competence_need_satisfaction	.740
competence_need_1	←	competence_need_satisfaction	.805
intrinsic_1	←	intrinsic_ motivation	.865
intrinsic_2	←	intrinsic_ motivation	.917
intrinsic_3	←	intrinsic_ motivation	.797
amotivation_3	←	amotivation_	.838
amotivation_2	←	amotivation_	.695

			Estimate
amotivation_1	←	amotivation_	.685
job_autonomy_2	←	job_autonomy_	.742
job_autonomy_3	←	job_autonomy_	.861
job_significance_2	←	jpb_significance_	.850
job_significance_1	←	jpb_significance_	.742
job_significance_3	←	jpb_significance_	.649
job_identity_3	←	job_identity_	.762
job_identity_1	←	job_identity_	.605
job_identity_2	←	job_identity_	.806
job_feedback_2	←	job_feedback_	.811
job_feedback_3	←	job_feedback_	.799
job_variety_1	←	job_variety_	.667
job_variety_2	←	job_variety_	.791
introjected_4	←	introjected_ motivation	.733
introjected_2	←	introjected_ motivation	.721
introjected_3	←	introjected_ motivation	.658
autonomy_need_2_R	←	autonomy_need_satisfaction	.644
autonomy_need_3_R	←	autonomy_need_satisfaction	.584
autonomy_need_6_R	←	autonomy_need_satisfaction	.717

Squared Multiple Correlations

	Estimate
*job_variety_*	.649
*job_feedback_*	.730
*job_identity_*	.352
*jpb_significance_*	.460
*job_autonomy_*	.720
autonomy_need_6_R	.515
autonomy_need_3_R	.341
autonomy_need_2_R	.414
introjected_3	.433
introjected_2	.520
introjected_4	.538
job_variety_2	.626
job_variety_1	.445
job_feedback_3	.638
job_feedback_2	.658
job_identity_2	.649
job_identity_1	.366
job_identity_3	.581
amotivation_1	.469
amotivation_2	.483
amotivation_3	.702
job_autonomy_3	.742
job_autonomy_2	.550
job_significance_3	.421
job_significance_1	.551
job_significance_2	.723
intrinsic_3	.635
intrinsic_2	.840
intrinsic_1	.749
competence_need_1	.647
competence_need_2	.548
competence_need_3	.642
extrinsic_social_2	**.**582
extrinsic_material_2	.212

	Estimate
extrinsic_social_1	.447
extrinsic_social_3	.381
extrinsic_material_3	.346
ICO_12	.375
ICO_7	.462
ICO_9	.344
ICO_6	.411
relatedness_need_6	.319
relatedness_need_2	.511
relatedness_need_1_R	.663
relatedness_need_5_R	.744
relatedness_need_3_R	.648
MNS_3	.647
MNS_2	.709
MNS_4	.744
MNS_5	.842
MNS_6	.794

Appendix 9 – Structural Equation Modelling

Model 1 results

SEM initial results - Regression weights and significance levels

			Estimate	S.E.	Standardised Estimate	C.R.	P
autonomy_need	←	PFP_percent	-.002	.001	-.089	-1.617	.106
competence_need	←	PFP_percent	-.003	.001	-.168	-2.748	.006
relatedness_need	←	PFP_percent	-.006	.002	-.160	-2.896	.004
autonomy_need	←	job_design	.327	.053	.336	6.143	***
competence_need	←	job_design	.193	.036	.288	5.305	***
relatedness_need	←	job_design	.204	.064	.151	3.173	.002
autonomy_need	←	manager_support	.196	.032	.286	6.147	***
competence_need	←	manager_support	.025	.021	.053	1.165	.244
relatedness_need	←	manager_support	.250	.040	.263	6.296	***
relatedness_need	←	impersonal_or	-.562	.061	-.467	-9.175	***
competence_need	←	impersonal_or	-.216	.031	-.362	-6.929	***
autonomy_need	←	impersonal_or	-.443	.048	-.510	-9.226	***
*job_autonomy_*	←	job_design	1.000		.847		
*job_significance_*	←	job_design	.811	.059	.661	13.800	***
*job_identity_*	←	job_design	.740	.063	.585	11.731	***
*job_feedback_*	←	job_design	.972	.062	.837	15.690	***
*job_variety_*	←	job_design	.923	.072	.791	12.906	***
*intrinsic_*	←	autonomy_need	-.125	.072	-.086	-1.730	.084
*introjected_*	←	autonomy_need	-1.211	.131	-.865	-9.229	***
*extrinsic_*	←	autonomy_need	-.937	.105	-.942	-8.944	***
*amotivation_*	←	autonomy_need	-.322	.102	-.282	-3.157	.002
*intrinsic_*	←	competence_need	.203	.074	.097	2.750	.006
*introjected_*	←	competence_need	.417	.103	.205	4.044	***
*extrinsic_*	←	competence_need	.026	.070	.018	.368	.713
*amotivation_*	←	competence_need	-.217	.075	-.131	-2.907	.004
*intrinsic_*	←	relatedness_need	.191	.038	.183	5.058	***
*introjected_*	←	relatedness_need	.049	.053	.049	.938	.348
*extrinsic_*	←	relatedness_need	.148	.038	.206	3.914	***
*amotivation_*	←	relatedness_need	-.218	.041	-.265	-5.368	***

			Estimate	S.E.	Standardised Estimate	C.R.	P
*intrinsic_*	←	job_design	.957	.079	.679	12.077	***
*introjected_*	←	job_design	.772	.105	.566	7.377	***
*extrinsic_*	←	job_design	.539	.077	.557	6.983	***
*intrinsic_*	←	manager_support	.066	.036	.067	1.858	.063
*introjected_*	←	manager_support	.237	.055	.247	4.291	***
*extrinsic_*	←	manager_support	.290	.041	.426	7.001	***
*amotivation_*	←	impersonal_or	-.082	.074	-.082	-1.105	.269
*amotivation_*	←	job_design	-.253	.064	-.228	-3.951	***
*amotivation_*	←	manager_support	.049	.040	.063	1.229	.219
*intrinsic_*	←	PFP_percent	.002	.002	.049	1.132	.258
*extrinsic_*	←	PFP_percent	.002	.002	.077	1.194	.233

Squared Multiple Correlations

	Estimate
autonomy_need	.700
competence_need	.293
relatedness_need	.416
*introjected_*	.412
*amotivation_*	.398
*intrinsic_*	.655
*extrinsic_*	.519

Model 2 results – including intrinsic job characteristics as a moderator

			Estimate	S.E.	Standardised Estimate	C.R.	P
autonomy_need	←	PFP_percent	-.002	.002	-.089	-1.093	.275
competence_need	←	PFP_percent	-.008	.002	-.458	-4.951	***
relatedness_need	←	PFP_percent	-.009	.003	-.264	-3.169	.002
autonomy_need	←	job_design	.330	.054	.338	6.074	***
competence_need	←	job_design	.227	.039	.340	5.863	***
relatedness_need	←	job_design	.231	.067	.171	3.472	***
autonomy_need	←	manager_support	.195	.032	.284	6.121	***
competence_need	←	manager_support	.023	.022	.048	1.025	.305
relatedness_need	←	manager_support	.248	.040	.261	6.219	***
relatedness_need	←	impersonal_or	-.560	.061	-.465	-9.133	***
competence_need	←	impersonal_or	-.217	.032	-.363	-6.817	***
autonomy_need	←	impersonal_or	-.442	.048	-.509	-9.224	***
autonomy_need	←	job_design_x_PFP	.003	.067	.003	.041	.967
competence_need	←	job_design_x_PFP	.225	.054	.383	4.143	***
relatedness_need	←	job_design_x_PFP	.170	.099	.144	1.724	.085
*job_autonomy_*	←	job_design	1.000		.847		
*job_significance_*	←	job_design	.811	.059	.661	13.802	***
*job_identity_*	←	job_design	.741	.063	.585	11.746	***
*job_feedback_*	←	job_design	.972	.062	.837	15.701	***
*job_variety_*	←	job_design	.922	.071	.790	12.900	***
*intrinsic_*	←	autonomy_need	-.124	.072	-.085	-1.722	.085
*introjected_*	←	autonomy_need	-1.207	.131	-.862	-9.230	***
*extrinsic_*	←	autonomy_need	-.934	.104	-.941	-8.954	***
*amotivation_*	←	autonomy_need	-.325	.102	-.285	-3.175	.002
*intrinsic_*	←	competence_need	.199	.074	.094	2.693	.007
*introjected_*	←	competence_need	.412	.104	.203	3.947	***
*extrinsic_*	←	competence_need	.024	.071	.016	.333	.739
*amotivation_*	←	competence_need	-.221	.075	-.133	-2.958	.003
*intrinsic_*	←	relatedness_need	.190	.038	.182	5.021	***
*introjected_*	←	relatedness_need	.047	.053	.046	.885	.376
*extrinsic_*	←	relatedness_need	.146	.038	.204	3.883	***
*amotivation_*	←	relatedness_need	-.219	.041	-.266	-5.389	***
*intrinsic_*	←	job_design	.960	.079	.681	12.104	***
*introjected_*	←	job_design	.775	.105	.568	7.393	***

			Estimate	S.E.	Standardised Estimate	C.R.	P
*extrinsic_*	←	job_design	.539	.077	.557	6.978	***
*intrinsic_*	←	manager_support	.066	.036	.066	1.845	.065
*introjected_*	←	manager_support	.236	.055	.246	4.276	***
*extrinsic_*	←	manager_support	.290	.041	.426	7.002	***
*amotivation_*	←	impersonal_or	-.085	.074	-.086	-1.150	.250
*amotivation_*	←	job_design	-.250	.064	-.225	-3.892	***
*amotivation_*	←	manager_support	.049	.040	.063	1.228	.219
*intrinsic_*	←	PFP_percent	.002	.002	.048	1.095	.274
*extrinsic_*	←	PFP_percent	.002	.002	.077	1.186	.236

	Estimate
autonomy_need	.700
competence_need	.344
relatedness_need	.420
*introjected_*	.411
*amotivation_*	.398
*intrinsic_*	.656
*extrinsic_*	.518

Model 3 – managerial need support

			Estimate	S.E.	Standardised Estimate	C.R.	P
autonomy_need	←	PFP_percent	-.002	.002	-.069	-.800	.423
competence_need	←	PFP_percent	-.007	.002	-.409	-4.108	***
relatedness_need	←	PFP_percent	-.008	.003	-.242	-2.689	.007
autonomy_need	←	job_design	.327	.053	.336	6.141	***
competence_need	←	job_design	.190	.037	.284	5.173	***
relatedness_need	←	job_design	.200	.064	.149	3.115	.002
autonomy_need	←	manager_support	.193	.034	.281	5.651	***
competence_need	←	manager_support	.054	.024	.115	2.277	.023
relatedness_need	←	manager_support	.271	.044	.286	6.189	***
relatedness_need	←	impersonal_or	-.558	.061	-.464	-9.123	***
competence_need	←	impersonal_or	-.213	.031	-.356	-6.780	***
autonomy_need	←	impersonal_or	-.443	.048	-.510	-9.227	***
autonomy_need	←	manager_x_PFP	-.026	.090	-.025	-.288	.773
competence_need	←	manager_x_PFP	.222	.073	.305	3.028	.002
relatedness_need	←	manager_x_PFP	.156	.134	.107	1.166	.243
*job_autonomy_*	←	job_design	1.000		.847		
*job_significance_*	←	job_design	.811	.059	.661	13.804	***
*job_identity_*	←	job_design	.740	.063	.585	11.737	***
*job_feedback_*	←	job_design	.971	.062	.837	15.689	***
*job_variety_*	←	job_design	.923	.071	.791	12.907	***
*intrinsic_*	←	autonomy_need	-.123	.072	-.085	-1.713	.087
*introjected_*	←	autonomy_need	-1.206	.131	-.861	-9.235	***
*extrinsic_*	←	autonomy_need	-.933	.104	-.940	-8.957	***
*amotivation_*	←	autonomy_need	-.323	.102	-.283	-3.165	.002
*intrinsic_*	←	competence_need	.200	.074	.095	2.711	.007
*introjected_*	←	competence_need	.410	.104	.202	3.961	***
*extrinsic_*	←	competence_need	.021	.071	.015	.302	.763
*amotivation_*	←	competence_need	-.217	.075	-.131	-2.909	.004
*intrinsic_*	←	relatedness_need	.191	.038	.183	5.050	***
*introjected_*	←	relatedness_need	.048	.053	.047	.907	.365
*extrinsic_*	←	relatedness_need	.147	.038	.204	3.895	***
*amotivation_*	←	relatedness_need	-.218	.041	-.265	-5.373	***
*intrinsic_*	←	job_design	.957	.079	.679	12.083	***
*introjected_*	←	job_design	.772	.105	.566	7.383	***

			Estimate	S.E.	Standardised Estimate	C.R.	P
*extrinsic_*	←	job_design	.539	.077	.558	6.991	***
*intrinsic_*	←	manager_support	.066	.036	.067	1.850	.064
*introjected_*	←	manager_support	.236	.055	.246	4.287	***
*extrinsic_*	←	manager_support	.290	.041	.426	6.992	***
*amotivation_*	←	impersonal_or	-.082	.074	-.083	-1.112	.266
*amotivation_*	←	job_design	-.253	.064	-.228	-3.942	***
*amotivation_*	←	manager_support	.049	.040	.063	1.234	.217
*intrinsic_*	←	PFP_percent	.002	.002	.049	1.118	.263
*extrinsic_*	←	PFP_percent	.002	.002	.077	1.189	.234

Squared Multiple Correlations

	Estimate
autonomy_need	.700
competence_need	.322
relatedness_need	.418
*introjected_*	.411
*amotivation_*	.398
*intrinsic_*	.655
*extrinsic_*	.518

Model 4 – impersonal causality orientations

			Estimate	S.E.	Standardised Estimate	C.R.	P
autonomy_need	←	PFP_percent	-.006	.002	-.248	-2.597	.009
competence_need	←	PFP_percent	-.009	.002	-.522	-4.755	***
relatedness_need	←	PFP_percent	-.012	.003	-.353	-3.566	***
autonomy_need	←	job_design	.323	.053	.334	6.050	***
competence_need	←	job_design	.189	.037	.283	5.079	***
relatedness_need	←	job_design	.196	.065	.146	3.016	.003
autonomy_need	←	manager_support	.193	.032	.283	6.013	***
competence_need	←	manager_support	.021	.022	.044	.937	.349
relatedness_need	←	manager_support	.245	.040	.259	6.100	***
relatedness_need	←	impersonal_or	-.602	.066	-.502	-9.167	***
competence_need	←	impersonal_or	-.250	.034	-.421	-7.293	***
autonomy_need	←	impersonal_or	-.463	.051	-.539	-9.098	***
autonomy_need	←	ICO_x_PFP	-.149	.069	-.200	-2.177	.029
competence_need	←	ICO_x_PFP	-.224	.056	-.432	-3.978	***
relatedness_need	←	ICO_x_PFP	-.250	.102	-.240	-2.451	.014
*job_autonomy_*	←	job_design	1.000		.848		
*job_significance_*	←	job_design	.810	.059	.661	13.814	***
*job_identity_*	←	job_design	.739	.063	.585	11.743	***
*job_feedback_*	←	job_design	.971	.062	.837	15.716	***
*job_variety_*	←	job_design	.922	.071	.791	12.916	***
*intrinsic_*	←	autonomy_need	-.134	.074	-.092	-1.824	.068
*introjected_*	←	autonomy_need	-1.247	.135	-.887	-9.238	***
*extrinsic_*	←	autonomy_need	-.961	.108	-.961	-8.910	***
*amotivation_*	←	autonomy_need	-.316	.102	-.275	-3.104	.002
*intrinsic_*	←	competence_need	.211	.075	.100	2.831	.005
*introjected_*	←	competence_need	.450	.106	.221	4.248	***
*extrinsic_*	←	competence_need	.050	.072	.035	.694	.488
*amotivation_*	←	competence_need	-.209	.074	-.126	-2.816	.005
*intrinsic_*	←	relatedness_need	.194	.038	.186	5.089	***
*introjected_*	←	relatedness_need	.059	.053	.058	1.097	.272
*extrinsic_*	←	relatedness_need	.155	.038	.215	4.026	***
*amotivation_*	←	relatedness_need	-.217	.041	-.263	-5.353	***
*intrinsic_*	←	job_design	.956	.079	.679	12.142	***
*introjected_*	←	job_design	.773	.105	.569	7.380	***

			Estimate	S.E.	Standardised Estimate	C.R.	P
*extrinsic_*	←	job_design	.537	.077	.556	6.959	***
*intrinsic_*	←	manager_support	.068	.036	.068	1.896	.058
*introjected_*	←	manager_support	.241	.056	.252	4.334	***
*extrinsic_*	←	manager_support	.294	.042	.431	7.005	***
*amotivation_*	←	impersonal_or	-.075	.071	-.076	-1.054	.292
*amotivation_*	←	job_design	-.257	.063	-.231	-4.064	***
*amotivation_*	←	manager_support	.048	.040	.061	1.195	.232
*intrinsic_*	←	PFP_percent	.002	.002	.048	1.090	.276
*extrinsic_*	←	PFP_percent	.002	.002	.079	1.206	.228

Squared Multiple Correlations

	Estimate
autonomy_need	.711
competence_need	.335
relatedness_need	.427
*introjected_*	.420
*amotivation_*	.398
*intrinsic_*	.655
*extrinsic_*	.523

Model 5 – including all 3 moderators

			Estimate	S.E.	Standardised Estimate	C.R.	P
autonomy_need	←	PFP_percent	-.005	.002	-.194	-1.969	.049
competence_need	←	PFP_percent	-.010	.002	-.560	-4.952	***
relatedness_need	←	PFP_percent	-.012	.004	-.342	-3.336	***
autonomy_need	←	job_design	.315	.057	.325	5.522	***
competence_need	←	job_design	.213	.041	.319	5.236	***
relatedness_need	←	job_design	.208	.071	.155	2.931	.003
autonomy_need	←	manager_support	.163	.037	.240	4.357	***
competence_need	←	manager_support	.015	.027	.031	.530	.596
relatedness_need	←	manager_support	.224	.050	.236	4.480	***
autonomy_need	←	impersonal_or	-.491	.055	-.572	-8.970	***
competence_need	←	impersonal_or	-.242	.036	-.408	-6.799	***
relatedness_need	←	impersonal_or	-.611	.069	-.511	-8.870	***
autonomy_need	←	ICO_x_PFP	-.300	.094	-.401	-3.200	.001
competence_need	←	ICO_x_PFP	-.152	.075	-.293	-2.011	.044
relatedness_need	←	ICO_x_PFP	-.282	.140	-.270	-2.011	.044
autonomy_need	←	job_design_x_PFP	-.087	.100	-.102	-.865	.387
competence_need	←	job_design_x_PFP	.152	.083	.259	1.837	.066
relatedness_need	←	job_design_x_PFP	.064	.153	.054	.422	.673
autonomy_need	←	manager_x_PFP	-.196	.132	-.186	-1.483	.138
competence_need	←	manager_x_PFP	-.043	.109	-.060	-.399	.690
relatedness_need	←	manager_x_PFP	-.148	.202	-.101	-.730	.465
*job_autonomy_*	←	job_design	1.000		.847		
*job_significance_*	←	job_design	.811	.059	.661	13.800	***
*job_identity_*	←	job_design	.740	.063	.585	11.738	***
*job_feedback_*	←	job_design	.975	.062	.839	15.733	***
*job_variety_*	←	job_design	.922	.072	.790	12.900	***
*intrinsic_*	←	autonomy_need	-.133	.074	-.092	-1.812	.070
*introjected_*	←	autonomy_need	-1.257	.136	-.893	-9.275	***
*extrinsic_*	←	autonomy_need	-.965	.108	-.966	-8.922	***
*amotivation_*	←	autonomy_need	-.306	.101	-.266	-3.028	.002
*intrinsic_*	←	competence_need	.206	.074	.098	2.766	.006
*introjected_*	←	competence_need	.439	.106	.216	4.133	***
*extrinsic_*	←	competence_need	.042	.073	.029	.572	.567
*amotivation_*	←	competence_need	-.216	.075	-.130	-2.893	.004

			Estimate	S.E.	Standardised Estimate	C.R.	P
*intrinsic_*	←	relatedness_need	.194	.038	.186	5.070	***
*introjected_*	←	relatedness_need	.064	.054	.063	1.184	.236
*extrinsic_*	←	relatedness_need	.158	.039	.220	4.068	***
*amotivation_*	←	relatedness_need	-.216	.041	-.262	-5.332	***
*intrinsic_*	←	job_design	.960	.079	.681	12.153	***
*introjected_*	←	job_design	.783	.105	.575	7.426	***
*extrinsic_*	←	job_design	.542	.078	.561	6.977	***
*intrinsic_*	←	manager_support	.067	.036	.068	1.878	.060
*introjected_*	←	manager_support	.240	.056	.251	4.315	***
*extrinsic_*	←	manager_support	.293	.042	.431	6.994	***
*amotivation_*	←	impersonal_or	-.069	.071	-.070	-.977	.329
*amotivation_*	←	job_design	-.254	.063	-.228	-4.005	***
*amotivation_*	←	manager_support	.044	.040	.056	1.102	.271
*intrinsic_*	←	PFP_percent	.002	.002	.048	1.080	.280
*extrinsic_*	←	PFP_percent	.002	.002	.079	1.213	.225

Squared Multiple Correlations

	Estimate
autonomy_need	.728
competence_need	.352
relatedness_need	.430
*introjected_*	.424
*amotivation_*	.396
*intrinsic_*	.656
*extrinsic_*	.525

Model 6 – including control factors

			Estimate	S.E.	Standardised Estimate	C.R.	P
autonomy_need	←	PFP_percent	-.005	.003	-.199	-1.947	.052
competence_need	←	PFP_percent	-.010	.002	-.610	-5.004	***
relatedness_need	←	PFP_percent	-.012	.004	-.348	-3.120	.002
autonomy_need	←	job_design	.379	.065	.381	5.795	***
competence_need	←	job_design	.233	.045	.348	5.153	***
relatedness_need	←	job_design	.224	.079	.166	2.842	.004
autonomy_need	←	manager_support	.149	.040	.212	3.761	***
competence_need	←	manager_support	.020	.028	.043	.713	.476
relatedness_need	←	manager_support	.232	.052	.244	4.455	***
relatedness_need	←	impersonal_or	-.647	.070	-.555	-9.270	***
competence_need	←	impersonal_or	-.245	.036	-.422	-6.856	***
autonomy_need	←	impersonal_or	-.491	.055	-.568	-8.898	***
autonomy_need	←	ICO_x_PFP	-.272	.098	-.354	-2.783	.005
competence_need	←	ICO_x_PFP	-.149	.081	-.289	-1.833	.067
relatedness_need	←	ICO_x_PFP	-.237	.152	-.229	-1.562	.118
autonomy_need	←	job_design_x_PFP	-.120	.100	-.138	-1.206	.228
competence_need	←	job_design_x_PFP	.155	.084	.265	1.845	.065
relatedness_need	←	job_design_x_PFP	.018	.157	.016	.117	.907
relatedness_need	←	manager_x_PFP	-.069	.220	-.047	-.312	.755
competence_need	←	manager_x_PFP	-.038	.117	-.052	-.321	.748
autonomy_need	←	manager_x_PFP	-.133	.138	-.122	-.965	.334
autonomy_need	←	base_pay_average	.000	.000	-.012	-.234	.815
competence_need	←	base_pay_average	.000	.000	-.063	-1.214	.225
relatedness_need	←	base_pay_average	.000	.000	-.054	-1.169	.242
autonomy_need	←	gender	.221	.095	.105	2.319	.020
competence_need	←	gender	-.069	.065	-.049	-1.066	.286
relatedness_need	←	gender	.275	.117	.097	2.353	.019
autonomy_need	←	Age_control	.054	.041	.070	1.311	.190
competence_need	←	Age_control	-.051	.028	-.099	-1.833	.067
relatedness_need	←	Age_control	-.044	.050	-.042	-.874	.382
autonomy_need	←	Education_control	.000	.059	.000	-.001	.999
competence_need	←	Education_control	.002	.040	.002	.042	.967
relatedness_need	←	Education_control	.027	.071	.015	.383	.701
relatedness_need	←	Panel_control	.032	.118	.011	.276	.782

			Estimate	S.E.	Standardised Estimate	C.R.	P
competence_need	←	Panel_control	.077	.066	.054	1.166	.244
autonomy_need	←	Panel_control	.247	.097	.117	2.532	.011
relatedness_need	←	Job_level_control	.067	.115	.022	.580	.562
competence_need	←	Job_level_control	.080	.064	.053	1.245	.213
autonomy_need	←	Job_level_control	.075	.096	.033	.784	.433
relatedness_need	←	Job_tenure	.020	.010	.080	2.113	.035
competence_need	←	Job_tenure	.023	.005	.179	4.188	***
autonomy_need	←	Job_tenure	.000	.008	.002	.036	.971
relatedness_need	←	Public_private_sector	-.134	.107	-.046	-1.252	.211
competence_need	←	Public_private_sector	.062	.060	.044	1.046	.296
autonomy_need	←	Public_private_sector	.271	.089	.127	3.035	.002
relatedness_need	←	PFP_frequency_control	-.114	.099	-.069	-1.150	.250
competence_need	←	PFP_frequency_control	-.037	.054	-.045	-.685	.493
autonomy_need	←	PFP_frequency_control	-.376	.076	-.307	-4.919	***
relatedness_need	←	Part_time_full_time_	-.256	.149	-.091	-1.722	.085
competence_need	←	Part_time_full_time_	-.119	.082	-.085	-1.450	.147
autonomy_need	←	Part_time_full_time_	-.115	.115	-.055	-.996	.319
*job_autonomy_*	←	job_design	1.000		.847		
*job_significance_*	←	job_design	.822	.058	.670	14.055	***
*job_identity_*	←	job_design	.714	.062	.567	11.500	***
*job_feedback_*	←	job_design	.948	.061	.815	15.555	***
*job_variety_*	←	job_design	.964	.072	.828	13.489	***
*intrinsic_*	←	autonomy_need	-.173	.076	-.123	-2.271	.023
*introjected_*	←	autonomy_need	-1.338	.142	-.994	-9.387	***
*extrinsic_*	←	autonomy_need	-1.081	.122	-1.092	-8.872	***
*amotivation_*	←	autonomy_need	-.245	.101	-.218	-2.424	.015
*intrinsic_*	←	competence_need	.259	.078	.123	3.316	***
*introjected_*	←	competence_need	.534	.112	.266	4.773	***
*extrinsic_*	←	competence_need	.145	.082	.098	1.762	.078
*amotivation_*	←	competence_need	-.224	.077	-.134	-2.910	.004
*intrinsic_*	←	relatedness_need	.194	.040	.186	4.900	***
*introjected_*	←	relatedness_need	.077	.056	.077	1.378	.168
*extrinsic_*	←	relatedness_need	.200	.044	.272	4.564	***
*amotivation_*	←	relatedness_need	-.190	.042	-.228	-4.507	***
*intrinsic_*	←	job_design	1.013	.088	.722	11.461	***
*introjected_*	←	job_design	.889	.124	.663	7.184	***

			Estimate	S.E.	Standardised Estimate	C.R.	P
*extrinsic_*	←	job_design	.627	.098	.635	6.386	***
*intrinsic_*	←	manager_support	.055	.037	.056	1.468	.142
*introjected_*	←	manager_support	.216	.060	.229	3.617	***
*extrinsic_*	←	manager_support	.271	.048	.389	5.641	***
*amotivation_*	←	impersonal_or	-.001	.076	-.001	-.013	.990
*amotivation_*	←	job_design	-.304	.072	-.271	-4.236	***
*amotivation_*	←	manager_support	.032	.039	.040	.818	.413
*intrinsic_*	←	PFP_percent	.001	.002	.022	.457	.647
*extrinsic_*	←	PFP_percent	.001	.002	.025	.371	.711
*intrinsic_*	←	base_pay_average	.000	.000	.067	1.864	.062
*introjected_*	←	base_pay_average	.000	.000	.020	.337	.736
*extrinsic_*	←	base_pay_average	.000	.000	-.037	-.580	.562
*amotivation_*	←	base_pay_average	.000	.000	-.001	-.012	.991
*intrinsic_*	←	gender	.045	.098	.015	.466	.641
*introjected_*	←	gender	.758	.148	.269	5.105	***
*extrinsic_*	←	gender	.282	.119	.136	2.371	.018
*amotivation_*	←	gender	-.109	.095	-.046	-1.154	.248
*intrinsic_*	←	Age_control	.121	.043	.111	2.832	.005
*introjected_*	←	Age_control	.296	.068	.286	4.335	***
*extrinsic_*	←	Age_control	.111	.052	.146	2.123	.034
*amotivation_*	←	Age_control	-.062	.041	-.072	-1.530	.126
*intrinsic_*	←	Education_control	.005	.060	.003	.079	.937
*introjected_*	←	Education_control	-.159	.094	-.089	-1.686	.092
*extrinsic_*	←	Education_control	-.117	.073	-.088	-1.591	.112
*amotivation_*	←	Education_control	.079	.056	.053	1.417	.157
*intrinsic_*	←	Panel_control	.167	.101	.056	1.657	.098
*introjected_*	←	Panel_control	.565	.163	.199	3.477	***
*extrinsic_*	←	Panel_control	.345	.125	.165	2.759	.006
*amotivation_*	←	Panel_control	.183	.097	.077	1.883	.060
*amotivation_*	←	Job_level_control	-.099	.096	-.039	-1.031	.303
*extrinsic_*	←	Job_level_control	-.339	.124	-.152	-2.731	.006
*introjected_*	←	Job_level_control	-.156	.160	-.051	-.978	.328
*intrinsic_*	←	Job_level_control	.145	.100	.046	1.457	.145
*amotivation_*	←	Job_tenure	.012	.008	.057	1.512	.131
*extrinsic_*	←	Job_tenure	-.031	.011	-.164	-2.907	.004
*introjected_*	←	Job_tenure	-.024	.014	-.096	-1.802	.071

			Estimate	S.E.	Standardised Estimate	C.R.	P
*intrinsic_*	←	Job_tenure	-.029	.009	-.108	-3.366	***
*amotivation_*	←	Public_private_sector	.110	.091	.046	1.210	.226
*extrinsic_*	←	Public_private_sector	.450	.119	.213	3.784	***
*introjected_*	←	Public_private_sector	.604	.153	.210	3.955	***
*intrinsic_*	←	Public_private_sector	-.013	.095	-.004	-.138	.890
*amotivation_*	←	PFP_frequency_control	.012	.078	.009	.154	.877
*extrinsic_*	←	PFP_frequency_control	-.677	.097	-.558	-7.009	***
*introjected_*	←	PFP_frequency_control	-.696	.121	-.423	-5.763	***
*intrinsic_*	←	PFP_frequency_control	-.321	.079	-.186	-4.043	***
*amotivation_*	←	Part_time_full_time_	.108	.102	.046	1.065	.287
*extrinsic_*	←	Part_time_full_time_	.331	.136	.161	2.440	.015
*introjected_*	←	Part_time_full_time_	.183	.170	.065	1.074	.283
*intrinsic_*	←	Part_time_full_time_	-.080	.110	-.027	-.732	.464

Squared Multiple Correlations

	Estimate
autonomy_need	.760
competence_need	.395
relatedness_need	.464
*introjected_*	.552
*amotivation_*	.418
*intrinsic_*	.690
*extrinsic_*	.696