

A Work Project, presented as part of the requirements for the Award of a Master's degree in Economics/ Finance/Management from the Nova School of Business and Economics.

RELATIONAL COORDINATION AS A PREDICTOR OF ORGANISATIONAL
QUALITY AND EFFICIENCY OUTCOMES AND THE MEDIATING ROLE OF WORK
ENGAGEMENT AND JOB SATISFACTION: A HEALTHCARE DATA ANALYSIS

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Abstract

The purpose of this study is to investigate the impact of relational coordination on different organisational performance outcomes (perceived and objective) through an analysis of the mediating role of work engagement and job satisfaction. The study utilizes data gathered by Albuquerque (2017) in a large Portuguese hospital and tests the validity of two serial mediation models. Using bootstrapping, the results reveal that relational coordination is positively associated with perceived performance. Work engagement and job satisfaction partially mediate this relationship. Contrary, relational coordination was negatively associated with objective efficiency, and the chain mediation effect of work engagement and job satisfaction was not significant.

Keywords: Relational coordination; organisational performance; work engagement; job satisfaction; healthcare

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1. Introduction

Healthcare providers are facing a well-known dilemma: They are challenged to continuously improve their service quality and, simultaneously, reduce costs. This requires organisations to constantly focus on satisfying the needs of all people involved in the care process, while also increasing efficiency. To achieve these goals, it is important for healthcare providers to establish, *inter alia*, a work environment that enables effectful collaboration. Gittell (2011) suggests that relational coordination (hereafter referred to as RC) can overcome the tradeoff between quality and efficiency by enabling organisations to achieve better outcomes for customers, while also utilizing resources less wastefully and more productively. According to the author, RC ‘occurs through frequent, high-quality communication, supported by relationships of shared goals, shared knowledge, and mutual respect’ (Gittell 2011: 3).

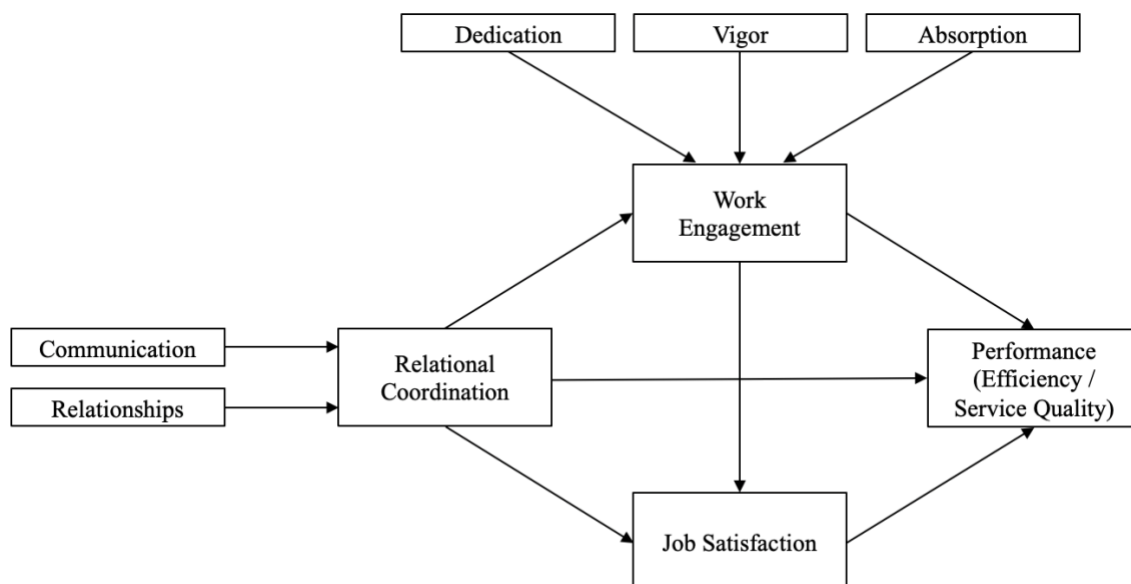
This paper explores the relationship between relational coordination and organisational outcomes in healthcare. We differentiate between perceived performance (service quality) and objective performance (efficiency) and analyze the impact of RC on performance outcomes through its relationships with work engagement (hereafter referred to as WE) and job satisfaction (hereafter referred to as JS). Several studies have already suggested the positive impact of RC on performance, WE and JS, mainly using simple regression-based analysis to explain theory. However, in order to better understand the dynamics of communication and relationships at work, there is a need for more complex models that expand the target variables and include indirect effects. Hence, we use serial mediation models, investigating whether WE and JS can explain the relationship between RC and performance outcomes. Thus, this study contributes to existing literature by shining a light on underlying processes through which RC may be related to organisational performance outcomes in healthcare. Results of this research will allow healthcare providers to better understand the complex interactions between different

factors that influence efficiency measures and service quality. The paper starts with a literature review on the before mentioned variables and their interrelationships and provides a theoretical framework. Thereafter, we develop hypotheses to be tested. We describe the methodology and present our results, which we will discuss, challenge and conclude in the last part of this paper.

2. Literature Review

The theoretical framework guiding this research paper integrates Gittel's (2006) concept of RC with Schaufeli and Bakker's (2004) model of WE. Figure 1 visualizes this framework, proposing that RC is associated with WE and JS, which results in both efficiency and service quality. Hence, WE and JS are conceptualized as the channel through which RC predicts performance. All variables and interrelationships will be explained in greater detail in the following sections, focusing on reviewing the literature regarding healthcare.

Figure 1: Theoretical framework



2.1 Relational Coordination

The theory of RC was mainly developed by Jody Gittell (2001) and first tested in the airline industry. The concept claims that the communication among professionals and the nature of their relationships determine the effectiveness of their coordination at work. Gittell (2002a: 301) has defined relational coordination as ‘a mutually, reinforcing process of interaction between communication and relationships carried out for task integration’. Frequent, accurate timely, problem-solving communication and relationships defined by shared knowledge, mutual respect and shared goals are the linchpins of the RC concept (Gittell 2009). Aiming at creating an ecosystem for high performance, RC can be developed at the micro level between individual professionals, at the meso level between job roles or categories, and lastly, at the macro level between entire departments or organisations. In literature, strong RC amongst co-workers who serve the same client has been associated with performance in regard to a range of beneficial organisational outcomes, including efficiency and enhanced financial outcomes, innovation, work quality, safety, and employee wellbeing like work satisfaction and engagement (Gittell 2009).

RC can be particularly useful to organisational systems facing highly interdependent, time constrained and uncertain settings. Hence, it has been studied and applied in healthcare, where diverse functional groups cooperate interdependently in order to optimize care outcomes (Gittell 2006; Gittell et al. 2000, 2008; Hartgerink et al. 2014; Havens et al. 2010; Lamontagne 2014; Lee 2013). Accordingly, Gittell et al. (2009) found that RC among doctors, nurses, social workers and physical therapists predicted both efficiency and quality outcomes for hospitalized patients. Cramm & Nieboer (2012) also highlighted the importance of RC among core medical professionals from multiple disciplines, with RC improving chronic illness care delivery. Besides, Hustoft et al. (2018) assessed RC scores among interprofessional teams and found

them to predict rehabilitation outcomes. In a further study of 15 nursing home facilities, patients' quality of life and nurse aide satisfaction were positively correlated to RC (Gittell et al. 2008). Havens, et al. (2010) examined RC and linked the concept to adverse patient outcomes like medication errors or hospital-acquired infections, showing a negative association. Concluding, a proliferation of literature supports Gittell's (2011) suggestion, stating that RC can overcome the trade-off between service quality and efficiency that is typically found in hospitals.

Additionally, Gittell (2008) proposes that RC may improve job satisfaction because of the framework's instrumental benefit 'in form of organisational social capital, an asset that makes it easier to access resources needed to accomplish one's work' (Gittell 2008:156). The literature in organisational psychology has declared high-quality relationships, which are promoted by shared goals, mutual respect and shared knowledge, to be a source of well-being at the workplace (Dutton & Heaphy 2003; Dutton & Ragins 2007). This is because high-quality connections promote awareness and attunement towards the needs of others, so individuals may feel more recognized and validated by their coworkers (Gittell 2008). In a cross-sectional study of 15 Massachusetts nursing homes, Gittell et al. (2008) found support for these propositions; RC among nurses and nurse aids accounted for 31 per cent of the variation in employee job satisfaction. RC significantly improved JS by providing social support, which enabled resilience in the face of pressure or stress and enabled coworkers to effectively carry out their work (Gittell 2008; Gittell et al. 2008). Another study measuring RC among nurses was conducted by Havens et al. (2018) in five acute care community hospitals and concluded that RC was significantly and positively associated with increased job satisfaction, reduced burnout and increased work engagement.

There is more literature that has linked positive relationships between coworkers to work engagement. WE captures the level of energy and mental resilience that people experience while working, which can be influenced by the quality of their relational context. For nurses and medical managers, workgroup cohesion enhanced WE, while non-cohesive teams showed to be less engaged (Gittell et al. 2013; Laschinger 2012; Laschinger et al. 2010; Warshawsky et al. 2012). Using data from two maternity hospitals, Freeney and Fellenz (2013) revealed the positive impact of relational resources on WE. This finds support in a study done by West & Dawson (2012), who suggested the use of teamwork and appraisal as predictors for WE. In their large study with British medical professionals, participants who were working in well-structured teams showed the highest WE.

To sum up, the bottom line of a positive relational context is that it may enable healthcare professionals to achieve quality outcomes more efficiently and increase their wellbeing and engagement, while connecting across different job categories and departments in order to foster innovation and learning.

2.2 Work Engagement

Schaufeli et al. (2002) refer to work engagement as a positive, pervasive, work-related state of fulfillment, which is characterized by three factors, namely vigor, dedication and absorption. The first component vigor captures one's high energy levels and mental resilience at work, including the willingness to persistently invest effort even in difficult circumstances. The second component dedication is related to the involvement in one's work and the feeling of significance, pride, enthusiasm and inspiration. Thirdly, absorption is characterized by a satisfied state of complete concentration in which it may be difficult to detach oneself from work (Schaufeli et al. 2006).

According to Schaufeli and Bakker (2004), work engagement issues from job resources like feedback or support, which catalyzes increased job satisfaction and lower turnover rates. Harter et al. (2002) came to the same result, arguing that WE was significantly and positively correlated to JS. However, the relationship between WE and JS has been controversial in recent studies. Alzyoud (2018) demonstrated that academics who were satisfied with their work were also more engaged in what they did, suggesting an opposite direction of the relationship. This finding was confirmed by other empirical studies regarding WE and JS (Lu et al. 2016; Torres 2014).

With regards to studies in healthcare, there is finite research that utilizes Schaufeli and Bakker's (2004) concept of WE. However, Simpson (2009) found WE to be significantly and positively correlated to JS in a study with surgical nurses. In their paper, 46% of the variability in nurses' WE could be explained through their interaction at work, satisfaction with their work-related status, and with their intention of quitting their job. Giallonardo et al. (2010) revealed that WE positively predicted JS in new graduate nurses. In that same manner, Keyko et al. (2016) also investigated WE in nursing practice and showed a positive impact on both, nurses' personal outcomes (including high job satisfaction) and their performance in terms of work efficiency, care quality and patient satisfaction. Therefore, we expect that in a hospital setting, Schaufeli and Bakker's (2004) concept can be applied, and WE may enhance JS.

Moreover, a significant body of research revealed that engaged employees have stronger tendencies to go beyond their usual work effort, which has a positive impact on multiple performance contexts (Laschinger & Leiter 2006; Rich et al. 2010; Rothmann & Jordaan 2006). In fact, Macey and Schneider (2008) have argued that any company wishing to win through competition should ensure that every of their employee is engaged. For example, in a study conducted in the fast-food industry, Xanthopoulou et al. (2009) found a significant and positive

influence of WE on financial returns. With regards to studies in healthcare, West & Dawson (2012) concluded that more engaged healthcare workers were associated with a more efficient use of resources, a more successful financial performance and lower patient mortality. In their review of empirical research on WE in nursing, García-Sierra et al. (2016) also argued that the quality of care performed by nurses improved through engagement. Accordingly, Collins (2015) came to the conclusion that professionals who report higher levels of engagement also delivered better healthcare, validating our theoretical framework. This goes hand in hand with Prins et al.'s (2010) findings that revealed a decrease in mistake likelihood among more engaged doctors.

2.3 Job Satisfaction

Literature has referred to JS in several different ways: While Locke (1976: 1300) defined it as 'a pleasurable emotional state that stems from the appraisal of the experiences on the job', Liu et al. (2016: 89) described JS in their concept analysis as 'the fulfillment of desired needs within the work settings, happiness or gratifying emotional responses towards working conditions, and job value or equity'. In a simple manner, JS can be defined as the extent to which professionals like their work (Stamps 1997).

The relationship between JS and organisational performance has been disputed by scholars. Some researchers argue that JS directly provides for organisational performance (Evans & Jack 2003; Harter et al. 2002; Ostroff 1992), while others believe in the inverse of the relationship (Cole & Cole 2005; Schneider et al. 2003). Bakotić (2016) has explored the direction of this link in 40 Croatian companies from different industries and found that the impact of JS on organisational performance was stronger than vice versa. The author further argued that it was

rather individual than organisational success that directly benefited or rewarded a particular worker, which may caused JS.

The concept of JS has been continuously addressed in hospital research. Numerous researchers have highlighted the positive relationship between nurses' JS and patient satisfaction (Ferrara et al. 2013; Mrayyan 2006; Tzeng et al. 2002), an indicator we will also use amongst others to determine service quality. Nikic et al. (2008) stated that JS of healthcare professionals had a strong impact on effectiveness, quality and work efficiency. Furthermore, a study of 923 nurses working in several mental health hospitals in Saudi Arabia concluded that nurse job satisfaction and organisational commitment predicted job performance (Al-ahmadi 2009).

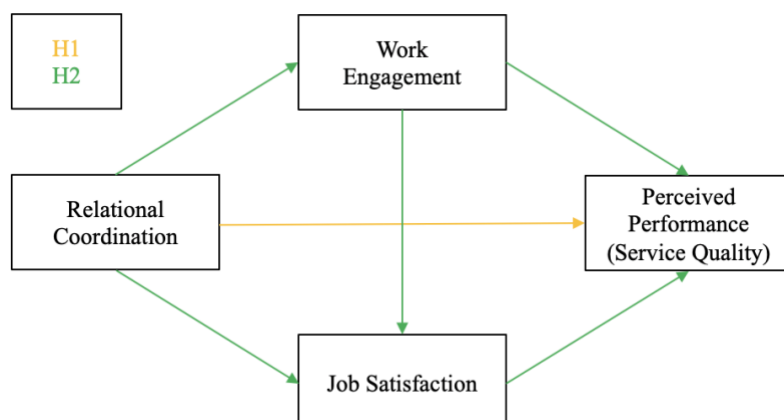
3. Hypothesis Development

Based on the theoretical associations between the reviewed concepts and with regards to the findings of previous papers, we hypothesized two serial mediation models. Preacher and Hayes (2008) have suggested the use of multiple mediation when a hypothesis involves two or more potential mediators. In the first model, we examine the relationship of RC and perceived performance, further testing whether WE and JS mediate this relationship. In the second model, we exchanged the perceived performance variable for objective performance. We hypothesized a positive relationship between RC and objective performance, which we want to explain using the mediators WE and JS.

3.1 Model 1

Figure 2 shows a graphical illustration of model 1, which involves perceived performance as the endogen variable and includes hypothesis 1 and 2.

Figure 2: Hypothesized serial mediation model 1



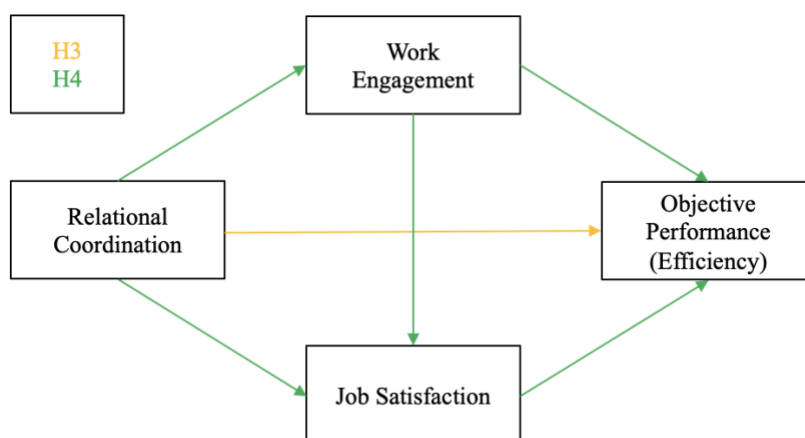
Hypothesis 1: Relational coordination is positively associated with perceived organisational performance.

Hypothesis 2: Work engagement and job satisfaction mediate the relationship between relational coordination and perceived organisational performance.

3.2 Model 2

Figure 3 presents model 2 and consists of hypothesis 3 and 4, which test the relationship of RC and the mediation role of WE and JS to the efficiency measure objective performance.

Figure 3: Hypothesized serial mediation model 2



Hypothesis 3: Relational coordination is positively associated with objective organisational performance.

Hypothesis 4: Work engagement and job satisfaction mediate the relationship between relational coordination and objective organisational performance.

4. Methodology

For our analysis, we use the Statistical Package for the Social Sciences (SPSS) software, version 27.0, and expand its functionality using Hayes' PROCESS macro (version 3.5). Further, we use the programming language Python 3, create a data frame using Pandas and involve a combination of different libraries like NumPy, Matplotlib, FactorAnalyzer and functionalities for translating the data to English.

4.1 Sample and data collection

The study utilizes data gathered by Albuquerque (2017) in a large public Portuguese hospital. The researcher of this study had the benefit of a network in that she was permitted access to the data. Albuquerque (2017) collected the data from April to June 2016, surveying professionals (doctors, nurses, administrative staff, operational assistants, health diagnostics technologists and senior health technicians) from twenty different services within the hospital, reaching an amount of 395 valid questionnaires. The data was gathered in the Portuguese language, so we translated it to English by implementing the Google Translate API via Googletrans.

Table 1 shows the sample distribution by socio-demographic characteristics. The large majority of the participants was female (73.7 percent). 67 percent of all questionnaires were returned by doctors or nurses and the age of participants ranged from 23 to 68 years. Further, 83.3 percent of the participants had at least an undergraduate university degree.

Table 1: Socio-demographic characteristics of the sample (n = 395)

<i>Demographic</i>		<i>Frequency</i>	<i>Percent</i>
Gender	Male	99	25.1
	Female	291	73.7
	Missing	5	1.3
Job category	Doctor	125	31.6
	Nurse	140	35.4
	Operational Assistant	30	7.6
	Senior Health Technician	12	3.0
	Diagnostic and Therapeutic Technician	57	14.4
	Technical Assistant	28	7.1
	Missing	3	.8
Tenure	< 6 months	8	2.0
	6 months - 1 year	22	5.6
	1 year - 5 years	62	15.7
	5 years - 10 years	102	25.8
	10 years - 20 years	87	22.0
	> 20 years	108	27.3
	Missing	6	1.5
		<i>N</i>	<i>Mean</i>
Age	381	40.31	<i>SD</i> 11.67

4.2 Measures

In order to measure RC, WE, JS and perceived performance, Albuquerque (2017) used Likert-type scales. For perceived performance and JS, a 7-point Likert-type scale was used (1= strongly disagree, 7= strongly agree), as well as for WE (1= never, 7= everyday). RC was measured using a 5-point Likert-type scale (1= never, 5= very frequently). Objective performance was computed as a group variable derived from an external source.

4.2.1 Relational Coordination

The seven-item scale developed by Gittell (2009) was used to measure RC. Participants were asked seven questions (see Appendix 1), which they had to answer with respect to all individual job categories. Each question measured one specific item in the RC framework, including four

survey questions that assessed the accuracy, timeliness, frequency and problem-solving nature of the communication in place and three further questions that explored the quality of the underlying relationships, represented in the degree of mutual respect, shared knowledge and shared goals amongst the employees. To determine RC, we conducted confirmatory factor analysis, which supported the use of a two-dimensional structure of the instrument consisting of (1) communication and (2) relationships ($\chi^2/df= 2.551$; CFI= .992; TLI= .984; RMSEA=.063), which both predict RC. The reliability measure Cronbach's alpha was .92, indicating a high internal consistency of the measure. We summed up all items to calculate total RC.

4.2.2 Work Engagement

The WE measure was based on Shaufeli et al.'s (2006) suggestion and a scale with nine items was used. Sample items included in the questionnaire were: 'At my work, I feel strong and energetic' (to determine vigor), 'I am enthusiastic about my job' (to determine dedication) and 'When I'm at work, I forget everything around me' (to determine absorption). Appendix 2 lists all items. Confirmatory factor analysis approved the use of a three-factor model consisting of vigor, dedication and absorption ($\chi^2/df= 3.753$; CFI= .977; TLI=.962; PCFI= .597; RMSEA=.084). We use the sum of all items, which we found to be the most accurate approach to compute total WE. Computing Cronbach's alpha showed a high value of .92.

4.2.3 Job satisfaction

We used a single-item approach to determine job satisfaction, which was: 'In general, I am satisfied with my work'. This approach has been referred to as the global rating of overall job satisfaction by Scapello and Campbell (1983) and finds support in a proliferation of literature, stating that a single-item rating of overall job satisfaction may be more inclusive and easier to

complete than a summation of many facet responses. It may also be more flexible, and contain more face validity (Dolbier et al. 2005; Nagy 2010).

4.2.4 Perceived performance

We derived the perceived performance variable from five performance criteria, which were assessed by five positively formulated statements (see Appendix 3). Four items (total quality management, teamwork, skill development and empowerment) are based on a study published by Wall et al. (2004), while the fifth item, patient satisfaction, was proposed by Cabral et al. (2002). The items used assess service and HR quality and were based on the perception of different hospital professionals in the absence of objective quality indicators. Hence, the measure can be understood as *perceived performance*. We conducted confirmatory factor analysis, which approved the one-dimensional nature of the variable structure ($\chi^2/df= 3.263$; CFI= .990; TLI= .970; RMSEA= .076). Cronbach's alpha scored .85.

4.2.5 Objective Performance

In this study, the Global Performance Index for hospitals, published by the Administração Central do Sistema de Saúde (Central Administration of the Health System), short ACSS (2016), was applied to determine objective performance. Two indicators were used: (1) number of appointments of each service and (2) waiting times for appointments that are referenced by primary healthcare or other hospitals. The indicators were evaluated by regional health authorities; thus, they can be considered as *objective*. For each service, the indicators of 2016 were compared to the 2015 numbers and the respective differentials between the two numbers were considered for further calculation. For each service, we obtained one percentage value for each indicator. We computed the mean score of the two indicators, providing a general score of objective performance for each individual service.

4.2.6 Control Variables

The perspective on performance is expected to be influenced by socio-demographic variables, including job function, gender, age and tenure (Gittell et al. 2010; Singh & Chopra 2016). We want to avoid misinterpreting the influence from such variables in our regression, thus, in the following analysis, we will control for age, tenure, job category, gender and education level.

4.3 Data Analysis

Firstly, we detected some missing data, so we conducted Little's chi-square test statistic ($\chi^2(9)=6.22$; $p=.718$), confirming that the respective values are missing completely at random (MCAR). It is typically safe to remove MCAR data, allowing for listwise deletion. We then computed descriptive analysis presented in Table 2, which revealed mean, standard deviation and Pearson's correlations among all variables in this study.

Table 2: Descriptive statistics and Pearson's correlations

	<i>Mean</i>	<i>SD</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
1. RC	3.22	.68	-							
2. WE	5.18	1.28	.28**	-						
3. JS	5.57	1.06	.24**	.72**	-					
4. Perceived Performance	4.64	1.41	.42**	.51**	.51**	-				
5. Objective Performance	.59	7.89	-.08	.03	-.05	.11**	-			
6. Age	40.31	11.67	.09	.15*	.19**	.08	-.03	-		
7. Education ^{a)}	4.44	1.16	.21**	-.002	-.02	.02	.04	-.21**	-	
8. Tenure ^{b)}	4.44	1.31	.04	.05	.11*	.01	-.03	.74*	-.21**	-

Notes: a) 7-point scale (Education: 1 = primary education; 2 = ninth grade; 3 = completed high school; 4 = undergraduate degree; 5 = graduate degree; 6 = master degree; 7 = doctoral degree); b) 6-point scale (Tenure: 1 = less than 6 months, 2 = between 6 months and 1 year, 3 = between 1 and 5 years, 4 = between 5 and 10 years, 5 = between 10 and 20 years, 6 = over 20 years); * $p < .05$; ** $p < .01$.

RC was positively and significantly correlated to WE, JS, perceived performance and the control variable education. WE was positively and significantly related to JS, perceived

performance and the control variable age. JS was also positively and significantly related to perceived performance and age. Perceived and objective performance are positively and significantly correlated, validating the use of perceived performance as an indicator for organisational performance.

We tested for all relevant assumptions of linear regression analysis. Running scatterplots confirmed linearity of relationships and the absence of extreme outliers. The application of bootstrapping allowed to disregard the normality assumption. We further used robust standard errors, which controlled for homoscedasticity of residuals. We utilized the Davidson and MacKinnon (1993) estimator that has widely been known as HC3. Descriptive statistics proved the absence of surville multicollinearity, as there are no correlations greater than .8 between our predictors.

Finally, we applied Hayes serial mediation model 6, which can be accessed after installing the macro PROCESS in SPSS. The advantage of this macro is that each regression equation is estimated separately, which allows for conclusions about the interrelationships within the model. We used two mediators (WE and JS) to explore the relationships between our independent variable RC and our dependent variables perceived performance (model 1) and objective performance (model 2).

5. Results

In this study, we used bootstrapping to construct confidence intervals and perform hypothesis testing, which was valid for more conditions than traditional hypothesis testing. For that reason, all results have been computed through resampling.

5.1 Results for hypothesized model 1

This model explores the relationship between RC and perceived performance and evaluates the mediation role of WE and JS. The results presented in Table 3 reveal that the total effect of RC on perceived performance was significant and positive ($c = .89$; $t = 8.31$; $p < .01$), so hypothesis 1 finds support in our data and cannot be rejected.

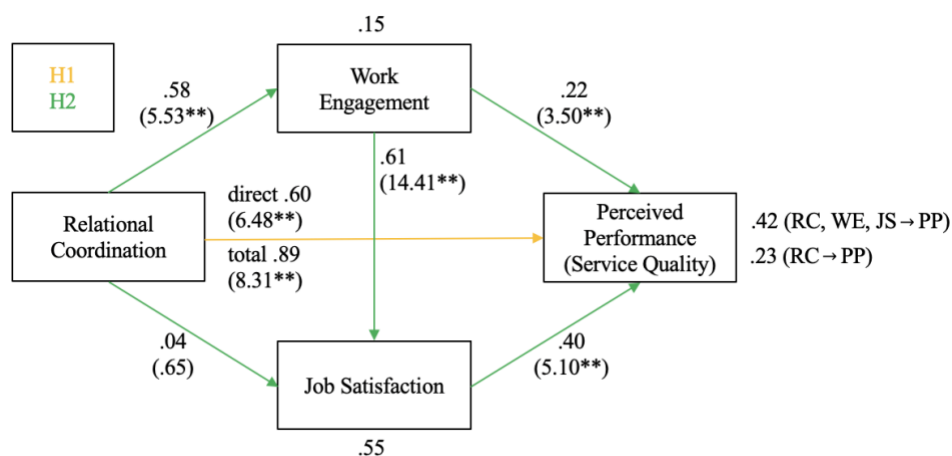
Table 3: Bootstrapping results of mediation model 1

	Mediator 1				Mediators 2				Dependent Variable			
	Work Engagement				Job Satisfaction				Perceived Performance			
Direct Effects	<i>Coef.</i>	<i>t</i>	<i>LL^{a)}</i>	<i>UL^{b)}</i>	<i>Coef.</i>	<i>t</i>	<i>LL^{a)}</i>	<i>UL^{b)}</i>	<i>Coef.</i>	<i>t</i>	<i>LL^{a)}</i>	<i>UL^{b)}</i>
Independent Variable												
Relational Coordination	.58	5.53**	.37	.78	.04	.65	-.09	.18	.60	6.48**	.42	.78
Mediators												
Work Engagement					.61	14.41**	.53	.69	.22	3.50**	.10	.35
Job Satisfaction									.40	5.10**	.25	.55
Control Variables												
Doctor	.32	.43	-1.12	1.75	.92	.14	-12.41	14.24	.63	.22	-4.95	6.20
Nurse	.76	1.07	-.64	2.17	.77	.11	-12.56	14.09	.68	.24	-4.89	6.25
Operational Assistant	1.12	1.64	-.24	2.59	.72	.11	-12.60	14.05	.22	.08	-5.35	5.79
Senior Health Techn.	.70	.85	-.93	2.33	.64	.09	-12.73	14.01	.48	.17	-5.11	6.08
Diagn. & Therap. Techn.	.32	.43	-1.13	1.76	.88	.13	-12.45	14.21	.04	.01	-5.54	5.61
Technical Assistant	.64	1.76	-.08	1.36	.10	.03	-6.56	6.77	.07	.05	-2.72	2.85
Education	.06	.81	-.09	.21	-.04	-.97	-.13	.04	-.11	-1.51	-.26	.03
Tenure	-.16	-2.05*	-.32	-.01	.04	1.1	-.04	.12	-.05	-.66	-.20	.10
Age	.03	3.58**	.02	.05	.00	.23	-.01	.01	.00	-.11	-.02	.02
Gender	-.14	-.87	-.45	.17	.05	.56	-.14	.24	.23	1.68	-.04	.51
Total direct and indirect effects on dependent variable (Perceived Performance)												
						<i>Coef.</i>		<i>SE(HC3)</i>			<i>t</i>	
Total Effect (Total Effect Model RC -> PP: $R^2 = .23$)												
Relational Coordination						.89		.11			8.31**	
Direct Effect (Direct Effects Model RC, WE, JS -> PP: $R^2 = .42$)												
Relational Coordination						.60		.09			6.48**	
						<i>Bootstrapped estimate</i>		<i>Bootstrapped SE</i>			<i>LL^{a)}</i>	<i>UL^{b)}</i>
Indirect Effects on dependent variable												
Total						.29		.06			.17	.41
Ind 1: RC -> WE -> Perceived Performance						.13		.05			.05	.23
Ind 2: RC -> JS -> Perceived Performance						.02		.03			-.03	.08
Ind 3: RC -> WE -> JS -> Perceived Performance						.14		.04			.07	.22

Notes: a) LL = Lower Level; b) UL = Upper Level; Level of confidence for all confidence intervals in output = 95.0%; Number of bootstrap samples for percentile bootstrap confidence intervals = 5000; * $p < .05$; ** $p < .01$

R-squared indicated that – when controlled for socio-demographic variables - 23 percent of the variance in perceived performance may be explained by RC. The values in Table 3 further suggest that the chain effect of WE and JS significantly mediates the relationship between RC and perceived performance. The indirect effect of WE as a single mediator (Ind 1= .13) was significant, as the bootstrap confidence interval (CI) = [.17, .41] did not include zero while controlling for socio-demographic variables. For the same reason, the indirect effect that stems from the serial mediation of WE and JS (Ind 3= .14) was significant (CI = [.07, .22]). The serial mediation through WE and JS was the strongest indirect effect on perceived performance, closely followed by the indirect effect that appeared through the single mediating role of WE. JS alone was not significantly mediating the relationship between RC and perceived performance. This confirms the use of our serial mediation model as the best fit to our data, compared to single or parallel mediation models. We observed that the relationship between RC and perceived performance decreased from .89 to .60 when serial mediation was introduced to the model. Since this effect stayed significant, we conclude partial mediation; thus, hypothesis 2 cannot be rejected. Figure 4 visualizes our findings and explains the relationships between the variables.

Figure 4: Path coefficients between latent variables (t-values) and R² of model 1



Note: * p < .05; ** p < .01

5.2 Results for hypothesized model 2

We followed the same procedures as in model 1, but we exchanged the dependent variable to objective performance. Table 4 presents our bootstrapping results and shows that the relationship between RC and objective performance is significant, but the total effect of RC on objective performance was negatively correlated ($c = -1.48$; $t = -2.15$; $p < .05$).

Table 4: Bootstrapping results of mediation model 2

	Mediator 1				Mediators 2				Dependent Variable			
	Work Engagement				Job Satisfaction				Objective Performance			
Direct Effects	<i>Coef.</i>	<i>t</i>	<i>LL^{a)}</i>	<i>UL^{b)}</i>	<i>Coef.</i>	<i>t</i>	<i>LL^{a)}</i>	<i>UL^{b)}</i>	<i>Coef.</i>	<i>t</i>	<i>LL^{a)}</i>	<i>UL^{b)}</i>
Independent Variable												
Relational Coordination	.47	3.92**	.23	.71	.07	.86	-.09	.22	-1.54	-2.22*	-2.91	-.17
Mediators												
Work Engagement					.61	12.97**	.52	.70	1.05	1.99*	.01	2.09
Job Satisfaction									-1.23	-1.64	-2.71	.25
Control Variables												
Doctor	.18	.10	-3.25	3.61	.94	.18	-9.42	11.30	3.39	.24	-24.45	31.22
Nurse	.56	.32	-2.85	3.97	.79	.15	-9.57	11.14	5.67	.40	-22.10	33.44
Operational Assistant	1.08	.62	-2.34	4.50	.87	.16	-9.49	11.22	5.84	.41	-21.90	33.58
Senior Health Techn.	.43	.24	-3.11	3.96	.57	.11	-9.86	10.99	1.88	.13	-26.27	30.04
Diagn. & Therap. Techn.	.21	.12	-3.24	3.66	.87	.17	-9.49	11.23	-3.85	-.27	-31.80	24.10
Technical Assistant	.57	.65	-1.15	2.29	.17	.07	-5.01	5.35	1.54	.22	-12.39	15.47
Education	.09	1.05	-.08	.25	-.04	-.80	-.14	.06	1.0	1.82	-.08	2.09
Tenure	-.13	-1.51	-.30	.04	.03	.75	-.05	.12	-.35	-.67	-1.39	.68
Age	.03	2.94**	.01	.05	.00	.47	-.01	.01	0.9	1.70	-.01	.20
Gender	-.10	-.56	-.44	.24	.07	.59	-.15	.29	1.39	1.16	-.97	3.75
Total direct and indirect effects on dependent variable (Objective Performance)												
					<i>Coef.</i>		<i>SE(HC3)</i>			<i>t</i>		
Total Effect (Total Effect Model RC -> OP: $R^2 = .15$)												
Relational Coordination					-1.48		.69			-2.15*		
Direct Effect (Direct Effects Model RC, WE, JS -> OP: $R^2 = .16$)												
Relational Coordination					-1.54		.69			-2.22*		
					<i>Bootstrapped estimate</i>		<i>Bootstrapped SE</i>			<i>LL^{a)}</i>		<i>UL^{b)}</i>
Indirect Effects on dependent variable												
Total					.06		.23			-.43		.49
Ind 1: RC -> WE -> Objective Performance					.50		.27			-.01		1.05
Ind 2: RC -> JS -> Objective Performance					-.08		.12			-.35		.11
Ind 3: RC -> WE -> JS -> Objective Performance					-.35		.23			-.82		.09

Notes: a) LL = Lower Level; b) UL = Upper Level; Level of confidence for all confidence intervals in output = 95.0%; Number of bootstrap samples for percentile bootstrap confidence intervals = 5000; * $p < .05$; ** $p < .01$

Since we suggested a positive relationship, we have to reject hypothesis 3. Figure 5 shows that - when controlling for socio-demographic variables - R-squared was 15 percent, which represents the proportion of variance in objective performance that can be explained by RC. Further, we found that both, WE and JS did not significantly mediate the relationship between RC and objective efficiency, as the bootstrap CIs of all three indirect effects included zero while controlling for socio-demographic variables. Hence, there is no significant serial mediation and hypothesis 4 is rejected, as it finds no support in our data.

Figure 5: Path coefficients between latent variables (t-values) and R^2 of model 2



Note: * $p < .05$; ** $p < .01$

6. Discussion and Implications

The direct effect of RC on our perceived performance variable showed a significant and positive relationship between the two. In contrast, objective performance was significantly negatively associated with RC. This means that in our study, RC improved the quality of the healthcare service, but decreased operational efficiency in the hospital. With regards to the indirect effects, we found a partial serial mediation of the relationship of RC to perceived performance through WE and JS successively. This partial mediation is in line with Baron and Kenny (1986), who stated that partial mediation models are sufficient in social science research, as full mediation is unrealistic to achieve in complex systems. In contrast, the bootstrapping CIs for the indirect

effects of RC on objective performance included zero, so our data showed no mediation of WE and JS here.

6.1 Interpretation of the results

To interpret the results, it is worth mentioning that our perceived performance variable included items assessing service and HR quality and thereby, the development of human capital. In that regard, our results find support in several other studies, which showed that HRM, relationships and well-being at work, which find expression through our variables RC, WE and JS, have stronger impacts on operational (proximal) performance than on financial (distal) performance indicators (Guest & Peccei 2001; Ramsay et al. 2000; Van De Voorde et al. 2012). Our perceived performance indicator measured proximal outcomes, while objective performance is an indicator of distal results. Hence, we found positive relationships in model 1, but not in model 2. Bandura (1986) argued that the setting of proximal goals would increase frequency of feedback, which may contain valuable information enabling improvement of performance. Since RC is promoted by frequent, accurate communication, the positive relationship between RC and perceived performance in our data can be explained. With regard to the indirect effects, we found that promoting RC motivates healthcare employees to be more engaged, who then exhibit more JS, which results in partial service quality improvements. The mediating factors WE and JS may intuitively be related to proximal outcomes, offering an explanation for the significance of the serial mediation effect on perceived, but not on objective performance.

Additionally, our results stated that in both models, RC was not significantly predicting JS, but WE. In turn, WE was positively associated with JS, perceived and objective performance. This supports the notion of several other studies that found a positive impact of WE on numerous performance indicators (Bakker & Schaufeli 2008; Bagnato & Paolino 2009; Gorgievski et al.

2010). Hence, it might be of particular interest to healthcare providers to improve performance management which creates and sustains WE (Mone & London 2010). According to Al-dalahmeh (2018), engaged employees expect a safe working place, meaningful work, and good workplace communication, which brings the attention back to RC as a precursor of WE. However, this interpretation cannot explain the fact that RC was negatively associated with objective efficiency in our study. For that reason, we take a deeper look into healthcare-related literature and refer to Bunderson (2001), who investigated the impact of work ideologies on the performance of healthcare staff. The author proposed that professional as well as administrative work ideologies and respective perceived role obligations shape the fictive, psychological contract between a healthcare worker and the employing organisation. There is a mismatch between the nature of the two ideologies involved: While administrative ideology is rather transactional and based on the understanding of the healthcare provider as a business with economic interests, professional ideology is shaped by the relational character of the organisation as a work setting with many highly trained professionals who feel obliged to fulfill generalized role expectations and provide excellent client service. These ideologies include pre-set perceived obligations, roles and rights. Bunderson (2001) used data obtained from doctors and technical professionals in a hospital and found that perceived breaches of professional role obligations were strongly associated with a decrease in organisational commitment and job performance in regard to productivity and client satisfaction. Thus, the ideologically pluralistic work setting of a hospital can support the interpretation of our results. In our study, medical participants identified with the proximal performance outcome service quality, but they perceived a breach in their role as professionals regarding the administrative performance goal efficiency, which is set by the organisation. If the efficiency goals are communicated to the medical staff, RC may enhance perceived, but decrease objective performance as a consequence.

6.2 Theoretical implications

The studies by Jodi Gittell and her peers (Gittell 2002b, 2006, 2008) highlighted the RC concept's role in overcoming the trade-off between service quality and efficiency. The results of our study support the potential of RC in fostering quality outcomes of healthcare providers, but not in terms of promoting operational efficiency. Hence, our findings and the implied theoretical contribution of this study challenge the existing literature and suggest a clear differentiation between the organisational performance outcomes addressed.

6.3 Implications for practice

As we found RC to fundamentally impact service quality, employees should be selected and trained for relational competences. The ability to understand how the efforts of different individuals across the entire organisation connect to each other in order to realize quality performance goals should be embraced by managers. Gittell et al. (2008) explain that better-quality relationships and high communication standards can be achieved if coworkers see the perspective of others, show empathy, and respect the work every individual accomplishes – regardless of their status, job category or the skills required. Knowledge sharing and the definition of common goals across different services can further reduce the gap between different job categories and ideologies and foster the establishment of deep, respectful relationships. An enhancement of RC can also be generally achieved through better formal as well as informal communications systems, for example through the technological development of supportive software that allows for transparent care and communication processes. Regular meetings could strengthen the feedback culture and enable professionals to discuss lessons learned (shared knowledge) and set future goals and guidelines in a solution-oriented and engaging way.

According to the concept of psychological ownership, individuals enjoy taking ownership of their performance achievements and be efficacious to their work environment (Pierce 2003). As a consequence, a professional's perspective or belief of performance can highly affect the performance itself. This is exactly what we see in the results of this study, where the relationship of RC and perceived performance (determined by the participants' perspective on performance) was partially mediated by people's WE and JS. In contrast, WE and JS did not mediate the impact of RC on objective performance. Hence, we imply that healthcare employees do not identify their performance with the items included in the objective performance variable, which is in turn linked to the described ideologically pluralistic work setting of a hospital (Bunderson 2001). Consequently, we propose to extend performance indicators to overcome this challenge and find mutual efficiency goals that integrate quality outcomes in objective performance measures and allow for a goal identification of all professionals involved in the healthcare process. On top of that, it may be beneficial for healthcare managers to improve WE and JS of all professionals, as they predict service quality.

7. Limitations to consider in future research

We would like to draw attention to some limitations in this study, which may be used as a guidance for future research. The first limitation is related to the causality chain between the variables used. It is possible that the relationships examined, for example between RC and WE, are inverse or mutually enforcing. We used cross-sectional data gathered by Albuquerque (2017), measuring RC by asking participants to rank their relationships to colleagues from different job categories. However, in order to draw conclusions about causality and capture developmental details, longitudinal intervention studies should be considered in future research. Also, the representativeness of the research sample might be critical. Although almost 400 valid questionnaires were collected, only one hospital was considered. Hence, general conclusions

should be taken with caution. Going forward, data gathered in a more diverse selection of healthcare providers could allow for more universally applicable findings. It is also important to hold some reservation against the variable structure that was used. While RC, WE, JS and perceived performance were individually calculated for each participant, objective performance has been determined as a group variable for an entire service. This might weaken the validity for direct comparison of perceived and objective performance and should be addressed in future studies. Additionally, including more indicators in the objective performance variable could deliver more robust results. Lastly, the perceived performance variable did not only include indicators of service quality, but also for HRM quality. A clear differentiation between the two and an inclusion of more components could lead to more distinct findings.

8. Conclusion

The main goal of this study was to investigate the associations between RC and two organisational outcomes, namely perceived and objective performance in a hospital. Further, we examined the mediating role of WE and JS. Our findings indicate that healthcare providers with higher RC in place have more engaged employees, who then exhibit more JS than those with lower relational coordination scores, and thus contribute to service quality gains. This means that RC was positively related to perceived performance and WE and JS partially mediated this relationship. Hence, RC, WE and JS should be considered by healthcare managers who want to implement high quality standards. Contrary, RC did not improve, but decrease objective performance in our data and no significant mediation of WE and JS could be found. This result can be explained, as health professionals identify with performance goals that reflect service quality gains rather than economic interests. Thus, based on the findings of this study, we suggest that healthcare providers should not neglect their staff's highest priority, the ability to cure, when implementing policies to increase efficiency.

9. References

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10. Appendix

Appendix 1: Items and questions used to measure RC

<i>Item</i>	<i>Question</i>
Problem solving communication	When a problem arises involving patients in this service, to what extent do the following providers become involved with you?
Shared goals	To what extent do the following professionals address their objectives regarding patient care in this service?
Mutual respect	To what extent do the following professionals respect you and your work in this service?
Shared knowledge	How much knowledge do the following professionals have about the work they do on patients in this service?
Timely communication	To what extent do the following professionals communicate with you in a timely manner about the condition of patients in this service?
Frequent communication	How often do you communicate with the following professionals about the condition of the patients in this service?
Accurate communication	To what extent do the following professionals accurately communicate with you about the condition of the patients in this service?

Appendix 2: Statements used to measure WE

<i>Item</i>	<i>Statement</i>
Vigor	At my work, I feel bursting with energy. At my work, I feel strong and energetic. When I get up in the morning, I want to go to work.
Dedication	I am enthusiastic about my job. My work inspires me. I am proud of the work I do.
Absorption	I feel happy when I am working intensely. I am immersed in my work. When I'm at work, I forget everything around me.

Appendix 3: Items and statements used to measure perceived performance

Item	Statement
Total quality management	In this service there are gradual and continuous improvements in existing processes and procedures, always looking for quality excellence.
Team work	In this service, the work is done in a team.
Skill development	In this service, the development of skills is possible.
Empowerment	In this service people can take initiatives.
Patient satisfaction	In this service, patient's health is high.
