

STOR765 Report

Impact of Relational Coordination on Job Satisfaction and Retention of Military Healthcare Professionals

Consultant: Ling CAI

Client: Sherita House

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Abstract

Relational coordination (RC) has been known to improve quality and efficacy under conditions of inter-dependent work with uncertainty and time constraints such as hospital industry. The effect of RC on patients has been widely studied, however the effect on direct healthcare professionals remains elusive. The purpose of this study is to explore the relationship between military and civilian nurses', residents', and physicians' experiences of RC and the effect on job satisfaction, retention and whether race, age, gender and rank influence this relationship in Womack Army Medical Center. This survey measures RC among Licensed Practical Nurses (LPNs), Registered Nurse (RNs), Residents and Physicians. In conclusion, we discovered that RC showed a significant positive effect on job satisfaction and retention. In addition, race, gender, credentials, working unit and job experience also had an effect on job satisfaction/retention. However, age didn't show a significant effect.

1 Introduction

Hospitals are complex organizations where multiple care providers work interdependently under conditions of uncertainty and time constraints to deliver safe and quality care. Communications among providers has been considered significant to improve quality. Relational coordination (RC) extends this view and emphasize the value of high-quality relationships. RC is “a mutually reinforcing process of communicating and relating for the purpose of task integration”¹. RC comprises four communication dimensions (timely, frequent, accurate and problem-solving communication) and three relationship dimensions (shared goals, shared knowledge and mutual respect)². The RC model is shown in Figure 1A. In this study, we describe the findings from the survey done in the Womack Army Medical Center in which 4 different types of providers reported RC levels across various clinical practice units. We tested association between RC and job satisfaction and retention. We performed ordinary least squares regression analysis to identify the relationship between RC and job satisfaction and retention, adjusted for provider’s age, race, gender, rank, job experience, clinical units etc.

2 Data Set

The data set was provided by the client in an excel spread sheet. The data set includes 289 survey responses that contains 53 questions. The first 28 questions are related to the 7-item RC which was used to measure the experience of RC among 4 types of care providers: LPN, RN, Resident and Physician. Four items address the frequency, timeliness, accuracy and problem-solving nature of communication, the other three items address the extent to which relationships are characterized by shared goals, shared knowledge and mutual respect (Figure 1). All questions are scored on a 5-point Likert-type scale.

There are a lot of missing data in this data set based on different questions. To keep the integrity of this dataset, I changed the NA values in most of the categorical data to a new category named “unknown”. Four survey responses were removed because of missing values in either military/civilian question or the job satisfaction question. I discarded the enlisted_rank question because 271 out of 289 survey responses had NA values for this question. I also got rid of two questions that were answered in text.

There are 288 surveys completed by 205 civilian providers and 83 military providers. Since the job retention survey question was separately asked to military and civilian respondents, military and civilian data subsets were generated to study the relationship of RC and job retention respectively.

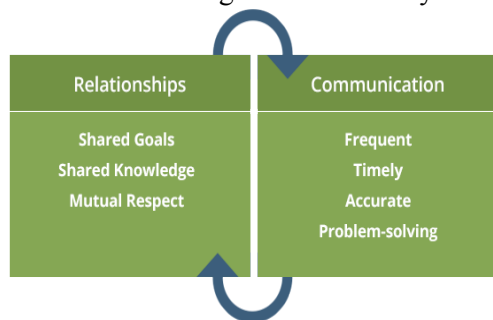


Figure 1 Dimensions of RC.

3 Exploratory Data Analysis

3.1 Cronbach's Alpha and Factor Analysis to Determine Construct Validity

We used a previously validated construct³, the RC index (7 items * 4 provider types = 28 questions) to represent the overall RC scores. For an exploratory study, Cronbach's alpha should be greater than 0.7 for index validity⁴. We assessed the internal consistency using Cronbach's Alpha which was .92 (28 questions) for this RC survey (Table 1), suggesting that this construct has a high level of reliability.

Next, we conducted an exploratory factor analysis to test whether RC behaves as a single factor in our setting. The chi square statistic of test of the hypothesis that 1 factor is sufficient is 61.87 on 14 degrees of freedom (p value = 5.49e-08), which suggested that RC was best characterized as a single factor³. Table 1

showed the Factor 1 loadings for RC. We concluded that the RC index meets standards for reliability and convergent validity.

Table 1 Factor 1 Loadings for Relational Coordination

Frequent Communication	0.46
Timely Communication	0.72
Accurate Communication	0.68
Problem-Solving Communication	0.65
Shared Goals	0.67
Shared Knowledge	0.69
Mutual Respect	0.8
Eigenvalue for Factor 1	3.19
Cronbach's Alpha	0.92

3.2 Descriptive Data Analysis

The survey respondents worked in various units including Surgery, ICU, OBGYN etc. Respondents were about 40 years old on average with a mean of 12 years of career experience, 5 years in this medical center, and 4.6 years in their current unit. The race of the majority of respondents was Caucasian and the General Schedule (GS) rate of most respondents was GS-11. The following tables showed some of the results of descriptive data analysis (Table 2-4).

Table 2 showed the average age and job experience of military and civilian providers. On average, civilian providers were older and had more job experience compared to military providers. Table 3 reported descriptive data on the RC index, the 7 dimensions of RC and job satisfaction. Table 4 described the statistics for RC, job satisfaction and retention of military and civilian providers.

Table 2 Descriptive Statistics for Respondent Demographics

Army	Mean	SD	Civilian	Mean	SD
Age	30.72	8.03	Age	44.14	10.58
Career_years	4.85	4.97	Career_years	14.83	9.45
Center_years	2.01	1.77	Center_years	6.25	6.16
Unit_years	1.7	1.78	Unit_years	5.73	5.87

Table 3 Descriptive Statistics for RC and job satisfaction of all respondents

	Mean	SD
RC	3.74	0.49
Frequent communication	2.73	0.42
Timely communication	3.83	0.66
Accurate Communication	4.02	0.63
Problem-solving communication	3.8	0.76
Shared goals	4.08	0.78
Shared knowledge	3.8	0.67
Mutual respect	3.91	0.73
Job satisfaction	3.72	1.04

Table 4 Descriptive Statistics for RC, job satisfaction and retention of military and civilian respondents

Army	Mean	SD	Civilian	Mean	SD
RC	3.83	0.37	RC	3.7	0.53
Frequent communication	2.8	0.41	Frequent communication	2.71	0.42
Timely communication	3.95	0.55	Timely communication	3.78	0.7
Accurate Communication	4.03	0.5	Accurate Communication	4.02	0.67
Problem-solving communication	3.97	0.73	Problem-solving communication	3.72	0.76
Shared goals	4.15	0.69	Shared goals	4.05	0.81
Shared knowledge	3.85	0.59	Shared knowledge	3.79	0.7
Mutual respect	4.03	0.59	Mutual respect	3.87	0.78
Job satisfaction	3.52	0.9	Job satisfaction	3.79	1.08
Plan to leave the Army	3.31	1.45	Plan to leave the Center	1.82	1.12
Will not voluntarily leave the Army	2.01	1.09	Will not voluntarily leave the Center	3.43	1.25
Reluctant to leave the Army	2.42	1.21	Reluctant to leave the Center	3.98	1.1
Plan to stay in the Army	2.43	1.28	Plan to stay in the Center	4.1	1.12

3.3 Description of the Degrees and Credentials of Respondents

The bar graphs of Figure 2 showed an uneven distribution of degrees (left) and credentials (right) among different job types. There was an uneven distribution of degrees. As expected, residents and physicians had graduate degrees. Most of the RNs had Baccalaureate or Associate degrees with some mixture among LPNs. Similarly, there was an unbalanced distribution of credentials among different job types. A large number of RNs had BSN credential and majority of LPNs had LPN credential. Residents and physicians had MD credential.

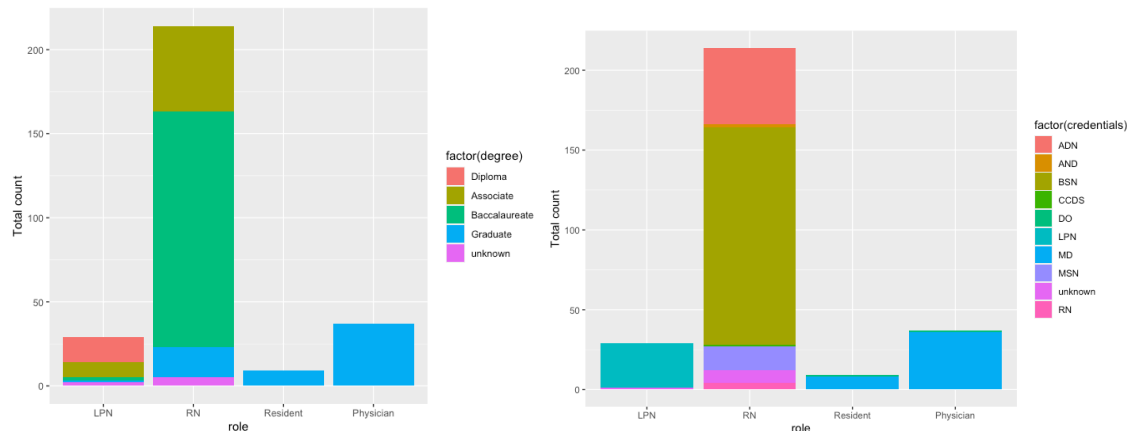


Figure 2 Bargraph of degree (left) and credentials (right) among different job types.

3.4 Difference of RC and Job Satisfaction between Military and Civilian Respondents

A box and whisker plot—also called a box plot—displays the five-number summary of a set of data. The five-number summary is the minimum, first quartile, median, third quartile, and maximum. In a box plot, we draw a box from the first quartile to the third quartile. The minimum is shown at the far bottom of the chart and the maximum is at the far top of the chart. A horizontal line goes through the box at the median. If a data value is very far away from the quantiles (either less than first quartile or greater than third quartile

by more than 1.5 times the interquartile range (third quartile – first quartile)), it will be designated as an outlier and shown as separately plotted points (the small circles in Figure 3).

The boxplots in Figure 3 showed there were some statistically significant difference of RC index and job satisfaction between military and civilian providers. Military providers had higher RC index but lower job satisfaction compared to civilian folks.

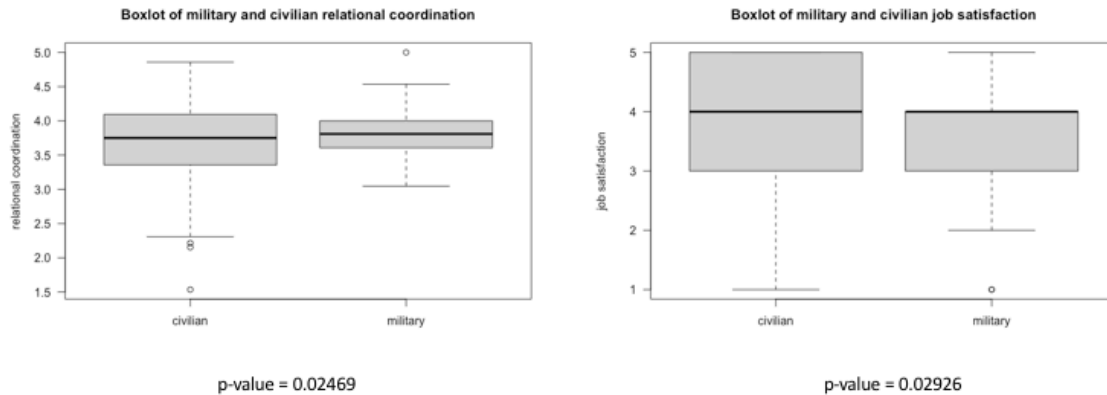


Figure 3 Boxplot of RC (left) and job satisfaction (right) between military and civilian providers.

3.5 Pearson correlation

The Pearson correlation method is the most common method to use for numerical variables; it assigns a value between -1 and 1 , where 0 is no correlation, 1 is total positive correlation, and -1 is total negative correlation. Table 5 showed correlations between RC and job satisfaction. Relational coordination and its 6 dimensions (except frequent communication, $p\text{-value} = .35$) showed significant positive correlations with job satisfaction.

Table 5 Correlations between RC and Job Satisfaction

	Job satisfaction	p-value
RC_index	0.43	0
Frequent Communication	0.06	0.35
Timely Communication	0.32	0
Accurate Communication	0.36	0
Problem-Solving Communication	0.34	0
Shared Goals	0.4	0
Shared Knowledge	0.29	0
Mutual Respect	0.38	0

4 LASSO regression

There are 28 questions for RC. To identify the most important features among these 28 questions of RC, we decided to perform LASSO (least absolute shrinkage and selection operator) regression. LASSO regression is a machine learning technique that performs both variable selection and regularization in order to enhance the prediction accuracy and interpretability of the statistical model it generates. We conducted LASSO regression using job satisfaction as the response variable and identified the following 5 most

significant questions: Q3_LPNs, Q5_LPNs, Q5_RNs, Q6_RNs, Q7_Resdnt (Table 6). We performed univariate linear regression to validate these five questions to predict job satisfaction. As expected, all of them showed statistically significant positive effect on job satisfaction (data not shown).

Table 6 Coefficient scores predicted by LASSO

	Coefficient
Q3_LPNs (Accurate Communication_LPNs)	0.059
Q5_LPNs (Shared Goals_LPNs)	0.031
Q5_RNs (Shared Goals_RNs)	0.141
Q6_RNs (Shared Knowledge_RNs)	0.017
Q7_Resdnt (Mutual Respect_Resdnt)	0.02

5 Ordinary Least Square Regression and model selection

5.1 How does RC affect job satisfaction in all providers?

From Table 5, we know there is a positive correlation between job satisfaction and RC_index. The scatter plot below (Figure 4) also supported this conclusion. A scatterplot is a graphic tool used to display the relationship between two quantitative variables. A scatterplot consists of an X axis (the horizontal axis), a Y axis (the vertical axis), and a series of dots. Each dot on the scatterplot represents one observation from a data set. The position of the dot on the scatterplot represents its X and Y values.

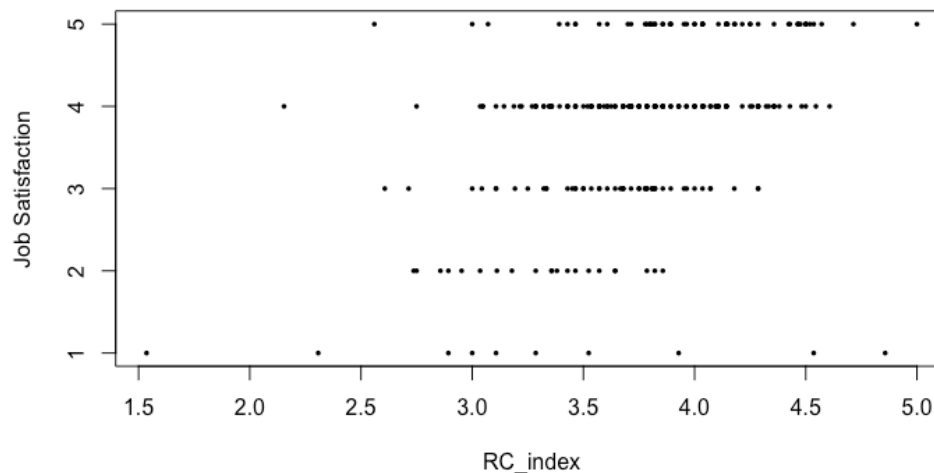


Figure 4 Scatter plot of Job satisfaction vs Relational Coordination

To further ascertain the relationship between RC and job satisfaction, we performed ordinary least squares (OLS) regression using job satisfaction as the response variable and RC_index as the main predictor, adjusting for respondents' age, gender, race, role, unit, degree, credentials, job experience (the years stayed in career, center and unit). As shown in Table 7, RC_index had a significant positive effect on job satisfaction.

Table 7 RC as a Predictor of Job Satisfaction

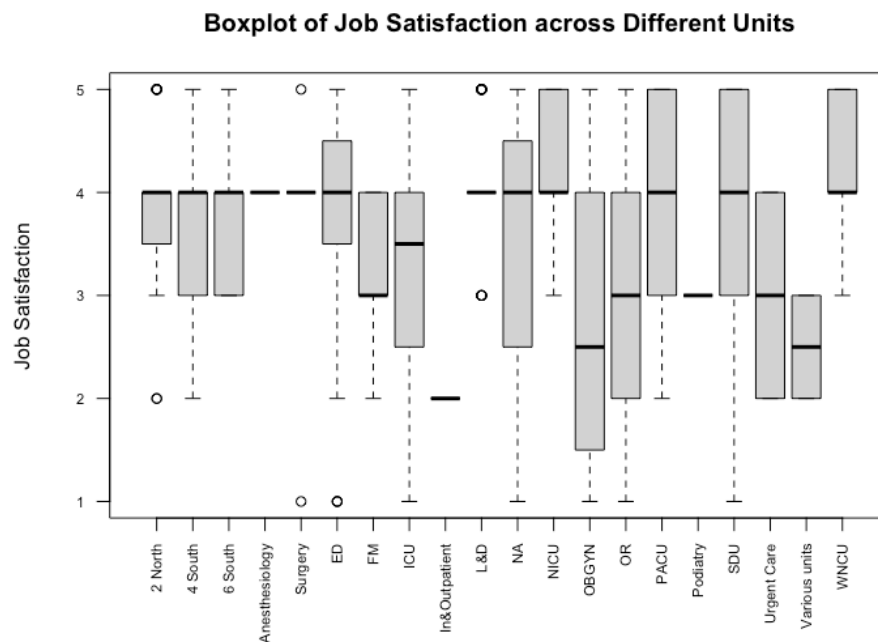
	Job Satisfaction		
	Coefficient	SE	p-value
RC_index	0.9	0.12	0

Next, we adjusted the other covariates together with RC_index respectively. Role, gender, degree, age, center_years and race didn't have significant effect on job satisfaction together with RC_index (data not shown). Interestingly, unit, credentials, unit_years_group, career_years_group and milli_civi did show significant effect together with RC_index as shown in Table 8-12.

Table 8 showed that RC_index had a positive effect on job satisfaction, but the unit OBGYN had a significantly negative effect on job satisfaction. The box plot in Figure 5 supported our conclusion. There was significant variability of job satisfaction among different units (p-value = 0.004). The job satisfaction level in unit OBGYN is low.

Table 8 RC and Unit as Predictors of Job Satisfaction

	Job Satisfaction		
	Coefficient	SE	p-value
RC_index	0.82	0.12	0
unit-OBGYN	-0.84	0.37	0.02

**Figure 5 Boxplot of Job Satisfaction among Different Units.****Table 9 RC and Credentials as Predictors of Job Satisfaction**

	Job Satisfaction		
	Coefficient	SE	p-value
RC_index	0.92	0.12	0
credentials-MD	-0.61	0.19	0

Table 9 showed that RC_index had a positive effect on job satisfaction, but the credential MD had a significantly negative effect on job satisfaction.

Table 10 RC and Unit_years_group as Predictors of Job Satisfaction

	Job Satisfaction		
	Coefficient	SE	p-value
RC_index	0.92	0.12	0
unit_years_group >15	0.52	0.23	0.03

Table 10 showed that RC_index had a positive effect on job satisfaction, and stay in the unit more than 15 years also had a significantly positive effect on job satisfaction.

Table 11 RC and Career_years_group as Predictors of Job Satisfaction

	Job Satisfaction		
	Coefficient	SE	p-value
RC_index	0.92	0.12	0
career_years_group >15	0.33	0.16	0.04

Table 11 showed that RC_index had a positive effect on job satisfaction, and stay in the career more than 15 years also had a significantly positive effect on job satisfaction.

Table 12 RC and Milli_civi Predictors of Job Satisfaction

	Job Satisfaction		
	Coefficient	SE	p-value
RC_index	0.94	0.12	0
milli_civi-military	-0.33	0.13	0.01

Table 12 showed that RC_index had a positive effect on job satisfaction, but military status had a significantly negative effect on job satisfaction, consistent with the previous box plot in Figure 3.

We also tested how the 7 individual dimensions of RC affect job satisfaction³. OLS regression identified that frequent communication had a negative effect on job satisfaction, while accurate communication and shared goals had positive effect (Table 13).

Table 13 RC Dimensions as Predictors of Job Satisfaction

	Job Satisfaction		
	Coefficient	SE	p-value
Frequent Communication	-0.33	0.15	0.03
Timely Communication	0.06	0.13	0.67
Accurate Communication	0.31	0.13	0.02
Problem-Solving Communication	0.12	0.1	0.21
Shared Goals	0.29	0.1	0
Shared Knowledge	0.05	0.11	0.66
Mutual Respect	0.15	0.12	0.2

5.2 How does RC affect job retention in military providers?

To study how RC affect job retention in military providers, we first made a military data subset which contains 83 survey responses. There are four response variables: plan to leave the Army, will not voluntarily leave the Army, reluctant to leave the Army, plan to stay the Army. OLS regression was run four times with each of the response variables as an outcome and RC_index as the predictor. The OLS results didn't show any significant effect of RC on military job retention, consistent with the Pearson correlation result shown in Table 14.

Table 14 Correlations between RC and Military Job Retention

	RC_index	p-value
Plan to leave the Army	0.02	0.86
Will not voluntarily leave the Army	0.01	0.95
Reluctant to leave the Army	-0.13	0.28
Plan to stay in the Army	0.03	0.83

5.2.1 What affects “plan to leave the Army”?

Since RC didn't affect the “plan to leave the Army” outcome, we chose to use best subset selection method to identify potential predictors that will affect this outcome. Best subset selection compares all possible models using a specified set of predictors, and displays the best-fitting models that contain one predictor, two predictors, and so on. The end result is a number of models and their summary statistics. It is up to you to compare and choose one.

This method suggested the model with top two predictors: unit and credentials. We used these two predictors and performed OLS regression and the result was shown in Table 15. Interestingly, military providers with LPN or MD credentials were more likely to leave the Army. The military providers in NICU were less likely to leave the Army probably because of the new born babies in NICU, consistent with the box plot shown in Figure 6.

Table 15 Unit and Credentials as Predictors of Plan to Leave Army

	Plan to Leave Army		
	Coefficient	SE	p-value
credentials-LPN	1.11	0.45	0.02
credentials-MD	1.75	0.82	0.04
unit-NICU	-2.76	0.97	0.01

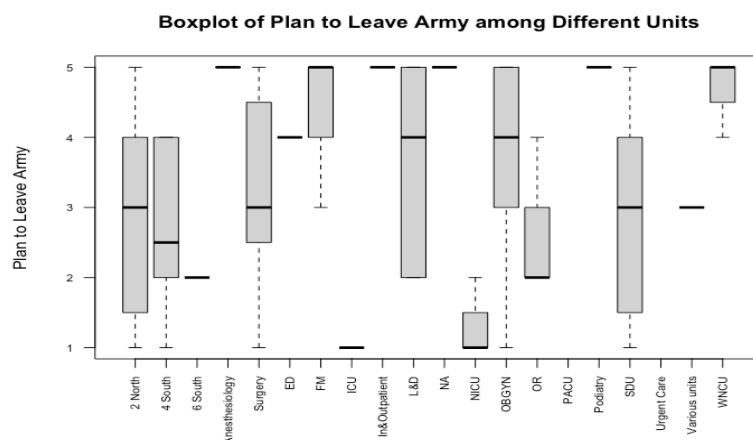


Figure 6 Boxplot of Plan to Leave Army among Different Units.

5.2.2 What affects “will not voluntarily leave the Army”?

Based on best subset selection, we chose the model with top five predictors: race, degree, unit_years_group, unit and officer_rank. We used these five predictors and performed OLS regression and the result was shown in Table 16. American Indian providers were not likely voluntarily leave the Army, consistent with the box plot shown in Figure 7. The military providers who had associate degree or O-6 officer rank were less likely voluntarily leave the Army. On the other hand, the military providers who had stayed in the unit for about 5-10 years were more likely voluntarily leave the Army.

Table 16 Predictors of Not Voluntarily Leave Army

	Not Voluntarily Leave Army		
	Coefficient	SE	p-value
race-American Indian	4.08	1.36	0
degree-Associate	1.19	0.56	0.04
unit_years_group-5-10 years	-3.73	1.27	0.01
Officer_rank- O-6	5.96	1.95	0

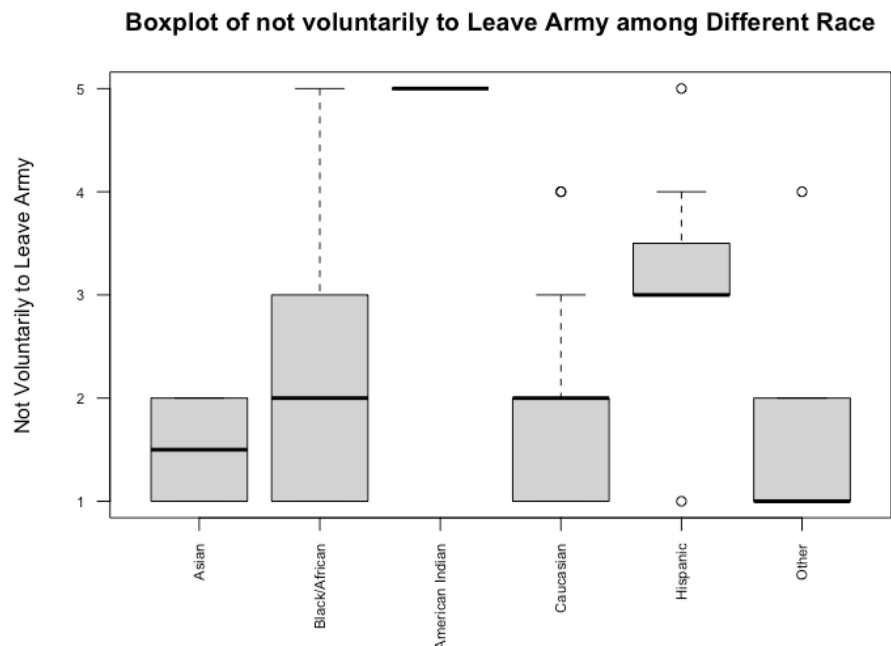


Figure 7 Boxplot of not Voluntarily Leave Army among Different Race.

5.2.3 What affects “reluctant to leave the Army”?

Based on best subset selection, we chose the model with top four predictors: race, gender, credentials and unit. We used these four predictors and performed OLS regression and the result was shown in Table 17. American Indian or Hispanic providers were more reluctant to leave the Army. Female military providers were also more reluctant to leave the Army. Military providers with DO, LPN or MD credentials were more likely to leave the Army, consistent with the box plot shown in Figure 8. Again, military providers in NICU and also in SDU were more reluctant to leave the Army.

Table 17 Predictors of Reluctant to Leave Army

	Reluctant to Leave Army		
	Coefficient	SE	p-value
race-American Indian	4.51	1.4	0
race-Hispanic	2.2	1.09	0.05
gender-Female	0.9	0.32	0.01
credentials-DO	-2.63	1.03	0.01
credentials-LPN	-1.04	0.37	0.01
credentials-MD	-1.42	0.62	0.03
unit-NICU	2.73	0.73	0
unit-SDU	1.37	0.49	0.01

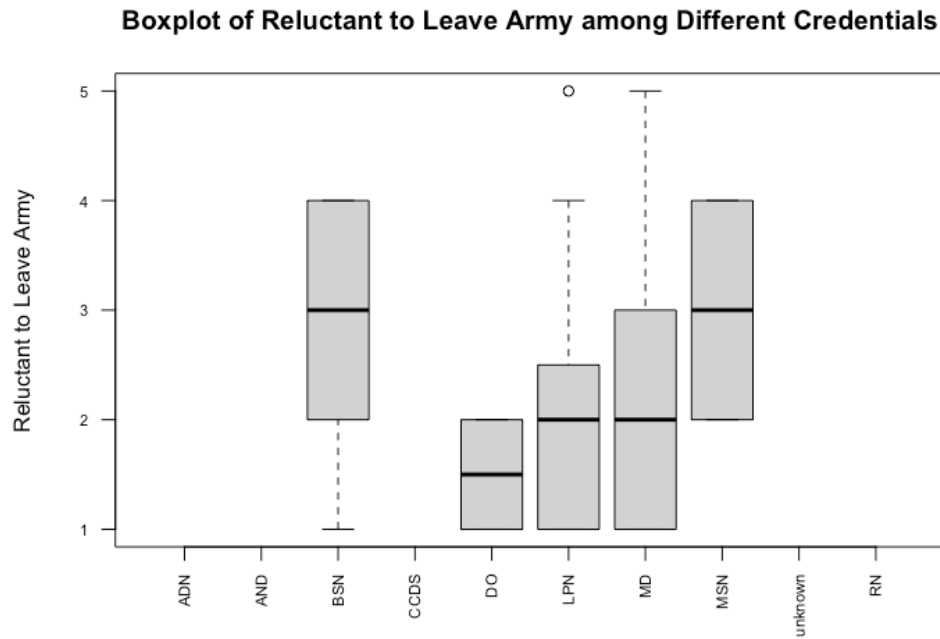


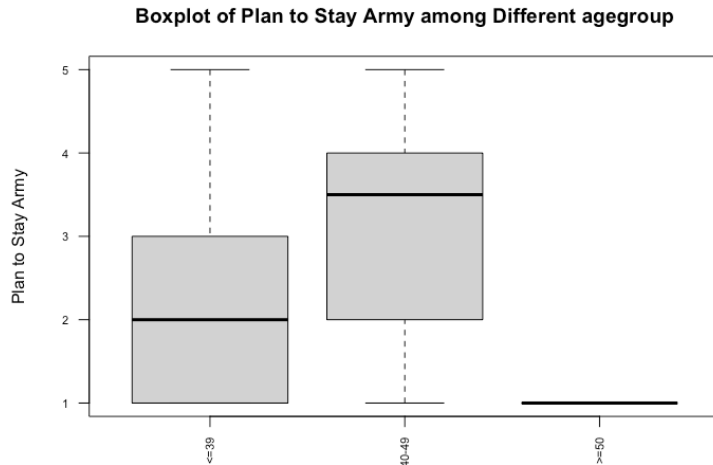
Figure 8 Boxplot of Reluctant to Leave Army among Different Credentials.

5.2.4 What affects “plan to stay the Army”?

Based on best subset selection, we chose the model with top six predictors: age_group, race, degree, unit_years_group, unit and role. We used these six predictors and performed OLS regression and the result was shown in Table 18. Again, American Indian providers or providers with age between 40-49 were more likely to stay the Army, consistent with the box plot shown in Figure 9. In agreement with previous result, the military providers who had stayed in the unit for about 5-10 years were less likely to stay the Army. Similar as before, military providers in NICU were more likely to stay the Army.

Table 18 Predictors of Plan to Stay Army

	Plan to Stay Army		
	Coefficient	SE	p-value
agegroup-40-49	1.39	0.64	0.04
race-American Indian	3.7	1.5	0.02
unit_years_group-5-10 years	-1.49	0.74	0.05
unit-NICU	2	0.86	0.03

**Figure 9 Boxplot of Plan to Stay Army among Different Agegroup.****5.2.5 How does job satisfaction affect job retention in military providers?**

The OLS regression analysis suggested job satisfaction had significant positive effects on job retention in military providers (Table 19-20), consistent with the Pearson correlation result (Table 21). Higher job satisfaction corresponded to less likely to leave the Army (Table 19) or more likely plan to stay the Army (Table 20).

Table 19 Job Satisfaction as a predictor of Plan to Leave Army

	Plan to Leave Army		
	Coefficient	SE	p-value
Job Satisfaction	-0.38	0.19	0.05

Table 20 Job Satisfaction as a predictor of Plan to Stay Army

	Plan to Stay Army		
	Coefficient	SE	p-value
Job Satisfaction	0.35	0.17	0.04

Table 21 Correlations between Job Satisfaction and Military Job Retention

	Job Satisfaction	p-value
Plan to leave the Army	-0.23	0.05
Will not voluntarily leave the Army	0.14	0.23
Reluctant to leave the Army	0.13	0.27
Plan to stay in the Army	0.24	0.04

5.3 How does RC affect job retention in civilian providers?

To study how RC affect job retention in civilian providers, we first made a civilian data subset which contains 205 survey responses. There are four response variables: plan to leave the Center, will not voluntarily leave the Center, reluctant to leave the Center, plan to stay the Center. OLS regression was run four times with each of the response variables as an outcome and RC_index as the predictor. The OLS results showed significant effects of RC on civilian job retention, consistent with the Pearson correlation result shown in Table 22. The respondents with higher RC_index will be less likely to plan to leave the Center and more likely to be reluctant to leave the Center or plan to stay in the Center.

Table 22 Correlations between RC and Civilian Job Retention

	RC_index	p-value
Plan to leave the Center	-0.28	0
Will not voluntarily leave the Center	0.14	0.06
Reluctant to leave the Center	0.3	0
Plan to stay in the Center	0.26	0

5.3.1 How does RC affect “plan to leave the Center”?

From Table 22, we know there is a negative correlation between Plan to leave the Center and RC_index. The scatter plot below (Figure 10) also supported this conclusion.

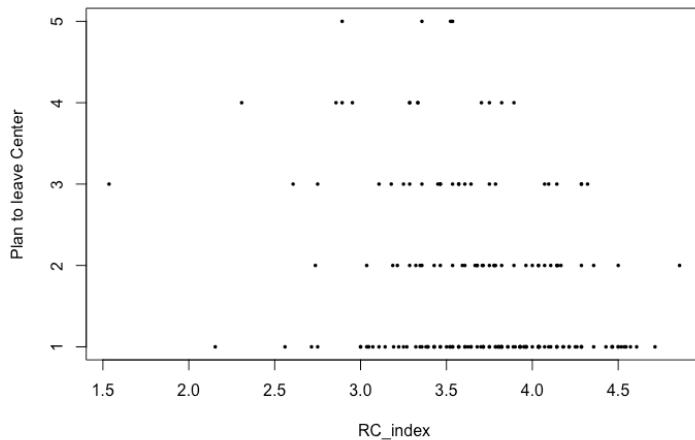


Figure 10 Scatter plot of Plan to Leave Center vs Relational Coordination

To further identify the relationship between RC and Plan to leave Center, we performed ordinary least squares (OLS) regression using Plan to leave Center as the response variable and RC_index as the main predictor, adjusting for respondents' age, gender, race, role, unit, degree, credentials, job experience (the years stayed in career, center and unit). As shown in Table 23, RC_index had a significant negative effect on Plan to leave Center.

Table 23 RC as a Predictor of Plan to Leave the Center

	Plan to Leave Center		
	Coefficient	SE	p-value
RC_index	-0.58	0.15	0

Next, we adjusted the other covariates together with RC_index respectively. Role, gender, degree, age, job experience and race didn't have significant effect on job satisfaction together with RC_index (data not shown). Interestingly, unit and credentials did show significant effect together with RC_index as shown in Table 24-25.

Table 24 RC and Unit as Predictors of Plan to Leave Center

	Plan to Leave Center		
	Coefficient	SE	p-value
RC_index	-0.5	0.15	0
unit-6 South	1.27	0.46	0.01
unit-OBGYN	1.71	0.75	0.02
unit-OR	1.02	0.43	0.02
unit-Urgent Care	2.66	0.73	0

Table 24 showed that RC_index had a negative effect on Plan to Leave Center. The civilian providers that worked in 6 South, OBGYN, OR or Urgent Care units were more likely to plan to leave the Center.

Table 25 RC and Credentials as Predictors of Plan to Leave Center

	Plan to Leave Center		
	Coefficient	SE	p-value
RC_index	-0.54	0.15	0
credentials-BSN	0.43	0.18	0.02
credentials-MD	0.74	0.31	0.02

Table 25 showed that civilian providers who had higher RC_index were less likely to Plan to Leave Center, but the civilian providers who had BSN or MD credentials were more likely to plan to leave the Center.

5.3.2 How does RC affect “will not voluntarily leave the Center”?

Since RC didn't affect the “Will not Voluntarily Leave the Center” outcome (Table 26), we chose to use best subset selection method to identify potential predictors that will affect this outcome. Based on the selection, we chose the model with one predictor: job satisfaction (Table 27). The civilian providers with higher job satisfaction were more likely not voluntarily leave the Center.

Table 26 RC as a Predictor of not Voluntarily Leave the Center

Not Voluntarily Leave the Center			
	Coefficient	SE	p-value
RC_index	0.34	0.18	0.06

Table 27 Job Satisfaction as a Predictor of not Voluntarily Leave the Center

Not Voluntarily Leave the Center			
	Coefficient	SE	p-value
Job Satisfaction	0.25	0.09	0.01

5.3.3 How does RC affect “reluctant to leave the Center”?

From Table 22, we know there is a positive correlation between Reluctant to leave the Center and RC_index. The scatter plot below (Figure 11) also supported this conclusion.

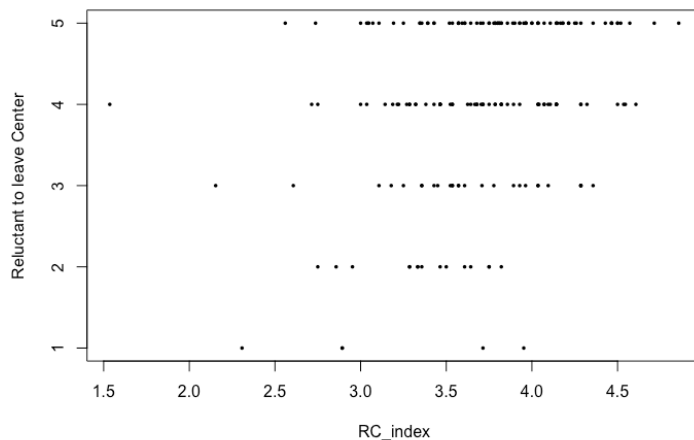


Figure 11 Scatter plot of Reluctant to Leave Center vs Relational Coordination

To further characterize the relationship between RC and Reluctant to leave Center, we conducted ordinary least squares (OLS) regression using Reluctant to leave Center as the response variable and RC_index as the main predictor, adjusting for respondents’ age, gender, race, role, unit, degree, credentials, job experience (the years stayed in career, center and unit). As shown in Table 28, RC_index had a significant positive effect on Reluctant to leave Center.

Table 28 RC as a Predictor of Reluctant to Leave the Center

Reluctant to Leave Center			
	Coefficient	SE	p-value
RC_index	0.63	0.15	0

Next, we adjusted the other covariates together with RC_index respectively. Role, gender, degree, age, career_years_group, unit_years_group and race didn’t have significant effect on Reluctant to Leave Center

together with RC_index (data not shown). Interestingly, unit, credentials and center_years_group did show significant effect together with RC_index as shown in Table 29-31.

Table 29 RC and Unit as Predictors of Reluctant to Leave Center

	Reluctant to Leave Center		
	Coefficient	SE	p-value
RC_index	0.51	0.15	0
unit-OBGYN	-2.34	0.77	0
unit-Various units	-2.16	1.02	0.04

Table 29 showed that RC_index had a positive effect on Reluctant to Leave Center. The civilian providers that worked in OBGYN or Various units were less likely to be reluctant to leave the Center.

Table 30 RC and Credentials as Predictors of Reluctant to Leave Center

	Reluctant to Leave Center		
	Coefficient	SE	p-value
RC_index	0.6	0.15	0
credentials-MD	-0.82	0.31	0.01
credentials-RN	-1.46	0.53	0.01

Table 30 showed that civilian providers who had higher RC_index were more likely to be reluctant to leave Center, but the civilian providers who had RN or MD credentials were less likely to be reluctant to leave the Center.

Table 31 RC and Center_years_group as Predictors of Reluctant to Leave Center

	Reluctant to Leave Center		
	Coefficient	SE	p-value
RC_index	0.65	0.15	0
center_years_group-5-10	0.36	0.18	0.04

Table 31 showed that RC_index had a positive effect on reluctant to leave Center, and stay in the Center for about 5 to 10 years also had a significantly positive effect on reluctant to leave Center.

5.3.4 How does RC affect “plan to stay the Center”?

From Table 22, we know there is a positive correlation between Plan to Stay Center and RC_index. The scatter plot below (Figure 12) also supported this conclusion.

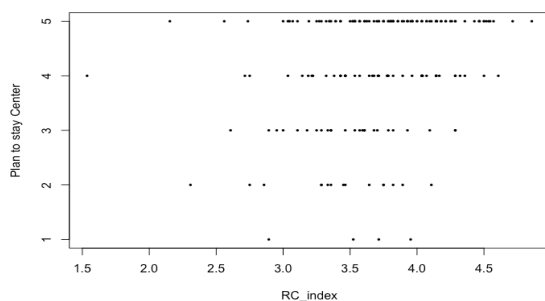


Figure 12 Scatter plot of Plan to Stay Center vs Relational Coordination

To further ascertain the relationship between RC and Plan to Stay Center, we performed ordinary least squares (OLS) regression using Plan to Stay Center as the response variable and RC_index as the main predictor, adjusting for respondents' age, gender, race, role, unit, degree, credentials, job experience (the years stayed in career, center and unit). As shown in Table 32, RC_index had a significant positive effect on Plan to Stay Center.

Table 32 RC as a Predictor of Plan to Stay the Center

	Plan to Stay Center		
	Coefficient	SE	p-value
RC_index	0.56	0.15	0

Next, we adjusted the other covariates together with RC_index respectively. Role, degree, age, job experience and race didn't have significant effect on Plan to Stay Center together with RC_index (data not shown). Interestingly, unit, credentials and gender did show significant effect together with RC_index as shown in Table 33-35.

Table 33 RC and Unit as Predictors of Plan to Stay Center

	Plan to Stay Center		
	Coefficient	SE	p-value
RC_index	0.41	0.15	0.01
unit-6 South	-1.24	0.47	0.01
unit-OBGYN	-2.62	0.76	0
unit-OR	-1	0.44	0.03
unit-Urgent Care	-1.99	0.75	0.01
unit-Various units	-2.38	1.02	0.02

Table 33 showed that RC_index had a positive effect on Plan to Stay Center. The civilian providers that worked in 6 South, OBGYN, OR, Urgent Care or Various units were less likely to plan to Stay the Center, consistent with the box plot shown in Figure 13.

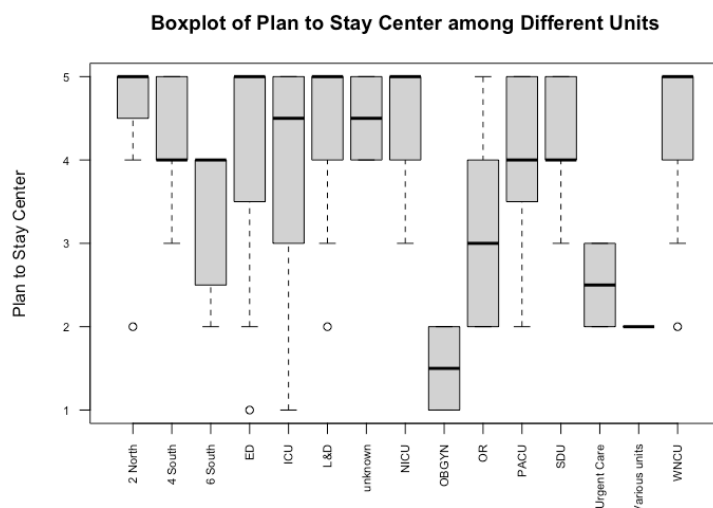


Figure 13 Boxplot of Plan to Stay Center among Different Units.

Table 34 RC and Credentials as Predictors of Plan to Stay Center

	Plan to Stay Center		
	Coefficient	SE	p-value
RC_index	0.51	0.15	0
credentials-BSN	-0.46	0.18	0.01
credentials-MD	-1.08	0.31	0

Table 34 showed that civilian providers who had higher RC_index were more likely to Plan to Stay Center, but the civilian providers who had BSN or MD credentials were less likely to plan to stay the Center.

Table 35 RC and Gender as Predictors of Plan to Stay Center

	Plan to Stay Center		
	Coefficient	SE	p-value
RC_index	0.6	0.15	0
gender-Female	-0.49	0.23	0.03

Table 35 showed that civilian providers who had higher RC_index were more likely to Plan to Stay Center, but the female civilian providers were less likely to plan to stay the Center.

5.4 What affects RC index?

The client was also interested in what would affect RC index. We performed OLS regression using RC index as the response variable and race, gender, unit, role, job satisfaction, job experience, age etc. as predictors. Based on best subset selection, we chose the model with top three predictors: credentials, center_years_group and job satisfaction (Table 36). The providers with higher job satisfaction or with LPN credentials were more likely to have higher RC index. On the other hand, providers with MSN credentials, or having worked in the unit more than 10 years tended to have lower Relational Coordination score.

Table 36 Predictors of Relational Coordination

	Relational Coordination		
	Coefficient	SE	p-value
job satisfaction	0.2	0.03	0
credentials-LPN	0.24	0.11	0.03
credentials-MSN	-0.32	0.13	0.01
center_years_group-10-15	-0.24	0.11	0.03
center_years_group->15	-0.34	0.1	0

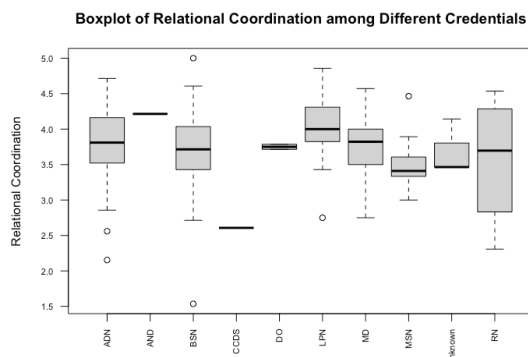


Figure 14 Boxplot of Relational Coordination among Different Credentials.

Figure 14 showed that there were some variations of Relational Coordination scores among providers with different credentials. The providers with LPN credential had relatively high RC score, while providers with MSN credential had lower RC score, consistent with the above OLS regression result.

6 Conclusion

These findings suggest relational coordination is a strong positive predictor of job satisfaction among healthcare providers. Working unit and job experience are also predictors of job satisfaction. Providers who work on OBGYN had worse job satisfaction. Besides using RC as a validated index, we also unpacked it to explore the underlying 7 dimensions in the correlation and regression analysis. Accurate communication (Q3) and shared goals (Q5) showed significant positive effect on job satisfaction.

Job satisfaction, credentials, unit and years in the working unit are common predictors of job retention for both military and civilian providers. There are also some different predictors for job retention between these two groups. RC couldn't predict job retention in military providers, but it could for civilian providers.

Taken together, this study provided strong evidence-based justification for leaders to change practice environments to foster RC which will increase the job satisfaction/retention of healthcare providers and eventually lead to deliver better quality care⁵.

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