

## **Mediation in the Effect of Autonomy Support from Managers on the Psychological Energy of Call Workers**

### **Introduction**

This research aims at understanding how getting autonomy support from the behalf of managers on the psychological energy of call workers, specifically whether or not the relationship between these two variables is mediated by intrinsic motivation: is the relationship between these variables indirect? Is there a third variable, intrinsic motivation, through which the relationship goes? It may be that manager autonomy support has an impact on intrinsic motivation, and that is why it influences the mental energy of workers. If this is the case, the predictor's (manager autonomy support) relationship with the outcome (psychological energy) flows through the mediator, which is theorised to be intrinsic motivation.

### **Research questions and hypotheses**

I formulate the following:

**Research question Q1.** Does manager autonomy support predict psychological energy in call workers?

**Null hypothesis H1.** Manager autonomy support does not predict the psychological energy of call workers.

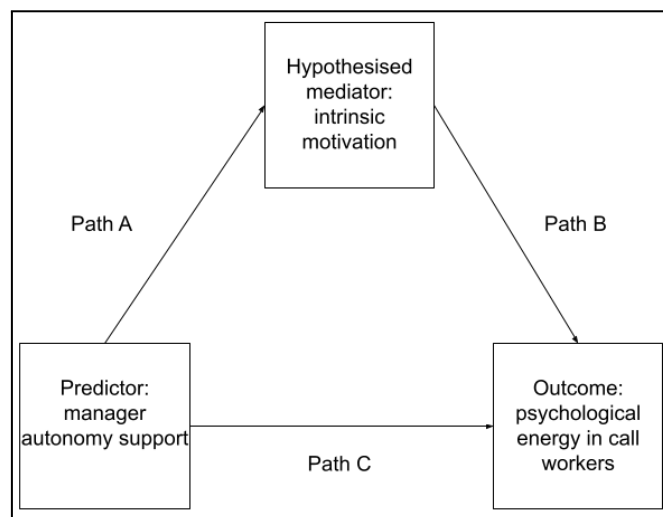
**Research question Q2.** Is the relationship between manager autonomy support and call worker psychological energy mediated by intrinsic motivation?

**Null hypothesis H2.** The indirect effect of the relationship between manager autonomy support and call worker psychological energy through intrinsic motivation will be zero.

## Data analysis method and justification

This quantitative research uses data from 214 employees at a British call centre, in the form of the energy\_data data file. The aut\_support variable refers to the average score on a 7-point Likert scale of each respondent's answer to prompts about autonomy granted to them by their manager. Likewise, int\_mot refers to responses to prompts about intrinsic motivation, and energy contains responses to prompts regarding mental energy at work.

To research this, I will be using linear regressions to test direct, total and indirect effects between manager autonomy support, energy and intrinsic motivation, especially testing magnitude and significance for the indirect effect, because they illustrate the effect of autonomy support on energy transmitted through intrinsic motivation. Initial analyses will summarise the data with favstats(), plot the distribution of energy and test covariance with Pearson's r. I will then analyse the three paths of the mediation diagram: from the predictor to the mediator and from the predictor to the outcome with simple regressions, and from the mediator to the outcome controlling for predictor, as well as from the predictor on the outcome, controlling for mediator, using a multiple regression. Finally, I will analyse the average causal mediation effect and average direct effect, and bootstrap the indirect effect. I believe these analyses will best indicate the statistical significance of the data and point to an answer to the two research questions.



**Figure 1.** *Diagram of the mediation paths used in the study.*

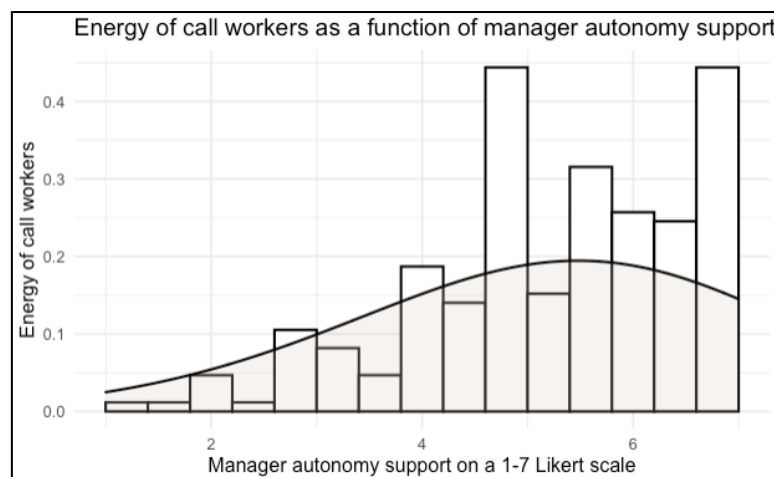
## Preliminary analysis

First I'll use the favstats() function to summarise the data.

min	Q1	median	Q3	max	mean	sd
1.666667	4.666667	5.333333	6	7	5.310748	1.034582

**Table 1.** Summary statistics on energy in the data file.

I'll now look at the distribution of energy as a function of manager autonomy support.



**Figure 2.** Distribution of energy of call workers as a function of autonomy support. The distribution seems to have a negative skew.

I will now test how much manager autonomy support and call worker psychological energy co-vary, using Pearson's r.

	aut_support	int_mot
aut_support	1.00	0.61
int_mot	0.61	1.00
energy	0.19	0.30
energy		
aut_support	0.19	
int_mot	0.30	
energy	1.00	
n= 214		

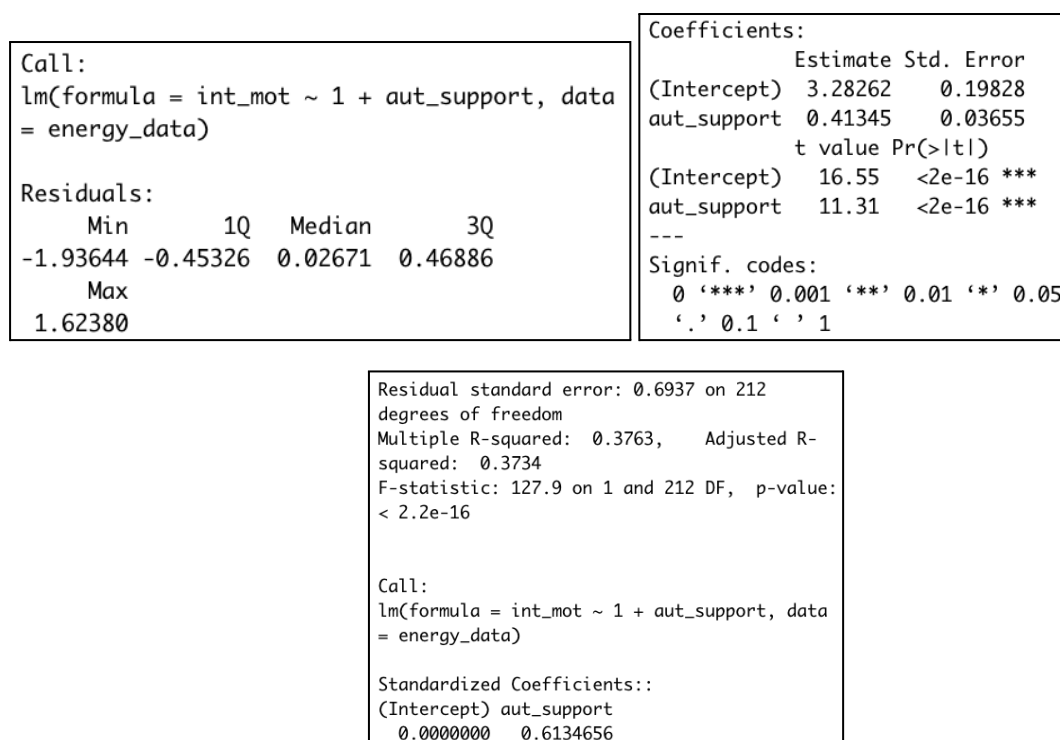
p	aut_support	int_mot
aut_support		0.0000
int_mot	0.0000	
energy	0.0048	0.0000
energy		
aut_support	0.0048	
int_mot	0.0000	
energy		

**Figures 3, 4.** Pearson correlation test for psychological energy and manager autonomy support.

The closer the  $r$  correlation coefficient is to +1 or -1, the larger the relationship. The relationship between autonomy support and energy is low (0.19), between intrinsic motivation and energy is low or moderate (0.3). The relationship between autonomy support and intrinsic motivation is high: 0.63. These correlations are positive and statistically significant, with  $p < 0.05$ . These results provide some backing to the hypothesis of a mediating variable.

### Primary analysis

I will now create a variable model, testing the path from the predictor to the mediator, that is the prediction of autonomy support on intrinsic motivation, using a simple regression.

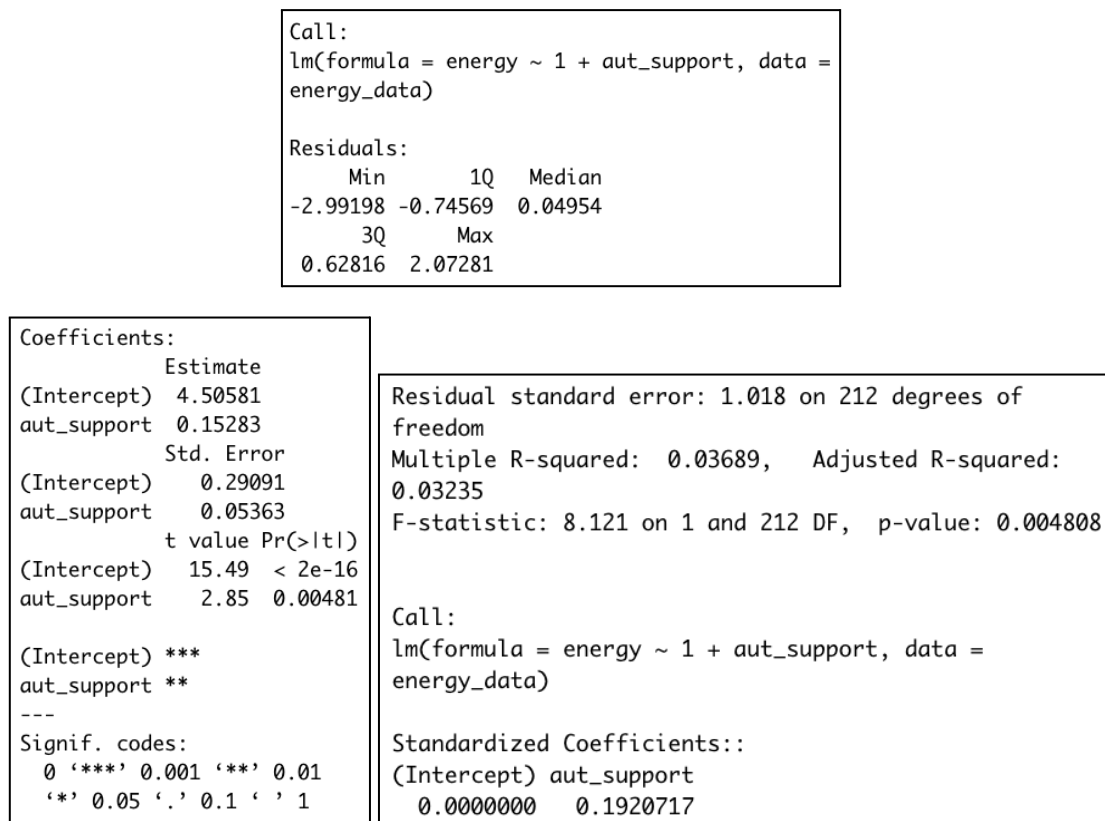


**Figures 5-7.** Summary and standardised coefficients of the linear model of path A.

The path from autonomy support to intrinsic motivation is 0.41, indicating that for every 1 unit increase in control there is a .35 unit increase in disconnection. The standardised estimate is higher: 0.61. The F ratio is significant, so we know that the linear model is a better

fit than the empty model. As the standard error is low and the t value is larger than 1.96 (11.31), I reject the null hypothesis. The effect is statistically significant.

Model.c regresses energy on autonomy support with a simple regression.



**Figures 8-10.** Summary and standardised coefficients of the linear model of path C.

The total effect of control on exhaustion is 0.15. The standardised estimate is 0.19. The F ratio (8.12) is significant: the linear model is a better fit than the empty model. The SE of the slope estimate is small and the t value is larger than 1.96 (2.85), so I can reject the null hypothesis and conclude that this is a statistically significant positive effect.

Model.b uses a multiple regression to regress intrinsic motivation on both autonomy support and energy.

Call: lm(formula = energy ~ 1 + aut_support + int_mot, data = energy_data)			Residuals: Min 1Q Median 3Q -2.80021 -0.68545 0.06596 0.60562 Max 2.18722		
Coefficients: Estimate Std. Error (Intercept) 3.38722 0.42946 aut_support 0.01194 0.06621 int_mot 0.34076 0.09824 t value Pr(> t ) (Intercept) 7.887 1.64e-13 *** aut_support 0.180 0.857089 int_mot 3.469 0.000634 *** --- Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 . ' ' 0.1 ' ' 1			Residual standard error: 0.9922 on 211 degrees of freedom Multiple R-squared: 0.08885, Adjusted R-squared: 0.08021 F-statistic: 10.29 on 2 and 211 DF, p-value: 5.455e-05  Call: lm(formula = energy ~ 1 + aut_support + int_mot, data = energy_data)  Standardized Coefficients: (Intercept) aut_support int_mot 0.00000000 0.01500298 0.28863670		

**Figures 11-13.** Summary and standardised coefficients of the linear model of path B.

This multiple regression contains both the prediction of intrinsic motivation on energy controlling for autonomy support and the direct effect of autonomy support on energy controlling for intrinsic motivation.

## Interpretation

This linear model is a better fit than the empty model as shown by the F ratio (10.29) and p value, which is smaller than 0.05.

The unstandardised slope estimate for the effect of intrinsic motivation on energy controlling for autonomy support is 0.34. The standardised slope estimate is 0.29. The SE is small and the t-value above 1.96, so we can reject the null hypothesis and say that this is a statistically significant positive relationship.

The unstandardised slope estimate for the effect of autonomy support on energy, controlling for intrinsic motivation, is 0.011. The standardised slope estimate is 0.015. The SE is small, but the estimate is too, and therefore the t-value is below 1.96 (0.18) so I cannot reject the null hypothesis H1. The results do not show that manager autonomy support predicts psychological energy in call workers.

Comparing the direct effect with the total effect seen in the multiple regression shows how much of the shared variance of autonomy support and energy is explained by intrinsic motivation. We can see that, in the presence of intrinsic motivation, the relationship between autonomy support and energy reduces to non-significance (i.e., from 0.15 to 0.011). This means that when the common variance between intrinsic motivation and autonomy support is removed from the model, the effect of autonomy support on energy becomes non-significant.

I'll now calculate the magnitude of mediation with the indirect effect, by multiplying 0.41 and 0.34. The result is 0.1394, meaning the indirect effect is 0.1394. Therefore for every increase of one unit in autonomy support, there is 0.1394 unit increase in energy passing through intrinsic motivation.

I will now bootstrap the sampling distribution of the indirect effect to calculate the 95% confidence interval. I need to do this to understand what I can infer from the 0.1394 effect: its meaning, size and implication for the research questions.

Causal Mediation Analysis			
Nonparametric Bootstrap Confidence Intervals with the Percentile Method			
	Estimate	95% CI Lower	
ACME	0.1409	0.0486	
ADE	0.0119	-0.1345	
Total Effect	0.1528	0.0290	
Prop. Mediated	0.9219	0.2661	
	95% CI Upper	p-value	
ACME	0.24	0.0024	
ADE	0.16	0.8876	
Total Effect	0.28	0.0176	
Prop. Mediated	3.81	0.0200	

ACME	**
ADE	
Total Effect	*
Prop. Mediated	*
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Signif. codes:	
0 '***' 0.001 '**' 0.01 '*' 0.05	
'.' 0.1 ' ' 1	
Sample Size Used:	214
Simulations:	5000

**Figures 14, 15.** *Bootstrap of the sampling distribution of the indirect effect for a 95% confidence interval.*

## Interpretation

The ACME, or "average causal mediation effect", is the indirect effect and is 0.1409, which is similar to the effect of 0.1394 I had calculated. The ADE, "average direct effect", or

direct effect, is 0.0119, similar to the one seen in the multiple regression model. The total effect is 0.15, as seen in the simple regression model. The proportion mediated, the total effect that is explained by the mediator, is 92.19%: nearly all of the variance shared between autonomy support and energy is explained by intrinsic motivation.

With 5000 simulations, the 95% confidence interval for the indirect effect of 0.14 runs from 0.0486 to 0.24. This interval does not include a zero indirect effect and therefore I can reject the null hypothesis. This means that the relationship between manager autonomy support and call worker psychological energy is mediated by intrinsic motivation. This answers my research question Q2 and I reject null hypothesis H2.

### **Lessons for future research**

Future research should first of all attempt to verify the validity of the findings of this study with different samples. It would be interesting to see how these results would hold up with responses from a more diverse sample, in terms of professional sector, gender and country.

### **Implications for practice**

The observed results have important consequences for the future of the well-being of call workers. Managers should understand that the relationship between autonomy support and energy at work appears in this study to be a correlation, not a causation, and the focus of the work to improve call worker well-being should be on increasing intrinsic motivation.