

# The Impact of Compulsory Citizenship Behavior on Job Performance of New-Generation Knowledge Workers: The Roles of Ego Depletion and Relational Energy

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**Purpose:** Based on ego depletion theory and interaction ritual theory, this research explores the impact of compulsory citizenship behavior on new-generation knowledge workers' job performance via the mediating role of ego depletion and the moderating role of relational energy employees experienced in interactions with coworkers.

**Methods:** Two studies were conducted to explore the impact of compulsory citizenship behavior on job performance. Study 1 used a 10-day daily diary Survey (N=112) and Study 2 used a questionnaire survey conducted multiple times (N=356) to test the hypotheses.

**Results:** The results of Study 1 and Study 2 were almost convergent. Compulsory citizenship behavior had a negative effect on job performance through the mediating effect of ego depletion. In addition, relational energy negatively moderated the effect of compulsory citizenship behavior on ego depletion and negatively moderated the mediating effect of ego depletion between compulsory citizenship behavior and job performance.

**Conclusion:** The results deepen our understanding of the mechanism underlying the effect of compulsory citizenship behavior on job performance from the theoretical perspective of psychological energy, and also provide practical implications on how to manage new-generation knowledge employees' work behavior and job performance.

**Keywords:** compulsory citizenship behavior, ego depletion, job performance, relational energy, new-generation knowledge workers

## Introduction

Organizational citizenship behavior is defined as individual voluntary behavior that is not included in the organizational formal reward system but that boosts organizational performance.<sup>1,2</sup> However, in recent years, some scholars have pointed that employees do not always act outside of their roles voluntarily, and sometimes they have to conduct out-role behaviors required by their organizations, in which case it is called compulsory citizenship behavior.<sup>3-5</sup> Unlike organizational citizenship behavior, compulsory citizenship behavior may have a negative effect on job performance, which needs more attention.<sup>6-8</sup> For example, based on the social exchange theory, compulsory citizenship behavior had a significant negative effect on job performance through psychological contract violation<sup>9</sup>; based on cognitive dissonance theory, compulsory citizenship behavior had a negative effect on job performance through damaging employees' job engagement<sup>10</sup>; based on the self-efficacy theory, compulsory citizenship behavior was negatively associated with job performance through damaging employees' self-efficacy<sup>11</sup>; and based on social identity theory, compulsory citizenship behavior reduced job performance through damaging employees' organizational identity.<sup>12</sup>

Existing studies have laid a foundation for understanding the mechanism operating in the negative relationship between compulsory citizenship behavior and job performance, but there are still some gaps to bridge. Firstly, few studies explored the effect of compulsory citizenship behavior on new-generation knowledge workers' job performance. However, in contemporary knowledge-based economies, the job performance of knowledge workers functions as a crucial source of organizational innovation and sustainability.<sup>13</sup> In addition, existing studies pointed that new-generation knowledge workers advocate for independence and autonomy at work.<sup>14,15</sup> Therefore, when they have to engage in compulsory citizenship behavior under high pressure, they are more likely to generate negative cognition and attitude.<sup>16</sup> Moreover, knowledge workers are mainly engaged in intangible mental work, and thus it is difficult to monitor their work processes, which makes the new-generation knowledge workers more likely to engage in negative work behaviors once they generate negative attitude.<sup>17</sup> For these reasons, it is necessary to pay more attention to the negative effect of compulsory citizenship behavior on the job performance of new-generation knowledge workers.

Secondly, previous studies mainly examined the mechanism underlying the negative effect of compulsory citizenship behavior on job performance based on cognitive dissonance theory, self-efficacy theory, social identity theory, etc.<sup>10–12</sup> These studies have provided a basis for understanding the mechanism, but they have not accounted for psychological energy, which is an important resource that can increase employees' performance.<sup>18–20</sup> According to the energy model of ego depletion theory, psychological energy is the basis of all self-control acts, such as attentional control, emotional control, etc.<sup>21</sup> If individuals consume excessive psychological energy, they may fall into ego depletion, which then leads to subsequent self-control failures in work process and thus damage job performance.<sup>22</sup> Given that knowledge workers need a large amount of psychological energy to perform self-control acts during the process of deep analysis of knowledge information,<sup>23</sup> it is more likely that their job performance will be damaged once they fall into ego depletion when they engage in many compulsory citizenship behaviors. Therefore, in order to shed light on the effect of compulsory citizenship behavior on new-generation knowledge workers' job performance, it is necessary to explore the mediating effect of ego depletion on the relationship between compulsory citizenship behavior and job performance from the theoretical perspective of psychological energy.

Thirdly, previous studies have rarely examined the moderating effect of relational energy employees experienced in interactions with coworkers. However, employees always have frequent interpersonal interactions with coworker in workplace, especially the new-generation employees pay more attention to maintaining high-quality interactions with coworkers.<sup>24</sup> According to interaction ritual theory, individuals can obtain relational energy through high-quality interpersonal interaction, then replenish their own psychological energy deficit and inhibit the generation of ego depletion.<sup>25–27</sup> Therefore, when new-generation knowledge workers consume more and more individual psychological energy as compulsory citizenship behavior increases, the relational energy they experience in interactions with coworkers can provide a supplement to their internal psychological energy, which can further weaken the negative effect of compulsory citizenship behavior on job performance through ego depletion. Therefore, it is necessary to expand the boundary conditions on the relationship between compulsory citizenship behavior and job performance by exploring the moderating effect of relational energy employees' experience during interactions with their coworkers.

Overall, guided by ego depletion theory and interaction ritual theory, the paper aims to explore the mechanism underlying the effect of compulsory citizenship behavior on new-generation knowledge workers' job performance, including the mediating effect of ego depletion, and the moderating effect of relational energy in the intermediary process. The main contributions are as follows. Firstly, the research provides a more comprehensive understanding of the mechanism underlying the effect of compulsory citizenship behavior on job performance from a new theoretical perspective of psychological energy. Secondly, the research expands the understanding of boundary conditions on the relationship between compulsory citizenship behavior and job performance by exploring the moderating effect of relational energy employees experienced in interactions with coworkers. Finally, the research aims to test the effect of compulsory citizenship behavior on job performance at within-individual and between-individual levels by two studies described below, which can cross-validate the findings and answer the calls for more replication studies with diverse research designs.<sup>28–30</sup>

## Theoretical and Hypothesis

### The Mediating Role of Ego Depletion

According to ego depletion theory, psychological energy is the energy resource basis for individuals to perform any self-control act (such as cognitive control, emotional control, or behavioral control). However, psychological energy resources are limited.<sup>31</sup> Once individuals consume too much psychological energy, they will fall into ego depletion, which is a state of impaired self-control function resulting from the depletion of psychological energy, then leading to the failure of subsequent self-control behaviors.<sup>32,33</sup> Based on this theory, given that compulsory citizenship behavior refers to extra-role behaviors performed against the employee's own will, new-generation knowledge workers have to consume psychological energy to control their inner reluctance and unwillingness when they engage in compulsory citizenship behavior. Therefore, the more compulsory citizenship behaviors new-generation knowledge workers must perform, the more psychological energy they must consume. Subsequently, they are more likely to fall into ego depletion due to a lack of psychological energy, leading to subsequent failure of self-control.

Furthermore, compared with other employees, knowledge-based employees often need to concentrate more attention to integrate and analyze information deeply.<sup>23</sup> That is, they need to consume a lot of individual psychological energy to perform a high degree of self-control, such as cognitive control and volitional control. Therefore, once new-generation knowledge workers fall into ego depletion as compulsory citizenship behavior increases, it will be difficult for them to implement self-control acts in subsequent knowledge-based work. Not only is it difficult to engage in work but it is also difficult to deeply process information.<sup>34–36</sup> Eventually, ego depletion will result in poor work quality and work inefficiency, and subsequent reductions in knowledge-based job performance. Therefore, the following hypothesis can be proposed:

Hypothesis 1: Compulsory citizenship behavior has a significant negative effect on job performance through the mediating effect of ego depletion.

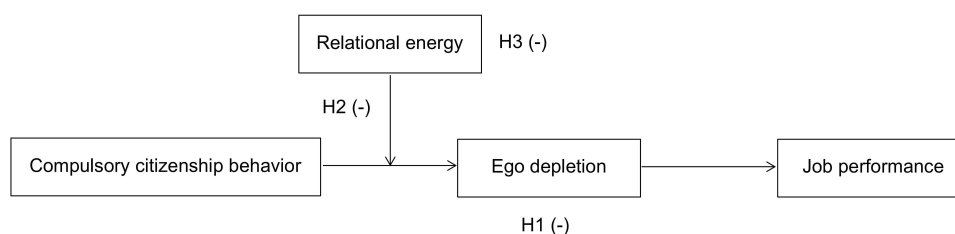
### The Moderating Role of Relational Energy

Based on interaction ritual theory, psychological energy exists not only within individuals but can also be transferred between individuals.<sup>37</sup> The latter is relational energy, which is rooted within the individual and arises from interpersonal interactions.<sup>25</sup> That is, individuals can obtain psychological energy from others through high-quality interpersonal interactions so that their own psychological energy resources can be replenished to some extent.<sup>26</sup> Existing studies have found that the new-generation employees interact frequently with coworkers in workplace and value high-quality interactions with coworkers.<sup>24</sup> Therefore, new-generation knowledge workers not only can rely on their own psychological energy to cope with internal cognitive dissonance in face of compulsory citizenship behaviors, but also can obtain relational energy through positive and effective high-quality interpersonal interactions with their coworkers, supplementing their own psychological energy and inhibiting ego depletion. When there is a lot of relationship energy available, new-generation knowledge employees will be less likely to fall into ego depletion even if they need to conduct more compulsory citizenship behavior, because they can also replenish their own energy by obtaining relationship energy through high-quality interpersonal interaction with coworkers. However, when the level of relationship energy is low, new-generation employees are unable to replenish their psychological energy through obtaining relationship energy, making ego depletion due to compulsory citizenship behavior a more likely outcome. Therefore, the following hypothesis can be proposed:

Hypothesis 2: Relational energy moderates the positive effect of compulsory citizenship behavior on ego depletion, such that the effect is stronger when the relational energy level is low, and weaker when the relational energy level is high.

### The Moderating Mediating Effect

In summary, by combining the mediating effect of ego depletion and the moderating effect of relational energy, we can propose a moderated mediation model to explain the mechanism underlying the effect of compulsory citizenship behavior on new-generation knowledge workers' job performance. Specifically, when the relational energy level is



**Figure 1** Theoretical model. Hypotheses and conceptual model regarding the effect of compulsory citizenship behavior on job performance.

higher, new-generation knowledge workers can supplement their internal psychological energy through relational energy, thus reducing the likelihood of ego depletion caused by compulsory citizenship behaviors, and weakening the negative effect of compulsory citizenship behaviors on job performance through ego depletion. On the contrary, when relational energy level is lower, it is difficult for new-generation knowledge workers to replenish their inner psychological energy consumed by compulsory citizenship behaviors, making them more likely to fall into a state of ego depletion, resulting in a stronger negative effect of compulsory citizenship behavior on job performance through ego depletion. Therefore, the following hypothesis can be proposed:

**Hypothesis 3:** Relational energy moderates the indirect negative effect of compulsory citizenship behavior on job performance through ego depletion, such that the indirect negative effect is stronger when the relational energy level is low, and weaker when the relational energy level is high.

As mentioned above, we proposed a conceptual model of the study as shown in [Figure 1](#).

## Overview of the Studies

In order to answer recent calls for more replication studies with diverse research designs,<sup>38</sup> we tested the conceptual model at within-individual and between-individual levels by conducting two studies. Study 1 used a daily diary survey to investigate the effect of compulsory citizenship behavior on the job performance of new-generation knowledge workers, aiming to test the model on the within-individual level. Study 2 used a survey at multiple points in time to investigate the effect of chronic compulsory citizenship behaviors on the job performance of new-generation knowledge workers, aiming to test the model on the between-individual level.

## Study I: Daily Diary Study

According to existing studies, compulsory citizenship behavior may be temporary daily behavior, which may occur once or several times within a workday, induced by some organizational contingency factors such as temporary task assignments or occasional demands.<sup>39</sup> Therefore, the purpose of Study 1 is to explore the mechanism underlying the negative effect of compulsory citizenship behavior on job performance using a daily diary study at the within-individual level.

## Participants and Procedure

We used a 10-day daily diary study in October 2022 to test the effect of compulsory citizenship behavior on job performance at the within-individual level. A total of 125 full-time employees were recruited from Chinese companies with the convenience sampling technique. According to existing studies, new-generation knowledge workers are employees born after 1980, who are mainly engaged in knowledge application and creation activities.<sup>40</sup> Therefore, in line with the definition of new-generation knowledge employees, the participants were all born after 1980 and work in knowledge-intensive industries, such as education and training. There were two-phases surveys. The first questionnaire survey asked for information on control variables and relational energy. One week later, the second survey was launched, asking questions about compulsory citizenship behavior, ego depletion, and job performance, and lasting for 10 working days. Specifically, we sent a questionnaire link to employees at 17:00 daily and reminded employees who had not yet completed the questionnaire at 18:00. All questionnaires were collected by 19:00 daily. In addition, the questionnaires

also included a cover letter stating that all participants' identities were anonymous and that they could stop participating at any point if they felt uncomfortable. Each participant was rewarded with 5 RMB for completing the questionnaire at each time point. After the survey, the sample data were screened for withdrawal from the survey and missing responses, and a total of 112 valid individual samples were obtained. Of the 112 employees in the final sample, 63 were male and 49 were female, 12 had some college education or less, 78 had a bachelor's degree, and 22 had a graduate degree or above. The participants' average age was 30.17 years, and the average organizational tenure was 5.29 years.

## Variable Measurement

Compulsory citizenship behavior was measured by a five-item scale in a unidimensional model developed by Vigoda-Gadot (2007).<sup>41</sup> Sample items included "I feel that I am forced to assist my supervisor against my will and beyond my formal job obligations". In Study 1, the Cronbach's alpha coefficient was 0.85.

Job performance was measured by a five-item scale in a unidimensional model developed by Janssen et al.<sup>42</sup> Sample items included "I meet all formal performance requirements of the job". In Study 1, the Cronbach's alpha coefficient was 0.85.

Ego depletion was measured by a five-item scale in a unidimensional model developed by Lin and Johnson.<sup>43</sup> Sample items included "My mind feels unfocused". In Study 1, the Cronbach's alpha coefficient was 0.91.

Relationship energy was measured by a five-item scale in a unidimensional model developed by Owens et al.<sup>26</sup> Sample items included "After interacting with my coworker I feel more energy to do my work". In Study 1, the Cronbach's alpha coefficient was 0.89.

In addition, because some demographic variables (gender, age, education level, and organizational tenure) have significant effects on employees' work attitudes and performance,<sup>44</sup> we also controlled these demographic variables. Moreover, this study also controls for social desirability bias. Social desirability was measured using a ten-item scale developed by Steenkamp et al.<sup>45</sup> In Study 1, the Cronbach's alpha coefficient was 0.88.

## Data Analysis

The data set contains both within-individual data and between-individual data, forming a two-level nested data structure. Namely, compulsory citizenship behavior (t), ego depletion (t+1), and job performance (t+1) belong to the sample data for the within-individual level (Level-1) while control variables and relational energy belong to the sample data for the between-individual level (Level-2). The within-individual level (Level-1) variables were centered on their respective person mean, while the between-individual level (Level-2) variables were centered on the grand mean. The data were analyzed with Mplus 7.4. Firstly, we tested the common method bias and discriminant validity. Secondly, we carried out descriptive statistics and correlation analysis to analyze the relationships between variables. Thirdly, we constructed a null model and tested the appropriateness of cross-level analysis. Finally, we constructed a cross-level moderated mediation model to test the hypothesis.

## Results

### Multilevel Confirmatory Factor Analysis

The results of the Harman's single-factor test method showed that the variance explained by the largest common factor was 23.40%, which is less than the 40% threshold, indicating that there is no prominent common method bias.<sup>46</sup> In addition, as shown in the results of the multilevel confirmatory factor analysis in Table 1, the fits of the four-factor model were better than those of other models, showing significant discriminant validity between variables.

### Descriptive Statistics Analysis

The mean value, standard deviation and correlation coefficients of all variables are shown in Table 2. The results showed that compulsory citizenship behavior was significantly and positively associated with ego depletion ( $r=0.12$ ,  $p<0.001$ ), and ego depletion was significantly and negatively associated with job performance ( $r=-0.23$ ,  $p<0.001$ ). These correlation results were basically consistent with the proposed hypotheses.

**Table 1** Results of Multilevel Confirmatory Factor Analyses in Study 1

Model	Factor	$\chi^2$	$\chi^2/df$	TLI	CFI	RMSEA	SRMR	
							Within	Between
Four-factor model	CCB, ED, JP, RE	494.50	5.38	0.92	0.94	0.07	0.05	0.03
Three-factor model	CCB + ED, JP, RE	2205.39	23.46	0.59	0.66	0.15	0.16	0.03
Two-factor model	CCB + ED + JP, RE	3916.96	41.23	0.26	0.39	0.20	0.21	0.03

**Abbreviations:** CCB, compulsory citizenship behavior; ED, ego depletion; JP, job performance; RE, relational energy; TLI, Tucker–Lewis's index; CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean residual.

**Table 2** Mean, Standard Deviations, and Correlations of Variables in Study 1

Variables	M	SD	1	2	3	4	5	6	7	8	9
Level 2 (between-person)											
1. Gender	1.44	0.50	I								
2. Age	30.17	3.57	0.11**	I							
3. Education level	2.09	0.54	−0.08*	0.21***	I						
4. Organizational tenure	5.29	2.69	0.17***	0.28***	−0.20***	I					
5. Social desirability	2.61	0.71	0.01	−0.03	−0.06*	−0.04	I				
6. Relational energy	2.48	0.83	0.00	−0.00	0.09**	0.13***	−0.05	I			
Level 1 (within-person)											
7. Compulsory citizenship behavior	2.34	0.91	−0.10**	−0.01	−0.05*	0.09**	0.01	0.22***	I		
8. Ego depletion	2.19	0.81	−0.05	0.00	0.04	−0.03	−0.04	−0.04	0.12***	I	
9. Job performance	3.17	0.96	0.04	0.03	0.02	−0.04	0.07*	−0.08*	−0.18***	−0.23***	I

**Notes:** \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ , \*\*\*\* $p < 0.001$ .

**Abbreviations:** M, mean; SD, standard deviation.

## Hypothesis Testing

Firstly, we began with a null model to evaluate whether conducting multilevel analysis would be appropriate. The results showed the ratios of variance between individuals (ICC, intraclass correlation coefficients) for compulsory citizenship behavior, ego depletion, and job performance were 0.59, 0.16, and 0.25, respectively, with  $p$ -values less than 0.001. Accordingly, multilevel analysis was appropriate.

Secondly, we tested the indirect negative effect of compulsory citizenship behavior on job performance through the mediating effect of ego depletion. As shown in Model 1 of Table 3, the results showed that compulsory citizenship behavior had not a significant effect on job performance ( $\beta = -0.11$ ,  $p > 0.10$ ). Then, ego depletion was added into the model. As shown in Model 2 of Table 3, the results showed that the effect of compulsory citizenship behavior was more insignificant ( $\beta = -0.09$ ,  $p > 0.10$ ), and the effect of ego depletion was significant ( $\beta = -0.16$ ,  $p < 0.01$ ). Therefore, ego depletion did not have a mediating effect on the relationship between compulsory citizenship behavior and job performance. In addition, the mediating effect of ego depletion was tested again according to procedures proposed by Hayes and Preacher.<sup>47</sup> The results showed that the mediating effect value was  $-0.01$  with a 95% confidence interval  $[-0.02, 0.00]$  containing 0, indicating that ego depletion did not have a significant mediating effect on the relationship between compulsory citizenship behavior and job performance. Thus, hypothesis 1 was not supported.

Thirdly, we tested the moderating effect of relational energy on the relationship between compulsory citizenship behavior and ego depletion. As shown in the results of Model 3 in Table 3, the interaction term between compulsory citizenship behavior and relational energy had a significant effect on ego depletion ( $\beta = -0.15$ ,  $p < 0.01$ ). Specifically, this study plotted predicted ego depletion against compulsory citizenship behavior separately for low and high levels of relational energy (1 SD below the mean and 1 SD above the mean, respectively) (Figure 2). Simple slope tests indicated that the effect of compulsory citizenship behavior on ego depletion was significant and strong when the level of relational



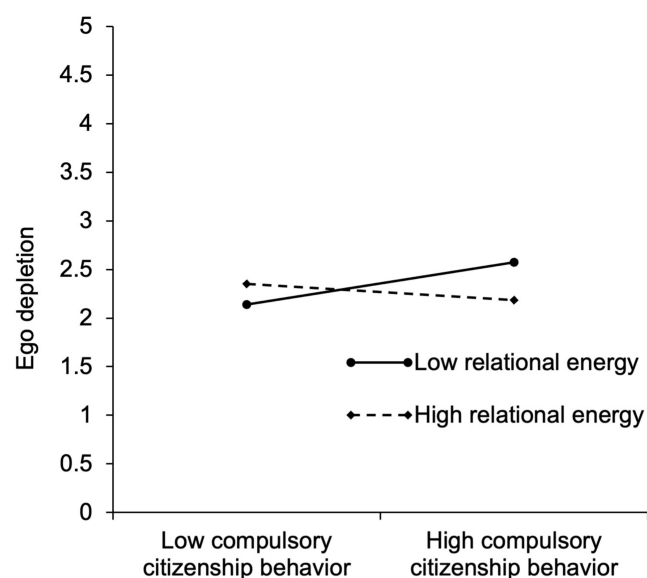
**Table 3** Analyses Predicting Ego Depletion and Job Performance in Study 1

Variables	Job Performance				Ego Depletion	
	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Intercept	2.83***	0.51	2.81***	0.51	2.31***	0.43
Level 2 (between-person)						
Gender	0.06	0.10	0.06	0.10	-0.08	0.08
Age	0.01	0.02	0.01	0.02	0.00	0.01
Educational level	-0.00	0.10	-0.00	0.10	0.04	0.10
Organizational tenure	-0.02	0.02	-0.02	0.02	-0.01	0.02
Social desirability	0.09	0.08	0.09	0.08	-0.04	0.05
Relational energy					-0.04	0.05
Level 1 (within-person)						
Compulsory citizenship behavior	-0.11	0.07	-0.09	0.07	0.07	0.07
Ego depletion			-0.16**	0.04		
Cross-level interaction						
Compulsory citizenship behavior × Relational energy					-0.15**	0.05

Notes: \*\* $p < 0.01$ , \*\*\* $p < 0.001$ .

energy was low ( $\beta=0.19$ ,  $p<0.01$ ). Conversely, the effect was not significant and weak when the level of relational energy was high ( $\beta=-0.06$ ,  $p>0.10$ ). Thus, hypothesis 2 was supported.

Fourthly, we tested the moderated mediation effect. Referring to the moderated mediation path analysis introduced by Edwards and Lambert,<sup>48</sup> we investigated whether the mediating effect of ego depletion was significantly different under low (1 SD below the mean) and high (1 SD above the mean) levels of relational energy. As shown in Table 4, the results showed that the indirect effect of compulsory citizenship behavior on job performance through ego depletion was stronger when relational energy was low ( $\beta=-0.03$ ,  $p<0.10$ , 90% CI=[-0.05, -0.00]) than when it was high ( $\beta=0.01$ ,  $p>0.10$ , 95% CI=[-0.01, 0.03]) and the difference between the indirect effects for high and low relational energy was significant ( $\Delta\beta=0.04$ ,  $p<0.05$ , 95% CI=[0.01, 0.07]). The result supported the proposed moderated mediation effect. Thus, hypothesis 3 was supported.



**Figure 2** Moderating effect of relational energy in Study 1. Low and high relational energy means 1 SD below the mean and 1 SD above the mean, respectively.

**Table 4** Results of Moderated Mediation in Study 1

Mediator	Relational Energy	Effect	SE	Boot LLCI	Boot ULCI
Ego depletion	Low	−0.03 <sup>†</sup>	0.02	−0.05	−0.00
	High	0.01	0.01	−0.01	0.03
	Difference	0.04 <sup>*</sup>	0.02	0.01	0.07

Notes: <sup>†</sup>p < 0.1, <sup>\*</sup>p < 0.05.

Abbreviations: SE, standard error; Boot LLCI, the lower limits of a confidence interval calculated using bootstrapping; Boot ULCI, the upper limits of a confidence interval calculated using bootstrapping.

## Study 2: Questionnaire Study

According to existing studies, compulsory citizenship behavior may be seen as a relatively stable (“chronic”) construct induced by some more stable factors, such as destructive leadership and illegal organizational institutions.<sup>49–51</sup> In such conditions, compulsory citizenship behavior may occur persistently or recurrently over long periods of time. Therefore, the purpose of Study 2 is to explore the mechanism underlying the negative effect of chronic compulsory citizenship behavior on job performance using a questionnaire survey conducted at two points in time at the between-individual level.

## Participants and Procedure

We used a questionnaire survey conducted at two points in time with a 1-month interval between September and December 2022 in China. A total of 403 full-time employees were recruited from Chinese companies with the convenience sampling technique. In line with the definition of new-generation knowledge employees,<sup>40</sup> the participants were all born after 1980 and work in knowledge-intensive industries, such as scientific research and information technology. The first online questionnaire measured control variables, and asked employees to report compulsory citizenship behaviors they had experienced over the past 3 months, as well as the relational energy employees usually experienced during interactions with coworkers. A month later, the second online questionnaire was conducted to measure ego depletion and job performance. In addition, the questionnaires also included a cover letter that indicated all participants’ identities were anonymous, and that they could stop participating at any point if they felt uncomfortable. Each participant was rewarded with 10 RMB for completing the questionnaire at each time point. Finally, 356 valid questionnaires were obtained. Of the sample, 187 were male and 169 were female, 29 had a college education or less, 256 had a bachelor’s degree, and 71 had a postgraduate degree or above. The participants’ average age was 30.14 years, and the average organizational tenure was 4.54 years.

## Variable Measurement

The measures of compulsory citizenship behavior, job performance, ego depletion, relational energy, and control variables were the same as those in Study 1. In Study 2, Each scale still had a good reliability and the Cronbach’s  $\alpha$  coefficients were 0.91, 0.94, 0.95, 0.88, and 0.89, respectively.

## Data Analysis

The data were analyzed with Mplus 7.4. Firstly, we tested the common method bias and discriminant validity. Secondly, we carried out descriptive statistics and correlation analysis to analyze the relationship between variables. Thirdly, we constructed the mediation model, moderated model, and moderated mediated model to test the hypotheses.

## Results

### Confirmatory Factor Analysis

The results of Harman’s single-factor test method showed that the variance explained by the largest common factor was 28.70%, less than the critical value of 40%, indicating no prominent common method bias.<sup>46</sup> In addition, as shown in Table 5, the four-factor model fits were higher than those of other models, showing significant discriminant validity between variables and no significant issue with common method bias.



**Table 5** Results of Confirmatory Factor Analyses in Study 2

Model	Factor	$\chi^2$	$\chi^2/\text{df}$	TLI	CFI	RMSEA	SRMR
Four-factor model	CCB, ED, JP, RE	622.55	3.80	0.90	0.92	0.09	0.04
Three-factor model	CCB + ED, JP, RE	1705.02	10.21	0.68	0.72	0.16	0.15
Two-factor model	CCB + ED + JP, RE	3143.66	18.60	0.38	0.45	0.22	0.21
One-factor model	CCB + ED + JP + RE	4780.77	28.12	0.05	0.15	0.28	0.27

**Abbreviations:** CCB, compulsory citizenship behavior; ED, ego depletion; JP, job performance; RE, relational energy; TLI, Tucker–Lewis's index; CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean residual.

## Descriptive Statistics Analysis

The mean value, standard deviation and correlation coefficients of all variables are shown in Table 6. Compulsory citizenship behavior was significantly and positively associated with ego depletion ( $r=0.22$ ,  $p<0.001$ ). Ego depletion was significantly and negatively associated with job performance ( $r=-0.21$ ,  $p<0.001$ ). These results are basically consistent with the proposed hypotheses.

## Hypothesis Testing

Firstly, we tested the indirect negative effect of compulsory citizenship behavior on job performance through the mediating effect of ego depletion. As shown in Model 1 of Table 7, the results showed that compulsory citizenship behavior ( $\beta=-0.12$ ,  $p<0.05$ ) had a significant effect on job performance. Then, ego depletion was added into the model. As shown in Model 2 of Table 7, the results showed that the effect of compulsory citizenship behavior ( $\beta=-0.07$ ,  $p>0.10$ ) was not significant, but the ego depletion ( $\beta=-0.23$ ,  $p<0.001$ ) was significant. Therefore, ego depletion had a full mediating effect on the relationship between compulsory citizenship behavior and job performance. In addition, the mediating effect of ego depletion was tested again according to procedures proposed by Hayes and Preacher.<sup>47</sup> The results showed that the mediating effect value was  $-0.05$  with a 95% confidence interval  $[-0.10, -0.02]$  not containing 0, indicating that ego depletion had a significant mediating effect on the relationship between compulsory citizenship behavior and job performance. Thus, hypothesis 1 was supported.

Secondly, we examined the moderating effect of relational energy on the relationship between compulsory citizenship behavior and ego depletion. As shown in the results of Model 3 in Table 7, the interaction term of compulsory citizenship behavior and relational energy had a significant effect on ego depletion ( $\beta=-0.21$ ,  $p<0.01$ ). Specifically, this study plotted predicted ego depletion against compulsory citizenship behavior separately for low (1 SD below the mean) and high (1 SD above the mean) levels of relational energy (Figure 3). Simple slope tests indicated that the effect of compulsory citizenship behavior on ego depletion was significant and strong when the level of relational energy was low ( $\beta=0.44$ ,  $p<0.001$ ). Conversely, the effect was not significant and weak when the level of relational energy was high ( $\beta=0.11$ ,  $p>0.10$ ). Thus, hypothesis 2 was supported.

**Table 6** Mean, Standard Deviations, and Correlations of Variables in Study 2

Variables	M	SD	1	2	3	4	5	6	7	8	9
1. Gender	1.48	0.50	I								
2. Age	30.14	3.12	0.02	I							
3. Education level	2.12	0.52	0.08	0.18**	I						
4. Organizational tenure	4.54	2.19	-0.00	0.27***	-0.22***	I					
5. Social desirability	1.92	0.76	0.03	0.02	0.00	-0.06	I				
6. Compulsory citizenship behavior	3.10	0.88	0.05	-0.04	-0.02	-0.06	-0.04	I			
7. Ego depletion	2.29	0.91	-0.01	-0.07	-0.08	-0.01	0.11*	0.22***	I		
8. Relational energy	3.06	0.70	-0.01	-0.00	0.00	-0.01	-0.07	0.02	-0.25***	I	
9. Job performance	3.50	1.03	0.03	-0.09 <sup>+</sup>	0.03	-0.04	-0.03	-0.10 <sup>+</sup>	-0.21***	0.13*	I

**Notes:** <sup>+</sup>  $p < 0.1$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

**Abbreviations:** M, mean; SD, standard deviation.

**Table 7** Analyses Predicting Ego Depletion and Job Performance in Study 2

Variables	Job Performance				Ego Depletion	
	Model 1		Model 2		Model 3	
	B	SE	B	SE	B	SE
Intercept	4.70***	0.61	5.16***	0.62	2.83***	0.48
Gender	0.07	0.11	0.06*	0.11	−0.04	0.09
Age	−0.03 <sup>+</sup>	0.02	−0.04 <sup>+</sup>	0.02	−0.09	0.09
Educational level	0.08	0.11	0.05	0.11	−0.02	0.02
Organizational tenure	−0.00	0.03	−0.00	0.03	0.00	0.02
Social desirability	−0.04	0.07	−0.01	0.07	0.10 <sup>+</sup>	0.06
Relational energy					−0.31***	0.06
Compulsory citizenship behavior	−0.12*	0.06	−0.07	0.06	0.26***	0.05
Ego depletion			−0.23***	0.06		
Compulsory citizenship behavior × Relational energy					−0.21**	0.08

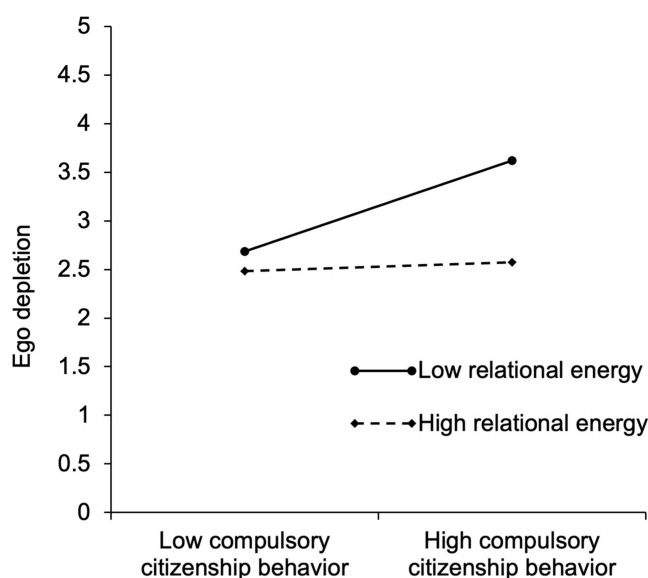
Notes: <sup>+</sup>p < 0.1, \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001.

Thirdly, we tested the moderated mediation effect. Referring to the moderated mediation path analysis introduced by Edwards and Lambert,<sup>48</sup> we investigated whether the mediating effect of ego depletion was significantly different under low (1 SD below the mean) and high (1 SD above the mean) levels of relational energy. As shown in Table 8, the results showed that the indirect effect of compulsory citizenship behavior on job performance through ego depletion was stronger when relational energy was low ( $\beta = -0.09$ ,  $p < 0.01$ , 95% CI = [−0.17, −0.03]) than when it was high ( $\beta = -0.03$ ,  $p < 0.05$ , 95% CI = [−0.07, −0.00]) and the difference between the indirect effects for high and low relational energy was significant ( $\Delta\beta = 0.06$ ,  $p < 0.05$ , 95% CI = [0.01, 0.12]). The result supported the proposed moderated mediation effect. Thus, hypothesis 3 was supported.

## Discussion and Implications

### General Discussion

Guided by ego depletion theory and interaction ritual theory, we constructed a moderated mediation model to explore the effect of compulsory citizenship behaviors on job performance. Most hypotheses were supported in Study 1 and Study 2.



**Figure 3** Moderating effect of relational energy in Study 2. Low and high relational energy means 1 SD below the mean and 1 SD above the mean, respectively.

**Table 8** Results for Moderated Mediation in Study 2

Mediator	Relational Energy	Effect	SE	Boot LLCI	Boot ULCI
Ego depletion	Low	−0.09**	0.04	−0.17	−0.03
	High	−0.03**	0.02	−0.07	−0.00
	Difference	0.06**	0.03	0.01	0.12

**Note:** \*\* $p < 0.01$ .

**Abbreviations:** SE, standard error; Boot LLCI, the upper limits of a confidence interval calculated using bootstrapping; Boot ULCI, the upper limits of a confidence interval calculated using bootstrapping.

Firstly, the result of Study 1 shed light on the mediating effect of ego depletion on the relationship between compulsory citizenship behavior and job performance. That is, compulsory citizenship behavior had a negative effect on job performance through the mediating effect of ego depletion, which support the hypothesis 1 and is consistent with previous studies.<sup>52</sup> But meanwhile, the result of Study 2 did not support the hypothesis 1. The reason may be that Study 1 tested the effect of daily compulsory citizenship behavior on job performance, while Study 2 asked employees to report compulsory citizenship behaviors they had experienced over the past 3 months, which tested the effect of chronic compulsory citizenship behavior on job performance. Given that psychological energy consumed by short-term self-control acts can be recovered through short breaks,<sup>53</sup> and that, in contrast, the psychological energy consumed by long-term self-control acts may not be easy to replenish and thus more likely to lead to ego depletion,<sup>54,55</sup> it would make sense that there was a significant indirect effect of chronic compulsory citizenship behavior on job performance through ego depletion in Study 2, but not a significant indirect effect of daily compulsory citizenship behavior on job performance through ego depletion in Study 1.

Moreover, the results of Study 1 and Study 2 found that relational energy negatively moderated the effect of compulsory citizenship behavior on ego depletion and negatively moderated the mediating effect of ego depletion between compulsory citizenship behavior and job performance. Existing studies have pointed that relational energy is emerging as a topic of importance to organizations, yet we have little understanding of how relational energy can be useful toward achieving work goals.<sup>26,56</sup> Previous studies also seldom explore the moderating role of relational energy on the relationship between compulsory citizenship behavior and job performance. However, our research results shed light on the moderating effect of relational energy employees experienced in interactions with coworkers, demonstrating the importance of relational energy in workplace. Specifically, when the relational energy level was low, both the effect of compulsory citizenship behaviors on ego depletion and the mediating effect of ego depletion were stronger than when the relational energy level was high.

## Theoretical Contributions

Firstly, the results enriched our understanding of the theoretical mechanism underlying the negative effect of compulsory citizenship behavior on job performance. Previous studies mainly examined the mechanism based on cognitive dissonance theory, self-efficacy theory, social identity theory, etc.<sup>10–12</sup> Compared with previous studies, based on ego depletion theory and interaction ritual theory, we constructed a moderated mediation model to reveal the mechanism from a new theoretical perspective of psychological energy. The results showed that as compulsory citizenship behavior increased, employees would fall into a state of ego depletion due to a deficiency of psychological energy, leading to a decrease in the knowledge-based work performance. Meanwhile, the mediating effects of ego depletion varied as the level of relational energy employees experienced in interactions with coworkers changed from low to high. These findings provide a more comprehensive understanding of the mechanism underlying the effect of compulsory citizenship behavior on job performance, and provide a beneficial supplement to existing literature using the theoretical lens of psychological energy.

Secondly, the results expanded the boundary conditions of the mechanism underlying the effect of compulsory citizenship behavior on job performance. Existing studies mainly explored the moderating effects of individual characteristics on the negative effects of compulsory citizenship behavior on job performance, such as attribution styles and interactional justice.<sup>16,57</sup> However, employees are not always independent in the workplace, since they

often have interpersonal interaction with their coworkers, especially for new-generation employees who pay more attention to maintaining high-quality interpersonal relationships with coworkers.<sup>24</sup> Compared with previous studies, based on interaction ritual theory, our study explored the moderating effect of the relational energy employees experienced in interactions with coworkers. The results indicated that relational energy can supplement employees' internal psychological energy and then reduce the negative effect of compulsory citizenship behavior on job performance through ego depletion, expanding the boundary conditions between compulsory citizenship behavior and job performance from the perspective of interpersonal interaction. In addition, the research area of relational energy is still in the initial stage of development, and few studies explored how relational energy can be useful in the workplace.<sup>58</sup> Thus, the paper also deepens the research area by exploring the moderating effect of relational energy employees experienced in interactions with coworkers on the relationship between compulsory citizenship behavior and job performance.

Finally, more and more scholars are calling for replication studies to test their results—for example, using different research designs or multi-source samples.<sup>30,59</sup> Consistent with these recent calls, we used two different samples and different research designs to test the conceptual model. The Study 1 (within-level) and Study 2 (between-level) results were almost convergent, which provided solid evidence for the moderated mediation model and allowed us to cross-validate our findings. Moreover, existing studies seldom explored the effect of daily compulsory citizenship behavior, however compulsory citizenship behavior can occur within a workday as a daily construct and can also occur persistently or recurrently over a long period of time as a chronic construct.<sup>49–51</sup> Through exploring the effects of both daily and chronic compulsory citizenship behavior on job performance using two studies, the results found that the mediating effects of ego depletion between compulsory citizenship behavior and job performance varied as the duration of compulsory citizenship behavior changed from short term to long term, which also made an in-depth investigation of the effects of compulsory citizenship behavior.

## Practical Implications

Organizations should pay attention to the negative effect of compulsory citizenship behavior on job performance, especially chronic compulsory citizenship behavior, because cumulative exposure to compulsory citizenship behavior over long periods of time is worse than occasional daily compulsory citizenship behavior. Moreover, our results revealed that ego depletion played a mediating role in the relationship between compulsory citizenship behavior and job performance. Hence, knowing how to mitigate ego depletion and replenish employees' psychological energy is very important. Some positive interventions or psychological counseling should be carried out to relieve employees' ego depletion and give them enough psychological energy to execute self-control acts in their knowledge-based work. Thirdly, organizations should build a harmonious organizational culture in various ways so that new-generation knowledge workers can obtain more relational energy they experience in interactions with coworkers in the organization, which will weaken the negative effects of high work stress, such as the stress caused by compulsory citizenship behaviors.

## Limitations and Future Directions

Given the difficulty of monitoring the work behavior of knowledge employees, job performance in this study was measured by knowledge employees' self-report. Although the results showed that the common method bias was not significant, future research could use job performance assessed by superiors or other more objective indicators, allowing for higher reliability and fewer errors in making causal results. In addition, this study mainly explored the moderating effect of relational energy in the relationship between compulsory citizenship behaviors and job performance. But psychological energy has multi-level manifestations in organizations: individual, relational, and also at the collective level, manifesting as collective energy.<sup>60</sup> Future research could further explore the moderating effect of collective energy on the relationship between compulsory citizenship behavior and job performance by constructing a multi-level structural equation model.

## Conclusion

Guided by ego depletion theory and interaction ritual theory, this study explored the mechanism underlying the effect of compulsory citizenship behavior on job performance of new-generation knowledge workers. The results showed that (1) Compulsory citizenship behavior had a significantly negative effect on job performance through ego depletion; (2) Relational energy employees experienced in interactions with coworkers significantly moderated the effect of compulsory citizenship behavior on ego depletion; (3) Relational energy employees experienced in interactions with coworkers significantly moderated the indirect negative effect of compulsory citizenship behavior on job performance through ego depletion. The results expanded and deepened the mechanism underlying the effect of compulsory citizenship behavior on job performance from the theoretical perspective of psychological energy. In addition, the results indicated that organizations should pay more attention to the negative effect of compulsory citizenship behavior on new-generation knowledge employee's job performance, and take various ways to relieve employees' ego depletion so that they have enough psychological energy to execute self-control acts in knowledge-based work, thus improving their job performance.

## Data Sharing Statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Compliance with Ethical Standards

All the methods were performed in accordance with the Declaration of Helsinki. Study 1 and Study 2 were approved by the Ethical Committee of Shenzhen Health Development Research Center. Informed consent was obtained from all individual participants included in the study.

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## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

## Disclosure

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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