

Selection, optimization, and compensation strategies: Interactive effects on daily work engagement

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ABSTRACT

The theory of selective optimization with compensation (SOC) proposes that the “orchestrated” use of three distinct action regulation strategies (selection, optimization, and compensation) leads to positive employee outcomes. Previous research examined overall scores and additive models (i.e., main effects) of SOC strategies instead of interaction models in which SOC strategies mutually enhance each other’s effects. Thus, a central assumption of SOC theory remains untested. In addition, most research on SOC strategies has been cross-sectional, assuming that employees’ use of SOC strategies is stable over time. We conducted a quantitative diary study across nine work days ($N = 77$; 514 daily entries) to investigate interactive effects of daily SOC strategies on daily work engagement. Results showed that optimization and compensation, but not selection, had positive main effects on work engagement. Moreover, a significant three-way interaction effect indicated that the relationship between selection and work engagement was positive only when both optimization and compensation were high, whereas the relationship was negative when optimization was low and compensation was high. We discuss implications for future research and practice regarding the use of SOC strategies at work.

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1. Introduction

The theory of selective optimization with compensation (SOC) proposes that the processes of selection, optimization, and compensation lead to effective functioning, adaptation, and successful development (Baltes, 1997; Baltes & Baltes, 1990). Within an action theoretical framework, SOC researchers have argued that the interplay or “orchestration” of three distinct behavioral strategies leads to positive outcomes such as goal accomplishment and well-being, because the combined use of these strategies helps individuals to optimally allocate their limited resources (Baltes & Dickson, 2001; Freund & Baltes, 2000, 2002).

The first strategy, selection, focuses on the choice and prioritization of important goals to pursue, either based on personal preferences or due to resource losses. The other two strategies are concerned with individuals’ resources that are necessary to achieve the selected goals. Optimization means that individuals invest additional resources to achieve their goals, and compensation entails replacing means that do not contribute to goal attainment with more effective means (Freund & Baltes, 2002; see Zacher & Frese, 2011, for work-related examples). Over the past two decades, organizational researchers have demonstrated that the use of SOC strategies predicts outcomes such as work ability, job performance, and occupational well-being (Abraham & Hansson, 1995; Bajor & Baltes, 2003; Baltes & Heydens-Gahir, 2003; Weigl, Müller, Hornung, Zacher, & Angerer, 2013; Wiese, Freund & Baltes, 2002).

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A central proposition of SOC theory, however, remains untested in both the organizational literature and the broader literature on the use of SOC strategies in everyday life. Specifically, the “orchestrated,” “synchronized,” and “coordinated” use of SOC strategies should yield better results than their independent use. Goal selection should result in more favorable outcomes if goal pursuit is optimized and resource losses are compensated at the same time (Freund & Baltes, 2000; Marsiske, Lang, Baltes, & Baltes, 1995). Thus, SOC theory suggests that the three strategies should mutually enhance each other's effects on positive work outcomes. So far, however, researchers have only examined effects of overall SOC strategy use (i.e., average scores) and additive (i.e., main) effects of individual SOC strategies. Interactive effects of the three SOC strategies have not yet been investigated despite the assumptions that the strategies are conceptually distinct and that “using multiple strategies may have a larger effect than using only one of the strategies” (Demerouti, Bakker, & Leiter, 2014, p. 103).

Moreover, most previous research on SOC at work has used cross-sectional designs, thus assuming that employees' use of SOC strategies is stable rather than fluctuating over time. Two exceptions are the daily diary studies conducted by Yeung and Fung (2009) and by Schmitt, Zacher, and Frese (2012). Yeung and Fung (2009) showed that age and task difficulty moderated the relationships between daily SOC strategy use and self-rated and objective job performance. Schmitt et al. (2012) found that daily SOC strategy use buffered the positive relationship between daily problem solving demands at work and employees' fatigue at the end of the work day. While both of these studies found that SOC strategy use fluctuated across work days, they did not examine interactive effects of the three SOC strategies on daily work outcomes.

The goal of the quantitative daily diary study reported in this article was to investigate interactive effects of the three SOC strategies on daily work engagement. Work engagement has been defined as a positive and fulfilling state of work-related well-being with physical, emotional, and cognitive components (Bakker, Schaufeli, Leiter, & Taris, 2008; Kahn, 1990). SOC theory suggests that the interplay or “coordinated use” of SOC strategies should be positively associated with successful adaptation and well-being at work (Baltes & Baltes, 1990; Freund & Baltes, 2000; Marsiske et al., 1995). Consistent with the job demands–resources model and its extension to personal resources (Bakker & Demerouti, 2007; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007), as well as Hobfoll's (1989) conservation of resources theory, SOC strategies can be considered a set of personal behavioral resources that positively predict favorable work outcomes such as work engagement (Schmitt et al., 2012; Weigl et al., 2013). Specifically, the use of SOC strategies at work starts a motivational process during which employees focus their attention on selected work goals, allocate their available resources to these goals, and acquire new, or activate unused, resources to facilitate goal achievement (Baltes & Dickson, 2001; Zacher & Frese, 2011).

According to SOC theory, employees should be most engaged at work if they make use of all three SOC strategies to a great extent. By contrast, their work engagement should be lower if their use of one or more of the three SOC strategies is low and strategies do not mutually facilitate each other's motivational effects (Marsiske et al., 1995). So far, only one cross-sectional study has examined the relationship between SOC strategy use and work engagement (Weigl, Müller, Hornung, Leidenberger, & Heiden, 2014). Specifically, Weigl et al. (2014) collected data from 118 flight attendants and showed that overall SOC strategy use was positively related to work engagement. However, these researchers did not report additive or interactive effects of the three individual SOC strategies on work engagement.

Based on SOC theory, the job demands–resources model, and conservation of resources theory, we propose that daily selection is positively associated with work engagement only when both optimization and compensation are high. Selection involves focusing on a small number of important goals, and this strategy may not be positively related to work engagement per se. However, when the pursuit of selected goals is optimized and actual or potential resource losses are compensated to achieve the goals, employees should feel more engaged in their work (Baltes, 1997; Weigl et al., 2014). Moreover, the job demands–resources model and conservation of resources theory predict that the more employees activate their personal resources, the higher their capability to deal successfully with work demands and to accumulate additional resources such as feelings of engagement at work (Hobfoll, 1989; Xanthopoulou et al., 2007). Employees' daily work engagement may benefit to a certain extent from the independent use of optimization and compensation strategies due to the associated investment of additional resources, the replacement of inadequate means, and the activation of unused resources. However, according to SOC theory, the effects of daily optimization and compensation on work engagement should be greatest when employees focus their goal-relevant resources and means on a manageable number of carefully selected goals (Baltes, 1997; Freund & Baltes, 2000).

Hypothesis: There is a three-way interaction effect of the daily use of selection, optimization, and compensation strategies on daily work engagement, such that the relationship between selection and work engagement is positive when both optimization and compensation are high, whereas the relationship is not significant or negative when either optimization or compensation, or both optimization and compensation, are low.

2. Method

2.1. Participants and procedure

To test our hypothesis, we collected data from 77 employees from Australia, who worked in various jobs and occupations and volunteered to participate in a online daily diary study. Thirty-six participants were female (47%) and 33 were male (43%; eight participants [10%] did not provide demographic information). Ages ranged between 21 and 61 years, with a mean age of 45.12 years ($SD = 10.56$). In terms of highest level of education, 18% of employees had completed high school, 23% held a diploma

from a technical college, 23% held an undergraduate university degree, and 26% held a postgraduate university degree (10% did not indicate their education). Average job tenure was 8.90 years ($SD = 9.82$). Job descriptions included accountant, administration officer, clerk, customer service officer, human resource consultant, IT professional, organizational change manager, technician, and urban planner.

We recruited participants for our study among the professional staff of a university, a government agency, and through professional contacts of the authors. Participants were asked to first provide their demographic information in an online baseline survey and, subsequently, to report their daily use of SOC strategies and work engagement in nine daily online surveys at the end of their work days across two work weeks. In total, 124 employees expressed initial interest in participating; 77 of these employees provided responses to at least three daily surveys (61% response rate) and 70 employees completed the demographic questions in the baseline survey. We included the seven employees who did not complete the baseline survey to make use of their daily data, and we excluded employees with less than three daily responses because their data did not exhibit sufficient variation at the within-person level. Thus, the final sample consisted of 77 employees who provided 514 daily responses (on average, 6.68 daily responses per person).

2.2. Measures

2.2.1. Daily work engagement

We assessed work engagement in the daily surveys with the three highest loading items from each of the three scales for physical, emotional, and cognitive work engagement developed and validated by Rich, LePine, and Crawford (2010). We adapted the items by adding the word “today” and changing each item to past tense. The validity of this approach has been demonstrated by Breevaart, Bakker, Demerouti, and Hetland (2012). Example items are “Today I exerted my full effort to my job,” “Today I was excited about my job,” and “Today I was absorbed by my job.” All nine items are shown in Appendix A. Participants provided their responses on 5-point scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Consistent with Rich et al. (2010), we computed an overall work engagement score. Mean Cronbach's α for the work engagement scale across the nine work days was .94.

2.2.2. Daily use of SOC strategies

We measured the daily use of SOC strategies with 12 items developed by Freund and Baltes (2002) and adapted to the work context by Zacher and Frese (2011). Again, we adapted the items to the day-level by referring to “today” in each item and writing the items in past tense (cf. Breevaart et al., 2012). Schmitt et al. (2012) and Yeung and Fung (2009) demonstrated that the use of SOC strategies can be reliably assessed at the day-level by adapting the items of the original scale in this way. Example items for selection are “Today at work, I focused on the one most important goal at a given time” (elective selection) and “Today, when I couldn't do something at work as well as I used to, I thought about my priorities and what exactly is important to me” (loss-based selection; mean α across the nine work days = .80). Example items for optimization and compensation, respectively, were “Today at work, I kept working on what I had planned until I succeeded” (mean $\alpha = .77$), and “Today, when things at work didn't go as well as they used to, I kept trying other ways until I achieved the same result I used to achieve” (mean $\alpha = .84$). All 12 items used to measure the three SOC strategies in this study are shown in Appendix A. Participants provided their responses on 5-point scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

2.2.3. Demographic variables

The baseline survey included questions on age, gender, highest level of education achieved, job description, and job tenure.

2.3. Statistical analyses

As our data had a nested structure (i.e., daily reports nested within participants), we conducted multilevel analyses using the hierarchical linear modeling (HLM) software (Raudenbush & Bryk, 2002). Before entering the within-person predictor variables (SOC strategies) in the analyses, and before computing the two- and three-way interaction terms, the variables were centered at each participant's mean. We examined the factor structure of the daily survey items by computing multilevel confirmatory factor analyses in MPlus (Muthén & Muthén, 1998–2012). Consistent with the factor structure validation procedure used by Weigl et al.

Table 1

Means (M), standard deviations (SD), and correlations of variables.

Variables	M	SD	1-ICC	1	2	3	4
1. Daily selection	3.28	.59	.45	(.80)			
2. Daily optimization	3.72	.61	.71	.49**	(.77)		
3. Daily compensation	3.33	.70	.43	.49**	.49**	(.84)	
4. Daily work engagement	3.51	.75	.37	.25**	.51**	.48**	(.94)

Note. Correlations are based on within-person data ($N = 514$) provided by $N = 77$ employees. The intraclass correlation coefficient (ICC) is calculated by dividing the between-person variance (τ_{00}) by the sum of τ_{00} and the within-person variance (σ^2). 1-ICC refers to the percentage of within-person variance observed for the variable. Reliability estimates (mean Cronbach's α s across the nine work days) are shown in parentheses along the diagonal.

** $p < .01$.

(2013), we allowed correlations among the three error terms of the three elective selection items and of the three loss-based selection items, respectively. We also allowed correlations among the three error terms of the three physical engagement items, the three emotional engagement items, and the three cognitive engagement items, respectively (cf. Brown, 2006).

A model with the hypothesized four factors (daily selection, optimization, compensation, and work engagement) had a good fit to the data ($\chi^2[168] = 383.602, p < .001; CFI = .948; TLI = .935; RMSEA = .052; SRMS_{within} = .062$). By contrast, a model with two factors (overall SOC and work engagement; $\chi^2[173] = 588.570, p < .001; CFI = .899; TLI = .878; RMSEA = .071; SRMR_{within} = .074$) and a model with loadings on only one factor resulted in worse fit indices ($\chi^2[174] = 978.885, p < .001; CFI = .805; TLI = .764; RMSEA = .098; SRMR_{within} = .106$).

3. Results

Table 1 shows the descriptive statistics and within-person correlations of the variables, as well as the proportions of within-person variance in the daily use of selection (45%), optimization (71%), compensation (43%), and work engagement (37%). Thus, as our variables showed variation at both the day-level and the between-person level, the use of multilevel modeling was justified. The results of the multilevel analyses used to test our hypothesis are shown in Table 2. In Model 1, we entered the main effects of the three SOC strategies. Daily optimization ($\gamma = .20, p < .001$) and daily compensation ($\gamma = .12, p < .001$) positively predicted daily work engagement, whereas daily selection did not have a significant effect ($\gamma = .01, p = .771$). The positive effects of daily optimization and compensation remained significant in subsequent models.

In Model 2, we entered the three two-way interaction effects (Table 2). The interaction between daily selection and optimization ($\gamma = .11, p = .003$) and the interaction between daily optimization and compensation ($\gamma = -.12, p = .004$) significantly predicted daily work engagement, whereas the interaction between daily selection and compensation did not ($\gamma = -.07, p = .115$). Simple slope tests for the interaction between daily selection and optimization showed that the relationship between daily selection and daily work engagement was negative when daily optimization was low (simple slope: $\gamma = -.10, SE = .05, p = .038$), whereas the relationship was positive when daily optimization was high (simple slope: $\gamma = .11, SE = .05, p = .023$). Simple slope tests for the interaction between daily optimization and compensation indicated that the relationship between daily optimization and daily work engagement was positive when daily compensation was low (simple slope: $\gamma = .30, SE = .04, p < .001$), whereas the relationship was non-significant when daily compensation was high (simple slope: $\gamma = .06, SE = .06, p = .269$). Importantly, these two-way interaction effects have to be interpreted with caution, as we hypothesized a significant three-way interaction effect of all three SOC strategies on daily work engagement.

In Model 3, we added the three-way interaction between daily selection, optimization, and compensation, which significantly predicted daily work engagement ($\gamma = .13, p < .001$; Table 2). This three-way interaction effect is shown in Fig. 1. Simple slope tests showed that the relationship between daily selection and daily work engagement was not significant when daily compensation was low and when daily optimization was either low (simple slope: $\gamma = .01, SE = .05, p = .879$) or high (simple slope: $\gamma = -.01, SE = .09, p = .877$; see left panel A in Fig. 1). By contrast, the relationship between daily selection and daily work engagement was negative and significant when daily compensation was high and daily optimization was low (simple slope: $\gamma = -.32, SE = .09, p < .001$; see right panel B in Fig. 1). Finally, consistent with our hypothesis, the relationship between daily selection and daily work engagement was positive and significant when both daily compensation and optimization were high (simple slope: $\gamma = .19, SE = .07, p = .006$; see right panel B in Fig. 1).

Table 2
Results of multilevel modeling analyses predicting daily work engagement.

Variables	Model 1		Model 2		Model 3	
	γ	SE	γ	SE	γ	SE
Intercept	3.52**	.07	3.52**	.07	3.52**	.07
Main effects						
Daily selection	.01	.03	.01	.03	-.03	.03
Daily optimization	.20**	.03	.18**	.03	.18**	.03
Daily compensation	.12**	.03	.13**	.03	.09*	.03
Two-way interaction effects						
Daily selection \times daily optimization			.11**	.04	.12**	.04
Daily selection \times daily compensation			-.07	.05	-.03	.05
Daily optimization \times daily compensation			-.12**	.04	-.09*	.04
Three-way interaction effect						
Daily selection \times daily optimization \times daily compensation					.13**	.03
τ_{00}	.36		.36		.36	
σ^2	.17		.16		.16	
Pseudo R^2	.06		.07		.08	

Note. Unstandardized coefficients (γ) with standard errors (SE) are shown. τ_{00} = between-person variance; σ^2 = within-person variance. Pseudo $R^2 = ((\text{null model } \tau_{00} + \text{null model } \sigma^2) - [\text{predictor model } \tau_{00} + \text{predictor model } \sigma^2]) / (\text{null model } \tau_{00} + \text{null model } \sigma^2)$.

* $p < .05$.
** $p < .01$.

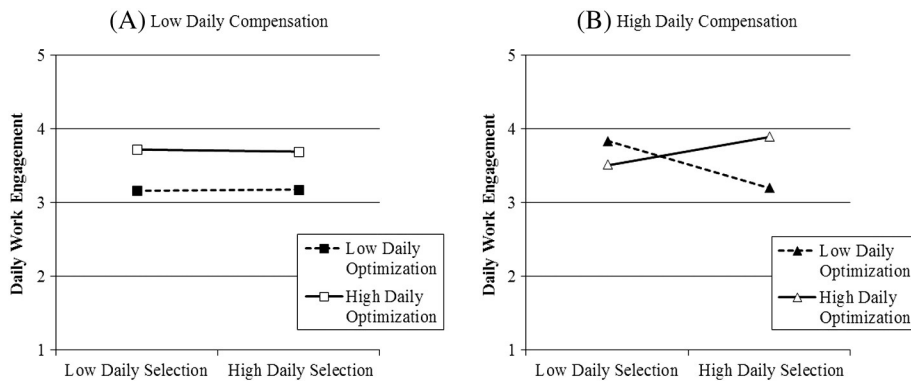


Fig. 1. Interactive effects of daily selection, optimization, and compensation strategies on daily work engagement.

4. Discussion

4.1. Summary and interpretation of findings

The goal of this study was to examine the central, yet hitherto untested, proposition of SOC theory that the “orchestrated,” “synchronized,” and “coordinated” interplay between selection, optimization, and compensation strategies results in higher well-being (Freund & Baltes, 2000; Marsiske et al., 1995). We contribute to the growing literature on SOC at work not only by demonstrating that the three SOC strategies were empirically distinct and had differential main effects on daily work engagement (cf. Demerouti et al., 2014; Yeung & Fung, 2009), but also by showing that the three SOC strategies interacted in predicting daily work engagement. In particular, we found that the use of daily optimization and compensation strategies was positively related to daily work engagement, whereas daily selection did not have a main effect on daily work engagement. Thus, employees’ daily work engagement benefited from the investment of additional resources, the replacement of ineffective means, and the activation of unused resources.

Our multilevel analyses further showed that the daily use of selection interacted with daily optimization and compensation in predicting daily work engagement, suggesting that employees were more engaged at work on a daily basis when they invested their resources into carefully selected work goals and when they compensated for actual or potential resource losses at the same time. Our findings indicated that the use of optimization was especially important when employees showed high levels of selection and compensation, as the combination of high selection, high compensation, and low optimization resulted in decreased work engagement. Conversely, high levels of optimization positively impacted on the effects of high selection and high compensation on daily work engagement. In sum, using a daily diary study design, we found initial support for a core assumption of SOC theory regarding the “orchestrated,” “synchronized,” and “coordinated” use of SOC strategies (Freund & Baltes, 2000; Marsiske et al., 1995). Our findings were also consistent with the job demands–resources model and conservation of resources theory, which predict that the more employees activate personal resources, the higher their capability to deal successfully with work demands and to accumulate additional resources such as feeling engaged at work (Hobfoll, 1989; Xanthopoulou et al., 2007).

Finally, with our daily diary study we contribute to the growing literature on SOC at work, which so far has primarily used cross-sectional designs, by providing further evidence that employees’ use of SOC strategies fluctuates across work days. Our study goes beyond the two existing diary studies conducted by Yeung and Fung (2009) and by Schmitt et al. (2012), as these studies did not investigate interactions among the daily SOC strategies on work outcomes.

4.2. Implications for future research and practice

Our findings have implications for future research and practical applications of SOC strategies at work. Future theoretical work on SOC strategies could elaborate on the individual and contextual boundary conditions under which the interactive effects of SOC strategies on positive work outcomes such as work engagement are particularly beneficial. For instance, older workers in less complex jobs may particularly benefit from the individual and combined use of SOC strategies (Zacher & Frese, 2011). Importantly, the main and interactive effects of SOC strategies may also differ depending on the work outcome under investigation. For instance, the combined use of SOC strategies may be particularly important for work engagement, whereas selection may be more important for reducing employees’ level of emotional exhaustion (Demerouti et al., 2014) and compensation may be more important for older employees’ decisions to work past traditional retirement age (Müller, De Lange, Weigl, Oxfart, & Van der Heijden, 2013). Clearly, further theoretical and empirical work is needed in this area.

Our findings suggest that future empirical research on the use of SOC strategies at work should examine both the additive effects of individual SOC strategies, as well as develop hypotheses on and test interactive effects of SOC strategies, instead of using only the potentially misleading overall SOC score (cf. Demerouti et al., 2014; Yeung & Fung, 2009). Organizational practitioners aiming to enhance employees’ daily work engagement could provide training regarding the optimal combined use of SOC strategies. In particular, employees should know that the use of optimization behavior is particularly important when they also use selection and compensation

strategies to a great extent, as a lack of optimization in these situations may negatively impact on their work engagement. Zacher and Frese (2011) provided a number of suggestions on how SOC training for employees could be designed, including the use of theoretical explanations, practical examples, role models, and opportunities for guided practice.

4.3. Limitations and conclusion

Our study has a number of limitations. First, we acknowledge that our daily diary study design does not allow conclusions about causal processes within and across days. It may be possible that engaged employees are more likely to use specific SOC strategies, or combinations of strategies, at work. Future research should therefore use experimental and long-term longitudinal designs to replicate and extend our findings. Second, data for this study came from a single source and thus may be susceptible to common method bias. However, research has shown that significant interaction effects cannot be artifacts of common method bias (Siemsen, Roth, & Oliveira, 2010). Nevertheless, future research could also obtain daily assessments from peers and supervisors, as well as obtain objective measures of work outcomes (cf. Yeung & Fung, 2009).

In conclusion, the strengths of our study on SOC strategies and work engagement are that it examined a central, yet so far untested, proposition of SOC theory and that it employed a daily diary design to take a closer look at the use of SOC strategies at work and how the independent and combined use of SOC strategies is associated with daily work engagement. Our findings contribute to the growing literature on SOC in the work context by showing that the combined use of the three SOC strategies – that is, high levels of selection, optimization, and compensation – appears to be most beneficial for work engagement.

Appendix A

Items used in this study to measure daily work engagement (adapted from Rich et al., 2010) and daily selection, optimization, and compensation strategies (adapted from Freund & Baltes, 2002, and from Zacher & Frese, 2011).

Daily work engagement (P = physical engagement, E = emotional engagement, C = cognitive engagement)

1. Today I exerted my full effort to my job.(P)
2. Today I tried my hardest to perform well on my job.(P)
3. Today I strove as hard as I can to complete my job.(P)
4. Today I was enthusiastic in my job.(E)
5. Today I felt energetic at my job.(E)
6. Today I was excited about my job.(E)
7. Today I paid a lot of attention to my job.(C)
8. Today I focused a great deal of attention on my job.(C)
9. Today I was absorbed by my job.(C)

Daily selection (E = elective selection, L = loss-based selection)

1. Today at work, I concentrated all my energy on few things.(E)
2. Today at work, I focused on the one most important goal at a given time.(E)
3. Today at work, I committed myself to one or two important goals.(E)
4. Today, when things at work didn't go as well as they had in the past, I chose one or two important goals.(L)
5. Today, when I couldn't do something important at work the way I did before, I looked for a new goal.(L)
6. Today, when I couldn't do something at work as well as I used to, I thought about my priorities and what exactly is important to me.(L)

Daily optimization

1. Today at work, I kept working on what I had planned until I succeeded.
2. Today at work, I made every effort to achieve a given goal.
3. Today, when something mattered to me at work, I devoted myself fully and completely to it.

Daily compensation

1. Today, when things at work didn't go as well as they used to, I kept trying other ways until I achieved the same result I used to achieve.
2. Today, when something at work wasn't working as well as it used to, I asked others for advice or help.
3. Today, when it became harder for me to get the same results at work, I kept trying harder until I could do it as well as before.

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