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Staying on track in turbulent times: Trait self-control and goal pursuit during self-quarantine



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ABSTRACT

Prior research has shown that routines and beneficial habits largely explain high self-control people's success at goal pursuit. However, COVID-19 self-quarantine measures and country-level lockdowns have largely challenged people's ability to stick to their daily routines and habits. How successful at goal pursuit are people with high self-control when the world around them is not as it used to be? We examined if self-control passes the 'quarantine test'. In an online study ($N = 271$), we measured trait self-control, goal progress, continued engagement in pre-pandemic goal-directed behaviors, development of new goal-directed behaviors and turning these new behaviors into habits. Results showed that during lockdown, people with higher (vs. lower) trait self-control were not only more likely to continue engaging in pre-pandemic goal-directed behaviors, but also found it easier to develop new goal-directed behaviors and were more likely to turn these behaviors into habits. High self-control people's ability to continue performing pre-pandemic goal-directed behaviors and to turn new behaviors into habits explained their success at goal attainment despite the major disruptions caused by the pandemic.

1. Introduction

Quarantine measures implemented to fight the COVID-19 pandemic have radically changed the lives of millions of people worldwide. Besides having various negative consequences for psychological well-being (Brooks et al., 2020; Rajkumar, 2020; Rodriguez, Litt, & Stewart, 2020), quarantine measures are likely to pose major challenges to personal goal pursuit because they disrupt people's daily routines and make it hard or even impossible to continue engaging in behaviors people used to engage in to reach their goals. People's struggle to stay on track and keep pursuing their goals despite major upheavals in almost all spheres of life has been often addressed in the popular press (Samuel, 2020; Times staff, 2020). What predicts individuals' ability to stay on track and stick to their goals despite major disruptions in their lives?

The literature has long identified a personality trait that predicts successful goal pursuit: self-control. People with higher (vs. lower) self-control are more successful at reaching their goals across various life domains, including health, well-being, relationships, academic, career, financial and others (De Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012; Tangney, Baumeister, & Boone, 2004). Herein, we asked whether trait self-control also passes the 'quarantine test': Using the COVID-19 pandemic as a natural laboratory to study goal pursuit

under exceptionally disruptive circumstances, we examined whether trait self-control is associated with more goal progress.

Prior research on self-control has shown that one of the reasons why people with higher (vs. lower) self-control are more successful at goal attainment is because they use adaptive behavioral strategies, such as turning goal-directed behaviors into habits (Adriaanse, Kroese, Gillebaart, & De Ridder, 2014; De Ridder & Gillebaart, 2017; Ent, Baumeister, & Tice, 2015; Galla & Duckworth, 2015; Stavrova, Pronk, & Kokkoris, 2020; Stavrova, Pronk, & Kokkoris, 2019). This tendency to develop "beneficial habits" could facilitate goal attainment during self-quarantine for high self-control individuals. Herein, we examined whether during the pandemic people with higher (vs. lower) trait self-control were more likely to stick to their "beneficial habits" and continue engaging in behaviors they had developed to reach their goals prior to the pandemic.

At the same time, regardless of whether high self-control people were more likely to continue engaging in their pre-pandemic goal-directed behaviors, it is intriguing whether self-control promotes flexibility and the ability to develop new goal-directed behaviors to adapt to the current situation as well. Developing new adaptive strategies might be necessary for goal pursuit when external circumstances change and existing routines may no longer serve one's goals. Although it has been argued that self-control might also be instrumental in the

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development of new habits (e.g., Wood, 2016), there has not been much empirical research examining the relation between self-control and new habit formation. The COVID-19 pandemic provides a very suitable context for the study of initial formation of beneficial habits. Thus, we investigated whether people with higher self-control would be more flexible to adjust to the new situation, would find it easier to develop new behaviors to reach their goals and would be more likely to turn these behaviors into habits that support their goal pursuit.

In sum, we used the COVID-19 pandemic as a context to examine whether people with higher (vs. lower) self-control made more progress towards their goals, and whether they did so by continuing performing their pre-existing goal-directed behaviors and/or by being more flexible and able to develop new behaviors and turn them into habits.

2. Method

2.1. Participants

Participants were 271 undergraduate students (147 women, 18–35 years old, $M = 21.68$, $SD = 2.81$) recruited via the subject pool of a large European university for course credit. A sensitivity power analysis showed that this sample size can reliably detect effect sizes of $\rho = 0.17$ (two-tailed) with an alpha level of 0.05 and power of 0.80.

2.2. Procedure

The study was conducted online from June 8 to 16, 2020. After an explanation of what goals are (Stavrova et al., 2019; Stavrova et al., 2020), participants were asked to write down one personal goal that they had started pursuing before the lockdown and that they still wanted to achieve. Then, they wrote down up to five behaviors they had been using to achieve this goal before the lockdown started. For each behavior, they indicated to what extent they were able to continue performing it after the lockdown started ($\alpha = 0.68$; 1 = *not at all*; 7 = *very much*).

Participants were also asked whether they had developed any new behaviors to achieve their goals after the lockdown started (yes/no), and if yes, to write down up to five of them. For each one of the new behaviors, they indicated how easy it was to develop this behavior ($\alpha = 0.67$; 1 = *not at all*; 7 = *very much*) and to what extent it had already become a habit for them, i.e. part of their daily routine ($\alpha = 0.69$; 1 = *not at all*; 7 = *very much*).

Goal progress was assessed with three items ($\alpha = 0.80$) adopted from Milyavskaya and Inzlicht (2017); e.g., “I feel like I’m on track with my goal plan”; 1 = *strongly disagree*; 7 = *strongly agree*).

In addition, participants filled out a measure of flexibility regarding their overall response to the COVID-19 crisis, which we developed for the purpose of this study. It comprised the following five items ($\alpha = 0.80$): “I accepted the challenge to reconsider my routines,” “I responded to the demands of the situation with flexibility,” “I tried to adjust to the new situation as best as I could,” “I discovered new ways of doing things,” and “I found alternative solutions to my problems” (1 = *not at all true*; 7 = *very true*).

Finally, trait self-control was measured with the Brief Self-control Scale (Tangney et al., 2004), which comprises 13 items ($\alpha = 0.83$; e.g., “I am good at resisting temptation”; 1 = *not at all like me*; 7 = *very much like me*). Self-control was measured in counterbalanced order at the beginning or the end of the questionnaire.

3. Results

Descriptive statistics and inter-correlations of all variables are presented in Table 1. Inspection of correlations between self-control and self-reported flexibility in the response to COVID-19 crisis showed that people with higher self-control reported a higher overall flexibility, $r(268) = 0.28$, $p < .001$. Next, we examined whether this perception of

flexibility reported by high self-control people is reflected in their ability to continue performing goal-directed behaviors developed before the pandemic and/or develop new behaviors to pursue their goals despite the pandemic-caused disruptions.

3.1. Self-control and pre-pandemic goal-directed behaviors

On average, participants reported 3.87 behaviors ($SD = 1.21$, $min = 1.00$, $max = 5.00$) that they had been using to reach their goals before the lockdown started. The number of behaviors reported was uncorrelated with trait self-control, $r = 0.00$, $p = .961$. However, during the lockdown, people with higher (vs. lower) trait self-control were more likely to continue engaging in behaviors they had developed to reach their goals prior to the lockdown, $r(268) = 0.25$, $p < .001$.

As our data have two levels, with participants (level 2) being able to report multiple behaviors (level 1), we additionally analyzed the data using multilevel regression. Multilevel regression is particularly suitable here as it accounts for the non-independent data structure (behaviors nested within participants) by modelling participants as random (i.e., including a random intercept at the level of participants; Hox, 2002). All variables were standardized before the analyses, so that the parameters can be interpreted as standardized coefficients. We used lme4 package (Bates, Maechler, Bolker, & Walker, 2015) in R. Consistent with the correlation analyses reported above, trait self-control was positively associated with the ability to continue performing pre-pandemic goal-directed behaviors during the lockdown, $\beta = 0.18$, $p < .001$.

3.2. Self-control and new goal-directed behaviors

Among all participants, 42.1% ($n = 114$) started new behaviors to reach their goals during lockdown. Starting new behaviors (dummy-coded, 1 = *yes*) was uncorrelated with trait self-control, $r(268) = 0.05$, $p = .443$. That is, people with higher self-control were not more or less likely to have developed new behaviors to reach their goals. If we examine only the group of participants who have started new behaviors, we can see that they reported to have started on average 2.62 new behaviors ($SD = 1.42$, $min = 1.00$, $max = 5.00$). Moreover, among these participants who developed new behaviors, the number of new behaviors reported was again uncorrelated with trait self-control, $r = 0.06$, $p = .529$. That is, people with higher self-control were not more or less likely to report more new goal-directed behaviors. However, people with higher self-control found it easier to develop new behaviors, $r(112) = 0.32$, $p = .001$, and were more likely to report that these behaviors have already become habits, $r(112) = 0.20$, $p = .032$.

Multilevel regression results supported these conclusions: self-control was positively associated with the ease of developing new goal-directed behaviors, $\beta = 0.23$, $p = .001$, and the perception that the new behaviors have become habits, $\beta = 0.17$, $p = .031$.

3.3. Self-control and goal progress

People with higher self-control reported more progress towards their goals, $r(268) = 0.26$, $p < .001$. We further explored whether the ability to stick to pre-pandemic goal-directed behaviors, the perceived ease of developing new goal-directed behaviors or the ability to turn new behaviors into habits explain high self-control individuals' success at goal attainment. We used parallel mediation analyses with the three variables (average values across the reported goal-directed behaviors) as parallel mediators. The results of the mediation are shown in Fig. 1. The indirect effects of the ability to continue pre-pandemic goal-directed behaviors and to turn newly developed behaviors into habits were significant mediators. That is, trait self-control predicts goal attainment as it is associated with both sticking to pre-pandemic goal-directed behaviors and turning new goal-directed behaviors into habits.

Table 1
Descriptive statistics and inter-correlations.

	1	2	3	4	5	6	7
1. Trait self-control	–						
2. Continuing pre-pandemic behaviors	0.25**	–					
3. Developing new behaviors (1 = yes)	0.05	0.06	–				
4. Ease of developing new behaviors	0.32**	0.36**	–	–			
5. Turning new behaviors into habits	0.20*	0.29**	–	0.29**	–		
6. Goal progress	0.26**	0.48**	0.26**	0.29**	0.43**	–	
7. Flexibility (response to COVID-19)	0.28**	0.38**	0.22**	0.37**	0.32**	0.37**	–
Cronbach's alpha	0.83	0.68	–	0.67	0.69	0.80	0.80
M	4.20	4.67	–	4.95	5.11	4.25	5.35
SD	0.97	1.53	–	1.32	1.50	1.43	1.12
Min	1.38	1.00	–	1.00	1.00	1.00	2.20
Max	6.77	7.00	–	7.00	7.00	7.00	7.00

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

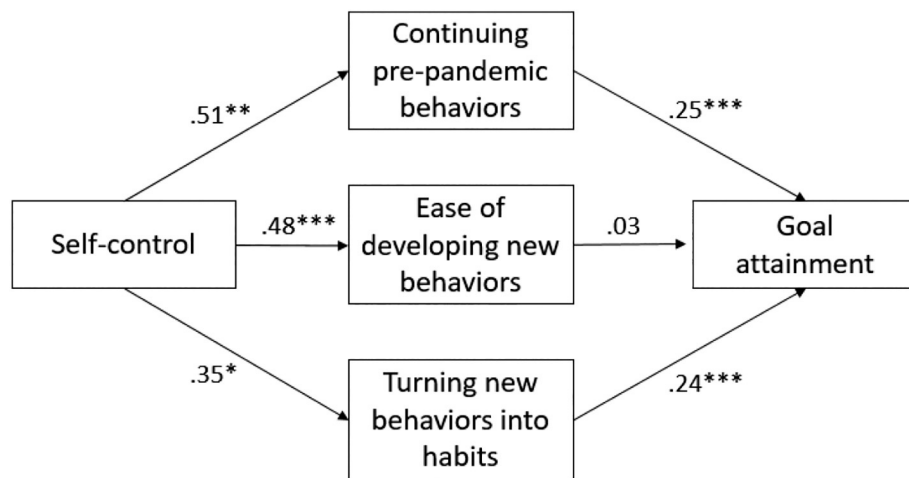


Fig. 1. Mediation model of the effect of trait self-control on goal attainment via continuing pre-pandemic behaviors, ease of developing new behaviors, and turning new behaviors into habits.

Note. The indirect effect of trait self-control on goal attainment (assessed via bootstrapping with 5000 re-samples; Hayes, 2013) was significant via continuing pre-pandemic behaviors, 0.13, 95%CI [0.04, 0.25], and turning new behaviors into habits, 0.08, 95%CI [0.01, 0.18], but was not significant via ease of developing new behaviors, 0.02, 95%CI [–0.06, 0.10].

4. Discussion

Developing structures, routines and beneficial habits explains high self-control people's success at goal attainment (Adriaanse et al., 2014; De Ridder & Gillebaart, 2017; Ent et al., 2015; Galla & Duckworth, 2015; Stavrova et al., 2020; Stavrova et al., 2019). Is this also true during challenging times such as the COVID-19 pandemic? Our results showed that self-control passes the 'quarantine test': Individuals higher (vs. lower) in self-control made more progress towards reaching their goals during quarantine. This was explained both by continuing pre-pandemic goal-directed behaviors and by turning newly developed goal-directed behaviors into habits.

This finding adds to prior literature by showing that the benefits of high self-control persist under uniquely disruptive circumstances. Even though the world had changed dramatically, high self-control people demonstrated a remarkable capacity to stick to pre-existing habits and had the flexibility to develop new habits that better met situational demands. The combination of these two – maintaining past habits and developing new ones – is high self-control people's recipe for success in turbulent times. A practical implication of our findings is that interventions aimed at increasing self-control may be beneficial also in the context of the challenges posed by the COVID-19 pandemic. Further research using objective measures of goal attainment, longitudinal data and non-student populations is needed to corroborate these insights.

CRedit authorship contribution statement

Michail D. Kokkoris: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Visualization, Writing - original draft. **Olga Stavrova:** Conceptualization, Formal analysis, Investigation, Methodology, Software, Visualization, Writing - review & editing.

Stavrova: Conceptualization, Formal analysis, Investigation, Methodology, Software, Visualization, Writing - review & editing.

References

Adriaanse, M. A., Kroese, F. M., Gillebaart, M., & De Ridder, D. T. (2014). Effortless inhibition: Habit mediates the relation between self-control and unhealthy snack consumption. *Frontiers in Psychology*, 5, 444.

Bates, D., Maechler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, 67(1), 1–48.

Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The Lancet*, 395(10227), 912–920.

De Ridder, D., & Gillebaart, M. (2017). Lessons learned from trait self-control in well-being: Making the case for routines and initiation as important components of trait self-control. *Health Psychology Review*, 11(1), 89–99.

De Ridder, D. T. D., Lensvelt-Mulders, G., Finkenauer, C., Stok, F. M., & Baumeister, R. F. (2012). Taking stock of self-control: A meta-analysis of how trait self-control relates to a wide range of behaviors. *Personality and Social Psychology Review*, 16(1), 76–99.

Ent, M. R., Baumeister, R. F., & Tice, D. M. (2015). Trait self-control and the avoidance of temptation. *Personality and Individual Differences*, 74, 12–15.

Galla, B. M., & Duckworth, A. L. (2015). More than resisting temptation: Beneficial habits mediate the relationship between self-control and positive life outcomes. *Journal of Personality and Social Psychology*, 109(3), 508–525.

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.

Hox, J. (2002). *Multilevel analysis: Techniques and applications*. New Jersey: Lawrence Erlbaum Associates.

Milyavskaya, M., & Inzlicht, M. (2017). What's so great about self-control? Examining the importance of effortful self-control and temptation in predicting real-life depletion and goal attainment. *Social Psychological and Personality Science*, 8(6), 603–611.

Rajkumar, R. P. (2020). COVID-19 and mental health: A review of the existing literature. *Asian Journal of Psychiatry*, 102066.

Rodriguez, L. M., Litt, D. M., & Stewart, S. H. (2020). Drinking to cope with the pandemic: The unique associations of COVID-19-related perceived threat and psychological distress to drinking behaviors in American men and women. *Addictive Behaviors*, 106532.

Samuel, S. (2020, June 9). Quarantine has changed us — And it's not all bad. *Vox*.

- Retrieved from <https://www.vox.com/future-perfect/2020/6/9/21279258/coronavirus-pandemic-new-quarantine-habits>.
- Stavrova, O., Pronk, T., & Kokkoris, M. D. (2019). Choosing goals that express the true self: A novel mechanism of the effect of self-control on goal attainment. *European Journal of Social Psychology, 49*(6), 1329–1336.
- Stavrova, O., Pronk, T., & Kokkoris, M. D. (2020). Finding meaning in self-control: The effect of self-control on the perception of meaning in life. *Self and Identity, 19*(2), 201–218.
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality, 72*(2), 271–324.
- Times staff (2020, May 14). 44 life-changing habits you don't want to give up after the pandemic. *Los Angeles Times*. Retrieved from <https://www.latimes.com/lifestyle/story/2020-05-14/life-habits-worth-keeping-after-coronavirus-quarantine>.
- Wood, W. (2016). The role of habits in self-control. In K. D. Vohs, & R. F. Baumeister (Eds.). *Handbook of self-regulation: Research, theory, and applications* (pp. 95–108). (3rd ed.). New York, NY: Guilford.