Motivation and Emotion (2023) 47:854–869
https://doi.org/10.1007/s11031-023-10031-4

ORIGINAL PAPER

No longer able to or no longer wanting to? Are intention violations failures to exert or decisions not to exert self-control?

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Accepted: 3 July 2023 / Published online: 25 July 2023

Abstract

Several theoretical models describe two pathways linking self-control demands with subsequent goal violations. The volitional pathway suggests that these goal violations should be interpreted as failures, while the motivational pathway suggests an interpretation as decisions. In this article, we examined (a) which psychological processes may explain the relationship between self-control demands and subsequent intention violations and (b) to what extent these violations reflect self-control failures rather than deliberate decisions. Results of two experience sampling studies showed that facing demands can trigger two opposing processes: fatigue, which leads to more subsequent violations of intentions, and the feeling that one deserves a reward, which leads to fewer subsequent violations of intentions due to boosts in self-efficacy. The actor may attribute intention violations to either an inability to act otherwise (indicating an actual failure) or a deliberate decision (indicating no failure). The different attributions have marked implications for the cognitive and affective downstream consequences of violating one's goals, pointing to the importance of distinguishing between actual and apparent failures in self-control.

Keywords Self-control failure · Ego depletion · Intentions · Self-licensing · Balancing

After working all day on a tedious assignment for school, Paula remembers what she told herself in the morning: "When I'm done with my schoolwork, I will go for a run and eat a salad!" Moments later, she finds herself sitting on the sofa, one hand on the TV's remote control, the other in a bag of potato chips.

How can we make sense of this situation, which we assume will sound familiar to many readers? Is Paula reaching for the potato chips because, after her long and demanding workday, she is no longer *able* to exert self-control to refrain from eating unhealthily and embark on a run through the park? Or did she reconsider her plans and deliberately decide to choose the TV and comfort food because she no longer *wants* to exert self-control? For practical and theoretical reasons, it is crucial to know whether people engage in behaviors that appear to be self-control failures because they no longer *can* or no longer *want* to control themselves after facing pronounced demands. For an outside observer, these questions are impossible to answer. Therefore, the present studies take a new approach by assessing the actors' own attributions of their real-life goal violations.

What is a failure of self-control?

Self-control is often defined as the capacity to prioritize long-term goals over competing short-term goals (Baumeister et al., 2007b; Fujita, 2011). Hence, self-control typically fails when people violate long-term goals to satisfy short-term desires. In research on self-control, some behaviors are generally considered self-control failures. For example, when people drink alcohol, eat unhealthy food, or cheat, it is generally assumed that self-control failed in these moments (e.g., Baumeister et al., 2007a). On average, across many people, this might be true. Most people try to live healthy and honest lives. But it is easy to imagine exceptions: For a person who has no goal to eat healthily or to restrict their alcohol consumption, neither having a burger with fries nor having 10 drinks can sensibly be regarded as self-control failures. In fact, in a recent vignette study, less than 14% of respondents considered hypothetically choosing a cake instead of a fruit salad a self-control failure (Vosgerau et al., 2019). To characterize a behavior as a self-control failure, it is therefore key to consider

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a person's goals (e.g., Carey et al., 2019; Hofmann et al., 2012; Wennerhold & Friese, 2023).

Although it is crucial to consider individual goals in order to determine whether a behavior constitutes a self-control failure or not, focusing only on the (non)adherence to a long-term goal may still be insufficient and may lead to false classifications in some cases for (at least) two reasons: First, this approach directly draws an inference from observable behavior (i.e., the [non]adherence to a long-term goal) to an underlying psychological process (i.e., the [in]ability to control oneself) that presumably explains the observed behavior. However, other causal mechanisms besides a lack of self-control are possible for explaining the prioritization of one goal over another. For example, a person violating a long-term goal may have deliberately decided not to control themselves to achieve a balanced trade-off of different goals (Shaddy et al., 2021). Such a violation would not constitute a self-control failure. To differentiate these alternative explanations for goal-incongruent behavior, in the present studies, we asked the actors to attribute their behaviors to inability and a decision. People have some reliable knowledge about themselves (Vazire & Carlson, 2010), and while the participants' self-assessment will likely not be fully veridical, it will add potentially useful information to the discussion. Several authors suggest that the subjective meaning of one's actions is an often neglected information source for the reasons behind their behavior (Shaddy et al., 2021; Vosgerau et al., 2019).

Second, labeling the pursuit of a short-term goal at the expense of a long-term goal a "failure" has specific implications: By definition, failures entail a lack of success. Hence, failures should be accompanied by negative cognitive (e.g., the wish to avoid acting similarly again in the future; Shaddy et al., 2021) and affective consequences (e.g., regret; Vosgerau et al., 2019). By contrast, a deliberate decision to act against one's long-term goals may be evaluated less negatively (Shaddy et al., 2021). However, cognitive and affective consequences are not observable from the behavior. They are psychological processes that need separate investigation. Previous work suggests that the inability to resist a desire is often followed by guilt and reduced pride (Becker et al., 2019; Hofmann et al., 2013). At the same time, the pursuit of hedonic short-term goals seems to be as relevant for subjective well-being as the pursuit of long-term goals (Bernecker & Becker, 2021). The present studies explore differences in the emotional consequences of 'real' self-control failures (which are attributed to inability) and deliberate decisions to violate one's goals.

Demands and subsequent self-control behavior

There are many reasons why people may violate their intentions (e.g., Hofmann et al., 2009). For example, there is evidence that time pressure (Friese et al., 2008 ; Shiv & Fedorikhin, 1999) and alcohol consumption (Hofmann & Friese, 2008) can influence unhealthy food choice and consumption. One influential line of work suggests that after facing pronounced demands on self-control, subsequent attempts at self-control are more likely to fail (ego depletion effect; Baumeister et al., 2007b). This idea has almost exclusively been examined in laboratory studies (for an overview, see Baumeister & Vohs, 2016). For various reasons, this laboratory research has received heavy criticism, and the existence of robust ego depletion effects in such studies is in doubt (Carter et al., 2015; Friese et al., 2019; Lurquin & Miyake, 2017).

Although the existence of laboratory ego depletion effects is questionable, the general idea may still have merit in people's everyday lives, which arguably differ substantially from the situations that participants faced in laboratory studies (Inzlicht & Friese, 2019). In fact, some evidence is consistent with the idea that facing pronounced demands is associated with subsequently less rigorous self-controlled behavior (e.g., less hand hygiene compliance in hospitals towards the end of work shifts or violations of self-imposed drinking limits after self-perceived pronounced self-control demands during the day; Dai et al., 2015; Muraven et al., 2005). Instead of an effect of prior self-control, some studies point towards a more complex picture and found that simply experiencing temptations (Milyavskaya & Inzlicht, 2017), desire-goal conflicts (Wilkowski et al., 2018), or self-control failures (Wenzel et al., 2020) can lead to subsequent goal violations. Other studies indicated that the ego depletion effect varies between individuals (Wenzel et al., 2019). Overall, the results on ego depletion effects in daily life are heterogeneous and still scarce (Friese et al., 2019).

Different theories have suggested that goal-incongruent desires are enacted more often after facing pronounced self-control demands for both volitional reasons (i.e., "I wanted to control myself, but couldn't") and motivational reasons (e.g., "I stopped wanting to control myself, and decided that immediate gratification was more important than delayed gratification"). Both pathways have different implications for whether goal violations after facing pronounced demands are considered failures or decisions.

The volitional pathway was first proposed by Baumeister et al. (1998). Their strength model of self-control posits

that exerting self-control draws on a limited resource, with the result that after exertion, people are no longer able to control themselves and fail to exert more self-control. The motivational pathway implies that after exerting control, people are still able to exert further control, but they no longer want to. One model conceptualizes all self-control behaviors as (value-based) decisions to act in line with or violate one's goals (Berkman et al., 2017). Most prominently, the process model of self-control suggests that after working on demanding tasks, people's motivational priorities and attention change toward activities that offer immediate gratification (Inzlicht & Schmeichel, 2012; Inzlicht et al., 2014; see Kool & Botvinick, 2014; Kurzban et al., 2013, for similar accounts).

From the perspective of the strength model, mental fatigue may serve as a suitable proxy for the volitional path by signaling that energy has been depleted (Baumeister & Vohs, 2016). Mental fatigue is a typical consequence of facing self-control demands (Hagger et al., 2010; Hockey, 2013), and although strength model proponents question the reliability of mental fatigue to indicate resource depletion (Baumeister & Vohs, 2016), we regard mental fatigue as the best available (even if not a clear-cut) indicator that may reflect a reduction in the hypothetical resource.

Turning to the motivational path of goal violations after exerting self-control, we consider two possible mechanisms. First, mental fatigue, caused by demands, could have the adaptive function of preventing fixation on current activities and redirecting attention toward behaviors with higher potential utility (i.e., those that promise fun and reward; Hockey, 2013; Inzlicht et al., 2014). Second, motivational changes may trigger justification processes. Justifications are arguments for pursuing short-term goals that may serve as excuses for behaviors that are incongruent with long-term goals (De Witt Huberts et al., 2014). Several aspects of grappling with demands may be used as justifications for why a person chooses not to exert control any longer, for example, exerted effort, success, restraint, or negative emotions ("I have restrained myself so much this morning, I deserve a treat now!"; Kivetz & Zheng, 2006; Mukhopadhyay & Johar, 2009). A prominent idea is that justifications serve to reduce negative affect after goal violations (De Witt Huberts et al., 2014, but note that a recent vignette study did not confirm this idea, Hill et al., 2021). Measuring justifications in everyday life is a great methodological challenge and still rarely done (Prinsen et al., 2018).

Several authors acknowledge that different pathways could explain the association between self-control demands and subsequent goal violations (e.g., De Witt Huberts et al., 2014; Hofmann & Kotabe, 2012; Kotabe & Hofmann, 2015; Shaddy et al., 2021; Wilkowski et al., 2018). Research considering both the volitional and the motivational paths simultaneously is still scarce, as is research about how to assess and differentiate them (to the extent this is possible given that fatigue could be regarded as an indicator for both pathways). Therefore, we sought to explore the link between their proposed indicators (i.e., fatigue and justification) and the participants' own attribution of their violations (i.e., to inability vs. a decision), as well as their emotional and cognitive consequences.

The present research

In this article, we pursued two broader aims: First, existing knowledge about the existence of ego depletion effects in everyday life is scarce, and the psychological processes that may contribute to such effects are poorly understood. Therefore, we investigated whether mental fatigue and justifications could explain the relationship between self-control demands and subsequent goal violations (operationalized as intention violations). Second, the present studies inspected the often overlooked but important question of whether goal violations actually reflect self-control failures as is commonly assumed or whether they sometimes and to some extent reflect deliberate decisions.[1] To distinguish failures from decisions, we asked participants to what extent they (a) attributed their violations to an inability versus a decision and (b) evaluated the violations negatively. Whether a given behavior reflects a self-control failure or not has major implications for theoretical models that are applied to explain goal violations. In addition, the cognitive and emotional consequences of interpreting a behavior as an inability or a decision may differ in important ways, pointing to the practical implications for people's experience and ensuing behavior in everyday life.

Study 1 employed experience sampling methodology to investigate whether higher self-control demands in the morning are associated with more violations of intentions in the afternoon and evening (Hypothesis 1). It also examined the extent to which two different psychological processes (i.e., mental fatigue and justification processes) explain the relationship between self-control demands and subsequent intention violations. To distinguish between self-control failures and deliberate decisions, we asked participants about the extent to which they attributed an intention violation to an inability to control themselves versus a deliberate decision to act as they did. Again, we examined the extent to which

[1] In contrast to our approach to consider motivational goal violations not as failures but as decisions, Hofmann and Kotabe (2012) labeled them "motivational self-control failures". By exploring to what extent actors regret motivational goal violations—an important indicator for 'real' self-control failures as suggested by Shaddy et al. (2021)—the present studies might shed light on the most appropriate labeling of this behavior.

prior self-control demands, mediated via mental fatigue and justification processes, accounted for these attributions (Hypothesis 2). Finally, we assumed that people would evaluate their behavior more negatively the more they violated their intentions, particularly when they attributed an intention violation to an inability versus a deliberate decision (Hypothesis 3). When people deliberately decide to choose a path of action instead of feeling unable to act differently, there is less reason to believe they will be unhappy with their behavior afterwards. Study 2 sought to conceptually replicate and extend selected findings from Study 1 and searched for possible process evidence.

Open science statement

Our research goals, hypotheses, and data analytic strategies are either preregistered or transparently marked as exploratory. Preregistration documents, scripts, materials, the datasets used in the current studies, and the supplement online materials (SOM) are openly available on the Open Science Framework (https://osf.io/3kp76/).

Study 1

Methods

Procedure and participants

Participants were university students with various majors at German universities (43% psychology) who were recruited through online advertisements and flyers on campus. They completed an initial online questionnaire (approximately 15 min) and provided their email address and cell phone number. During the next work week (from Monday to Friday), they were sent three questionnaires a day (and reminders if necessary) via email and text messages (approximately 3 to 5 min each). Participants who completed all three daily reports on at least 4 out of the 5 days received 10€ ($11.80 USD at the time) and individual feedback about their responses after data collection was completed. Recruitment continued until 150 people had completed all three daily reports on at least 4 of the 5 days. However, data from all individuals who completed at least one report were used in the analyses. We excluded 32 participants who either completed the initial questionnaire but none of the daily reports or who completed at least some daily reports, but indicated poor data quality for all reports in daily self-rating assessments. After these exclusions, data from 216 participants were included in the analyses (166 women, 48 men, 2 diverse; M_{age} = 24.25 years, SD_{age} = 3.80, $Range_{age}$ = 19 to 50 years). On average, participants had completed eight semesters of university education (M = 8.02, SD = 4.25).

Daily reports

To align our study design to the general idea of ego depletion effects in everyday life, we assessed the relevant variables at the following three times during the day: First, during a morning questionnaire, participants set intentions for the afternoon and evening of the same day. Second, during an afternoon questionnaire, participants reported self-control demands that they experienced between the morning and the afternoon questionnaire, current feelings of fatigue, and currently felt justifications. Third, during an evening questionnaire, participants indicated their compliance with and violation of the previously reported intentions that occurred between the afternoon and the evening questionnaire, as well as their evaluations and attributions of their behavior. Thus, the order of the assessments aligned with the theoretically expected ego depletion/justification assumptions.

The morning questionnaire included a list of intentions from various domains (e.g., health, work, media, physical exercise) presented in a random order. Every morning (between 6 a.m. and 10 a.m.), participants chose two intentions from the list or described their intentions in a free response format. Intentions were defined as everything that the participant intended to do (e.g., physical exercise) or not do (e.g., smoking) on the same day between 4 and 10 p.m. Intentions were defined as activities that provide a certain challenge or require willpower, self-discipline, or a sacrifice of pleasures.

Between 3 and 4 p.m., participants completed the afternoon questionnaire, which included items on momentary feelings of justification, self-control demands (between the morning and afternoon questionnaire), and momentary fatigue. In the evening questionnaire (between 10 p.m. and 12 a.m.), for each intention participants had identified in the morning questionnaire, they were asked to indicate whether it had actually become relevant between 4 and 10 p.m. Subsequently, participants rated their violation of or compliance with the relevant intentions, evaluated this behavior, and attributed violations to an inability to control themselves or a decision. If participants selected fewer than two intentions, they were given additional questions that were not relevant to the present purposes, ensuring roughly equal completion times for all surveys. Last, participants assessed the quality of their data for this day.

Measures

For all measures, we report the within-person internal consistencies using the omega index by Geldhof et al. (2014) implemented in the multilevel Tools package (v0.1.1; Wiley, 2020).

Self-control demands Participants rated the demands on their self-control up to this point in the day (3 to 4 p.m.). They indicated the extent to which they had to regulate their mood, deal with stress, force themselves to do something they did not want to do, and force themselves not to do something they wanted to do (Simons et al., 2016). Aggregates of similar items were associated with subsequent goal violations in previous research, providing evidence for their validity (Muraven et al., 2005; Simons et al., 2016). On three additional items, participants rated the extent to which they had to focus, resist temptations, and ignore distractions ranging from 1 (*not at all*) to 7 (*to a great extent*) ($\omega_{within} = .75$).

Fatigue We used three items from the Work Fatigue Inventory (Frone et al., 2018) and three items from the five-item scale measuring state self-control capacity (Lindner et al., 2019) to assess fatigue. On items ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), participants rated the extent to which they felt mentally exhausted, sharp and focused (recoded), lazy, and like their willpower was gone ($\omega_{within} = .82$).

Justifications Measuring justifications can be challenging: Asking about justifications before the relevant behavior took place could change cognitions and subsequent behavior. Asking after the behavior took place could promote post hoc confabulation and the generation of reasons for the behavior (Prinsen et al., 2018). We addressed this problem by asking participants about justifications in the afternoon survey before their intentions became relevant (i.e., during the afternoon/evening) but without referring to the intentions they had provided in the morning survey.

Participants read the following instructions: "You've already been through the bulk of your day. Perhaps you feel that you should be allowed to reward yourself in some way. A reward is any nice thing you do for yourself and that leads to a good feeling. People have different reasons for rewarding themselves. Please rate how much you feel you deserve a reward later today for the following reasons. For each of the reasons below, give yourself between 0 (*not deserving of a reward*) and 10 (*deserving a lot of reward*) coins as a reward." Participants were asked to symbolically assign themselves between 0 to 10 coin tokens each as a reward for today's effort, for today's success, as compensation for today's restraint, and as a consolation for negative emotions. We used these specific justifications out of a list of common ones (De Witt Huberts et al., 2014) because these seem to be especially likely to follow self-control demands. We excluded the item "reward as a consolidation for negative emotions" because it correlated negatively or not at all with the rest of the scale. The mean of the other three items formed the justification variable ($\omega_{within} = .73$).

Violation of intentions Participants indicated their compliance with/violation of any intentions that became relevant in the afternoon/evening (1 = *I fully complied* to 7 = *I violated it to a great extent*).

Attributions to inability or to a decision When participants indicated that they had violated at least one intention to at least some extent, they indicated why they violated it: "Because I didn't have enough willpower" (inability), "Because I decided to" (decision), "Because I wanted to behave that way" (decision), "Because I just couldn't help it" (inability; 1 = *don't agree at all* to 7 = *fully agree*) (attribution to inability: $\omega_{within} = .41$[2]; attribution to a decision: $\omega_{within} = .58$).

Evaluation Participants completed four items (inspired by Shaddy et al., 2021) to cognitively differentiate actual failures from deliberate decisions (e.g., "If I had thought harder about the consequences, I would have behaved differently" (recoded); 1 = *strongly disagree* to 7 = *strongly agree*). To assess the affective consequences, three items asked about the extent to which participants felt regret (recoded), pride, or satisfaction when looking back on their intention compliance/violation (1 = *not at all* to 7 = *to a great extent*; see Becker et al., 2019). Higher values represent a more positive evaluation. We calculated one joint indicator of evaluation ($\omega_{within} = .74$). Separate results for cognitive and affective items can be found in the SOM.

Data quality The last question of the day asked participants to self-rate the quality of their data on this particular day. Participants were asked the following: "The quality of reported data can be reduced for a variety of reasons (e.g., rushed, not focused, disrupted, not honest). How would you rate the quality of your data today? Please answer honestly. Your answer will not affect your compensation." Participants could choose one of three answers: "My data is okay"; "I am unsure if my data is okay or not"; "I am sure that the quality of my data is reduced".

[2] Reliability of the attribution measures was unexpectedly low, particularly for the attribution to inability measure. We ran all relevant analyses separately for both items and report these in the SOM, Table S8.

Table 1 Descriptive statistics and correlation matrix of the main variables

Variables	*N* (level 1)	*M* (*SD*)	ICC	1	2	3	4	5	6	7
1. Self-control demands	830	3.72 (1.17)	.40		.50**	.19**	.13	.38**	.10	− .28**
2. Fatigue	830	3.44 (1.38)	.35	.37**		− .19**	.32**	.34**	.11	− .42**
3. Justifications	828	3.94 (2.30)	.45	.13**	− .22**		− .21**	− .06	− .07	.21**
4. Violation	768	3.32 (1.49)	.17	.04	.12**	− .14**		.41	.25**	− .73**
5. Attribution to inability	705	3.60 (1.42)	.28	.09*	.15**	− .05	.31**		.21**	− .59**
6. Attribution to a decision	705	3.50 (1.56)	.22	.03	.02	.01	.15**	.01		− .17*
7. Evaluation	768	4.74 (1.21)	.27	− .06	− .15**	.13**	− .73**	− .51**	.02	

N (level 2) = 216, ICC = intraclass correlation, below the diagonal: pooled within-person correlations, above the diagonal: between-person correlations

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

Data analysis

If participants answered items about both intentions in the evening survey (which was the case in 90%), we used the mean of the two answers. This fits our goal to test ego depletion effects on the day level, that is, the influence of self-control demands in the morning on broad self-control behavior in the afternoon/evening. A downside of this approach is that the analyses cannot be interpreted on the level of single intentions. If participants indicated poor data quality in a daily report, all data from that day were excluded from the analyses.

All analyses were performed using the R Statistical Software (v4.1.2; R Core Team, 2021). We analyzed the data by applying a hierarchical linear modeling approach using the R package lme4 (v1.1.27.1; Bates et al., 2015). Repeated (daily) measures (Level 1 $N = 928$) were nested within persons (Level 2 $N = 216$). All predictors were group-mean-centered (Enders & Tofighi, 2007). We compared models with and without random slopes via deviance tests. On the basis of the results, we report random slope or random intercept models only. However, in the interaction models, we included random slopes as well as the correlations between the random slopes of both predictors. The full model descriptions and all results, including the fixed and random effects, can be found in the SOM. By contrast, for the mediation analyses, we used the R package lavaan (v0.6.12; Rosseel, 2012) and computed fixed slope parameters only.

Deviations from the preregistration

In several instances, we deviated from our preregistered plan. First, we preregistered to include emotional and physical fatigue in our index of fatigue but decided to focus on mental fatigue, in line with theoretical ideas that focus on mental fatigue only (e.g., Inzlicht & Schmeichel, 2012). Second, we excluded one of the justification items ("reward as a consolidation for negative emotions") that did not correlate or correlated negatively with the rest of the scale. Figures S4 and S5 in the SOM show that the exclusions of the fatigue and justification items do not meaningfully change the results of the main analyses. Third, contrary to expectations, "attribution to inability" and "attribution to a decision" did not correlate negatively but were uncorrelated. Therefore, we used both variables as single predictors instead of aggregating them into a single scale as preregistered. Fourth, additionally to the preregistered mediation models that include both potential mediators simultaneously (fatigue and justifications), we report (non-preregistered) single mediation models with only one mediator. Finally, we preregistered multiple serial mediation models to examine the influence of self-control demands on violation and attribution, mediated through a fatigue-justification path, and present the results in the SOM.

Results

Descriptive statistics

After excluding data from 30 days in which participants rated their own data quality as reduced, we analyzed reports from 928 days (773 of the days included all three questionnaires). On average, participants completed all three questionnaires on 3.72 days ($SD = 1.56$). In total the data included 2531 completed questionnaires and on average, participants completed 11.72 questionnaires ($SD = 4.11$). Participants reported a total of 1856 intentions. Table S1 in the SOM presents an overview of how often participants reported each kind of intention. Table 1 presents descriptive information, intraclass correlations (ICC), and the within- and between-person correlation matrix of the main variables. A post hoc sensitivity analysis suggests that Study 1 was able to detect small level 1 standardized effect sizes of .12 or higher with

a statistical power of at least 80% (based on tables provided by Arend and Schäfer (2019) who relied on Cohen's (1988) conventions of .10, .30, and .50 for small, moderate, and large effects, respectively). Note that, although helpful, this estimate constitutes a rough approximation to the true power rather than a precise calculation, because the values given in Arend and Schäfer (2019) assume certain statistical properties of the data and are restricted to certain ranges of values (e.g. our sample size was larger than the largest sample size considered in the tables).

Effects on violations of intentions

Contrary to Hypothesis 1, self-control demands experienced until midday did not predict the extent to which participants violated their intentions in the afternoon or evening, $b = 0.05$, 95% CI [− 0.08, 0.17], pseudo-$R^2 = -.00$. Three mediation models (two separate and one parallel) examined indirect effects of self-control demands on violations of intentions through fatigue and justifications. As expected, self-control demands led to more fatigue, which in turn led to more violations (indirect effect: $b = 0.08$, $\beta = .05$, $p = .005$). Also, as expected, self-control demands led to stronger perceived justifications for violating intentions. Unexpectedly, stronger perceived justifications were, in turn, related to less (not more) pronounced actual violations. The indirect effect of self-control demands on violations through justifications was significant ($b = -0.03$, $\beta = -.02$, $p = .016$) but in the opposite direction as predicted. The fact that the indirect effects through fatigue and justifications worked in opposite directions could at least partly explain the lack of a direct relationship between self-control demands and subsequent violations of intentions.

In a parallel mediation model that included fatigue and justifications simultaneously, the indirect effect of fatigue was no longer significant, whereas the indirect effect of justifications remained significant (fatigue: $b = 0.05$, $\beta = .04$, $p = .050$, justifications: $b = -0.02$, $\beta = -.02$, $p = .034$, see Fig. 1a). Note, however, that the standardized parameter actually suggested a descriptively stronger effect through fatigue than through justifications. This model explained 2.8% of the variance in violations, 22.1% of the variance in fatigue, and 0.7% of the variance in justifications.

Effects on attributions to inability versus a decision

In Hypothesis 2, we predicted that self-control demands would lead to a stronger attribution of violations to inability versus a decision, mediated by fatigue, and to a stronger attribution to a decision versus inability, mediated by justifications. The results showed a positive effect of self-control demands in the morning on the attribution of subsequent violations to inability, as expected, but this effect fell short of statistical significance ($b = 0.12$, 95% CI [− 0.002, 0.22], pseudo-$R^2 = .007$), and no significant effect on the attribution of violations to a decision ($b = 0.04$, 95% CI [− 0.09, 0.16], pseudo-$R^2 = -.001$). Two single mediation models showed that self-control demands increased fatigue, which increased the attribution to inability (indirect effect: $b = 0.07$, $\beta = .05$, $p = .005$), but there was no indirect effect through fatigue on the attribution to a decision ($b = 0.004$, $\beta = .003$, $p = .872$). There was no indirect effect through justifications on the attribution to inability ($b = -0.01$, $\beta = -.01$, $p = .192$) or to a decision ($b = 0.002$, $\beta = .001$, $p = .850$).

A parallel mediation model, analyzing the influence of self-control demands on the attribution to inability, mediated by fatigue and justifications, showed a positive indirect effect via fatigue ($b = 0.06$, $\beta = .05$, $p = .010$) but not justifications ($b = -0.01$, $\beta = -.004$, $p = .543$). This model (Fig. 1b) explained a total of 2.5% of the variance in the attribution to inability, 13.3% of the variance in fatigue, and 1.7% of the variance in justifications. The second parallel mediation model, predicting the attribution to a decision with self-control demands, showed no significant mediation via fatigue ($b = 0.01$, $\beta = .004$, $p = .816$) or justifications ($b = 0.002$, $\beta = .001$, $p = .808$). This model (Fig. 1c) explained 0.1% of the variance in the attribution to a decision, 13.3% of the variance in fatigue, and 1.7% of the variance in justifications. Therefore, the results partly confirmed Hypothesis 2 by indicating a positive association between self-control demands and the attribution to inability, mediated by fatigue, but no influence on the attribution to a decision or via the mediator justifications.

Effects on evaluations of behavior

Consistent with Hypothesis 3, the larger the violations, the less positively participants evaluated their violations (Violation only model, see Table 2 for statistical details). Also, participants evaluated their violations less positively if they attributed them to inability (Attribution to inability model) and more positively if they attributed them to a decision (Attribution to decision model). Both attributions moderated the effect that the extent of the violation had on its evaluation: Major violations were evaluated more negatively when attributed to inability (Fig. 2, Panel a) and less negatively when attributed to a decision (Panel b). Smaller violations were rated similarly regardless of the attributions. The SOM includes results for similar models including demands, fatigue, and justifications as potential moderators.

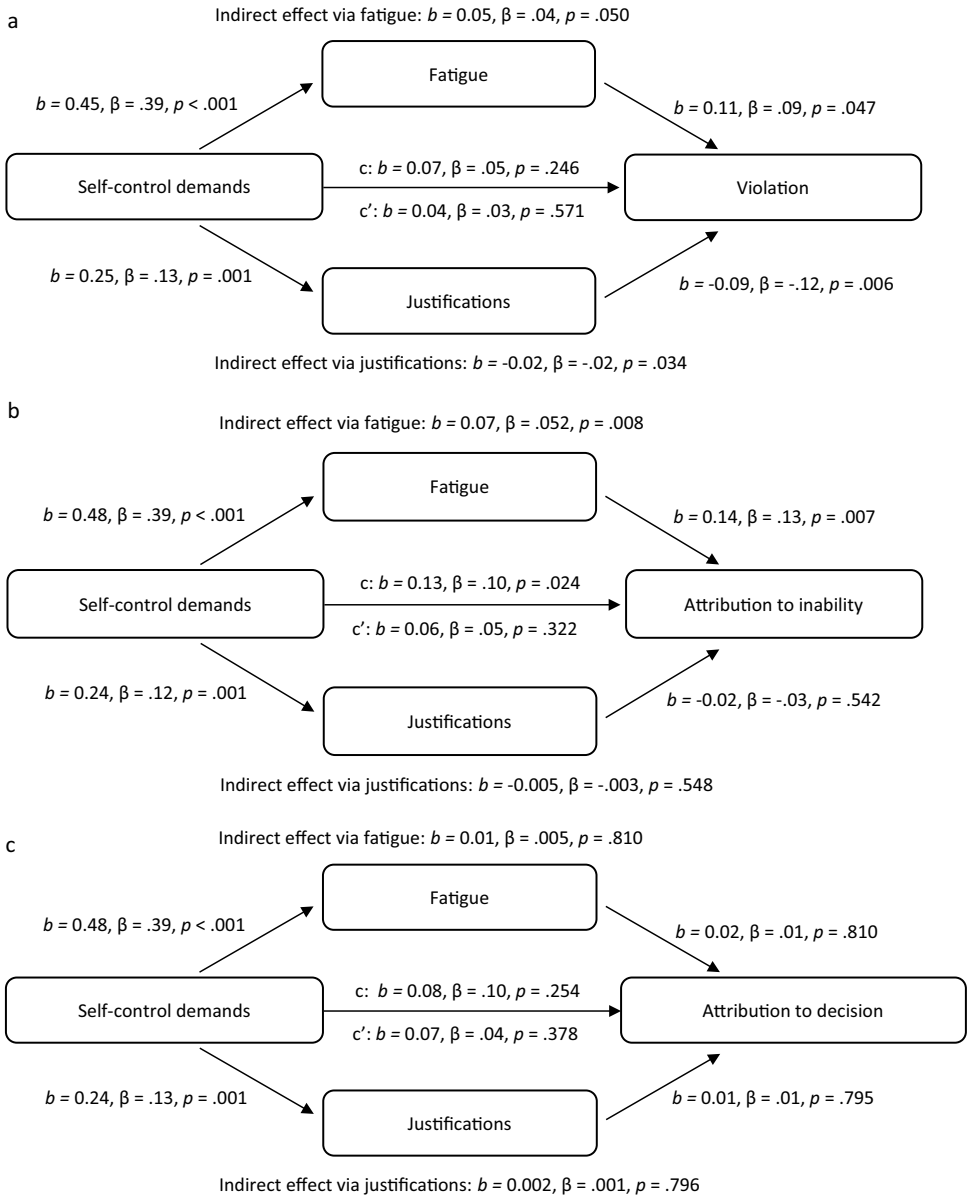

Fig. 1 Parallel mediation models

Discussion

Contrary to all models suggesting an ego depletion effect, more pronounced self-control demands did not lead to more violations of intentions later in the day. Compatible with both the volitional and the motivational pathway, higher self-control demands led to more fatigue, which in turn led to more violations of intentions. Higher self-control demands also led to more pronounced perceived justifications for violations of intentions, which, surprisingly, were associated with less, not more, subsequent violations of intentions. Together, the indirect effects through fatigue and justifications worked antagonistically, which partly explains the lack of a significant direct effect of self-control demands on intention violations.

Attributions of intention violations to inability versus decisions were unrelated within participants, and on average, participants endorsed the two to a similar extent ($M_{\text{inability}} = 3.60$, $M_{\text{decision}} = 3.50$), suggesting that both offer subjectively viable explanations for goal violations. Consistent with the volitional path of self-control decline, participants were particularly likely to attribute their intention violations to an inability to act otherwise (i.e., a self-control failure) following pronounced self-control demands, an effect partly mediated by mental fatigue. By contrast, self-control demands did not predict the extent to which participants attributed their intention violations to a deliberate decision.

Finally, participants evaluated violations more negatively if they were stronger, attributed more to inability, and

Table 2 Summaries of multilevel model analyses for predicting evaluation with violation and attribution

	Violation only model		Attribution to inability model		Attribution to decision model	
Predictors	*b*	*CI*	*b*	*CI*	*b*	*CI*
(Intercept)	4.74	**[4.62, 4.85]**	4.71	**[4.57, 4.83]**	4.69	**[4.57, 4.81]**
Violation	− 0.54	**[− 0.60, − 0.49]**	− 0.44	**[− 0.49, − 0.39]**	− 0.54	**[− 0.60, − 0.49]**
Attribution to inability			− 0.26	**[− 0.31, − 0.21]**		
Violation: attribution to inability			− 0.05	**[− 0.09, − 0.00]**		
Attribution to a decision					0.10	**[0.05, 0.14]**
Violation: attribution to a decision					0.06	**[0.02, 0.11]**
Random effects						
σ^2	0.43		0.31		0.38	
τ_{00}	0.57_{ID}		0.58_{ID}		0.57_{ID}	
τ_{11}	$0.04_{ID.violation}$		$0.03_{ID.violation}$		$0.04_{ID.violation}$	
			$0.03_{ID.attributionInability}$		$0.01_{ID.attributionDecision}$	
ρ_{01}	0.11_{ID}		0.13		0.03	
			− 0.05		− 0.43	
Pseudo-R^2	.592		.710		.639	

Pseudo-R^2 = reduction in residual variance when the predictors were added to the model. Confidence intervals that do not include zero are written in bold

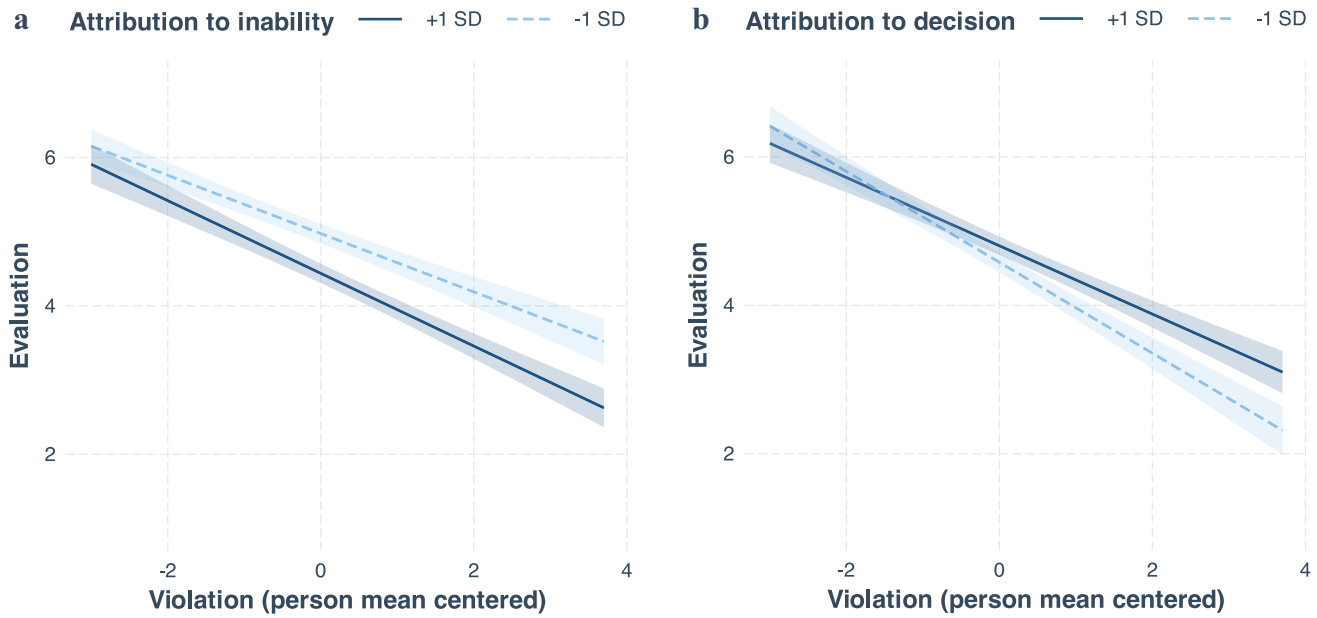

Fig. 2 Evaluation of behavior as a function of magnitude and the attribution for the violation. The areas indicate 95% confidence intervals

attributed less to a decision. The effect of intention violations on evaluations was stronger when there were more pronounced attributions to inability and less pronounced attributions to a deliberate decision.

Study 2

In Study 1, we unexpectedly found that stronger justifications (indicating stronger feelings that one deserves a reward) were associated with weaker, not stronger, subsequent violations of intentions. We had expected the opposite.

Because we used a newly developed measure of justifications, the underlying processes are not yet well understood. Therefore, we conducted preregistered Study 2 as a follow-up to replicate the unexpected negative association of justifications with subsequent violations of intentions.

Beyond replication, we sought to examine potential processes underlying this association. One possibility is that stronger perceived justifications (reflecting a stronger feeling that one deserves a reward) may be associated with the subjective impression of "having gotten things done." This impression may increase feelings of self-efficacy that would actually make it easier to continue following through with one's plans for the rest of the day despite feeling justified in cutting oneself some slack. Why violate intentions if one feels self-efficacious enough to follow through? In Study 2, we explored the potential mediating role of self-efficacy in the negative association between justifications and violations of intentions (nonpreregistered).

Additionally, we examined the association between the opinion that one deserves a reward (justifications) and subsequent rewarding behavior (indulgence) that does not necessarily violate intentions. Indulgence without violating intentions is possible because our justification measure purposefully did not ask specifically about intending to reward oneself *by violating one's (reported or other) intentions*.

We also added some exploratory items that could provide insight into the validity of the justifications measure (nonpreregistered). More precisely, if participants violated their intentions, they reported whether they violated them to reward themselves and whether they used the justification cognitions to do so.

Methods

Procedure and participants

Recruitment was similar to Study 1. We excluded seven participants who did not fill out any daily reports and analyzed data from 93 participants (79 women, 14 men, $M_{age} = 25.06$ years, $SD_{age} = 6.88$, $Range_{age} = 18$ to 55 years). Participants could win one of two vouchers worth €50 each ($56.60 USD at the time) that could be used at different online shops with the chances of winning increasing with the completion of more daily surveys. Psychology students could also earn course credit. Most (58%) participants were students.

Study 2 used a shortened and modified version of the protocol used in Study 1. The initial questionnaire (approximately 10 min) included the following definitions of indulging behavior and violation of intentions. The definition and examples were the same for all participants irrespective of their individual intentions: "By indulging behavior, we mean activities that are pleasant and lead to a positive feeling. Indulging behavior can also involve refraining from doing something unpleasant. A violation of intentions is anything you do but know you really shouldn't (e.g., smoking). It can also be something you don't do but really should (e.g., not exercising). The indulging/violating behaviors are not mutually exclusive. That is, you can indulge and thereby violate your intentions, or you can indulge and thereby not violate them." To make sure that the participants understood these concepts, they had to categorize each of two example behaviors as an indulging behavior that violates versus does not violate intentions, respectively. In each mobile survey that asked about these behaviors, participants could look up the definitions by clicking a link. In the following 7 days, participants received two daily questionnaires (and reminders if necessary). Each questionnaire took approximately 3 to 5 min to complete. On Day 8, they received a link to claim their compensation.

Daily reports

Participants completed an afternoon questionnaire between 2 and 4 p.m., including questions about justifications and self-efficacy. Between 9 and 11 p.m., they rated the extent to which they violated intentions and indulged without necessarily violating intentions since finishing the afternoon questionnaire. If participants could think of a violation, they attributed it to a reward and rated the extent to which they used justifications. Last, they rated their data quality for the day.

Measures

Justifications Participants rated the extent to which they deserved a reward for today's effort due to success, restraint, negative emotions, and (not used in Study 1) stress ($\omega_{within} = .76$).

Self-efficacy On a scale ranging from 1 (*not at all*) to 7 (*to a great extent*), participants indicated the extent to which they felt they could accomplish everything they set out to do that day, were up to all challenges, and had enough self-discipline for all demands ($\omega_{within} = .88$).

Violations and indulgence Participants indicated the extent to which they had been (a) indulging and (b) violating their intentions since the afternoon questionnaire (1 = *not at all* to 7 = *to a great extent*).

Attribution to a reward and use of justifications If participants reported a violation of intentions, they rated the extent to which they violated their intentions to reward themselves (1 = *not at all* to 7 = *to a great extent*). On four separate

Table 3 Descriptive statistics and correlation matrix of the main variables

Variables	*N* (level 1)	*M* (*SD*)	ICC	1	2	3	4	5	6
1. Justifications	443	4.12 (2.31)	.30		.26*	− .13	.13	.39**	.57**
2. Self-efficacy	443	4.36 (1.48)	.24	.44**		− .41**	− .10	.24*	.19
3. Violation	443	3.32 (1.64)	.14	− .11*	− .23**		.14	− .02	− .06
4. Indulgence	443	4.39 (1.65)	.11	.07	.07	.08		− .08	− .04
5. Attribution to a reward	229	3.56 (2.04)	.29	.37**	.24**	− .19**	− .01		.10**
6. Use of justifications	228	3.39 (1.48)	.27	.43**	.31**	− .16*	.09	.71**	

N (level 2) = 93, ICC = intraclass correlation. Pooled within-person correlations are presented below the diagonal. Between-person correlations are presented above the diagonal

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

items, participants rated the extent to which they used the reasons given in the justifications measure to justify this behavior (e.g., referring to their thoughts about the situation in which they violated an intention: "I am allowed to indulge because I have made quite an effort today"; 1 = *not at all* to 7 = *to a great extent*, $\omega_{within} = .77$).

Data analysis

The data analysis followed the same plan as Study 1, with repeated (daily) measures (Level 1 $N = 443$) nested within persons (Level 2 $N = 93$). We used group-mean-centering and deviance tests to decide between random intercept and random slope models.

Deviations of the preregistration

First, as in Study 1, we excluded the justification item about negative emotions because it was negatively correlated or not at all correlated with the remaining items. Second, we preregistered (and report) three analyses with justification as a predictor and the use of justification, indulgence, and violation as outcomes, respectively. The other reported analyses were not preregistered.

Results

After excluding five daily reports on which participants rated their data quality as reduced, we analyzed reports from 443 days. On average, participants completed both questionnaires on 4.82 days ($SD = 2.06$). In total the data included 886 completed questionnaires and on average, participants completed 9.53 questionnaires. Table 1 presents descriptive information, intraclass correlations (ICCs), and the within- and between-person correlation matrix of the main variables. A post hoc sensitivity analysis suggests that Study 2 was able to detect small-to-medium level 1 standardized effect sizes of .16 or higher with a statistical power of at least 80% (based on tables provided by Arend and Schäfer (2019) who relied on Cohen's conventions of .10, .30, and .50 for small, moderate, and large effects, respectively).

Replicating the unexpected finding from Study 1, more justifications were again associated with less subsequent intention violations, $b = -0.09$, 95% CI [-0.19, 0.01], pseudo-$R^2 = .097$ (Table 3). Self-efficacy turned out to be a suitable explanation for the negative association, mediating the association between justifications and violations (indirect effect: $b = -0.07$, $\beta = -.09$, $p < .001$). Extending Study 1, in a separate model we examined and found that more justifications were associated with more indulgence behavior that did not necessarily violate intentions. This effect was in the expected direction, but not significant, $b = 0.06$, 95% CI [− 0.03, 0.14], pseudo-$R^2 = .002$.

Additional analyses provided further evidence for the validity of our measure of justifications. First, stronger justifications predicted the extent to which participants reported that they violated an intention specifically to reward themselves (i.e., attribution to a reward; $b = 0.38$, 95% CI [0.26, 0.51], pseudo-$R^2 = .172$). This finding suggests that, as expected, (a) intentional self-reward is one valid reason for violating intentions, and (b) the feeling that one deserves a reward at midday predicts whether one will draw on that reason when violating one's intentions later in the day. Second, justifications predicted the extents to which participants reported using the four reasons assessed at midday (effort, success, restraint, stress in the morning) to justify their violation of intentions later in the day ($b = 0.33$, 95% CI [0.24, 0.41], pseudo-$R^2 = .251$).

Discussion

Study 2 replicated the unexpected finding from Study 1: Stronger justifications for violating intentions (i.e., having the feeling that one deserves a reward) were associated

with less, not more, subsequent intention violations. An exploratory analysis provided a first glimpse into the processes underlying this effect by revealing an indirect effect of justifications through self-efficacy on subsequent intention violations. This finding suggests that after investing effort, experiencing success, exercising restraint, and dealing with stress in the morning, people felt like they deserved a reward, but they also felt that they had the self-efficacy to successfully master upcoming challenges. This boost to their self-efficacy may then have helped them adhere to previously formed plans. Interestingly, we found a small positive association between justifications and self-rewarding indulgent behavior. This finding suggests that although people did not tend to reward themselves by violating their intentions, they tended to do so with rewarding activities that did not necessarily violate intentions. This suggests that self-efficacy specifically helped to adhere to intentions, but did not prevent people from indulging more generally, pointing toward an interesting and potentially adaptive balancing mechanism that warrants further study.

Finally, we gathered some evidence of the validity of our new measure of justifications: When participants violated their intentions, stronger justifications predicted the extent to which participants indicated that they wanted to reward themselves as a reason for the violation. In addition, more justifications predicted the extent to which participants reported using the four reasons to justify their violations of intentions. Thus, in general, justifications (i.e., the feeling that one deserves a reward) were associated with fewer violations, but when a violation occurred, participants tended to use various reasons to justify their behavior.

General discussion

The present research pursued two broader goals: First, we examined whether increased demands on self-control would lead to more self-control failures (i.e., violations of intentions) later in the day, and we explored the psychological processes that underlie this effect. Second, we wondered about the extent to which apparent self-control failures go back to an actual inability to exert control (i.e., "real" failures) or are rather based on deliberate decisions to act in a way that is discrepant with previous plans.

Demands and goal violations

Contrary to expectations, in Study 1, we found no direct effect of self-control demands on subsequent intention violations, indicating the absence of an ego depletion effect in everyday life. This lack of a direct effect was partly explained by two indirect effects that worked in opposite directions: Higher demands increased mental fatigue that in turn led to stronger violations of intentions, but higher demands also increased perceived justifications (i.e., the feeling that one deserves a reward), which, unexpectedly led to decreased violations. Study 2 replicated this latter effect and provided initial evidence for the idea that having a "successful" morning that warranted a reward increased self-efficacy, which in turn helped people adhere to their plans.

The two opposing indirect effects of demands on intention violations through fatigue and justifications point to more complex effects of self-control demands on success in handling later demands than previously known. The positive indirect effect of self-control demands on violations through mental fatigue is in line with a volitional (e.g., Baumeister et al., 2007b) and motivational pathway (e.g., Inzlicht & Schmeichel, 2012). The negative indirect effect of demands through justifications (the subjective perception that one deserves a reward) may point to a reversed ego depletion effect or a positive feedback loop: Facing (and at least sometimes fulfilling) demands may lead to the feeling that one has been productive and deserves a reward, ultimately leading to increased self-efficacy with respect to further anticipated challenges during the day (e.g., Bandura, 2001; Sitzmann & Yeo, 2013). Self-efficacy, in turn, is known to facilitate goal-congruent behavior (Sitzmann & Yeo, 2013). This suggests that (a lack of) adherence to goals in everyday life depends not only on the extent of prior demands but also on how people interpret these demands and their success in handling them.

Admittedly, this interpretation goes beyond our results, but it is consistent with previous work: Different literatures have suggested that people often act in a manner that is consistent with previous behavior, an effect coined spill-over (Mata et al., 2009), extreme solutions (Shaddy et al., 2021), or the *what-the-hell effect* (Herman & Mack, 1975). Their common idea is that successfully handling demands could be self-energizing, whereas failing to fulfill demands (e.g., breaking one's diet) could work as a sign of an already "lost" day. Both cognitive and motivational processes may contribute to these effects: Exerting self-control may work like a knowledge structure that is easier to use once it is activated by prior use. This idea was initially considered but quickly dismissed by Baumeister et al. (1998) as an alternative to their preferred theory of a limited resource that predicted a decrease in self-control performance after initial effort exertion. Motivational models consider the possibility that motivation may reinforce itself over time if people remain in the same mindset or work on similar tasks (e.g., Inzlicht & Schmeichel, 2012).

Thus, the possibility that dealing with demands may have both detrimental and fostering effects on later performance has been theoretically considered, but the present research is one of the first to provide evidence that the two processes

can happen simultaneously. Future work should follow up on this initial evidence, for example, by examining potential boundary conditions (e.g., degree of success at meeting demands or demand difficulty; Palma et al., 2018).

Goal violations: self-control failures or deliberate decisions?

Our second aim was to investigate the extent to which intention violations represent actual self-control failures versus deliberate decisions—at least from the subjective perspective of the acting participants. On average, participants attributed their intention violations to an inability to act otherwise or to a deliberate decision to similar degrees. Stronger violations were evaluated more negatively, particularly when attributed to an inability to act otherwise. That is, participants were more likely to judge their behavior as a mistake, were less likely to recommend behaving in such a manner to others and experienced more regret and dissatisfaction. By contrast, strong violations were evaluated less negatively when attributed to a deliberate decision.

On the one hand, this result is in line with our interpretation of motivational goal violations as decisions, which do not necessarily imply "failures". On the other hand, participants evaluated even decisions for goal violations on average more negatively than positively, which could be considered as indicative of a "motivational self-control failure", as suggested by Hofmann and Kotabe (2012). We recommend to conceptually let room for behavior that violates one's goals but is not labeled a failure. When considering that people have to balance multiple goals, deciding to violate a goal (often in favor of another one) does not (always) have to be undesirable behavior, and sometimes there is no other option than to "fail" in adhering to a goal (see Berkman et al., 2017). How often people regret motivational decisions to act against one's goals and how often they are satisfied with it is a question for further research.

These results indicate that goal violations that seem identical to the outside observer may have noticeably different cognitive and affective downstream consequences for the actors. This is a noteworthy insight, because previous work showed that the cognitive and affective reactions to goal violations influence how people resolve future self-control conflicts. For example, experiencing guilt after goal violations reduces the probability of repeating this behavior in the future (Becker et al., 2019), increases subsequent self-control, but can also diminish inhibition of recurring temptations (Hofman & Fisher, 2012). Consequently, future studies could explore if the attribution of a goal violation to inability versus a decision changes actors' future self-control behavior.

Additionally, while the positive effects of self-controlled goal-congruent behavior are widely recognized (De Ridder et al., 2012), recent evidence indicates the importance of goal-violating hedonic behavior for long-term well-being (Bernecker & Becker, 2021). The ability to balance the pursuit of different goals and needs, to take a rest from long-term goals, and to know when to rest may be adaptive and an important aspect of what can be considered good self-control. Future studies could investigate if and under what circumstances balancing of decisions to adhere versus violate one's goals is beneficial for subjective well-being.

Our findings also have theoretical implications. We found support for a volitional pathway of goal violations after facing self-control demands, mediated by fatigue. Facing higher demands led to more fatigue, to increases in the extent to which these violations were attributed to an inability to act otherwise, and (indirectly) to stronger violations of intentions. By contrast, there was no support for a motivational path, which suggests that violations should be more likely to be attributed to deliberate decisions via increased justifications. As mentioned previously—participants' mean ratings of whether their violations were due to inability or a decision were similar. This indicates that (at least from the actors' perspective) both explanations have merit. Therefore, despite the lack of an indirect effect, it remains an important task for future research to more closely examine when goal violations may feel like a decision (and when not).

The attribution to inability and attribution to a decision did not correlate negatively with each other as we assumed at the beginning. As can be seen in Figure S1 in the SOM, often the participants rated both attributions low at the same time. Future work could examine different attributions of goal violations besides inability and deliberate decisions, for example, external circumstances, and their implications.

Limitations

The absence of a direct effect of demands on violations of intentions has to be interpreted in the context of the specific study design. In Study 1, each morning, participants stated two intentions for the respective day. This approach has the advantage of capturing intentions that represent goal promoting behavior (e.g., "I plan to study in the afternoon") as well as intentions representing behavior that prevents goal violations (e.g., "I will refrain from using social media this afternoon"). At the same time, this approach only included a small set of goal-relevant behaviors (and potential violations thereof) and only those that participants were able to anticipate. The approach did not cover (non)adherence to long-term goals achieved in ways other than the ones that were reported. Possibly, the focus on violations of only two specific intentions in contrast to violations of all sorts of goals limited the power of the present study. Additionally, the morning prompt to set intentions for the day may have triggered the formation of implementation intentions (Gollwitzer, 1999) that helped participants adhere to their intentions. Finally, in the evening

survey, participants reported behavior that was summarized across several hours. Memory effects may have biased these reports compared with more frequent experience sampling during the day.

The longitudinal rather than cross-sectional nature of the data used in the mediation analyses helps to mitigate some concerns about the direction of effects in these correlational analyses. Nevertheless, a causal interpretation of the mediation effects is unwarranted, because we neither experimentally manipulated variables nor can we rule out effects of confounding variables (Rohrer et al., 2022).

Additional limitations lie in the validity of the measures. Whereas we applied frequently used measures of self-control demands and fatigue, the measure of justifications was newly developed. Study 2 laid the foundation for validating this measure. Future studies should build on this foundation and explore new ways to assess the cognitive processes involved in justifying one's behavior in real life. Questions about attributions require a high degree of introjection from the participants. Hence, inferences from the post hoc attributions of a behavior to the actual cause (i.e., inability or a decision) should be treated cautiously.

Conclusion

Facing (and at least partly mastering) demands may trigger two opposing processes: (a) fatigue, which leads to more subsequent violations of intentions, and (b) the feeling that one deserves a reward, which leads to fewer subsequent violations of intentions due to boosts in self-efficacy. Goal violations that appear identical to the outside observer may be attributed by the actor to either an inability to act otherwise (indicating an actual failure of self-control) or a deliberate decision (indicating no self-control failure). Thus, inferring a self-control failure solely on the basis of the observation of a behavior is not warranted. The different attributions have marked implications for cognitive and affective downstream consequences of violating one's goals, pointing to the importance of distinguishing actual self-control failures from apparent ones.

Funding Open Access funding enabled and organized by Projekt DEAL. No funds, grants, or other support were received.

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

Ethical approval No ethical approval was required for this research.

Consent to participate Informed consent was obtained from all individual participants included in the study. The participants agreed to their data being anonymously published in a journal.

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