



# Within-person variations and between-person differences in self-control and wellbeing<sup>☆</sup>



Asuman Buyukcan-Tetik<sup>a,\*</sup>, Catrin Finkenauer<sup>b,c</sup>, Wiebke Bleidorn<sup>d</sup>

<sup>a</sup> Sabanci University, Turkey

<sup>b</sup> Utrecht University, The Netherlands

<sup>c</sup> VU University Amsterdam, The Netherlands

<sup>d</sup> University of California, Davis, United States

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## ABSTRACT

This research investigated the associations between both within-person variations and between-person differences in self-control and wellbeing. We examined these associations across two diverse samples using longitudinal survey data from 69 American undergraduate students who completed biweekly assessments across 39 weeks in Study 1, and 199 Dutch newlywed couples who completed five yearly assessments in Study 2. Our results showed that both between-person differences and within-person variations in self-control were related to wellbeing. Our research also showed that between-person differences have a stronger association than within-person variations with wellbeing.

Self-control helps people to cope with everyday life, work, and relationships. For example, people with high levels of self-control are more likely to exercise regularly, earn success in their professional life, and maintain harmonious relationships (De Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012). Not surprisingly considering these positive outcomes, recent studies demonstrated a positive association between self-control and psychological wellbeing (Cheung, Gillebaart, Kroese, & De Ridder, 2014; Hofmann, Luhmann, Fisher, Vohs, & Baumeister, 2013). People who have high levels of self-control report higher levels in both feelings of happiness and life satisfaction than people low in self-control (Hofmann et al., 2013).

Although people have high/low levels in self-control or wellbeing on average, their self-control and wellbeing levels are not static. Individuals experience fluctuations in their self-control and wellbeing in daily life (Eid & Diener, 2004; Hofmann, Vohs, & Baumeister, 2012). For example, on some days, people are better able to regulate their behaviors, thoughts, and emotions than on other days. Conversely, on other days, people may not have the strength to resist temptations or alter their behaviors. Similarly, on some days, people are happier or more depressed than they are in general. How are these within-person fluctuations in self-control and wellbeing linked to each other?

In contrast to the burgeoning literature on individual differences in self-control and wellbeing, relatively little is known about the link between these two constructs at the within-person level. Research,

however, has shown that associations between psychological constructs do not have to be the same at between- and within-levels in terms of direction and size (Curran & Bauer, 2011). A particularly important and hitherto unanswered question is whether people experience a change in their subjective wellbeing when they experience a change in their self-control. Previous studies on the relationship between self-control and wellbeing have exclusively focused on between-person differences in these constructs, and thus, provide only limited insight into within-person processes. A better understanding of these processes would be critically important to develop interventions designed to boost self-control and/or wellbeing (Curran & Bauer, 2011; Tennen, Affleck, Armeli, & Carney, 2000). Hence, the current research aims both to replicate the findings on between-person differences in the previous work and to examine the association between within-person variations in self-control and wellbeing.

## 1. Associations between self-control and wellbeing at the between-person level

In this research, self-control is defined as the ability to inhibit temptations, override unwanted responses, and regulate behaviors so as to bring them into agreement with some internal or external standards (Tangney, Boone, & Baumeister, 2004). Wellbeing is used as an umbrella term, which covers different indicators of subjective wellbeing,

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\* Corresponding author at: Sabanci University, Faculty of Arts and Social Sciences, Psychology Program, Universite Cad. No: 27 Tuzla, 34956 Istanbul, Turkey.

E-mail address: [asumanbt@sabanciuniv.edu](mailto:asumanbt@sabanciuniv.edu) (A. Buyukcan-Tetik).

including positive mood, happiness, absence of depressive symptoms, and life satisfaction. These indicators represent different components of wellbeing such that positive mood, happiness, and absence of depressive symptoms assess the affective component, and life satisfaction measures the cognitive component (Diener, Suh, Lucas, & Smith, 1999). Although the affective component captures the felt wellbeing in the short-run, the cognitive component assesses the overall evaluation of life in general. Research has found a substantial phenotypic and genetic overlap between affective and cognitive components, supporting our approach to use wellbeing as an umbrella term (e.g., Bartels & Boomsma, 2009).

Several possible mechanisms may explain the positive link between self-control and wellbeing at the between-person level. First, individuals high in self-control are better in pursuing and reaching their goals. Successful goal pursuit should then lead to higher wellbeing (Carver & Scheier, 1990; Hsee & Abelson, 1991). Second, the relation between self-control and happiness may be mediated by regulatory orientation (promotion vs. prevention focus; Cheung et al., 2014). Specifically, people with high levels of self-control may be more likely to approach and strive for positive outcomes and future goals (e.g., work promotion) and less likely to focus on preventing negative outcomes (e.g., work failures) than people low in self-control. The focus on positive outcomes, in turn, may have a positive impact on wellbeing.

Third, Hofmann et al. (2013) showed that higher levels of self-control were related to fewer conflicts and temptations in people's everyday life. Similarly, recent studies showed that self-control's positive effects on several life domains are related to avoiding temptations and sticking to beneficial habits (De Ridder et al., 2012; Galla & Duckworth, 2015).

Fourth, wellbeing may also contribute to higher levels of self-control. For example, Fredrickson (2004) proposed that, opposite to the effects of negative feelings (e.g., anxiety), which narrow people's perception and attention, positive feelings may broaden people's mindsets and lead to better self-regulation and improved goal pursuit (Aspinwall, 1998; Fredrickson, 2004; Isen & Reeve, 2005; Lyubomirsky, King, & Diener, 2005). Taken together, theory and research suggest that higher self-control may be conducive to increased wellbeing, and increased wellbeing may facilitate self-control.

Previous research has found evidence for positive associations between self-control and wellbeing at the between-person level. However, these findings cannot inform the question whether experiencing increased levels of self-control at one particular time precipitates increased levels of wellbeing, and vice versa. A better understanding of the association between self-control and wellbeing at the within-person level is needed to answer this question.

## 2. Within-person variations in self-control and wellbeing

### 2.1. Self-control

Stable and variable components of self-control have often been referred to as trait and state self-control, respectively (Baumeister & Heatherton, 1996). Research has shown that factors such as sleep deprivation (Christian & Ellis, 2011) and resisting temptations (e.g., media use or sex) in daily life (Hofmann et al., 2012) predict decreases in state self-control. Conversely, small acts of encouragements (Hamburg & Pronk, 2015) and mindful meditation (Friese, Messner, & Schaffner, 2012) for example have been shown to lead to increases in state self-control.

### 2.2. Wellbeing

Although some of the wellbeing indicators are highly variable (e.g., mood) and others are relatively stable (e.g., life satisfaction), all wellbeing indicators contain both variable and stable components to some extent. For example, Eid and Diener (2004) investigated state and trait

components of mood and life satisfaction among college students across three measurements in eight weeks. Because relatively variable part (i.e., state variance) was larger for mood than for life satisfaction, their findings suggested that life satisfaction is more stable over time than is mood. Nevertheless, life satisfaction also had a substantial state variance, indicating that life satisfaction too is to some extent variable. Other experience sampling, diary, and longitudinal studies also showed that wellbeing indicators such as negative affect and positive affect fluctuate across hours within a day, across days, and across years (e.g., Bleidorn & Peters, 2011; Csikszentmihalyi & Hunter, 2003; Luhmann, Hofmann, Eid, & Lucas, 2012).

## 3. The present research

In this research, we seek to investigate natural, real-life fluctuations in self-control and wellbeing, and their link with each other. Consistent with earlier findings on between-person associations between self-control and wellbeing, we predicted that within-person variations in self-control and wellbeing are also positively interrelated.

To our knowledge, only one previous study has tested the association between self-control and one aspect of wellbeing (i.e., positive affect) at the within-person level. In their study, Wenzel, Kubiak, and Conner (2016) showed that within-person increases in positive affect were related to the successful use of one specific strategy of self-control, namely distraction (i.e., being able to pay attention to something else other than the impulse), in the presence of strong temptations.

In our research, we aim to extend this finding in three respects. First, in contrast to Wenzel et al. (2016) who investigated only within-person variations, we examined within-person fluctuations independent of between-person differences in self-control and wellbeing (Curran & Bauer, 2011; Hoffman & Stawski, 2009). Second, we investigated the associations between self-control and wellbeing using four different indicators of wellbeing: mood, happiness, life satisfaction, and absence of depressive symptoms. These indicators may have different state and trait variances (e.g., life satisfaction has more trait variance than state variance; Eid & Diener, 2004). Also, the associations between the affective and the cognitive component, respectively, and personality characteristics may vary in strength (Schimmack, Schupp, & Wagner, 2008). Therefore, we will assess whether the proposed association between self-control and wellbeing holds for all these indicators. Last, to examine the robustness and generalizability of our findings, we tested our research question across two different time scales (i.e., 39 weeks and 4 years) and across two different samples (i.e., American students and Dutch newlywed couples).

Our research includes two longitudinal studies, which complement each other. Study 1 followed undergraduate students at an American university biweekly for 39 weeks. Study 2 followed newlywed couples in the Netherlands annually for four years. A large number of assessment waves (14–20 assessments in Study 1; 5 assessments in Study 2) is important to estimate reliable associations between the within-person variations in self-control and wellbeing (cf. Whitton, Rhoades, & Whisman, 2014).

## 4. Study 1

### 4.1. Method

#### 4.1.1. Participants and procedure

Data of Study 1 came from 69 American undergraduate students ( $M_{\text{age}} = 18.04$ ,  $SD = 0.43$ ) who filled out biweekly online questionnaires for 39 weeks. Data were almost equally distributed across gender (51% were males). Most participants were European American (76%) and Asian American (11%); the rest included participants from other ethnicities and nationalities.

Participants were invited to take part in a longitudinal study through flyers distributed at the university campus (for details, see

Finkel, Burnette, & Scissors, 2007). All participants were first-year undergraduate students, between 17 and 19 years old, in a relationship for more than two months, and native English speakers.

#### 4.2. Measures

Here, we only report the variables relevant to this study. All variables were measured using Likert scales ranging from 1 = *completely disagree* to 7 = *completely agree*. Self-control and happiness were measured across 20 assessments, and mood and life satisfaction were measured across 14 assessments.

**4.2.1.1. Self-control.** Self-control was assessed using an item-measure: “I am able to resist temptations and work effectively toward long-term goals.”

**4.2.1.2. Wellbeing.** Study 1 included mood, happiness, and life satisfaction as indicators of wellbeing. Mood and happiness were assessed using the items “I am in a positive mood right now” and “In general, I am pretty happy these days”, respectively. Life satisfaction was measured using the item “I am satisfied with my life”.

#### 4.2.2. Strategy of analysis

To investigate both trait and state levels in self-control and wellbeing, we partitioned the total variance into variances between individuals (e.g., trait self-control) and within individuals (e.g., state self-control), which we refer to as *between-person differences* and *within-person variations*, respectively (Nezlek, 2007). For example, *between-person differences in self-control* reflect the degree to which individuals differ in their average self-control levels whereas *within-person variations in self-control* reflect the degree to which individuals' self-control levels deviate from their average level across situations.

We first estimated intraclass correlations, which indicate the percentage of variance at the within-person level in our research. Intraclass correlation is computed by dividing the between-person variance to the total variance. In our research, however, we subtracted intraclass correlations from 1 to present the proportion of within-person variance (Wilt, Bleidorn, & Revelle, 2016). Intraclass correlations can vary between 0 and 1. In our type of computation, intraclass correlation can be 1, if participants do not vary in terms of their average levels of self-control and wellbeing (i.e., all variance is at the within-person level). Intraclass correlation of 0 however, can mean that all the variance in self-control and wellbeing is due to the variance across participants (i.e., no variance at the within-person level) (Bolger & Laurenceau, 2013; Nezlek, 2008). The intraclass correlations were  $ICC_1 = 0.52$  for self-control,  $ICC_2 = 0.77$  for mood,  $ICC_3 = 0.64$  for happiness, and  $ICC_4 = 0.48$  for life satisfaction, suggesting that a substantial amount of the total variance in self-control and wellbeing indicators in Study 1 was due to within-person variations in these variables (between 48% and 77%).

We conducted concurrent multilevel analyses rather than time-lagged analyses, because time intervals in both our studies were too long to capture lagged associations. Lagged associations between temporary changes (i.e., within-person variation) in self-control and wellbeing across assessments are more likely to be observed in hours or within one day (cf. Wilson, Stadler, Boone, & Bolger, 2014). In our multilevel analysis, we included person-mean centered self-control for within-person variations at Level 1 and grand-mean centered person averages across waves for between-person differences at Level 2 (Bolger & Laurenceau, 2013; Nezlek, 2007).

Level 1:  $Wellbeing_{ij} = \beta_{0j} + \beta_{1j} (\text{Variation in self-control}_{ij}) + e_{ij}$

Level 2:  $\beta_{0j} = \gamma_{00} + \gamma_{01} (\text{Person-mean level of self-control}) + u_{0j}$

$\beta_{1j} = \gamma_{10} + u_{1j}$

In the equation above,  $Wellbeing_{ij}$  (wellbeing of person  $j$  at time  $t$ ) is a function of the person-level intercept ( $\beta_{0j}$ ), the effect of self-control

**Table 1**

Correlations among the study variables in Study 1.

Variable	<i>M</i>	<i>SD</i>	1	2	3
1. Self-control	5.29	1.18	–		
2. Mood	5.44	1.38	0.30	–	
3. Happiness	5.71	1.09	0.36	0.66	–
4. Life satisfaction	5.71	1.02	0.38	0.56	0.71

Note. Descriptive statistics and correlations across all waves of data. All correlations are significant,  $ps \leq 0.01$ .

variation at the within-person level ( $\beta_{1j}$ ), and measurement error ( $e_{ij}$ ). At Level 2, the person-level intercept is estimated as a function of the grand mean ( $\gamma_{00}$ ), the effect of self-control at the between-person level ( $\gamma_{01}$ ), and random error ( $u_{0j}$ ). Self-control variation at the within-person level is a function of the average effect of self-control variations ( $\gamma_{10}$ ) and error ( $u_{1j}$ ). We conducted our analyses using Mplus version 7 (Muthén & Muthén, 2012) and maximum likelihood estimation. In our study, we had adequate power – 69 participants with 1380 reports for self-control and happiness, and 966 reports for mood and life satisfaction – to examine within-person variations using multilevel analysis (Maas & Hox, 2005; Scherbaum & Ferreter, 2009).

#### 4.3. Results

##### 4.3.1. Descriptive statistics and correlations

Table 1 shows the descriptive statistics and correlations between the study variables. Self-control and all three indicators of wellbeing were positively related to each other.

##### 4.3.2. Multilevel analysis

In our multilevel analyses, we regressed wellbeing indicators onto between-person differences and within-person variations in self-control. The results in Table 2 revealed that both between-person differences and within-person variations in self-control were positively related to wellbeing. To illustrate, participants reported higher levels of happiness on days when their self-control was higher than their average self-control level,  $b = 0.23$ , 95% CI = [0.18, 0.27],  $p < 0.01$ . Additionally, participants with higher average levels of self-control reported higher levels of happiness on average than participants with lower average levels of self-control,  $b = 0.43$ , 95% CI = [0.30, 0.57],  $p < 0.01$ . Notably, the strengths of the associations between all three wellbeing indicators and self-control were significantly higher at the between-person level than at the within-person level (Wald = 6.42,  $df = 1$ ,  $p = 0.01$  for mood; Wald = 5.55,  $df = 1$ ,  $p = 0.02$  for happiness, and Wald = 12.27,  $df = 1$ ,  $p < 0.01$  for life satisfaction).

#### 4.4. Discussion

The goal of Study 1 was to examine the associations between self-control and wellbeing at the within- and between-person levels among university students across biweekly assessments. We found that both between-person differences and within-person variations in self-control were positively related to wellbeing. The associations were stronger at the between-person level. To examine the robustness and generalizability of our findings in Study 1, we investigated in Study 2 whether these associations held across five annual measurement waves in a Dutch sample of newlyweds. Because trait self-control and wellbeing are more stable and less susceptible to short-term changes, this study provides a more conservative test of the hypotheses that these concepts influence each other, even over long time intervals.

**Table 2**

Fixed effect estimates for the between-person differences and within-person variations on wellbeing indicators.

Variable	Self-control WTH					Self-control BTW				
	<i>b</i>	95% CI	<i>p</i>	$\beta$	<i>R</i> <sup>2</sup>	<i>b</i>	95% CI	<i>p</i>	$\beta$	<i>R</i> <sup>2</sup>
Study 1										
Mood	0.23	[0.15, 0.31]	< 0.01	0.16	3%	0.49	[0.34, 0.64]	< 0.01	0.61	38%
Happiness	0.23	[0.18, 0.27]	< 0.01	0.21	5%	0.43	[0.30, 0.57]	< 0.01	0.56	31%
Life satisfaction	0.17	[0.12, 0.22]	< 0.01	0.20	4%	0.50	[0.35, 0.65]	< 0.01	0.57	33%
Study 2										
Happiness	0.34	[0.23, 0.45]	< 0.01	0.13, 0.13	2%, 2%	0.87	[0.74, 1.00]	< 0.01	0.54, 0.50	29%, 25%
Depressive symptoms	−0.19	[−0.23, −0.14]	< 0.01	−0.17, −0.14	3%, 2%	−0.27	[−0.31, −0.24]	< 0.01	−0.68, −0.56	46%, 31%

Note. WTH = Within-person variations. BTW = Between-person differences. For the sake of space, we placed independent variables (between-person differences in self-control and within-person variations in self-control) in the columns, and dependent variables (wellbeing indicators) in the rows. For example, first cell in the table shows the association of within-person variations in self-control with mood. In Study 2, two estimates for the standardized estimates show the estimates for men and women, respectively. Because men and women's variables had different standard deviations, we computed gender-specific standardized estimates.

## 5. Study 2

### 5.1. Method

#### 5.1.1. Participants and procedure

In total 199 heterosexual newlywed couples in the Netherlands participated in this study. Almost all of the participants (98%) were Dutch. Participants' average age was 30.65 (*SD* = 4.79) at the first assessment wave. Most of the participants had a mid level of education (i.e., education that prepares for professional work) or a high level of education (i.e., university degree, or an education that prepares for a university degree) (in total 71% of husbands, 75% of wives). Almost all participants had a paid job (98% of husbands, 93% of wives) (for more information, see Finkenauer, Kerkhof, Righetti, & Branje, 2009).

Dutch municipalities provided contact information of newlyweds. We sent written invitations to each couple for a study on wellbeing and marriage. We then contacted the couples, who responded favorably to our invitation, by phone to verify their fulfillment of the study's criteria. Specifically, we included the participants if it was their first marriage, they had no children, and they were between 25 and 40 years old. In total, 19% of the couples to whom invitations were sent participated in our study.

The five assessments took place at one-year intervals. At each wave, we ensured that the partners completed the questionnaires separately by having a trained interviewer present during the data collection at couples' homes.

#### 5.1.2. Measures

**5.1.2.1. Self-control.** We assessed self-control using the 11-item version of the Trait Self-control Scale (Tangney, Baumeister, & Boone, 2004;  $\alpha$ s = 0.72–0.78 across assessment waves). Sample items were “I am good at resisting temptation” and “I am able to work effectively toward long-term goals.” We administered a 5-point Likert scale (1 = *completely disagree*, 5 = *completely agree*).

**5.1.2.2. Wellbeing.** In this study, we measured two indicators of wellbeing: happiness and (lack of) depressive symptoms. *Happiness* was measured using the 4-item scale by Lyubomirsky and Lepper (1999,  $\alpha$ s = .76–.83). For example, participants were asked whether they considered themselves as a happy person in general (1 = *not a very happy person*, 7 = *a very happy person*).

*Depressive symptoms* in the past week were assessed using the 20-item Center for Epidemiologic Studies Depression Scale (Radloff, 1977). An example item is “During the past week, I thought my life had been a failure.” We administered a 4-point Likert scale (1 = *rarely or never* (< 1 day), 2 = *sometimes* (1–2 days), 3 = *regularly* (3–4 days), 4 = *usually or always* (5–7 days)). Cronbach's alpha levels across assessments ranged between 0.84 and 0.86.

#### 5.1.3. Strategy of analysis

The intraclass correlations, reflecting the percentage of variance at the within-person level, were  $ICC_1 = 0.22$  and  $ICC_2 = 0.25$  for males' and females' self-control, respectively. For both males' and females' happiness  $ICC_{3,4}$  were 0.37. The intraclass correlations for depression were  $ICC_5 = 0.63$  and  $ICC_6 = 0.62$  for males and females, respectively. These results indicated that most of the variance was due to between person-differences in self-control and happiness, but within-person variation in depressive symptoms. This is not surprising, because we assessed trait self-control and general happiness, but the depression symptoms in the past week in our study. Less variance at the within-person level, compared to the within-person variance in Study 1, for self-control and happiness reflects the different time intervals in two studies.

In this study, the goal was recruiting around 200 couples at the first assessment wave due to time and budget constraints. This sample size however, was enough to have adequate power considering that the correlations stabilize when sample size approaches 250 (Schönbrodt & Perugini, 2013).

Because our dataset was dyadic, we extended the multilevel model used in Study 1 to take the interdependence between partners' responses into account (cf. Bleidorn et al., 2016). That is, we included between-person differences and within-person variations of both males and females.

Level 1: Wellbeing ( $M$ )<sub>*ij*</sub> =  $\beta_{0jM}$  +  $\beta_{1jM}$  (Variation in self-control<sub>*ijM*</sub>) +  $eM_{ij}$

Wellbeing ( $F$ )<sub>*ij*</sub> =  $\beta_{0jF}$  +  $\beta_{1jF}$  (Variation in self-control<sub>*ijF*</sub>) +  $eF_{ij}$

Level 2:  $\beta_{0jM}$  =  $\gamma_{00M}$  +  $\gamma_{01M}$  (Person-mean level of self-control<sub>*M*</sub>) +  $u_{0jM}$

$\beta_{0jF}$  =  $\gamma_{00F}$  +  $\gamma_{01F}$  (Person-mean level of self-control<sub>*F*</sub>) +  $u_{0jF}$

$\beta_{1jM}$  =  $\gamma_{10M}$  +  $u_{1jM}$

$\beta_{1jF}$  =  $\gamma_{10F}$  +  $u_{1jF}$

In the equation above, Wellbeing ( $M$ )<sub>*ij*</sub> and Wellbeing ( $F$ )<sub>*ij*</sub> are for estimating males' and females' wellbeing at time *t* in couple *j*, respectively. For example, Wellbeing ( $M$ )<sub>*ij*</sub> is a function of the male intercept in couple *j* ( $\beta_{0jM}$ ), the effect of male's variation in self-control in couple *j* ( $\beta_{1jM}$ ) and measurement error ( $eM_{ij}$ ). The second equation at Level 1 includes the same coefficients for females. At Level 2, the male/female intercept is estimated as a function of the grand mean ( $\gamma_{00M}$  for males and  $\gamma_{00F}$  for females), the effect of male/female self-control across couples ( $\gamma_{01M}$  for males and  $\gamma_{01F}$  for females) and error term ( $u_{0jM}$  for males and  $u_{0jF}$  for females). Male/female variation in self-control in couple *j* ( $\beta_{1jM}$  and  $\beta_{1jF}$ ) is a function of the intercept ( $\gamma_{10M}$  and  $\gamma_{10F}$ ) and error ( $u_{1jM}$  and  $u_{1jF}$ ) in each couple. Intercepts and slopes of males and females were allowed to covary.



**Table 3**  
Correlations among the study variables in Study 2.

Variable	<i>M</i>	<i>SD</i>	1	2
1. Self-control	3.26	0.46	–	
2. Happiness	5.67	0.88	0.40	–
3. Depressive symptoms	1.34	0.30	– 0.40	– 0.48

Note. Descriptive statistics and correlations across all waves of data. All correlations are significant,  $ps \leq 0.01$ .

## 5.2. Results

### 5.2.1. Descriptive statistics and correlations

Descriptive statistics and correlations among the study variables are shown in Table 3. As predicted, self-control was positively related to happiness and negatively related to depressive symptoms.

### 5.2.2. Multilevel analysis

Model comparison tests (see supplemental materials) revealed that there were no differences between males and females in terms of the associations between self-control and wellbeing at both between-person and the within-person levels. The final models fit the data well,  $\chi^2(4, N = 199) = 1.28$  ( $p = 0.86$ ), CFI = 1.00, RMSEA = 0.00 for happiness, and  $\chi^2(4, N = 199) = 2.64$  ( $p = 0.62$ ), CFI = 1.00, RMSEA = 0.00 for depressive symptoms.

As presented in Table 2, similar to Study 1, the results suggested that both between-person differences and within-person variations in self-control were related to wellbeing. Again, the association between self-control and well-being was stronger at the between-person level (Wald = 26.73,  $df = 1$ ,  $p < 0.01$  for happiness; Wald = 5.57,  $df = 1$ ,  $p = 0.02$  for depressive symptoms).

Although it was not the focus of our study, considering the dyadic nature of our dataset, we also examined the between-partner associations. The results revealed that within-person variations in partners' depression levels were related to each other,  $b = 0.005$ , 95% CI = [0.00, 0.01],  $\beta = 0.09$ ,  $p = 0.02$ . At the between-person level, one partner's self-control was positively associated with the other partner's happiness level,  $b = 0.19$ , 95% CI = [0.06, 0.32],  $\beta = 0.11$ ,  $p = 0.02$ . There was no other significant within-couple relation at the within- or between-person level.

## 5.3. Discussion

The goal of Study 2 was to extend the analyses in Study 1 to a longer-term time scale and a different sample. As in Study 1, the multilevel correlations suggested that although both within-person variations and between-person differences in self-control were positively related to wellbeing, the association was stronger for between-person differences.

## 6. General discussion

The present research investigated the associations between both between-person and within-person variations in self-control and wellbeing across two different time scales using samples from two different countries and age groups. Across two studies, our results consistently showed that not only between-person differences, but also within-person variations in self-control were related to wellbeing. That is, when individuals' self-control level is higher than usual, their wellbeing is also likely to be higher than usual.

Why do individuals experience an increase in their wellbeing when they have more self-control? One possible mechanism is that self-control contributes to a concurrent wellbeing by leading to feelings of mastery and goal accomplishment (Carver & Scheier, 1990; Wilt et al., 2016). Furthermore, self-control enables people to devalue short-term

distractions and temptations to reach long-term goals (Myrseth, Fishbach, & Trope, 2009; Pronk, Karremans, & Wigboldus, 2011). Thus, people may be less likely to experience decreases in their wellbeing due to unsatisfied short-term desires when their self-control level is higher than their average than when their self-control is lower than their average. Finally, it is possible that increased self-control brings good interpersonal interactions, smooth communication, and less conflicts with other people, which in turn adds to wellbeing (Buyukcan-Tetik, Finkenauer, Siersema, Vander Heyden, & Krabbendam, 2015; Finkel & Campbell, 2001; Karremans, Pronk, & Wal, 2015; Vohs, Finkenauer, & Baumeister, 2011).

Positive association between within-person variations in self-control and wellbeing may also be due to the fact that positive affect and increased wellbeing free cognitive and regulatory resources, which in turn may help people to regulate their emotions, thoughts, and behaviors (Aspinwall, 1998; Fredrickson, 2004). Another possible mechanism is that an upward shift in wellbeing changes people's beliefs and expectations about their self-control. Egan, Clarkson, and Hirt (2015) showed that when people were in a positive mood, compared to when they were in a negative mood, they were more likely to believe that their regulatory resources were unlimited, or could simply be restored. The authors showed that this perception, in turn, positively affected actual self-regulation performance of people in positive mood. Hence, research pitting different cognitive, behavioral, emotional, social, and motivational mechanisms against each other to examine the possible cyclical influence between wellbeing and self-control would be promising.

Furthermore, our results showed that, compared to the association of within-person variations, the association of between-person differences in self-control with wellbeing was stronger. Having a higher level of average self-control over time (i.e., trait self-control) seems to be more beneficial for wellbeing than having a temporary increase in self-control for example. This finding seems to suggest that improving trait levels of self-control, rather than aiming temporary shifts, through long-term continuous efforts in intervention programs may be more important for individuals' wellbeing (Berkman, Graham, & Fisher, 2012; Diamond & Lee, 2011; Oaten & Cheng, 2006).

## 7. Limitations and strengths

The correlational nature of the two study designs prevents us from drawing causal conclusions concerning the association between wellbeing and self-control. Experimental research is needed to disentangle the causal nature of the link between self-control and wellbeing. Given the correlational design of our studies, causal explanations for associations between self-control and wellbeing compete with alternative explanations. Self-control may increase wellbeing, but reverse causation, where wellbeing is a cause, rather than a consequence, of self-control is equally plausible. Moreover, confounding, when self-control or wellbeing are associated with other factors is possible (e.g., age, education, lifestyle, socioeconomic status). Studies examining the role of poverty and socioeconomic levels on self-control and wellbeing, which have been found to be associated with both variables that were at the heart of our study, would be particularly promising (Johnson, Richeson, & Finkel, 2011; Miller, Chen, & Parker, 2011; Pinquart & Sörensen, 2000).

Our research should also be interpreted cautiously until replicated in future research using shorter and more flexible time intervals between assessment waves. Future studies using diary studies and ecological momentary assessment methods should examine both short-term dynamics and lagged-effects of within-person variations in self-control and wellbeing.

Future research should also investigate the boundary conditions of the positive association between within-person associations in self-control and wellbeing. For example, self-control may be counterproductive to wellbeing in case of very strong temptations

(Trope & Fishbach, 2000), or extreme levels of wellbeing would be related to low levels of self-control due to not expecting any threats and thus not being able to foresee possible negative consequences (Dunn & Schweitzer, 2005; Storbeck & Clore, 2005). Future research should also investigate whether the positive association between self-control and wellbeing holds for domain-specific components of wellbeing (e.g., financial satisfaction, relationship satisfaction).

In our conceptualizations of between- and within-person variances, we referred to trait and state components of our variables, respectively. Nevertheless, one should also note that the conceptual distinction between these variables is not very clear. For example, a person's state variance is affected by not only situational factors, but also by the interaction between situational factors at that moment and the traits of that person (Steyer, Ferring, & Schmitt, 1992). Thus, within-person variance in our conceptualization also includes between-person differences to some extent, because whether and how a person is affected by a situation is also shaped by that person's traits.

Although the time scales in our two studies were different, we used similar measures to assess self-control. That is, the item to assess self-control in Study 1 is the combination of two of the items used in Study 2 to assess trait self-control. Future research should use different items or scales to capture state self-control especially in studies with short time periods.

Another research question is whether within-person variation (i.e., state changes) in self-control/wellbeing can lead to constant changes in individual traits (cf. Wichers, 2014). For example, high within-person variability can be a consequence of a person's attempts to change his/her trait self-control or wellbeing. A promising line of research for future studies therefore is to examine the effect of within-person variance on between-person variance in self-control/wellbeing.

In this research, we focused on only one type of operationalization of within-person variation: deviation from the average level. Research on within-person variations in self-control and wellbeing can also benefit from different operationalizations. For example, is an incremental increase in self-control in one day compared to self-control in the previous day related to wellbeing (cf. Carstensen et al., 2011)? Is the absolute extent of variation (i.e., standard deviation) in self-control over time related to wellbeing (cf. Campbell, Simpson, Boldry, & Rubin, 2010)? Future research should investigate the comparative effects of different operationalizations of within-person variations in self-control (wellbeing) on wellbeing (self-control) (Hardy & Segerstrom, 2016).

Another suggestion for future research is integrating genetically sensitive designs to examine the association between self-control and wellbeing. A substantial amount of variance in both self-control and wellbeing can be accounted for by genetic differences (Boisvert, Wright, Knopik, & Vaske, 2012; Okbay et al., 2016). Considering the heritable nature of self-control and wellbeing, future studies should focus on the contribution of both environmental and genetic factors to the within- and between-person variances in both variables and their association.

In our research, we also found links between partners' temporary changes in depression levels, and one partner's self-control and the other partner's happiness. More longitudinal and experimental research is needed to explain the mechanisms of these links and the directions of the associations. For example, can a person with high levels of self-control increase his/her partner's happiness, or vice versa (Dawson, Rehman, McAuley, & Schryer, 2015)?

To our knowledge, the present research is the first to investigate the link between within-person variations in self-control and wellbeing controlling for between-person differences. Our results are noteworthy in that they rest on data obtained from two diverse samples: students and married individuals living in the United States and the Netherlands, who were tracked across 39 weeks and 4 years. The consistent patterns of results across both studies promote confidence in our findings.

## 8. Concluding remarks

The present work offers an important contribution to recent research on the interplay between self-control and wellbeing. Wellbeing and self-control seem to benefit from not only individual differences, but also temporary shifts in each other. That is, when people feel better than usual, they are likely to believe that they are more able to regulate their behaviors, thoughts, and emotions than usual (and vice versa). Hence, boosting self-control or wellbeing at a moment can elevate the other one at the very same moment.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jpaid.2017.10.013>.

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