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# ABSTRACT

## The Stability of Self-Control in a Population Representative Study*

We investigate the stability of self-control at the population level. Analyzing repeated Brief Self-Control Scale scores, we demonstrate that self-control exhibits a high degree of mean-level, rank-order, and individual-level stability over the medium term. Changes in self-control are not associated with major life events, nor are they economically important. The stability of self-control is particularly striking given our study period (2017-2020) spans the onset of the COVID-19 pandemic.

**JEL Classification:** D91, D01
**Keywords:** self-control, Brief Self-Control Scale, SOEP, stability

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*"From our perspective, nearly every major personal and social problem affecting large numbers of modern citizens involves some kind of failure of self-regulation . . . " (Baumeister and Vohs, 2004).*

# 1 INTRODUCTION

In their theory of crime, Gottfredson and Hirschi (1990) linked criminality to low self-control which they viewed as a stable personality trait resulting from ineffective child-rearing. Criminologists responded by launching a major research effort to understand whether—and if so why—some people exhibited consistently low self-control (see Beaver et al., 2008, for a review). Today, self-control is one of the most frequently studied concepts in social science (Duckworth and Kern, 2011). Despite this, we know surprisingly little about the extent of stability in self-control.

Reaching consensus on this issue has no doubt been made difficult by the plethora of strategies used to operationalize self-control.[1] Moreover, research has focused largely on children, adolescents, and selected samples of young adults (e.g., university students, those incarcerated), implying that we know a great deal about self-control at certain ages, and virtually nothing at others. This is perhaps understandable given that human development is characterized by a growing capacity for self-regulation into early childhood (see Pan and Zhu, 2018, for a review). Still, the existing evidence leaves us in the dark about the stability of self-control over much of the remaining life cycle.

In this note, we use data from a population representative panel survey to assess the stability in a well-established measure of self-control—the Brief Self-Control Scale (BSCS) (Tangney et al., 2004). Our data come from the German Socio-Economic Panel Inno-

[1] See Duckworth and Kern (2011) who discuss the convergent validity of self-control measures derived from (i) executive function tasks; (ii) delay of gratification tasks; (iii) self-reports; and (iv) informant reports.

vation Sample (SOEP-IS) which, to our knowledge, is the only comprehensive, population representative panel survey to provide repeated self-control measures. The BSCS is a domain-general measure of trait self-control with high internal consistency (Tangney et al., 2004), test-retest reliability (Tangney et al., 2004; Bertrams and Dickhäuser, 2009), and predictive validity (de Ridder et al., 2012). Importantly, people's BSCS scores are highly predictive of their physical, mental, and financial well-being (Cobb-Clark et al., 2021).

Characterizing self-control as a stable personality trait does not necessarily imply that the capacity for self-control is either completely fixed or non-modifiable. Instead, in psychology the concept of stability accommodates some systematic changes while excluding others. For example, rank-order stability is a defining aspect of a personality trait, while mean-level stability within individuals over time, is not (Golsteyn and Schildberg-Hörisch, 2017). For this reason, we center our analysis on three key facets of trait stability: (i) mean-level stability at the population level; (ii) rank-order stability; and (iii) individual-level stability (see Bleidorn et al., 2019). Our finding that self-control is stable across all three concepts is especially noteworthy given that our three-year study period—2017 to 2020—spans the onset of the COVID-19 pandemic. Importantly, any observed changes in self-control are not associated with major life events nor are they economically meaningful.

This is good news for economists who are increasingly modeling the behavioral consequences of personality traits, including self-control, on people's life outcomes (Borghans et al., 2008; Almlund et al., 2011; Heckman et al., 2021). Empirically, it is often convenient to assume that self-control is fixed over the relevant study period because this implies that self-control is exogenous to the outcome of interest, allowing an important threat to causal identification to be avoided. This stability assumption is also particularly useful when self-control is measured contemporaneously, ex post or perhaps years prior to the observed outcome since it allows the use of lead or lagged self-control measures. Estimation strategies relying on this stability assumption are, of course, likely to produce biased estimates if self-control is, in fact, not stable over the relevant time frame. Our results provide an empirical underpinning to the core identification assumption underlying many empirical analyses. Conceptually, our results are also important in highlighting that self-control, as captured in the BSCS, can be regarded as a stable personality trait. This provides an avenue for theoretical modeling and empirical evidence to be more closely integrated, and testable hypotheses about the role of self-control in economic decision making to be derived.

# 2 DATA

The Self-Control Scale is the most widely used measure of trait self-control in psychological research on self-regulation and self-control (see Hoyle and Davisson, 2016). The 13-item brief scale (employed here) is highly correlated (0.92-0.93) with the full 36-item scale (Tangney et al., 2004), but is more suitable for large surveys. Widely applied in not only psychology, but also criminology and sociology (e.g., Duckworth and Kern, 2011; Maloney et al., 2012; Hagger et al., 2021), the BSCS includes 13 items related to resisting temptations, self-discipline, and acting without thinking. Responses ranging from "fully applies" (5) to "does not apply at all" (1) (see the Appendix) are then aggregated to construct a score, ranging from 13 to 65 points, increasing in self-control.

The innovation sample of the German Socio-Economic Panel Study was launched in 2012 with a target population of 5,000 representative German households (Richter and Schupp, 2015). The goal was to construct a new sample, mirroring the core SOEP sample, to allow new, and innovative, survey questions to be trialed (Richter and Schupp, 2012).

The BSCS was included in the SOEP-IS in 2017, and again in 2020, providing the first opportunity to observe repeated measures of self-control in a sample that is representative of the entire adult (age >16) population.

Our analysis sample consists of 1,237 individuals who answered all self-control items in both 2017 and 2020.[2] Our sample is evenly split between men (48%) and women (52%). On average, respondents are aged 55 (minimum age is 17), have 13 years of education, and have a gross monthly income of 3,027 euros.

# 3 THE STABILITY OF SELF-CONTROL

## 3.1 MEAN-LEVEL STABILITY

Mean-level stability characterizes the extent to which the average traits of a population (or sub-population) remain the same over time (see Roberts and DelVecchio, 2000). In contrast, mean-level change—also referred to as normative change—occurs when aging, social forces, or macro events, lead most people's personalities to largely change in the same way (Little, 2020). Given this, we first assess the mean-level stability in self-control by comparing mean population-level BSCS scores across time. In 2017, the mean BSCS score is 45.56 ($SD = 7.59$); in 2020, the mean BSCS score is 45.55 ($SD = 7.10$). The inter-temporal difference is $-0.01$ ($p = 0.924$), indicating that there is no statistically significant mean-level change in self-control between 2017 and 2020. Nor is there evidence of a change in the distribution of self-control over time; a Kolmogorov-Smirnov test fails to reject the null hypothesis that the two distributions are the same ($p = 0.51$) (see Figure 1).

[2] In 2017, 2,090 respondents answered at least one item, with 1,961 answering all items. In 2020, 1,375 respondents provided responses to all 13 items. The reduction in sample sizes across waves is mainly due to attrition rather than item non-response. We show evidence in favor of non-selective attrition in Appendix Table A1.

[HERE Figure 1]

Stability can also be assessed by considering the inter-temporal correlation in measured self-control. The Pearson correlation (raw score) in our BSCS measures taken three years apart is 0.68. This estimate may be attenuated by measurement error, however (see Saccenti et al., 2020). If we assume that measurement errors in the two periods are independent and additive, the true correlation ($\rho_0$) is the estimated correlation ($\rho$) times a function of the noise-to-signal ratio (Adolph and Hardin, 2007; Saccenti et al., 2020). The noise-to-signal ratio is equal to the within-person contemporaneous variances, $\sigma_w^2$, divided by the variance between individuals, $\sigma_a^2$:

$$\rho_0 = \rho \times (1 + \frac{\sigma_w^2}{\sigma_a^2}). \tag{1}$$

The variance in self-control between individuals is observable ($\sigma_a^2 = 53.94$, pooling all observations in 2017 and 2020). However, as we only observe one measure of self-control per respondent per period, there is no within-person variation in BSCS scores in either year. Consequently, we cannot calculate a noise-to-signal ratio using our data. Instead, we illustrate the sensitivity of our correlation to attenuation bias by depicting the true correlation (y-axis) given the noise-to-signal ratio (x-axis) implied by different degrees of within-person contemporaneous variation. Figure 2 shows that the true correlation rises sharply from a base of 0.68 (our estimate ignoring measurement error) as variability in contemporaneous within-person self-control—and hence the noise-to-signal ratio—increases. Once the noise-to-signal ratio reaches 0.47 ($\sigma_w^2 = 25.39$), the true correlation coefficient reaches the maximum value of 1.

[HERE Figure 2]

Previous studies differ in the study periods, measures, and samples used to assess the stability of self-control, making direct comparisons difficult. Nonetheless, our estimate of the inter-temporal correlation in self-control appears to be consistent with, or at the high end of, previous estimates for children and young adults. Hay and Forrest (2006), for example, proxy self-control with selected items from the Behavioral Problems Index (BPI) and find that, among U.S. children (aged 7-15), the correlation is around 0.65 when measured over two years, but only 0.43 when measured over eight years. Similarly, Burt et al. (2006) consider a 39-item measure of low self-control and find that, over two years, the correlation in the self-control of Black children (aged 10-12) is 0.48. In contrast, the short-run stability in self-control over the course of an academic semester is much higher (0.82) among college students (Arneklev et al., 1998).

## 3.2 RANK-ORDER STABILITY

Rank-order stability captures the extent to which the relative ordering of people on a given personality trait remains constant over time. Traits that meet the criterion for rank-stability are considered to be stable, even if there is mean-level change in trait levels within the population (Turner and Piquero, 2002; Golsteyn and Schildberg-Hörisch, 2017). Assessing the rank-order stability of self-control requires that we move away from population averages to consider the relative position of individuals within the distribution of self-control.

Consequently, following others in the literature (see Turner and Piquero, 2002; Burt et al., 2006; Yun and Walsh, 2011; Coyne and Wright, 2014), we assess the stability of self-control by considering whether people's rank in the self-control distribution remains consistent across time. We illustrate this using an alluvial diagram (see Figure 3). The quartiles of the 2017 self-control distribution are depicted in different colors on the left y-axis; those for the 2020 self-control distribution are shown on the right. Overall, we find that 48.8% of respondents are in the same quartile in both years. The stability in self-control is particularly evident at both ends of the distribution. Fully 61% of those in the bottom quartile in 2017 are also in the bottom quartile in 2020; similarly, 62% of those in the top quartile in 2017 remain there in 2020. Among those whose rank changed, 20% move up one quartile, 5% move up two quartiles, and less than 1% move from the bottom to the top quartile. The transitions among those moving from higher to lower points in the self-control distribution are similar.

[HERE Figure 3]

The Spearman correlation in our sample is 0.67, also indicating that there is a high degree of rank-order stability in self-control within the adult population. In contrast, using different indicators of low self-control, Mitchell and Mackenzie (2006) report Spearman correlations ranging from 0.27 to 0.48 over a six-month period for young (average age 23), incarcerated offenders in the United States, while Yun and Walsh (2011) calculate five-year Spearman correlations ranging from 0.42 to 0.53 for Korean adolescents.

## 3.3 INDIVIDUAL-LEVEL STABILITY

Our finding that self-control exhibits a great deal of mean-level and rank-order stability at the population-level does not necessarily imply that changes in self-control at the individual-level are unimportant or do not exist. The capacity for self-control, for example, may be increasing for some people over time, while simultaneously decreasing for others, producing offsetting changes that result in no mean-level change in the population as a whole (see Roberts, 1997; Roberts et al., 2001). Given this, it is important to understand not only how much individual-level change occurs, but also the extent to which this change is endogenous to people's life experiences.

Individual-level change in self-control is given by:

$$\Delta_i = SC_{i,2020} - SC_{i,2017} \tag{2}$$

On average, BSCS scores change by $-0.01$ ($SD = 5.91$) points between 2017 and 2020. Among our 1,237 respondents, 109 (8.8%) report exactly the same score in both years; 886 (71.6%) report change within 1 standard deviation, 221 (17.8%) change scores by more than 1 standard deviation but within 2 standard deviations; only 21 (1.7%) change by more than two standard deviations and less than three standard deviations; and no one changes by three standard deviations or more.[3]

The relationship between individual-level change in self-control and age is shown in Figure 4. The change in self-control tends to be positive up to around age 54, before becoming negative. The overall trend of intra-individual change is not statistically significant from 0 except for the 30-34-year-old group (positive), and 75-year-old and above group (negative). This shows that the aging effect across different cohort groups is relatively small and stable in the medium run.

[HERE Figure 4]

Thus far, our analysis points to a high degree of individual-level stability in self-

[3] This compares favorably with estimates of individual-level changes in other personality traits including locus of control (see Cobb-Clark and Schurer, 2013) and the Big-Five (Cobb-Clark and Schurer, 2012).

control. We turn now to consider whether the changes we do observe are potentially endogenous. That is, does people's measured self-control seem to respond to the major life events they experience? We address this question by estimating the following regression model:

$$\Delta_i = \beta_1 LE_{ij} + \mathbf{X_i}\boldsymbol{\beta_2} + e_i, \tag{3}$$

where $\Delta_i$ is the change in self-control as defined in Eq 2. Moreover, $LE_{ij}$ captures life-event shocks $j = 1$ to 5 in the years 2017-2020, which are defined as follows: (1) employment shock ($= 1$ if exiting full-time employment or exiting regular part-time employment for irregular part-time work or unemployment); (2) relationship breakdown ($= 1$ if marriage or registered same-sex partnership ends); (3) family death ($= 1$ if spouse, father, mother, child or other household relative dies); (4) childbirth ($= 1$ if new child is born); (5) COVID exposure ($=$ number of days from declaration of global pandemic on March 11, 2020 to interview date; interviews took place between September, 2020 and February, 2021). Note that shocks $j = 1$ to 4 are dummy variables, whereas shock $j = 5$ is a continuous variable. In the years of 2017-2020, 10% of respondents have employment shocks; 3% report relationship break downs; 5% experience family deaths; 8% experience childbirth; and the average COVID exposure days is 227 $(SD = 27)$. Finally, $\mathbf{X}$ is a vector of controls including age, years of education, personal monthly income—added sequentially.

Our estimates are reported in Table 1. Relationship breakdown, family death, and COVID exposure are not significantly related to individual-level change in self-control. The positive and significant relationships between employment shocks/childbirth and self-control disappear once we account for age. Thus, individual-level changes in self-control seem to be independent of these key life shocks.

[Here Table 1]

# 4 THE ECONOMIC RELEVANCE OF CHANGES IN SELF-CONTROL

We turn now to consider the economic relevance of observed changes in the capacity for self-control. Our strategy is to benchmark the changes we observe against four key measures of economic well-being; mental and physical health, life satisfaction, and monthly income.[4] We begin by estimating the relationship between economic well-being and self-control using the following model:

$$Y_{itj} = \gamma_{1j}\tilde{SC}_{it} + \mathbf{W_{itj}}\boldsymbol{\gamma_{1j}} + v_{itj}, \tag{4}$$

where $Y_{itj}$ is the outcome $j$ for individual $i$ at time $t$; $\tilde{SC}_{it}$ is the BSCS score standardized to have mean 0, $SD = 1$; and $\mathbf{W_{itj}}$ is a vector of controls appropriate for each $j$. The parameter of interest is $\gamma_{1j}$ which captures the relationship between people's outcomes and their self-control. Results are provided in Table 2 Panel A.

[HERE Table 2]

We find no evidence that the individual-level changes in self-control we observe are economically meaningful. First, variation in self-control across people is associated with

[4]The details of the four measures are (1) Current Life Satisfaction (range 0-10, mean = 7.6, $SD = 1.6$); (2) Mental Component Summary (MCS) from SF12 (range 0-100, mean = 52.4, $SD = 9.5$); (3) Physical Component Summary (PCS) (range 0-100, mean = 49.0, $SD = 10.5$)—both MCS and PCS following the variables selections according to Ware et al. (1996) and statistical methods according to Nübling et al. (2006); (4) Person gross monthly income (mean = 3,027, $SD = 2,179$).

modest disparities in economic well-being. Specifically, a one-standard-deviation increase in the BSCS score is associated with an increase in life satisfaction of 0.289 points (out of 10); an increase in physical health of 1.022 points (out of 100); an increase in mental health of 1.735 points (out of 100); and an increase in monthly income of 125.60 euros (4% of a standard deviation)—see Table 2. Second, individual-level changes in self-control of this magnitude are uncommon. Fewer than one in five people (19.6%) experience a change in their BSCS scores of one SD or more between 2017 and 2020; for everyone else, the economic relevance of changes in self-control is even smaller.

Finally, we consider whether attenuation bias resulting from measurement error may be leading us to understate the economic relevance of inter-temporal change in individual-level self-control. Following Cobb-Clark and Schurer (2013), we assume that self-control is measured with error in both 2017 and 2020 and account for this error by estimating structural equations models:

$$\begin{cases} sc_{it1} = & \alpha_1 + SC_{it}^L \beta_1 + e_{it1} \\ sc_{it2} = & \alpha_2 + SC_{it}^L \beta_2 + e_{it2} \\ & \ldots \\ sc_{it13} = & \alpha_{13} + SC_{it}^L \beta_{13} + e_{it13} \\ Y_{itj} = & \alpha_{14} + SC_{it}^L \beta_{SEM} + e_{it14} \end{cases} \tag{5}$$

where $sc_{it1}$ to $sc_{it13}$ are the 13 items of the BSCS reported by $i$ in time $t$. In effect, $SC_{it}^L$ is an indicator of each person's latent self-control (i.e., to be estimated by the model). The first 13 equations model each self-control item in the BSCS as being an indicator of the latent self-control with measurement error. We assume that the measurement errors are independent, and in order to anchor the units of latent self-control, we set its variance to

1. Estimates from this model are compared to OLS estimates using a standardized BSCS score. The reliability parameter is the ratio of the OLS and SEM estimates, providing an indication of the degree of attenuation bias.

Our SEM and OLS estimates are very similar (see Table 2 Panel B). In particular, the reliability parameters range from 78% to 92%, indicating that the impact of measurement error is small. Thus, attenuation bias is unlikely to be driving our conclusion that individual-level change in self-control is not significantly relevant for economic well-being.

# 5 CONCLUSION

People's capacity for self-control is inherently linked to the choices they make and the outcomes they achieve. Our research makes an important contribution by demonstrating that self-control exhibits mean-level, rank-order, and individual-level stability at the population level over the medium term. Moreover, changes in people's measured self-control are unrelated to key life events including employment shocks, relationship breakdown, family death, child birth, or length of exposure to the COVID-19 pandemic. Together, these results provide strong support for the perspective that self-control is a stable personality trait much like the Big-Five personality traits (Cobb-Clark and Schurer, 2012) and locus of control (Cobb-Clark and Schurer, 2013). Any change in people's self-control after reaching adulthood appears to be small, economically unimportant, and likely exogenous to their life experiences.

Crucially, our study period covers the onset of the COVID-19 pandemic which has been unprecedented in the impact it has had on people's lives. The pandemic is, in effect, a natural experiment, providing us with an opportunity to study how population-level self-control responds to major global events. The fact that self-control exhibits no significant mean-level or rank-order change—both of which are measured at the population level—is a strong testament to the stability of self-control even in the face of extraordinary events.

Given that self-control has been linked to a wide range of social and economic outcomes (see Moffitt et al., 2011; de Ridder et al., 2012; Cobb-Clark et al., 2021), our results have important policy implications. In particular, the stability of self-control implies that those with high self-control are likely to consistently make decisions that are aligned with their long-term goals, achieving greater overall well-being as a result. In contrast, those with limited self-control are likely to consistently find them failing to achieve the life outcomes they desire. The stability of self-control, in effect, contributes to the persistence in economic outcomes. Consequently, economic opportunity may be enhanced through policies that assist children and adolescents in developing self-control (see Alan and Ertac, 2018; Alan et al., 2019; Sorrenti et al., 2020) or through better commitment tools that facilitate the decision making of adults with low self-control (see Schilbach, 2019, for an overview).

Finally, the recent inclusion of a psychometrically validated measure of trait self-control in population representative panel studies opens up numerous opportunities for developing new insights into the drivers of self-control as well as the role of self-control in inter-temporal choice. Evidence on the stability of self-control over time will play an important role in supporting these future studies.

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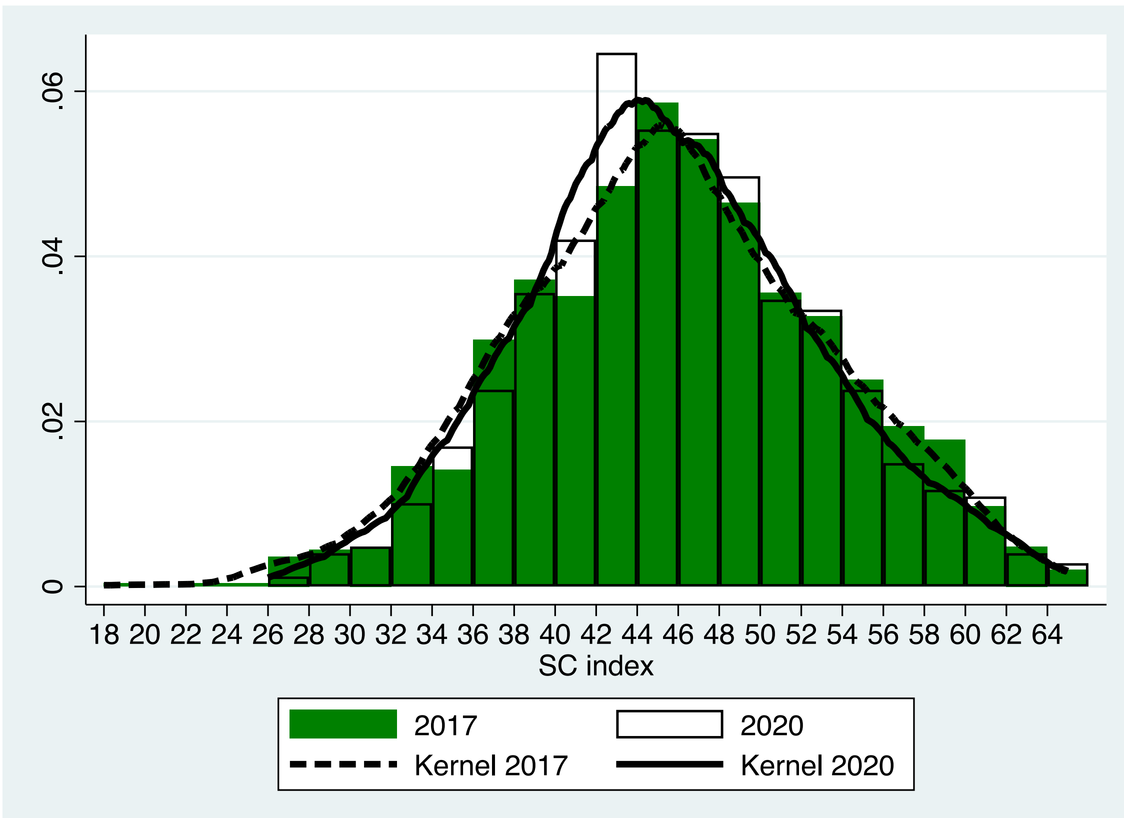
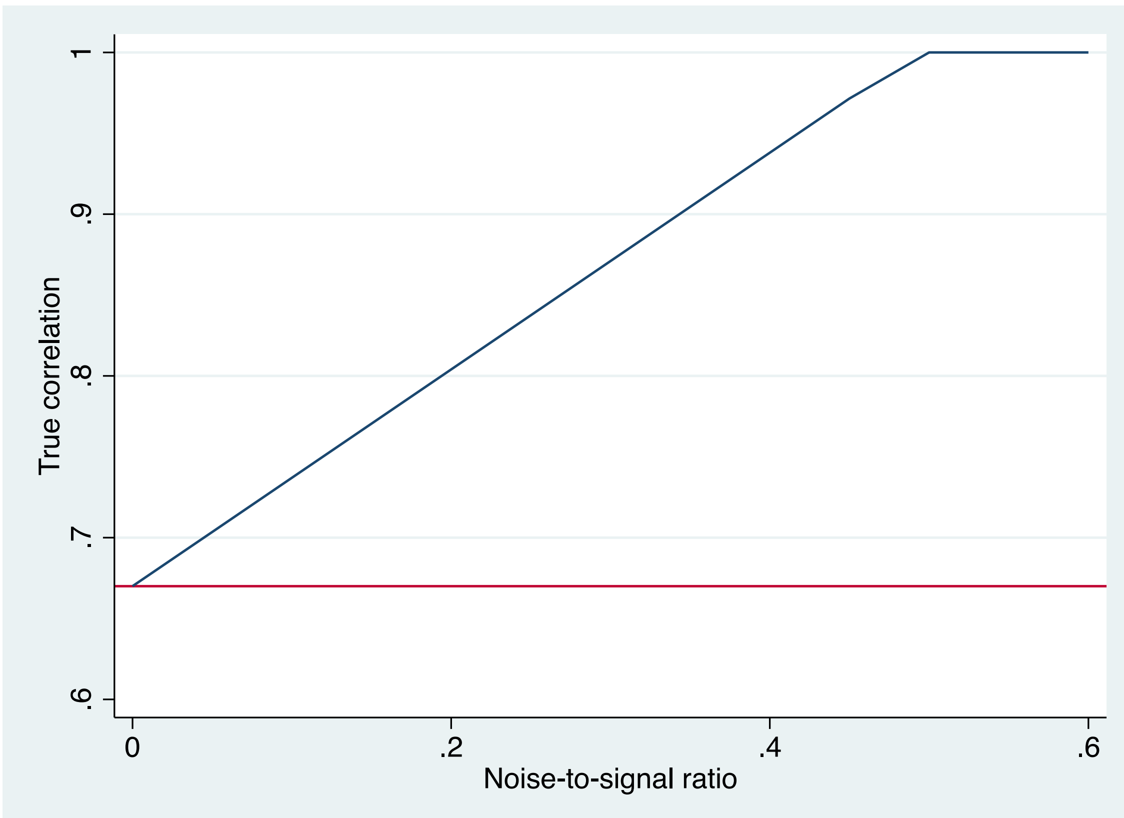
Figure 1: Distribution of self-control raw score in 2017 and 2020.



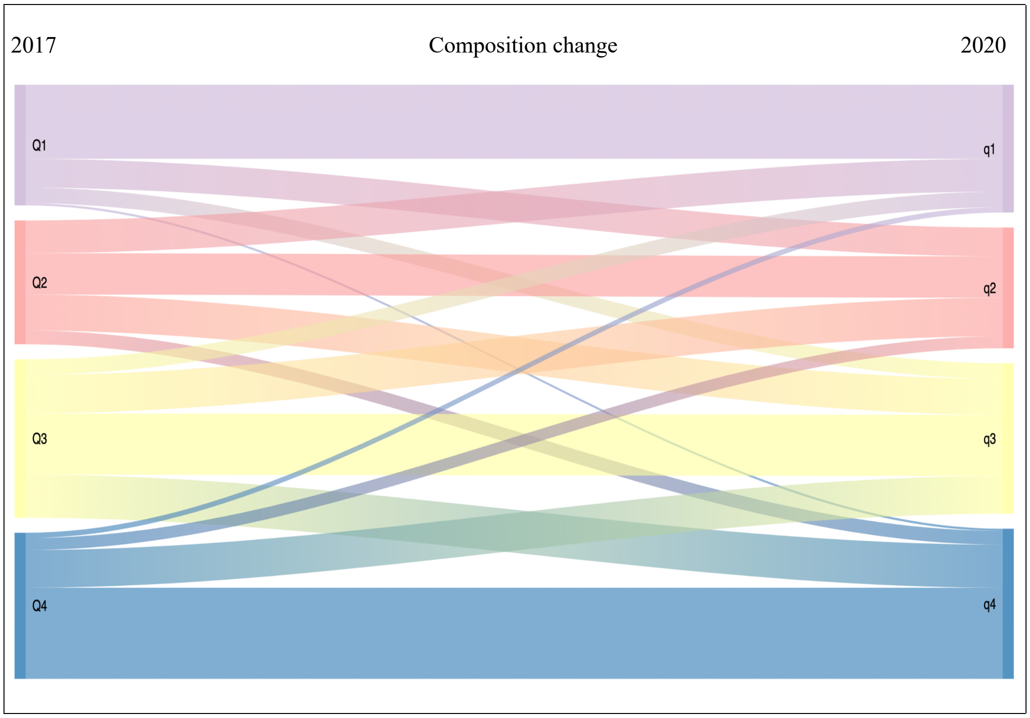

Source: SOEP 2017 and 2020 waves innovation sample. N=1,237. BSCS histogram and kernel density plot.

Figure 2: Correlation coefficient and noise-to-signal ratio.



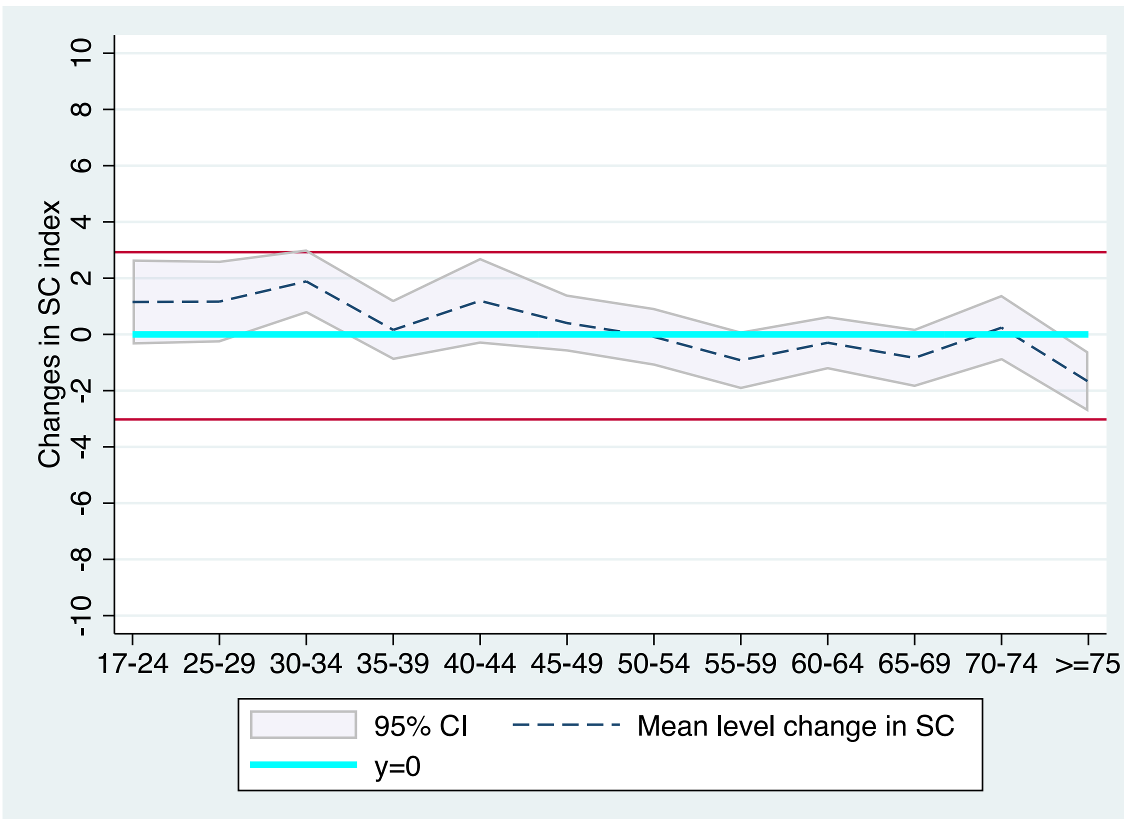

Note: The assumptions are (1) measurement errors are uncorrelated and additive; (2) two periods within individual variances are equal. The measurement errors produce attenuation bias (Saccenti et al., 2020), which suggests that our estimated correlation coefficient, $\rho = 0.68$, is a lower bound estimate.

Figure 3: Alluvial diagram for quartile transitions.




Note: The blocks represent nodes for each quartile (Q1-Q4 are 2017 quartiles, and q1-q4 are 2020 quartiles), and stream fields between the blocks represent changes in the composition of these groups over time. The height of a block represents the proportion of the group in the sample, and the height of a stream field represents the percentage of the group that changes to another group. In the sample, 48.8% of the respondents remain in the same quartile over the three years.

Figure 4: Changes in SC over the life cycle.




Note: SOEP 2017, 2020. Innovation Sample. The Y-axis is the SC index in 2020-SC index in 2017. SC scale ranges from 13-65. Horizontal red lines indicate μ±0.5 sd. The X-axis is the respondent's age in the 2017 wave.

Table 1: OLS estimates of life events on the individual-level change in self-control, adding age, education, and income as controls.

| | Change in SC | | | |
|---|---|---|---|---|
| VARIABLES | (1) | (2) | (3) | (4) |
| Employment shocks | 0.726* | 0.505 | 0.483 | 0.440 |
| | (0.397) | (0.403) | (0.411) | (0.421) |
| Observations | 2,474 | 2,474 | 2,397 | 2,325 |
| Adjusted R-squared | 0.001 | 0.019 | 0.017 | 0.017 |
| Relationship breakdown | -0.896 | -0.592 | -0.529 | -0.554 |
| | (0.727) | (0.722) | (0.732) | (0.730) |
| Observations | 2,474 | 2,474 | 2,397 | 2,325 |
| Adjusted R-squared | 0 | 0.019 | 0.017 | 0.017 |
| Family death | 0.214 | 0.204 | 0.138 | 0.085 |
| | (0.567) | (0.564) | (0.585) | (0.588) |
| Observations | 2,474 | 2,474 | 2,397 | 2,325 |
| Adjusted R-squared | 0 | 0.019 | 0.017 | 0.017 |
| Childbirth | 1.369*** | 0.018 | 0.278 | 0.340 |
| | (0.446) | (0.515) | (0.535) | (0.540) |
| Observations | 2,474 | 2,474 | 2,397 | 2,325 |
| Adjusted R-squared | 0.003 | 0.019 | 0.017 | 0.017 |
| Covid exposure | -0.00390 | -0.00536 | -0.00743 | -0.00712 |
| | (0.00617) | (0.00614) | (0.00650) | (0.00661) |
| Observations | 1,237 | 1,237 | 1,171 | 1,135 |
| Adjusted R-squared | 0 | 0.013 | 0.01 | 0.009 |
| Age | | Yes | Yes | Yes |
| Education | | | Yes | Yes |
| Income | | | | Yes |

Note: SOEP 2017 and 2020 waves innovation sample for self-control. Dependent variable is the level change in the self-control index. Standard errors are in parentheses. *** $p$<.01, ** $p$<.05, * $p$<.1.

Table 2: Outcomes and self-control: OLS and SEM estimates with controls in the pooled sample.

| VARIABLES | Life satisfaction<br>(1) | PCS<br>(2) | MCS<br>(3) | Income<br>(4) |
|---|---|---|---|---|
| PANEL A: OLS | | | | |
| $\tilde{SC}$ | 0.289*** | 1.022*** | 1.735*** | 125.6** |
| | (0.032) | (0.203) | (0.197) | (62.27) |
| PANEL B: SEM & Reliability parameter | | | | |
| Latent SC | 0.326*** | 1.302*** | 2.013*** | 136.1* |
| | (0.039) | (0.240) | (0.234) | (69.89) |
| $\hat{\beta}_{OLS}/\hat{\beta}_{SEM}$ | 88.65% | 78.49% | 86.19% | 92.29% |

Note: SOEP 2017 and 2020 waves innovation sample for self-control. Dependent variables are life satisfaction (0-10), physical component summary (0-100), mental component summary (0-100), and personal gross income last month in euros (mean=3027, SD=2179). $\tilde{SC}$ is the standardized BSCS score, and Latent SC is standardized unobserved self-control. Appropriate controls to the dependent variable are used as follows: life satisfaction regression controls for age, income, unemployment status, and physical health; PCS and MCS regressions control for age, income and education; Income regression controls for age, unemployment status, and education. Standard errors are in parentheses. *** $p<.01$, ** $p<.05$, * $p<.1$.

# APPENDIX

## Self-control index

I will now read out some statements. Please indicate how much you agree personally. Answers are from [1] Does not apply at all to [5] Fully applies

1. I am good at resisting temptation
2. I have a hard time breaking bad habits
3. I am lazy
4. I say inappropriate things
5. I do certain things that are bad for me, if they are fun
6. I refuse things that are bad for me
7. Pleasure and fun sometimes keep me from getting work done
8. I have trouble concentrating
9. I am able to work effectively towards long-term goals
10. Sometimes, I can't stop myself from doing something, even if I know it is wrong
11. I often act without thinking through all the alternatives
12. I wish I had more self-discipline
13. People would say I have iron self-discipline

Table A1: Attrition balance test

| VARIABLES | (1)<br>Prob(Stay=1) |
|---|---|
| Age | 0.00166 |
| | (0.00201) |
| Male | -0.0286 |
| | (0.0519) |
| Years of education | 0.0164* |
| | (0.00901) |
| *Marital status: Married as the base* | |
| Single | -0.124* |
| | (0.0727) |
| Divorced | -0.0658 |
| | (0.0789) |
| Widowed | -0.0223 |
| | (0.0982) |
| *Employment status: Full-Time as the base* | |
| Regular Part-Time | -0.131 |
| | (0.0826) |
| Vocational Training | -0.0189 |
| | (0.196) |
| Not Employed | -0.139** |
| | (0.0623) |
| Observations | 2,701 |

Note: SOEP-IS 2017 wave. The dependent variable is the probability of staying in 2020.
*** $p<.01$, ** $p<.05$, * $p<.1$.