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RUNNING HEAD: DELAY OR PROCRASTINATION

Delay or Procrastination –

A Comparison of Self-Report and Behavioral Measures of Procrastination

and Their Impact on Affective Well-Being

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Abstract

A short-term longitudinal study ($N = 162$ undergraduate students) replicates and extends previous findings on the relationship between self-reported procrastination and behavioral measures of procrastination (i.e., a comparison between actual and planned study time), and assesses their relation with affective well-being. All variables were measured 16 times over the course of eight weeks. State measured self-reported and behavioral procrastination correlated only moderately. In line with the definition of procrastination as a combination of delaying to work on a task and discomfort with the delay, affective well-being was better predicted by self-reported than by behavioral procrastination. This suggests that self-reported procrastination better reflects the construct than a purely behavioral measure of procrastination. Consequences and implications for further assessment of procrastination are discussed.

Keywords: Procrastination, discomfort, assessment, self-report, behavioral measures, affective well-being

(121 words)

1. Delay or procrastination? – A comparison of self-report and behavioral measures of procrastination and their impact on affective well-being

Unfortunately, most of us know the phenomenon of procrastination all too well, i.e., to delay working on a goal one has intended to pursue and feeling guilty about it. Although most authors agree on these two key elements of procrastination – delay and discomfort –, there is no agreement in the literature on an exact definition (Corkin, Yu, & Lindt, 2011; Steel, 2010). Along with the diversity in the definition of procrastination comes the challenge to find an adequate way to measure the phenomenon. There are a number of well-documented and frequently used measurement instruments of procrastination, such as the Academic Procrastination State Inventory (APSI, Schouwenburg, 1995), the General Procrastination Scale (GPS, Lay, 1986), and Academic Procrastination Scale (APS, Aitken, 1982), as well as more recently developed scales combining previous scales, such as the scale “Procrastination” (Schwarzer, 2000) and the Pure Procrastination Scale (Steel, 2010). What most of these scales have in common is that they assess different aspects of habitual procrastination, such as delaying to work on a task, concentration deficits, lack of energy and persistence, and the feeling of guilt or frustration about not having proceeded as planned.

1.1 How well do self-report procrastination scales reflect behavior?

Much of the extant literature on procrastination has adopted self-report instruments and methodologies to assess this phenomenon. However, how well scale-based self-report measures of procrastination reflect the actual behavior remains subject of an on-going debate (Steel, Brothen, & Wambach, 2001), and is currently understudied. However, there are some notable exceptions. For instance, the pioneers of procrastination research, Solomon and Rothblum (1984), intended to assess the prevalence of procrastination for very specific academic behavior using the Procrastination Assessment Scale for Students (PASS). They let students report procrastination for specific academic situations such as writing a term paper or keeping up with weekly reading assignments, and asked them to which degree procrastination

is a problem for them. In addition to these measures, Solomon and Rothblum assessed as a behavioral index of procrastination how many self-paced quizzes students took in the last third of the semester. They found only relatively moderate positive correlations between the number of quizzes and self-reported procrastination, and conclude that affective and cognitive aspects have to be considered for a comprehensive understanding of the phenomenon.

We shortly review three studies comparing self-reported academic procrastination on a trait level with behavioral procrastination measured multiple times. In the studies by Moon and Illingworth (2005) and Steel, Brothen, and Wambach (2001), behavioral academic procrastination was operationalized as the difference between the date an introductory psychology test was available on the Internet and the day students actually took the test. Results showed moderate positive correlations between trait self-report procrastination and behavioral procrastination. Steel et al. (2001) observed a lack of convergence between observed and self-report measures due to the notion that in self-report measures of procrastination participants often retrospectively negatively evaluate their behavior. Moon and Illingworth (2005) concluded that trait-based assessments of procrastination might not adequately describe actual behavior.

DeWitte and Schouwenburg (2002) used a different behavioral measure of procrastination, namely how many hours students intended to study during the coming week and how many hours they actually had studied in the prior week. They assessed behavioral procrastination over the period of 10 weeks in a sample of $N = 21$ university students, and correlated this measure with a trait measure of procrastination. They found behavioral procrastination to be unrelated to the trait measure of procrastination and explain their findings with their rather small sample size.

1.2 Goal 1: Comparison of self-report procrastination over time with actual behavior

Although these studies provide important foundations for future procrastination research, there are limited in a key way: They investigated the relationship between self-

reported procrastination measured *on a trait level* and multiple measures of *specific* behavioral procrastination over time. To date, it has not been investigated how indices of both self-report *and* behavioral procrastination relate when both are measured multiple times. Therefore, the first goal of the present research is to expand the validation of self-report measures of procrastination by relating them to behavioral measures of procrastination in a study over time in a real life situation in the academic context. We employ a state-based self-report measure of procrastination (APSI, Schouwenburg, 1995) and a behavioral measure in a short-term longitudinal study with university students. The behavioral measure is based on DeWitte and Schouwenburg (2002) and consists of the difference between planned and actual study hours.

The approach of assessing both self-reported and behavioral measures of procrastination repeatedly over time offers two advantages. First, such data allow us to validate self-reported procrastination measured over time with a behavioral proxy of procrastination over time, hence we close a gap in the literature. Second, the repeated-measures design permits estimation of trajectories and the development of both measures over a short period of time. These models allow us to detect similarities and differences of the measures during a real-life study situation.

1.3 Goal 2: Validation of self-report procrastination via affective well-being

Procrastination research seems to agree on the notion that not all delay is procrastination but all procrastination is associated with delay (Pychyl, 2009). So, what differentiates procrastination from delay? Defining procrastination as tendency to delay initiation or completion of important tasks to the point of discomfort (Howell & Watson, 2007; Solomon & Rothblum, 1984) ties the phenomenon to the feeling of guilt, or generally lower levels of well-being (i.e., Pychyl, Lee, Thibodeau, & Blunt, 2000). Steel and Ferrari (2013), for example, state that procrastination is delaying something “despite expecting to be worse off for the delay” (p.51). Krause and Freund (2013) pointed out that the feeling of guilt

might even be functional for bringing procrastinating persons back on track. Most of the self-report procrastination scales include items reflecting this emotional aspect of the construct (Klingsieck, 2013). For instance, Milgram, Batori, and Mowrer (1993) found that procrastination measured with the PASS correlated moderately high with emotional upset. More importantly in the current context, Steel et al. (2001) found that trait affect correlated with self-reported but not with behavioral procrastination. In other words, although a behavioral measure of procrastination seems to assess delay it might fail to reflect the emotional aspect that is essential in the definition of procrastination. In consequence, Corkin, Yu, and Lindt (2011) propose the term “active delay” to differentiate a form of delay that lacks the irrationality and negative emotions from procrastination. Thus, we expect that affective well-being as an important part of the construct of procrastination can be predicted best by self-report measures of procrastination, whereas a behavioral measure does not provide information about the emotions accompanying the delay.

In sum, the purpose of this paper is to (1) broaden and replicate previous findings on the relation between self-report and behavioral measures of procrastination over time with multiple measurement occasions by using a *state* measure of procrastination (instead of a one-time trait assessment as was done in previous research) and (2) investigate if *state* self-report measures of procrastination predict affective well-being better than a state measure of behavioral procrastination.

2. Method

2.1 Participants

The sample consisted of $N = 162$ undergraduate university students (75% female; $M_{\text{age}} = 21.43$ yrs.) who were recruited as a convenience sample in two lecture classes (Introduction to Law) at the University of Zurich.

2.2 Procedure

Before registering for participation, students were informed of the purpose and scope of the study and provided informed consent. As an incentive for their participation, participants entered a raffle for Amazon book vouchers with a total value of CHF 5000,- (equivalent to 5400 US\$).

Data was collected in a nine-week longitudinal online study during student's studying phase for an exam in "Introduction to Law." The study consisted of 16 measurement points. The questionnaires were administered via a tool for online surveys (www.soscisurvey.com). As a reminder, participants received emails containing a link to each questionnaire. In the first questionnaire students also filled out a measure of trait procrastination and reported their age. In the following eight weeks, participants filled out web-based questionnaires twice a week and each time rated their academic procrastination, their planned and actual studying time, their affective well-being, and other measures not relevant to the current study. After the exam, we assessed whether students had passed the exam and how satisfied they were with the way they had studied for the exam.

2.3 Measures

For the present set of analyses, we used the following measurement instruments. If not noted otherwise, participants rated all items on a 7-point scale ranging from 0 = *not at all* to 6 = *very much*. Means, *SDs*, and internal consistencies of the measures are provided in Table 1. With exception of trait procrastination each construct was reassessed at each measurement occasion.

2.3.1 Academic Procrastination. To capture state procrastination in the academic context, we used a subset of 11 items of the 13-item *Academic Procrastination State Inventory* (APSI, by Schouwenburg, 1995; German translation by Helmke and Schrader,

2000).¹ The resulting 11 item-scale measures facets of procrastination such as delay, concentration deficits, and lack of energy. Participants were instructed as follows: “*Please indicate, how frequently in the last days you engaged in the following behavior.*” A sample item is: “*You put off the completion of a task.*”

2.3.2 Behavioral academic procrastination. Based on the study by DeWitte and Schouwenburg (2002), we asked students to report how much time (in minutes) they had planned to study in the past 24 hours (planned study time) and how much time (in minutes) they had actually spent studying in the past 24 hours (actual study time). We subtracted the actual study time from the planned study time and used the result as an indicator of behavioral procrastination.

2.3.3 Trait Procrastination. To assess procrastination on the trait level we used 10 items of the 12-item Pure Procrastination Scale (Steel, 2010; own translation into German).² A sample item is: “*I am continually saying "I'll do it tomorrow"*”. Trait procrastination was assessed at the first measurement occasion only.

2.3.4 Affective Well-being. Affective well-being was assessed in terms of positive and negative affect using two parallel 4-item short versions of the mood subscale of the multidimensional mood-questionnaire (Steyer, Schwenkmezger, Notz & Eid, 1997). Participants indicated how “*good/happy/bad/...*” they felt at the specific moment.

2.4 Summary of the statistical analysis

Comparison of self-reported state procrastination with behavioral procrastination.

The relative stability of both measures was tested by calculating test-retest reliability

¹ According to results by Helmke and Schrader (2000) the item “*Experienced concentration problems when studying*” loaded not only on the procrastination factor but also on the factor fear of failure; the item “*Forgot to prepare things for studying*” had a factor loading < .44. Hence, we excluded these two items.

² We excluded two items that were related to decisional procrastination, because they were not relevant in the current context where the decision to take the exam had already been made. The scale was translated by us and back translated by a Native English speaker who is also a trained psychologist.

coefficients across the 16 measurement points. A series of simple regression analyses was conducted within each time point to test the concurrent validity of the two measures. In addition time lag (-1 lag) analyses were used where indicated.

Comparison of predictors of affective well-being. A multilevel analysis with self-reported procrastination (mean-centered), behavioral procrastination (mean-centered) and time as predictors was applied to test the hypothesis that self-reported procrastination is a better predictor of affective well-being than behavioral procrastination. The data were analyzed using the linear mixed models procedure in SPSS (with Maximum Likelihood for deriving parameter estimates). A stepwise procedure using χ^2 tests was applied to assess overall model fit.

3. Results

Correlations between the measures are provided in Table 1. Trait and state procrastination were positively correlated with each other and both with behavioral procrastination. Affective well-being correlated moderately negatively with academic state procrastination and trait procrastination, but not with behavioral procrastination.

3.1 Comparison of self-reported procrastination and behavior. The average test-retest reliability coefficient for self-report academic procrastination across the 16 measurement occasions was $r = .69$. For behavioral procrastination, the average test-retest reliability was $r = .39$. In addition to the relatively lower stability estimate, the behavioral measure of procrastination exhibited more variability in terms of pairwise consecutive assessments. Figures 1 and 2 show the trajectories for self-report academic procrastination and behavioral procrastination, respectively.

To test the concurrent validity of the self-report and behavioral measures of procrastination, a series of simple regression analyses were conducted within each time point. Self-report procrastination was a positive significant predictor of behavioral procrastination at 12 of the 16 measurement occasions (R^2 between .05 and .13, $p < .05$, $F > 4.03$).

Furthermore, we assessed how well self-report procrastination predicted behavioral procrastination by the previous measurement point (-1 lag). In four of the 15 measurement-occasions, self-report procrastination at T_{-1} significantly predicted behavioral procrastination at T_0 (all R^2 between .04 and .1, all $p < .05$, all $F > 4.12$).

3.2 Comparison of predictors of affective well-being. Results from multilevel testing of the hypothesis that self-reported procrastination is a better predictor of affective well-being than behavioral procrastination, are displayed in Table 2. The stepwise procedure of testing the models allowed for detecting that the behavioral indicator of procrastination dropped out as a significant predictor after adding our state self-report measures of procrastination to the model (see Model 4 and 5 in Table 2). In the final model that best fit the data (Model 5), significant predictors of affective well-being were time (measurement occasion), $F(1, 1441.37) = 12.38, p < .001$ and self-report procrastination, $F(1, 120.57) = 31.83, p < .001$. Behavioral procrastination was no significant predictor of affective well-being, $F(1, 1499.93) = 3.29, p = .07$. In addition, the model shows significant variation in the individual slope of self-report procrastination (see Table 2, comparison between Model 4 and 5, and Table 3 for parameter estimates for Model 5).

3.3 Additional analyses. To determine the growth curve trajectories of self-reported procrastination and behavioral procrastination, we conducted several nested model comparisons, thereby assessing the improvement in model fit of the growth curve models (using the mixed model function in SPSS). For self-reported academic procrastination the linear, $F(1, 1520.02) = 23.47, p < .01$, the quadratic, $F(1, 1448.82) = 15.5, p < .01$, and the cubic, $F(1, 1446.4) = 13.41, p < .01$, trends all significantly described the pattern over time. For the behavioral measure of procrastination none of the trends were significant.

4. Discussion

There are two main findings of this study: (1) Self-reported *state* procrastination is moderately positively correlated with a behavioral measure of procrastination (i.e., the

difference between planned and actual study time) over 16 consecutive measurement occasions and (2) Self-reported but not behavioral procrastination negatively predicted one of the two central aspects of procrastination, namely affective well-being,

The results broaden prior research by showing that the correlation of self-reported and behavioral measures of procrastination is stable over time. This is remarkable when taking into account that the trajectories of the two measures show differences in their stability across time, with self-reported procrastination being more stable and declining towards the deadline (i.e., the exam) while the behavioral measure shows more fluctuation throughout the course of the study.

The finding that only self-reported but not behavioral procrastination predicted affective well-being, suggests that behavioral measures of procrastination reflect delay but do not tap into the affective component of procrastination. Importantly, all of the variables were assessed as state constructs referring to the past couple of days. This rules out one of the shortcomings of previous research that assessed self-reported procrastination and subjective well-being both on the trait level but behavioral procrastination on the state level.

The results of the current study are in line with research by Pychyl, Lee, Thibodeau, and Blunt (2000). They also found in an experience sampling study that behavioral measures of procrastination were not associated with affect. Pychyl et al. argue, that behavioral procrastination might not only be tied to a feeling of guilt but also to positive affect people experience during a procrastination episode, because they engage in enjoyable activities instead of the procrastinated task. In contrast to the simultaneous assessment of behavioral procrastination and affect in a given situation, their trait measure of procrastination reflected past behavior (i.e., *“In the past days, how much did you put off your task?”*). Participants might have evaluated their past behavior more negatively because they felt guilty about not having studied when looking back. In our design, we avoided this problem by assessing both measures of procrastination referring to the same time frame.

4.1 Limitations. One limitation of this study is that the self-report measure of procrastination and the measure of affective well-being were both operationalized using 7-point scale ratings, whereas behavioral procrastination was indexed by a difference score of planned minus actual study time. Hence, self-reported procrastination and affective well-being shared some common method variance (Richardson, Simmering, & Sturman, 2009). However, the moderate positive correlation using mono-trait hetero-methods provides convergent validity for the underlying latent construct (Campbell & Fiske, 1959).

Another limitation is that the behavioral measure of procrastination (i.e., the difference between planned and actual study time) was also self-reported. To address the issue of potential miscalculation of the planned and actual study time by *feelings* of having procrastinated (as assessed by the self-report measure), future studies could assess the actual time spent studying or preparing for an exam using an online study platform (see Steel et al., 2001). This allows assessing actual study behavior in a computerized PSI (personalized system of instruction) environment, and thereby limits the amount of potential self-report bias. Furthermore a limitation lies in the fact that we have not assessed the reasons why students plan more study time than they actually studied. This issue should be addressed in future studies.

4.2 Conclusion. The current study provides evidence for the usefulness of self-report measures of procrastination as reflecting both of the central aspects of procrastination, namely delay and feelings of discomfort. Going beyond previous research, we show that the usefulness of self-report measures of procrastination is not due to a higher aggregation level when assessing *trait* procrastination, but also holds for a *state* measure. The use of a state measure offered new insights into the temporal trajectory of self-reported procrastination that can be clearly distinguished from measures of pure delay (see also, Corkin et al., 2011).

In sum, our results hopefully help to appease those concerned that self-report measures of procrastination might not be able to reflect actual behavior. They do, and they do even

more as they are clearly superior in predicting negative affective well-being. Thus, we maintain that self-reported procrastination provides a more comprehensive assessment of procrastination than purely behavioral measures do.

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Figure 1. Self-reported procrastination across 16 measurement points

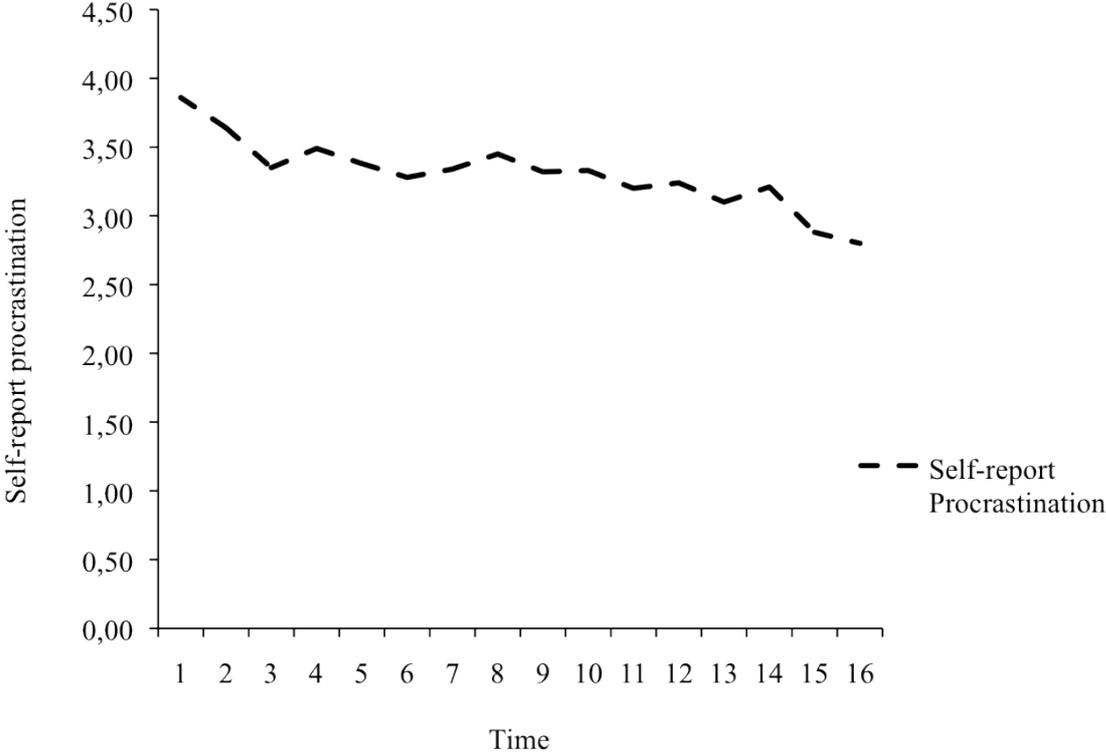
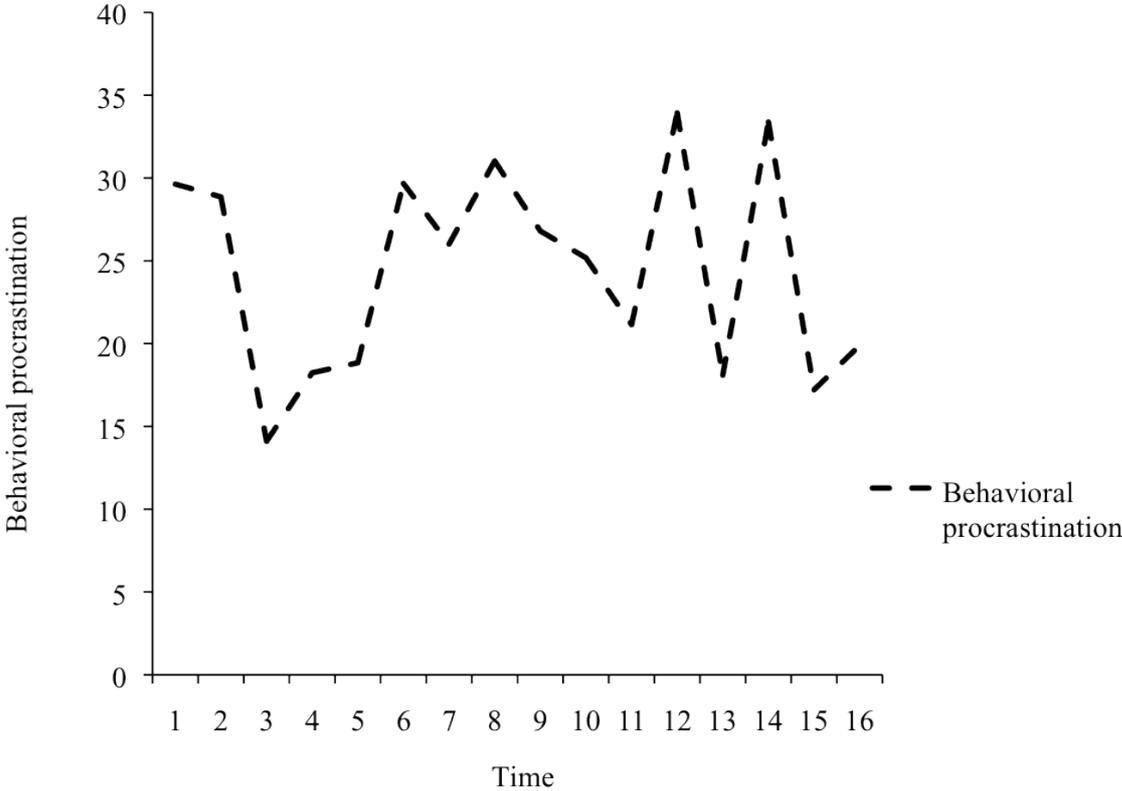


Figure 2. Behavioral procrastination across 16 measurement points



Note. Behavioral procrastination comprised the difference between actual and planned study time in minutes.

Table 1

Descriptive Statistics and Correlations Among the Study Variables

	1	2	3	4
1. Academic Procrastination (State)	-	.32***	-.25**	.59***
2. Behavioral Procrastination ¹		-	-.04	.22**
3. Affective well-being			-	-.25**
4. Academic Procrastination (Trait) ⁺				-
<i>M</i>	3.54	26.62	4.89	3.44
<i>SD</i>	.95	39.96	1.07	1.13
<i>Cronbach's Alpha</i>	>.81	-	>.85	.88

Note. $N = 139 - 188$ for a maximum of 16 measurement points. ¹Subtraction of actual study time from planned study time in minutes. ⁺Only one assessment at T0.

* $p < .05$. ** $p < .01$ *** $p < .001$