




Delaying Academic Tasks and Feeling Bad About It

Development and Validation of a Six-Item Scale Measuring Academic Procrastination

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Abstract: Procrastination is the irrational delay of an intended task and is common among students. A delay can only be defined as procrastination when it is voluntary, the action was intended but not implemented, and the delay is accompanied by subjective discomfort. Established scales of procrastination cover mainly behavioral aspects but have neglected the emotional aspect. This inaccuracy concerning the construct validity might entail misconceptions of procrastination. Accordingly, we developed and validated the Behavioral and Emotional Academic Procrastination Scale (BEPS), which covers all aspects of the definition of procrastination. The 6-item scale measuring self-reported academic procrastination was tested in three studies. Study 1 ($N = 239$) evaluated the psychometric qualities of the BEPS, indicating good item characteristics and internal consistency. Study 2 ($N = 1,441$) used confirmatory factor analysis and revealed two correlated factors: one covering the behavioral aspect and the other reflecting the emotional aspect. Measurement invariance was shown through longitudinal and multigroup confirmatory factor analyses. Study 3 ($N = 234$) provided evidence for the scale's convergent validity through correlations with established procrastination scales, self-efficacy, and neuroticism. The BEPS thus economically operationalizes all characteristics of academic procrastination and appears to be a reliable and valid self-report measure.

Keywords: academic procrastination, scale development, validation

Procrastination, the voluntary delay of intended tasks or decisions, goes along with subjective discomfort and other negative consequences (e.g., Klingsieck, 2013; Steel, 2007). When defining procrastination, most authors agree that three main aspects must be met to classify a delay as an instance of procrastination. First, the delay must be voluntary (Steel, 2007), without external circumstances making the intended action unrealizable. Second, there needs to be an intention–action gap (Lay & Schouwenburg, 1993; Steel, 2007). Third, the expectation of negative consequences needs to be accompanied by subjective discomfort, characterized by negative emotions, such as feelings of guilt or worry (Ferrari, 1998; Sirois & Pychyl, 2013; Solomon & Rothblum, 1984). These aspects are genuine for procrastination and can be used to differentiate it clearly from unproblematic, rather strategic forms of

delay (e.g., Chowdhury & Pychyl, 2018; Corkin et al., 2011; Klingsieck, 2013; Wieland et al., 2018).

Several scales have been developed to measure procrastination as a state or trait (e.g., Academic Procrastination State Inventory [APSI], Schouwenburg, 1995; Tuckman Procrastination Scale [TPS], Tuckman, 1991). Most follow a rather one-dimensional way of operationalizing it by focusing mainly on the behavioral aspect of the delay in procrastination. The emotional aspect of subjective discomfort, containing affective and cognitive components, is mostly neglected. However, this aspect, is a defining element of procrastination, both from a state and a trait perspective (Klingsieck, 2013; Krause & Freund, 2014; Wieland et al., 2018). This situation of neglecting a defining element of a construct when measuring it reveals a problem concerning the construct validity of these scales.

Reliable and valid scales, however, are crucial for measuring procrastination, understanding its consequences and correlates, and differentiating it from other forms of delay or other motivational and self-regulating problems. Instruments that assess this phenomenon in an all-encompassing way are also required to support students in a reliable and theory-based manner.

Thus, this study provides a reliable and construct valid self-report scale that considers all defining aspects of academic procrastination for future endeavors in research and intervention. For adequate use in comprehensive and time-consuming surveys, the scale was constructed as economically as possible. We operationalized procrastination as a habitual behavior by measuring the general tendency for procrastination. In this way, procrastination can be measured independently of the current stage in the study program (i.e., exam period and semester breaks). We developed and validated a scale called the Behavioral and Emotional Academic Procrastination Scale (BEPS).

Academic Procrastination

Procrastination has been considered part of the human condition (Steel, 2007) and is especially common among students of higher education (Beutel et al., 2016). However, answering how frequently problematic academic procrastination is, is somewhat challenging. Different theory-based operationalizations of procrastination (Kim & Seo, 2015), use of various scales to measure procrastination, lack of consistent cut-off scores (Rozenal et al., 2022), and the decisive role of internal norms in the classification of a delay as procrastination (Klingsieck, 2013; van Eerde, 2003) have led to considerable variations in the prevalence of severe procrastination, depending greatly on the measurement tool and the sample. Beutel and colleagues (2016) reported that students report significantly more procrastination than their employed peers and that procrastination is most likely in the typical student age of late adolescence and early adulthood. Day and colleagues (2000) reported 32% of their sample to be severe procrastinators and approximately 50% that procrastination is harmful to them. Grunschel and Schopenhauer (2015) reported in a study with German students that 65% would like to or already have made a behavioral change concerning their procrastination tendency. Rozenal and colleagues (2022) identified two aspects for differentiating student procrastinators who suffer from procrastination from students who experience their procrastination as less harmful: in the former group, procrastination was associated with a lower degree of life satisfaction and a higher degree of stress, depression, and anxiety.

In fact, academic procrastination is often accompanied by negative consequences, such as higher stress levels (Sirois, 2014), especially at the end of a semester (Tice &

Baumeister, 1997), impaired psychological well-being (van Eerde, 2003), and increased shame and guilt (Fee & Tangney, 2000). Procrastination also negatively affects academic achievement (Kim & Seo, 2015), is associated with academic misconduct (Patzek, Sattler, et al., 2015), and negatively affects study and life satisfaction (Grunschel et al., 2013; Klingsieck et al., 2012). Most studies have focused on academic procrastination (Klingsieck, 2013).

Role of Subjective Discomfort in Academic Procrastination

Trying to understand why many students tend to frequently procrastinate despite various negative consequences reveals a puzzling dynamic. A procrastination episode involves not doing the intended and doing something originally unintended instead, despite being worse off for not doing the intended (cf. Steel, 2007). This inner conflict is accompanied by subjective discomfort (Solomon & Rothblum, 1984) and, thus, negative emotions not only during but also before and after a procrastination episode (Grunschel et al., 2013). The mood repair hypothesis conceptualizes procrastination as a dysfunctional attempt to regulate negative emotions (Sirois & Pychyl, 2013; Tice et al., 2001). If an intended task is subjectively perceived as stressful, difficult, or complex (Blunt & Pychyl, 2000), it is more likely to be delayed due to impulse-driven short-term mood regulation (Sirois & Pychyl, 2013). Individuals avoid the aversive task in order to repair their mood. They procrastinate the task and fail to do the aversive task (Tice et al., 2001). At the same time, they frequently report experiencing feelings of guilt (Pychyl et al., 2000), worry, and shame (Fee & Tangney, 2000; Wohl et al., 2010) during and after a procrastination episode. This subjective discomfort also leads to increased negative affect over time (Sirois & Giguère, 2018), further maladaptive dynamics, and even enhances future procrastination (Pollack & Herres, 2020; Wäschle et al., 2014).

Thus, negative feelings play a decisive role during a procrastination episode. That also becomes clear by looking at procrastination's link with self-efficacy and neuroticism. For instance, in a state of test anxiety, as one aspect of task-aversiveness (Haghbin et al., 2012), a person feels less able to cope with challenges and, thus, experiences lower levels of self-efficacy (Usher & Pajares, 2008). Lower levels of self-efficacy, in turn, result in less initiative to act, which makes procrastination more likely (Steel, 2007). On the other hand, individuals with high levels of neuroticism experience feelings of guilt, worry, and shame particularly intensely and can, thus, be especially susceptible to these feelings during and after procrastination episodes which in turn can enhance future procrastination. Not surprisingly, neuroticism is related to procrastination (Lay, 1997; cf. Steel, 2007).

Conceptualizing Procrastination

The foundation of a psychological instrument is an adequate conceptualization of the measured construct. Procrastination is a complex psychological phenomenon that consists of specific behavioral, cognitive, and emotional components (Solomon & Rothblum, 1984). Klingsieck (2013) defined procrastination as “the voluntary delay of an intended and necessary and/or [personally] important activity, despite expecting potential negative consequences that outweigh the positive consequences of the delay” (p. 26). This definition entails three main aspects that must be met to characterize a delay as dysfunctional. First, the delay is voluntary and, therefore, not caused by external circumstances which prevent the fulfillment of the intended task (Steel, 2007). Second, a course of action was intended but not implemented (“intention–action gap”; Lay & Schouwenburg, 1993). Third, the expected negative consequences lead to subjective discomfort during the procrastination episode. This component is particularly crucial. If a delay does not go along with certain negative feelings or the person does not have to fear negative consequences that outweigh the positive consequences of the delay, the delay can be considered strategic. Some authors incorporate this directly into the definition of procrastination. For example, Solomon and Rothblum (1984) defined procrastination as “the act of needlessly delaying tasks to the point of experiencing subjective discomfort” (p. 503). Milgram (1991) described this emotional companion of procrastination as a state of emotional upset. Ellis and Knaus (1977) used the wording of negative emotions. Current studies that include subjective discomfort in their definitions of procrastination (Hagbin et al., 2012; Krause & Freund, 2014) mostly refer to the definitions of Ellis and Knaus (1977) or Solomon and Rothblum (1984). Anderson (2016) argues that the core difference between strategic delay and procrastination is the presence of emotional struggle or a guilty mind. Given the role the subjective discomfort plays in a procrastination episode and in defining the phenomenon itself, it is puzzling that most procrastination scales do not depict this emotional aspect of procrastination in a clearly defined manner.

Current Measures

Besides self-report questionnaires, researchers have introduced behavioral measures for procrastination, such as the discrepancy between planned and actual hours studied (DeWitte & Schouwenburg, 2002) or the time between the date a test was available and the date that students took the test (Steel et al., 2001). However, among other problems with behavioral measures of procrastination mostly fail to consider its emotional aspects (Ferrari et al., 1995;

Krause & Freund, 2014). Therefore, due to its highly subjective nature (Krause & Freund, 2014), procrastination is best measured using self-report and behavioral measures. Most established scales, such as the Tuckman Procrastination Scale (TPS; Tuckman, 1991) or the General Procrastination Scale (GPS; Lay, 1986), operationalize procrastination as a rather stable trait-related construct. As an exception, the Academic Procrastination State Inventory (APSI; Schouwenburg, 1995) conceptualizes procrastination as a situational state, and the Ecological Momentary Assessment of Procrastination Scale (e-MAPS; Wieland et al., 2018) can also be used in the realm of experience sampling studies.

Inspecting these and other frequently used scales reveals that most scales focus mainly on the aspect of voluntary delay and almost completely neglect the aspect of subjective discomfort. Some wordings of items describe only forms of delay but do not cover any aspects of procrastination. For instance, items that do not explicitly capture the voluntariness of a delay (Steel, 2007) include “I frequently find myself putting important deadlines off” (Academic Procrastination Scale; McCloskey & Scielzo, 2015). A person needing to strategically delay some deadlines because there are too many being imposed on them would highly agree with this item, as would a person who habitually procrastinates deadlines due to task aversion. Other items do not clearly state that action was intended but not implemented, which would be necessary for covering the second aspect of procrastination, the intention–action gap (Lay & Schouwenburg, 1993; Steel, 2007), such as “I generally delay before starting on work I have to do” (GPS; Lay, 1986; Pure Procrastination Scale, Steel, 2010). Finally, most items do not encompass the third aspect of subjective discomfort. For example, the item “I don’t get things done on time” (Adult Inventory of Procrastination, McCown et al., 1989) reflects that it may be desirable for this person to get things done on time, but this is not explicitly mentioned. Hence, subjective discomfort while procrastinating (Solomon & Rothblum, 1984) is not covered by the wording of the items in these scales. If emotional aspects of procrastination are entailed in scales, then they are entailed as reasons that can lead to procrastination, such as evaluation anxiety. The Procrastination Assessment Scale – Students (PASS; Solomon & Rothblum, 1984) and the Questionnaire on Reasons for Academic Procrastination (Patzek, Grunschel, et al., 2015) are two examples. A scale that covers all aspects of the current definition of procrastination is the e-MAPS (Wieland et al., 2018), originally developed for use in experience sampling studies. This 5-item instrument differentiates between a delay and a procrastination episode by using different criteria, namely that the delay is needless, not justified by external circumstances, and correlates with subjective discomfort.

The limitations of the existing scales indicate a serious problem concerning their construct validity (Cronbach & Meehl, 1955), mirrored by correlational patterns found in previous studies. For instance, low self-efficacy should theoretically correlate with higher levels of procrastination because it decreases motivation (Wigfield & Eccles, 2000) and makes the fulfillment of tasks with a higher competence experience more likely (Steel & König, 2006). Neuroticism should correlate with procrastination because it entails a decreased tolerance of negative emotions (Costa & McCrae, 1992) and should therefore increase the urge to procrastinate tasks that evoke negative feelings (cf. mood-regulation perspective, Sirois & Pychyl, 2013). However, self-efficacy (Klassen et al., 2008) and neuroticism (Brown, 1991) were found to only moderately correlate with procrastination when measured by these scales (Steel, 2007). We suggest that correlations between self-efficacy and procrastination, and between neuroticism and procrastination, are due to the emotional aspects shared by the constructs. Therefore, a scale that also encompasses the emotional aspect of procrastination should correlate higher with those constructs than scales that focus solely on the behavioral aspect. Thus, the two key aspects – the intention-action-gap and the negative emotional experiences – should be included in a procrastination scale, which has already been recommended by other authors (Klingsieck, 2013; Krause & Freund, 2014; Wieland et al., 2018; Wieland et al., 2021). Only then can procrastination be differentiated from strategic delay in a psychometrically sound manner.

The Present Study

The present study developed and validated the BEPS, which measures academic procrastination by covering all aspects of the definition. We tested its reliability and validity via three main studies in an academic setting. First, a pilot study was conducted to test the first version of the items. Next, Study 1 was conducted to reduce the total number of items and create an economic scale. It also tested for psychometric properties such as item characteristics and scaled reliability in terms of internal consistency. Study 2, covering two measurement points, was designed to test the factorial structure of the scale and the stability of the scale scores. This study was part of a larger research project, but only the relevant variables concerning the formulated research questions were reported. Study 3 investigated the construct validity of the scale. We hypothesized that the items that focused solely on voluntary delay would highly correlate with established scales, whereas the items focusing additionally on subjective discomfort would, compared with established scales, strongly correlate with related constructs such as self-efficacy and neuroticism. All studies were conducted online and were, prior to data collection,

approved by an ethics committee. Table 1 presents the sample characteristics of the pilot study and the three main studies. We report how we determined our sample size, all measures in the study, and all analyses, including all tested models. If we use inferential tests in the following, we report exact p values and 95% confidence intervals.

Method and Results

Scale Construction

We thoroughly inspected existing academic procrastination scales and deductively developed the BEPS. In particular, the items of the e-MAPS (Wieland et al., 2018) served as a starting point for formulating the items. The goal was to develop a short scale that economically covers all defining aspects of academic procrastination. In a first step, we tested a large selection of items that focused mainly on the adequate operationalization of the subjective discomfort during a procrastination episode. Because there is no sharply defined representation of subjective discomfort in the literature, we tested various formulations to explore how this state is most likely experienced. Formulations such as “While I am putting off tasks for my studies, I experience a certain discomfort,” or “I do not feel well when I unnecessarily put off tasks that I have set for my studies” were included in the original item pool. In formulating the items, we followed strict rules: The items had to cover all three aspects of the definition: (1) voluntariness of the delay, (2) intended but not implemented action, and (3) subjective discomfort during the delay. Yet, the second aspect is captured rather indirectly in the items. We assume that study-related tasks belong to the goal-directed tasks (Lay, 1986) that students intend to perform because they are enrolled in the study program. Operationalizing the delay and the subjective discomfort, as the behavioral and emotional aspects of procrastination, were at the center of interest during the development of the new scale. The original item pool consisted of 22 items, 10 of which focused mainly on the voluntariness and the intention of the delayed action, while the wording of the other half of the items reflected subjective discomfort during the delay as well. All items asked for the delay of academic tasks in general. Participants responded on a scale ranging from 1 = *never* to 5 = *always* to indicate how often they typically show the described behavior concerning their study-related tasks in general (see Table 2). Results of the first exploratory factor analyses (see pilot study in Table 1 for details on the sample) led to the exclusion of two items, reformulation of four items, and standardizing of the sentence structure of three items. These changes resulted in an improved item pool of 18 items. For further statistical procedures, our goal

Table 1. Description of the sample of the three studies

Study	N	Age M (SD)	Gender	Number of semesters studied	Study subject	%
Pilot study	143	23.43 (3.39)	f = 81; m = 62	M = 5.21 (SD = 3.01), 8.4% in first semester	Law Psychology Degree in teaching Other	16.1 8.4 6.3 69.2
Study 1	239	20.67 (2.39)	f = 167; m = 72	M = 2.85 (SD = 2.35), 50.6% in first semester	Law Maths Other	68.6 30.2 1.2
Study 2						
T1	1,441	20.81 (2.71)	f = 861; m = 580	M = 2.61 (SD = 2.02), 49.5% in first semester	Maths Economics Law	11.1 34.7 21.7
T2	1,099	21.77 (2.64)	f = 714; m = 385		Educational studies Computer science Other	12.7 11.2 8.6
Study 3	234	24.03 (4.79)	f = 187, m = 46, d = 1	M = 4.53 (SD = 2.56), 2.6% in first semester	Psychology Degree in teaching Medical studies Economics Other	46.0 6.3 4.7 3.2 39.8

Note. f = female, m = male, d = diverse.

Table 2. Psychometric qualities of the BEPS with internal consistencies, factor loadings, means (Ms), standard deviations (SDs), and item-total correlations

	Ω [CI]	λ	M	SD	r_{it}
Total score	.61 [0.55, 0.67]				
Delay	.89 [0.86, 0.91]				
Delay 1. I unnecessarily waste a lot of time before I start completing my study-related tasks.		.94	2.99	1.12	.87
Delay 2. I could start with my study-related tasks, but I do other things instead.		.95	3.13	1.04	.89
Delay 3. Even if the opportunity arises to start with upcoming study-related tasks, I do not do them immediately.		.94	3.03	1.05	.86
Subjective discomfort	.91 [0.88, 0.92]				
Subjective Discomfort 1. I feel bad while I am needlessly delaying study-related tasks.		.89	3.98	0.99	.92
Subjective Discomfort 2. I feel guilty while I am delaying study-related tasks for no reason.		.93	3.78	0.97	.86
Subjective Discomfort 3. I worry during the unnecessary delay of my study-related tasks.		.94	3.77	0.95	.84

Note. Ω = omega total; λ = factor loading; r_{it} = item-total correlation. Data from Study 1, N = 239. Response format 1 = never to 5 = always. The English version has not been validated yet.

was for the scale or subscales to consist of at least three items each. The original scale was formulated in German (see Appendix, Table A1). The English version of the scale has not yet been validated. The following results refer to the original German version of the items.

Study 1: Item Reduction and Exploratory Factor Analysis

The goal of the first study was to create a short scale with good psychometric properties. We aimed to reduce the total number of items and optimize their wording.

Statistical Procedures

We conducted principal axis analyses with Promax rotation using SPSS version 25 to examine the factorial structure of the instrument. Eigenvalues (< 1) suggested the extraction of two factors. To reduce the total number of 18 items, we excluded items based on both statistical criteria and content-related criteria. Hence, items were excluded with factor loadings of $\lambda < .60$ (Bortz & Döring, 2006) and corrected item-total correlations of $r < .30$ (Lienert & Raatz, 1998). For all analyses, we calculated McDonald's ω as an estimation for internal consistency (Dunn et al., 2014).

Results

Following the criterion for excluding items, we reduced the item pool from 18 to 6 items. All items displayed satisfying item characteristics. A second principal axis analysis with these six items resulted in the same two-factor solution. The first factor, including three items that cover the pure delay (delay subscale), accounted for 45.22% of the variance. The second factor, including three items that ask for subjective discomfort (subjective discomfort subscale), accounted for 41.95% of the variance. Table 2 presents the internal consistencies of the two subscales, the factor loadings of the items, and the item characteristics.

Study 2: Factorial Validity, Measurement Invariance, and Reliability

This longitudinal study was conducted to cross-validate the scale's factorial structure with another sample, test for measurement invariance across time, gender, and study duration, and test the scale's stability in terms of test-retest reliability. We conducted a study with two measurement points and performed confirmatory factor analysis (CFA). Due to varying study requirements during a semester, self-reported procrastination can also vary during a semester (Tice & Baumeister, 1997). The more distant the reward for an activity (e.g., getting a good grade for studying for an exam), the lower the motivation to pursue that activity (cf. Temporal Motivation Theory, Steel & König, 2006). Therefore, we deliberately chose one measurement point at the beginning (T1) and one at the end of a semester (T2).

Statistical Procedures

To test for the scale's factorial structure, we calculated three measurement models using CFA. Model 1 was a general factor model (all items load on one factor), Model 2 depicted two correlated factors (delay and subjective discomfort items load on two different factors, and these factors correlate with each other), and Model 3 had two uncorrelated factors. The model with the best model fit at T1 was cross-validated by the data of T2. Additionally, we compared the fit indices of the three postulated models. Since the χ^2 index is sample sensitive and very restrictive within large sample sizes (Hair et al., 2010), we focused on other fit indices. The fit indices were compared with the suggested scores of $\chi^2/df \leq 3$, comparative fit index (CFI) ≥ 0.95 , root-mean-square error of approximation (RMSEA) ≤ 0.06 , and standardized root-mean-square residual (SRMR) ≤ 0.08 (Beauducel & Wittmann, 2005; Hu & Bentler, 1999). We further examined the Akaike and Bayesian Information Criteria (AIC and BIC, respectively). The smaller the AIC and BIC criterion, the more likely it is that the model is the model that fits the data best (Fahrmeir et al., 2009).

We tested for different types of measurement invariance, calculating a longitudinal CFA for testing measurement invariance over time and two multigroup CFA for testing measurement invariance for gender (male vs. female) and study duration (first-year students vs. students enrolled in higher semester) (Little et al., 2007). For the longitudinal CFA, we chose a latent state model, in which we included autocorrelations between residuals of the same indicators over time (Marsh & Grayson, 1994). For both the longitudinal and the multigroup CFA, we followed a step-up procedure (Brown & Moore, 2012), sequentially constructing three nested models and adding more restrictions to the model in each of the overall three steps. In step 1, we compared the factorial structure for each measurement point or group (configural invariance). In step 2, we constrained the factor loadings to be equal across the measurement points or groups (metric invariance). Finally, in step 3, we constrained the intercepts of the model to be equal across the measurement points or groups (scalar invariance). In each step of testing measurement invariance, we tested the data fit for the more restrictive model compared to the previous, more parsimonious model. We computed the adjusted chi-square difference (Satorra & Bentler, 2001) for each model comparison. If the restriction did not lead to a significant decrease in model fit, namely a change in CFI of -0.01 and RMSEA of 0.015 as suggested by Cheung and Rensvold (2002) and Chen (2007), we assumed the next higher level of invariance. For all described analyses, we used the program Mplus Version 8 (Muthén & Muthén, 1998–2017).

Results

The dropout rate between the two measurement points was 23.67%. Table 3 presents the item and scale characteristics of the BEPS.

Factorial Structure

Model 1, with all items loading on one general factor, revealed unsatisfying fit indices. Models 2 and 3 with two factors revealed similar fit indices at the first measurement point (see Table 4 for details). Overall, both models represented the data adequately. To finally decide on a factorial model and to cross-validate its structure, we tested Models 2 and 3 with data from the second measurement point. This revealed a better data fit for Model 2 at T2, which is also the less restrictive model and revealed lower AIC and BIC overall. For this reason, and due to theoretical considerations, especially that the scale should measure one underlying construct, we conclude that the scale consists of two weakly correlated factors, one factor measuring the behavioral aspect (delay factor) and the other factor measuring the emotional aspect (subjective discomfort factor) of procrastination. Figure 1 illustrates the final model.

Table 3. Item Characteristics of the BEPS of Study 2 with internal consistencies, means (Ms), standard deviations (SDs), item-total correlations and factor loadings

	T1 (N = 1,441)					T2 (N = 1,099)				
	Ω	M	SD	r_{it}	λ	Ω	M	SD	r_{it}	λ
Total score	.64					.75				
Delay	.86	3.11	0.87			.89	3.14	0.88		
Delay 1		3.01	1.01	.46	.84		3.08	1.02	.56	.87
Delay 2		3.25	0.96	.44	.84		3.25	0.95	.56	.87
Delay 3		3.03	0.97	.43	.78		3.08	0.97	.53	.82
Subjective discomfort	.87	3.68	0.93			.88	3.63	0.89		
Subjective discomfort 1		3.80	1.03	.49	.87		3.69	0.98	.54	.89
Subjective discomfort 2		3.74	1.05	.48	.88		3.69	0.99	.53	.87
Subjective discomfort 3		3.50	1.08	.48	.73		3.52	1.01	.59	.77

Note. Ω = omega total; r_{it} = item-total correlation; λ = factor loadings.

Table 4. Results of the CFA for the three models

	χ^2	p	df	χ^2/df	CFI	RMSEA	RMSEA [CI]	SRMR	AIC	BIC
Model 1: One general factor	2,136.09	.00	9	237.34	.49	.41	[0.39, 0.42]	.22	22,813	22,851
Model 2: Two correlated factors (T1)	20.94	.01	8	2.62	.99	.03	[0.02, 0.05]	.02	20,700	20,740
Two correlated factors (T2)	32.21	.01	8	4.03	.99	.05	[0.03, 0.07]	.03	14,862	14,957
Model 3: Two uncorrelated factors (T1)	29.07	.01	9	3.23	.99	.04	[0.03, 0.06]	.04	20,707	20,744
Two uncorrelated factors (T2)	86.53	.00	9	9.61	.98	.09	[0.07, 0.11]	.11	14,914	14,947

Note. Fit indices for the three models. Data from Study 2, T1, N = 1,441, T2, N = 1,099.

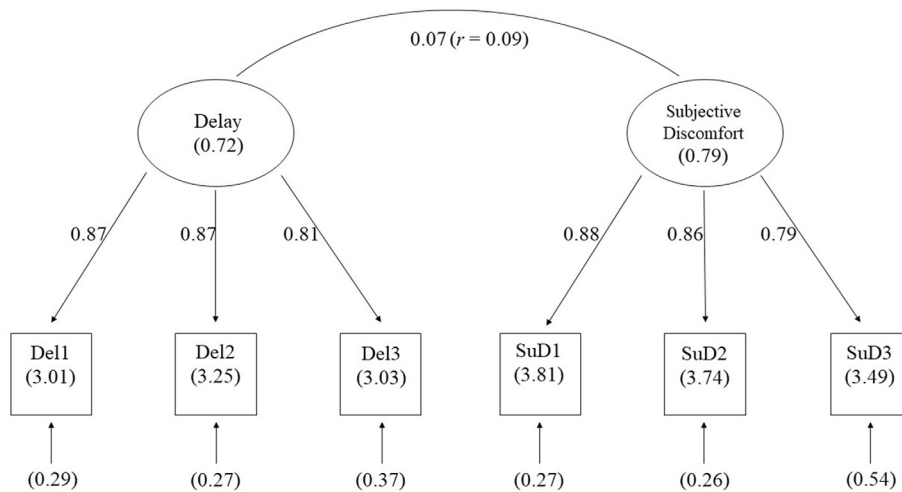


Figure 1. Two-factor model with standardized parameter scores (means, loadings, variances, residual variances) and latent factor correlations (r). Del = Delay; SuD = Subjective discomfort.

Measurement Invariance

Given that the correlated two-factor structure of the BEPS (i.e., Model 2) was deemed the best fit for the data, we used it for tests of measurement invariance over time, gender, and study duration. The changes in fit indices (i.e., RMSEA and CFI) across all examined invariance models (i.e., configural, metric, and scalar) were small (Table 5), below the cut-off values suggested by Cheung and Rensvold (2002). The BEPS thus demonstrated scalar invariance over

time, gender, and study duration. Comparisons of latent means are therefore legitimate.

Reliability

The test-retest reliability over the 18-week period was $r = .62$ (delay factor) and $r = .52$ (subjective discomfort factor). The internal consistencies of the delay factor ($\Omega_{T1} = .86$; $\Omega_{T2} = .87$) and the subjective discomfort factor ($\Omega_{T1} = .89$; $\Omega_{T2} = .88$) resembled those found in Study 1.

Table 5. Results of the analysis for measurement invariance over time, gender, and study duration

	SB χ^2 (df)	CFI	RMSEA	SRMR	Δ SB χ^2 (Δ df)	Δ CFI	Δ RMSEA
Time							
Configural	67.123 (42)	.99	.02	.02	–	–	–
Metric	72.801 (46)	.99	.02	.03	5.68 (4)	.00	.00
Scalar	119.234 (52)	.99	.03	.03	46.43 (6)	.00	.01
Gender							
Configural	70.65 (20)	.98	.06	.05	–	–	–
Metric	88.92 (24)	.98	.05	.08	18.27 (4)	.00	–.01
Scalar	53.81 (26)	.99	.04	.08	35.11 (2)	.01	–.01
Study duration							
Configural	36.37 (20)	.99	.04	.03	–	–	–
Metric	40.56 (24)	.99	.03	.03	4.19 (4)	.00	–.01
Scalar	38.17 (26)	.99	.03	.04	2.39 (2)	.00	.00

Note. Fit indices for the different models. Data from Study 2, T1, $N = 1,441$, T2, $N = 1,099$; $n_{\text{female}} = 861$, $n_{\text{male}} = 580$; $n_{\text{firstsemester}} = 714$, $n_{\text{highersemester}} = 727$. SB χ^2 = Satorra-Bentler χ^2 ; df = degree of freedom; CFI = comparative fit index; RMSEA = root-mean-square error of approximation; SRMR = standardized root-mean-square residual.

Study 3: Construct Validity

Given the results of Study 2, which revealed two weakly correlated subscales, we took the two subscales separately into account when analyzing the data for indications of construct validity. We tested different hypotheses concerning the convergent validity of the BEPS with regard to its link with scales that operationalize procrastination, neuroticism, and self-efficacy. To evaluate the size of the correlation coefficients, we followed Cohen's classification scheme (Cohen, 1992) $r = .10$ characterizing small, $r = .30$ medium and $r = .50$ large effect sizes. Based on the observation that frequently used self-report scales of procrastination mainly focus on the delay and do not include its emotional aspect,

Hypothesis 1 (H1): We expected that the delay subscale to correlate positively and strongly ($r \geq .50$) with scales measuring procrastination.

Hypothesis 2 (H2): We expected that the subjective discomfort subscale to correlate weakly to medium ($r \leq .30$) with scales measuring procrastination.

Hypothesis 3 (H3): We expected that the subjective discomfort subscale to correlate positively and strongly ($r \geq .50$) with constructs that have a strong negative emotional component, such as fear of failure within procrastination, academic self-efficacy, and neuroticism.

Hypothesis 4 (H4): We expected that the delay subscale to correlate weakly ($r \leq .30$) with emotion-related constructs, such as fear of failure within procrastination, academic self-efficacy, and neuroticism.

Instruments and Statistical Procedure

We assessed three German versions of self-report procrastination scales to collect indications for convergent validity of the delay subscale. We used two trait-related procrastination scales (one focusing on academic procrastination and one on general procrastination) and one state-related scale. First, we used the 16-item Tuckman Procrastination Scale – Deutsch (TPS-D, Stöber, 1995; Tuckman, 1991; 1 = *not at all* to 5 = *very*), in an adaption to the academic context (Grunschel et al., 2013). Second, we used the 9-item GPS-K (Klingsieck & Fries, 2012; 1 = *very untypical* to 4 = *very typical*). In addition, we used the 12-item procrastination subscale of the APSI-d (Patzelt & Opitz, 2014; 1 = *never* to 5 = *always*).

To collect indications for convergent validity of the subjective discomfort subscale, we first used the 6-item subscale “fear of failure” of the APSI-d (Patzelt & Opitz, 2014). Second, we assessed neuroticism through four items (1 = *totally disagree* to 4 = *totally agree*), which were taken from a short form of the Big Five Inventory (BFI; Rammstedt & John, 2005). Third, we assessed academic self-efficacy using the 10-item General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995; 1 = *totally disagree* to 4 = *totally agree*). Internal consistencies for all scales are presented in Table 6.

Results

The correlations of the scales are presented in Table 6. The correlations supported our hypotheses. Established self-report scales of procrastination, the TPS, GPS-K, and APSI, were strongly and positively correlated with the delay subscale of the BEPS (cf. H1). The correlations of the procrastination scales were weaker for the subjective discomfort

Table 6. Internal consistencies of and manifest correlations among measures of the BEPS, other procrastination self-report scales, fear of failure within procrastination, neuroticism, and academic self-efficacy

	<i>M</i>	<i>SD</i>	Ω	BEPS SuD	TPS-d	GPS-K	APSI (P)	APSI (FoF)	Neuroticism	Academic self-efficacy
BEPS Del	3.97	1.28	.93	.21**	.87**	.82**	.69**	.36**	.14*	-.21**
BEPS SuD	4.61	1.01	.88	–	.26**	.14*	.22**	.48**	.48**	-.32**
TPS-d	2.91	0.92	.95		–	.86**	.77**	.45**	.26**	-.35**
GPS-K	2.97	0.76	.92			–	.71**	.34**	.17**	-.21**
APSI (P)	3.01	0.87	.85				–	.59**	.32**	-.33**
APSI (FoF)	2.96	0.69	.87					–	.59**	-.57**
Neuroticism	3.32	0.97	.83						–	-.46**
Academic self-efficacy	2.81	0.56	.91							–

Note. Data from Study 3, $N = 234$. BEPS Del = Subscale “delay”; BEPS SuD = Subscale “subjective discomfort”; APSI (P) = Subscale “procrastination in a narrow sense”; APSI (FoF) = Subscale “fear of failure related to procrastination”; Ω = omega total. ** $p < .01$; * $p < .05$.

subscale than for the delay subscale (cf. H2). Comparable emotion-related constructs were moderately and positively correlated with the subjective discomfort subscale of the BEPS (cf. H3). The correlations of the emotion-related constructs were weaker for the delay subscale than for the subjective discomfort subscale (cf. H4). Thus, the BEPS subscales correlate as expected with established self-report scales of procrastination and scales measuring comparable emotion-related constructs, which provides evidence for the convergent validity of the scale.

Discussion

The aim of the present contribution was to develop a reliable and valid scale, the BEPS, to measure, unlike most scales, both behavioral and emotional aspects of academic procrastination, focusing on the construct validity of the scale. The scale construction was led by theoretical considerations that strengthened the content validity of the scale. Furthermore, aspects of reliability and validity were empirically inspected within three studies. The studies have indicated acceptable internal consistencies (Studies 1–3), factorial validity (Study 2), measurement invariance over time, gender and study duration (Study 2), acceptable test-retest reliability (Study 2), and convergent validity (Study 3) of the scale. Our data indicate that the BEPS is a reliable and valid (concerning content, factorial and convergent validity) self-report scale that, due to its relative brevity, can be used in future studies.

Meaning and Significance of the BEPS Subscales

We found strong correlations between established procrastination scales and the delay subscale of the BEPS. This suggests that the three items of this scale can be used to measure the behavioral aspect (i.e., the aspect of pure delay) of procrastination in a qualitatively similar manner

as established scales but more economically. Each item incorporates the voluntariness of the delay and the intention–action gap, reflecting important definitional aspects of procrastination. The strong correlations with established scales based on these definitional aspects can be seen as further hints at the content validity of the scale. Moreover, the weak correlations between the BEPS delay subscale and neuroticism or self-efficacy can be seen as a hint at the discriminant validity of this subscale.

The descriptively higher means in the subjective discomfort subscale compared with the delay subscale imply that procrastination does have a negative impact on the emotional well-being of the procrastinating person. The descriptively higher correlations between the subjective discomfort subscale and fear of failure, neuroticism, and self-efficacy, compared with the delay subscale, agree with the findings on the interplay of emotional aspects of a procrastination episode and these variables (Hagbin et al., 2012; Wäschle et al., 2014). However, meta-analytically determined correlations between procrastination and these variables that have a strong emotional component (Steel, 2007) are only weak. This can lead to the assumption that the operationalization of procrastination by established scales does not fully capture the emotional aspect of procrastination. Our scale can provide insights into the link between procrastination and constructs with a strong emotional component.

The different correlational patterns concerning emotional variables and the subjective discomfort subscale on the one hand and between those variables and the behavioral subscale on the other hand clearly show that considering procrastination as a behavioral phenomenon is too unidimensional. As the BEPS operationalizes both the behavioral and the emotional aspects, links between procrastination and emotional variables can be uncovered, which will propel our understanding of procrastination.

Moreover, the BEPS can also be used to study the emotional components that are directly related to procrastination. During a procrastination episode, one is likely to be

absorbed in the moment (Sirois, 2014), which mirrors the character of procrastination as it numbs the task's aversive feelings by doing something more pleasurable instead. In the moment of procrastinating, subjective discomfort is, thus, intertwined with positive emotions induced by the alternative task. That makes it difficult to capture feelings such as guilt and worry *during* a procrastination episode. So far, time-based analyses have found mixed results concerning subjective discomfort, with neither positive nor negative effects during a procrastination episode (Pychyl et al., 2000), higher levels of anxiety, and lower levels of hope during a procrastination episode (Gadosey et al., 2021), an increased task aversiveness in the moment of intended action increasing the likelihood to procrastinate (Wieland et al., 2021), or increased thoughts about life deprivation and a lower frustration tolerance for habitual procrastinator during a delay (McCown et al., 2012). For a 2-day period, low positive affect was found to increase the likelihood of actual procrastination (Sirois & Giguère, 2018) and prior day negative emotions to enhance next day procrastination (Pollack & Herres, 2020). However, the retrospective approach used with regard to the BEPS, although not free of problems in itself, might be potentially less influenced by the positive effect induced by the alternative task during a procrastination episode. Therefore, future studies that assess procrastination by using the BEPS will shed light on the fact that procrastination itself evokes negative emotions, although it is seen as a way of regulating task-aversive emotions (cf. Sirois & Pychyl, 2013). This could be done by combining the BEPS with other scales measuring procrastination and emotions.

The correlation between the two BEPS subscales is rather weak, which implies that a person who frequently delays tasks (high scores on the delay subscale) does not always and necessarily suffer emotionally from this behavior (low scores on the subjective discomfort subscale). For some students, experiencing intense subjective discomfort while procrastinating seems purposeful because it actually prevents them from frequently procrastinating (Milgram et al., 1993). For others, this subjective discomfort resolves further maladaptive dynamics and even enhances their procrastinating tendency (Wäschle et al., 2014). This weak correlational pattern is further in line with a theoretical discussion on “behavioral procrastination” and “emotional upset” (cf. Milgram et al., 1992), which states that the correlation needs to be weak because delaying a task is not always accompanied by intensive emotional upset.

Implications for Student Counselling

The BEPS offers some implications for counseling settings by offering the opportunity to focus on more than the occurrence and possible reasons for procrastination

(Patzek, Grunschel, et al., 2015). Counselors can now also focus on the emotional difficulties a student experiences while procrastinating. This focus on the emotional aspect is relevant because, assumably, various negative consequences of procrastination can occur due to increased feelings of shame, self-doubt, or decreased self-efficacy. The BEPS offers a more sophisticated understanding of the person's procrastination experience and can support more individualized consultations and other supportive interventions.

Limitations and Future Research

To further investigate the quality of the BEPS, additional studies should look closer at the discriminant and criterion-related validity of the scale. In doing so, it would be informative to understand which of the two subscales is more predictive regarding the occurrence of procrastination as seen in the actual behavior.

The fact that the two measurement points do not differ from each other in the present research, although other studies have demonstrated varying self-reported procrastination during a semester (Tice & Baumeister, 1997), could also be influenced by the fact that the time period within the instruction of the BEPS is rather vaguely defined. A stronger specification of the time period within the instruction (e.g., “to what extent do you agree with the statements during the last four weeks”) could direct students' reflections to certain phases of the semester and would better control for the time period that the participants refer to. Furthermore, in future studies, true group comparisons within a norm sample would be interesting, also to answer questions of frequencies of problematic procrastination or different characteristics between groups of students.

With regard to the formulation of the items, the intention-action gap is captured rather indirectly in the BEPS. Asking for it at the moment of occurrence could capture this criterion more directly, as is done, for example, in the e-MAPS (Wieland et al., 2018). In a combined survey, with scales measuring both trait and state procrastination, one could also determine whether the reports of the BEPS on subjective discomfort are actually less distorted because they are not influenced by the positive affect induced by the alternative task during a procrastination episode. As the BEPS operationalizes procrastination as a mainly behavioral and emotional construct, the cognitive aspect of procrastination is only indirectly covered by the BEPS (e.g., by item “I worry during the unnecessary delay of my study-related tasks”). Future studies could further analyze the interplay between the BEPS and accompanying cognitions with regard to procrastination episodes or also cognitive appraisals of procrastination (e.g., how they evaluate their

behavior) in connection with the subjective discomfort. Furthermore, Studies 1 and 2 included mostly first-year students, even though studies show that the procrastination tendency increases with the total number of semesters (Patzelt & Opitz, 2014). However, because we could already report evidence in favor of the expected hypotheses within these samples, it can be assumed that studies with older students reveal the same, if not stronger, results. Hints for this assumption were found in Study 3.

At this point, we can tentatively recommend that researchers and practitioners take all aspects of the definition of procrastination into account and seek a multidimensional understanding of this specific form of delay. The BEPS can be a suitable scale in this regard.

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All authors declare that they have no conflict of interest.

Open Science

Open Data: The information required to reproduce all of the reported results are, at the time of submission, not openly accessible. This is because the study was funded by the German Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung, BMBF) and the data will be made accessible in a separate process.

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Appendix

Table A1. Original German Items of the BEPS

	Original German version	English version
Delay 1	Ich lasse unnötigerweise viel Zeit verstreichen, bis ich mit dem Erledigen meiner Aufgaben im Studium beginne.	I unnecessarily waste a lot of time before I start completing my study-related tasks.
Delay 2	Ich könnte mit den Aufgaben für mein Studium anfangen, stattdessen beschäftige ich mich mit anderen Dingen.	I could start with my study-related tasks, but I do other things instead.
Delay 3	Auch wenn sich die Gelegenheit bietet mit den anstehenden Aufgaben für mein Studium anzufangen, tue ich es nicht sofort.	Even if the opportunity arises to start with upcoming study-related tasks, I do not do them immediately.
Subjective discomfort 1	Beim grundlosen Aufschieben von Aufgaben in meinem Studium überkommt mich ein schlechtes Gefühl.	I feel bad while I am needlessly delaying study-related tasks.
Subjective discomfort 2	Beim unbegründeten Aufschieben von Aufgaben für mein Studium plagt mich ein schlechtes Gewissen.	I feel guilty while I am delaying study-related tasks for no reason.
Subjective discomfort 3	Beim unnötigen Aufschieben von meinen Aufgaben für das Studium mache ich mir Sorgen.	I worry during the unnecessary delay of my study-related tasks.