Confirmatory Factor Analysis of the Academic Procrastination Scale

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Abstract

This study verified the construct validity and reliability of the Academic Procrastination Scale (APS). Undergraduate students (N = 1153) from 5 different colleges at the University of Eastern Philippines completed the APS. Confirmatory factor analyses (-CFA) indicated that a three-factor structure of the APS provided a good fit to the data. The APS dimensions and items had moderate to high internal consistency reliabilities indicating the usefulness of the scale in measuring the dilatory behavior of students especially in college setting. These results support the utility of the scale for research and in theory development of academic procrastination.

Keyword: Confirmatory Factor Analysis; Validity; Reliability; Structured Procrastination, Unstructured Procrastination, Non-procrastination

Introduction

Most researchers have defined procrastination as the lack or absence of self-regulated performance and the behavioral tendency to postpone what is necessary to reach a goal. We procrastinate when we delay beginning or completing an intended course of action (Beswick & Mann, 1994; Ferrari, 1993; Lay & Silverman, 1996). In the academe, procrastination represents a border between the goals and actions of college students because their goal of completing college successfully is held up by their action of procrastinating on studying lessons and doing academic requirements. Not less than 70% of undergraduate students procrastinate, and almost 20% do so regularly (Ellis & Knaus, 1977; O'Brien, 2002; Schouwenburg, 1995), while 50% of them chronically procrastinate (Day, et al., 2000). Chronic procrastination is either getting worse or more people are willing to admit to chronically procrastinating (Steel, 2007). Higher ability students procrastinated more than lower ability students and this behavior become intense as students move on to their academic careers and became more self-regulated (Ferrari, 1991). In most of these studies, researchers have focused on the negative aspects of this behavior and found that procrastination is a maladaptive practice that should be corrected.

Recently, Chu and Choi (2005) provided a different point of view, and showed that there is another facet of academic procrastination other than the negative aspect previous researchers presented. They proposed two different types of procrastinators, passive and active procrastinators. Passive academic procrastinators postpone their tasks because of their inability to make the decision to do tasks in a timely manner. In contrast, active procrastinators make intentional decision to procrastinate, work best under pressure, and are able to complete tasks with satisfactory outcomes. What is interesting with their findings is that active

procrastinators demonstrated similar attitudes, coping styles, and academic performance to those of non-procrastinators.

Other studies have also shown that procrastination presents some benefits too. For instance, Vacha and McBride (1993) found that students who procrastinate were more likely to cram, and that crammers do better than non-crammers by using superior study strategies to attain maximum effectiveness. Sommer (1990) asserted that high ability students maximize the effectiveness of their study time by doing a carefully orchestrated cycle of procrastination and cramming. Brinthaupt and Shin (2001) further investigated the relationship of cramming to maximum efficiency and peak experience. They argued that cramming increases flow because it increases the level of task challenge and demands a higher level of performance from the student.

In an attempt to show the lighter side of academic procrastination, Schraw, Wadkins, and Olafson (2007) used grounded theory to look into this phenomenon. They described the participants in their study as having a wide variety of potentially adaptive characteristics, as well as maladaptive aspects of procrastination. They discovered that adaptive characteristics included cognitive efficiency and peak experience as its dimensions. These findings suggest that procrastination improves efficiency, challenge, and flow. Csikszentmihalyi (1997) defined flow as the state of total involvement in an activity that consumes one's complete attention. According to Csikszentmihalyi the most important determinant for flow or "optimal experience" is the balance between the challenge of the task or situation and one's skills. When challenge and skills are matched, flow is more likely to occur. Schraw, et al. (2007) indicated that procrastination ultimately increases the likelihood of achieving a deep state of flow because procrastinators work under pressure for an extended period of time in which all of their resources are focused on one goal.

Similarly, Perry (2008) discussed benefits of procrastination in what he called structured procrastination. This strategy, as he referred to it, converts procrastinators into well-organized human beings and valued for efficiently using their time. He said that structured procrastination is the art of making this bad trait work. The key idea that he offered is that procrastination does not mean absolutely doing nothing. Procrastinators do useful things, as Perry notes, "Procrastinators seldom do absolutely nothing; they do marginally useful things, like gardening or sharpening pencils or making a diagram of how they reorganize their files when they get around to it" (Perry, 2008). The result of this kind of strategy is that in order to avoid that task at the top of our list, we engage in other worthwhile tasks below our priority list.

On the basis of the above-mentioned literature, one thing clear is that there are two types of academic procrastination, the adaptive and the maladaptive procrastination. There is also no definite instrument to date that could clearly measure and distinguish the adaptive and maladaptive procrastination. Although researchers in the field of social and personality psychology have recognized this new development on procrastination (e.g. Alexander & Onwuegbuzie, 2007; Bui, 2007; Howell & Watson, 2007; Hu,

Huhmann, & Hyman, 2007; Vacha & McBride, 1993), few studies have expanded on this idea and that no researcher in the field of educational psychology has taken serious steps in making a reliable and valid adaptive/maladaptive academic procrastination instrument.

In an effort to address these dilatory behaviors especially the emerging positive dimension of this behavior, Morales (2010) developed a 65-item Academic Procrastination Scale (APS). The APS was developed to measure three dimensions of academic procrastination (i. e., structured procrastination, unstructured procrastination, and non-procrastination).

Objectives of the Study

The main objective of the study was to validate the Academic Procrastination Scale that assesses each of the three academic procrastination constructs. It determined if indeed an internally consistent measure of structured procrastination could be used in a classroom context. Of particular interest was whether the three procrastination constructs could be validated as statistically independent using confirmatory factor analysis (CFA). It also sought to determine if indeed the items for each construct would fall under each category. It is predicted that CFA of the three academic procrastination dimensions would yield acceptable goodness of fit indices. This study also examined the means and intercorrelations among the academic procrastination variables with specific interest in structured procrastination in relation to the other constructs.

Methods

Participants

The sample was drawn from five colleges in a state university in Region 8 in central Philippines. A total of 1200 students enrolled for the 2nd semester of school year 2009-2010 were given questionnaires but only 1153 were used in actual analysis because some questionnaires were not retrieved or others have either no response or missing necessary information. The students came from the Colleges of Education, Science, Nursing, Engineering, and Business Administration.

Instrument

The newly developed 65-item academic procrastination scale in Study 1 features three dimensions of academic procrastination. The first dimension, structured procrastination (α= .93), measures the positive side of procrastination. Sample items include "I always manage to finish report papers even if I started it few hours before deadline" and "I intentionally put off work to maximize my motivation." Unstructured procrastination (α = .92) is the second dimension measuring procrastination related to fear of failure, task aversiveness and laziness. Items include "I don't think I have

enough knowledge to write a school paper" and "I set aside reading lesson for a test when my friends drop by at our house." The third dimension, non-procrastination (α = .78) clusters items related to the non-practice of procrastination. Items such as "I usually accomplish all the things I plan do to in a day" and "I tend to finish tasks well ahead of deadlines" are included. Participants answered each item using a 6-point scale that ranges from 1 (strongly disagree) to 6 (strongly agree).

Data Analysis

A two-step analysis was employed in this study. First, descriptive statistics was used to present the basic facts of all the variables involved. These preliminary analyses examined whether basic characteristics of the current data set (i.e. means, standard deviations, percentages, skewness, kurtosis) are acceptable for further analyses. It also included the examination of reliability coefficients and relationships of factor structures of the measure. The purpose of examining estimates of internal consistency from the sample was to determine if the measures that were used have acceptable reliability levels or reliability estimates. Bivariate relation between the factors of procrastination processes was conducted to determine how each variable associate itself with other variables.

Second, Confirmatory factor analysis (CFA) for the measurement model (i. e., Academic Procrastination) was conducted. CFA was investigated using Structural Equation Modelling (SEM) that uses maximum likelihood estimation (MLE). This was followed by assessment of model fit to determine the degree to which the measurement model fits the data (Joreskog & Sorbom, 1989). In evaluating the fit of the models, recommendations by Schermelleh-Engel, Moosbrugger, & Müller (2003) were followed. These recommendations state that for an acceptable model fit, the ratio χ^2/df should be less than or equal to 5, the Root Mean Square Error of Approximation (RMSEA) should be less than or equal to .08, the standardized root-mean-square (SRMR) should be less than .05, the Tuker-Lewis Index (TLI) should be greater than or equal to .95, and the Comparative Fit Index (CFI) should also be greater than or equal to .90 (Schermelleh-Engel, et al., 2003). The RMSEA, SRMR, TLI, and CFI were chosen because they were found as being less affected by the size of the sample when compared to the Normative Fit Index (NFI), the Goodness-of-Fit Index (GFI), and the Adjusted Goodness-of-Fit Index (AGFI) (Schermelleh-Engel, et al., 2003).

Procedure

Participants were asked to fill out an informed consent stating that they were volunteers and could end answering the questionnaire at any time. The consent form also had the researcher's name and email address in case there were any future questions. All participants were given brief verbal instructions by the researcher or the faculty in-charge. After administering the questionnaires, data were encoded and cleaned for

errors (e. g., typographical, missing personal information, incomplete entries). Items comprising each of the 3 variables were taken as is in the analysis to represent score for each variable. Negatively keyed items were scored in reverse.

Results and Discussion

Descriptive Statistics

The means, standard deviations, skewness, and kurtosis values for the 65 items on the APS are reported in Table 1. Item means indicated a moderate ceiling effect. The skewness and kurtosis values for all APS items were within acceptable range of ± 1.96 (George & Mallery, 2001), suggesting no concern about deviation from normality.

Table 1
Means, Standard Deviations, Skewness, and Kurtosis for the Academic Procrastination scale items

Item	*M*	*SD*	*Skewness*	*Kurtosis*
		Structured Procrastination		
AP2	4.26	1.39	-0.67	-0.36
AP4	3.68	1.42	-0.12	-0.81
AP5	4.00	1.28	-0.40	-0.33
AP8	3.57	1.48	-0.04	-0.88
AP9	3.59	1.36	-0.26	-0.65
AP12	3.76	1.41	-0.27	-0.73
AP13	3.48	1.33	-0.11	-0.66
AP14	3.31	1.33	-0.05	-0.79
AP17	2.83	1.26	0.31	-0.62
AP18	3.28	1.19	0.00	-0.55
AP20	3.54	1.27	-0.12	-0.55
AP21	3.64	1.30	-0.20	-0.65
AP22	3.55	1.29	-0.15	-0.41
AP23	3.59	1.19	-0.19	-0.56
AP24	3.48	1.37	-0.23	-0.71
AP25	2.84	1.33	0.40	-0.50
AP26	3.02	1.29	0.18	-0.61
AP31	3.08	1.24	-0.15	-0.76
AP32	2.88	1.16	0.12	-0.60
AP39	3.95	1.32	-0.48	-0.37
AP40	3.06	1.29	0.20	-0.58
AP43	3.12	1.35	0.07	-0.79
AP44	3.17	1.25	0.10	-0.65
AP47	3.27	1.33	-0.10	-0.83
AP48	3.25	1.28	0.00	-0.63

		Unstructured Procrastination		
AP6	3.09	1.33	-0.05	-0.83
AP7	2.02	1.33	1.24	0.68
AP10	3.03	1.25	0.15	-0.53
AP11	2.33	1.30	0.84	0.02
AP15	1.97	1.10	1.20	1.47
AP16	2.60	1.24	0.41	-0.53
AP27	2.24	1.26	0.80	-0.28
AP28	2.09	1.19	1.13	0.80
AP29	1.85	1.19	1.48	1.71
AP30	2.05	1.17	0.96	0.16
AP33	2.54	1.29	0.68	-0.05
AP34	2.66	1.24	0.43	-0.51
AP36	3.04	1.27	0.06	-0.82
AP37	2.58	1.15	0.43	-0.35
AP38	2.20	1.23	0.91	0.07
AP41	2.85	1.36	0.23	-0.86
AP42	2.55	1.27	0.51	-0.47
AP45	2.77	1.25	0.23	-0.74
AP46	2.29	1.28	0.79	-0.15
		Non-Procrastination		
AP1	3.65	1.14	-0.35	-0.10
AP3	4.08	1.15	-0.42	0.00
AP19	3.81	1.24	-0.32	-0.35
AP35	4.19	1.57	-0.58	-0.78

CFAs and Reliabilities

CFA was conducted on the academic procrastination model using AMOS 7 (Arbuckle, 1997). The analyses were conducted on covariance matrices, and the solutions were generated on the basis of maximum-likelihood estimation. The model was treated as observed variables by taking the average from its respective items. Following Schermelleh-Engel, et al. (2003), both absolute (e. g., chi square) and incremental (e.g., Comparative Fit Index [CFI]) fit indices were used to evaluate the fit of the models to the data.

Confirmatory Factory Analysis examined the academic procrastination model, which designated that the items for each type of procrastination load on their respective latent variables. The results from this analysis supported the hypothesized model, as each fit statistic met the acceptable criteria for a good fitting model: χ^2 /df = 4.33; root-mean-square error of approximation (RMSEA) = .047; SRMR = .0499; Tucker–Lewis Index (TLI) = .93; CFI = .90. Factor loadings for this model presented show that value for each item ranged from .46 to .93. The CFA data clearly indicate that the three academic procrastination measures represent empirically separable and internally consistent variables. These results further suggest that the three-factor model represents a good fit to

the responses of the participants to the 65-APS items. Table 2 presents standardized factor loadings for this three-factor model. The factor loadings ranged from .45 to .75 for the first factor, from .43 to .90 for the second factor, and from .46 to .98 for the third factor. The factors were positively related to each other with correlation coefficients ranging from .34 to .88. All factor loadings were statistically significant, *p*s < .05.

Table 2
Standardized Factor Loadings for the Three-Factor Model of the APS Items

Items	Factor Loadings		
Structured	1	2	3
AP2	0.65		
AP4	0.71		
AP5	0.60		
AP8	0.82		
AP9	0.87		
AP12	0.49		
AP13	0.75		
AP14	0.60		
AP17	0.61		
AP18	0.48		
AP20	0.53		
AP21	0.88		
AP22	0.63		
AP23	0.69		
AP24	0.67		
AP25	0.57		
AP26	0.56		
AP31	0.51		
AP32	0.52		
AP39	0.54		
AP40	0.80		
AP43	0.84		
AP44	0.78		
AP47	0.75		
AP48	0.80		
Unstructured			
AP6		0.50	
AP7		0.63	
AP10		0.51	
AP11		0.78	
AP15		0.52	
AP16		0.66	
AP27		0.84	

AP28	0.80	
AP29	0.65	
AP30	0.46	
AP33	0.83	
AP34	0.84	
AP36	0.70	
AP37	0.68	
AP38	0.67	
AP41	0.77	
AP42	0.84	
AP45	0.65	
AP46	0.69	
Non-procrastination		
AP1		0.50
AP3		0.56
AP19		0.34
AP35		0.43

Bivariate Relations among the Academic Procrastination

Table 3 shows that the zero-order correlations among the measures indicate that structured procrastination was positively associated with unstructured procrastination ($r = .26$, $p < .01$). Both structured ($r = .11$, *n. s.*) and unstructured ($r = -.05$, *ns*) procrastination were not associated with non-procrastination. It should be noted that similar relationships were observed during the development phase were structured procrastination was positively correlated with unstructured procrastination but both type of procrastination were not significantly associated with non-procrastination. The low coefficient yet highly significant relationship between structured and unstructured procrastination shows the discriminant validity of the two constructs. They are conceptually different yet theoretically similar constructs. Both are dilatory behaviors but are done with different intentions and outcomes.

Table 3
Factor Intercorrelations

	Structured	Unstructured	Non-procrastination
Structured	-		
Unstructured	.26**	-	
Non-procrastination	.11^{ns}	-.05^{ns}	-

Means, Standard Deviation, and Reliabilities of the factors

Internal consistency reliabilities for the scale scores were .91 for structured procrastination, .89 for unstructured procrastination and .76 for non-procrastination.

Table 4
Means, standard deviation, and Cronbach's alphas of the variables in the study

N	Variable	Range	*M*	*SD*	α
1	Structured Procrastination	1-6	3.21	0.71	.91
2	Unstructured Procrastination	1-6	3.26	0.73	.89
3	Non-procrastination	1-6	3.93	0.75	.76

Confirmatory factor analysis documented that each of the procrastination tendencies represents different constructs. The factor analytic technique also indicated that the academic procrastination framework provided a good fit to the data.

Examination of the structured procrastination score revealed that this dilatory behavior is clearly operative in the undergraduate classroom (the means were close above the scale midpoint, and the full range of scores was used). In addition, structured procrastination was consistently correlated with the negative procrastination construct with which they shared a theoretically similar constructs that bond positively. On the other hand, both structured and unstructured procrastination evidenced no association with non-procrastination both in this study and in the scale development phase.

In general, the relations among variables involved in this study largely support the hypotheses forwarded. This demonstrates the generalizability of the newly developed academic procrastination framework among Filipino college students. The study found structured procrastination construct to be valid and reliable measure different from the negative procrastination construct.

Generally, this study highlights the importance of knowing that there exists a procrastination behavior with positive outcome, different from traditional view of procrastination with negative consequence. This finding provides important implication for teachers. They should be aware that students' postponement of tasks could be their strategy of making the task interesting and that teachers should not jump into conclusion and make a negative impression about it. It is hoped that the academic procrastination framework established in this study will serve as additional theoretical and empirical tool in addressing this issue and the

many other important issues that await attention in the academic procrastination literature.

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