



Procrastination as a Fast Life History Strategy

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Abstract

Research has revealed that procrastination—the purposive delay of an intended course of action—is a maladaptive behavior. However, by drawing on an evolutionary life history (LF) approach, the present study proposes that procrastination may be an adaptive fast LF strategy characterized by prioritizing immediate benefits with little regard to long-term consequences. A total of 199 undergraduate students completed measures of procrastination and future orientation and the Mini-K scale, which measures the slow LF strategy. Structural equation modeling revealed that, as predicted, procrastination was negatively associated with a slow LF strategy both directly and indirectly through the mediation of future orientation. These results define the fast LF origin of procrastination.

Keywords

procrastination, life history, fast strategy, future orientation

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Introduction

Procrastination is defined as the purposive delay of an intended course of action (Steel, 2007). It is well studied within the mainstream psychology literature (Kim & Seo, 2015), but little is known about its evolutionary origin and function. The purpose of the present study is to provide one of the first evolutionary conceptualizing and empirical investigations of procrastination within the life history (LH) framework.

LH trade-off strategies are enacted by the coordinated tuning of multiple physiological (e.g., endocrine, hemostasis, and immunity) and psychological (e.g., behavior, cognition, and attitude) systems, which constantly assess environmental constraints and accordingly calculate the energetic allocations (Del Giudice, Gangestad, & Kaplan, 2015). Time orientation (e.g., present vs. future orientation) and related behavioral and personality characteristics (e.g., procrastination) represent psychological manifestations of fast–slow LH strategies that correspond with the physiological manifestations according to maturational and reproductive schedules. A fast LH strategy hedges against environmental unpredictability by accelerating growth and initiating early reproduction before mortality and mobility occur (Ellis, Figueredo, Brumbach, & Schlomer, 2009). Corresponding with the fast developmental schedule is a psychological time orientation that focuses on the present and

discounts the future; related behavioral and personality attributes are aligned with this time orientation. For example, fast strategists exhibit high impulsivity (Del Giudice, 2014), acting on the moment and taking high risks (Wang, Kruger, & Wilke, 2009) as well as overlooking consequences and discounting the future (Griskevicius, Tybur, Delton, & Robertson, 2011). Fast LH people are poor parents (Belsky, Steinberg, & Draper, 1991; Ellis, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1999) because in an unpredictable, high-mortality environment that has formed fast life histories, either the parent or the child may not live long enough to deliver or receive the benefit of parental investment (Lu, Zhu, & Chang, 2015). Within the same framework, fast LH people are expected to be procrastinators who do not have the requisite future orientation to meet and who would not benefit from meeting prospective schedules. By contrast, slow strategists are conscientious

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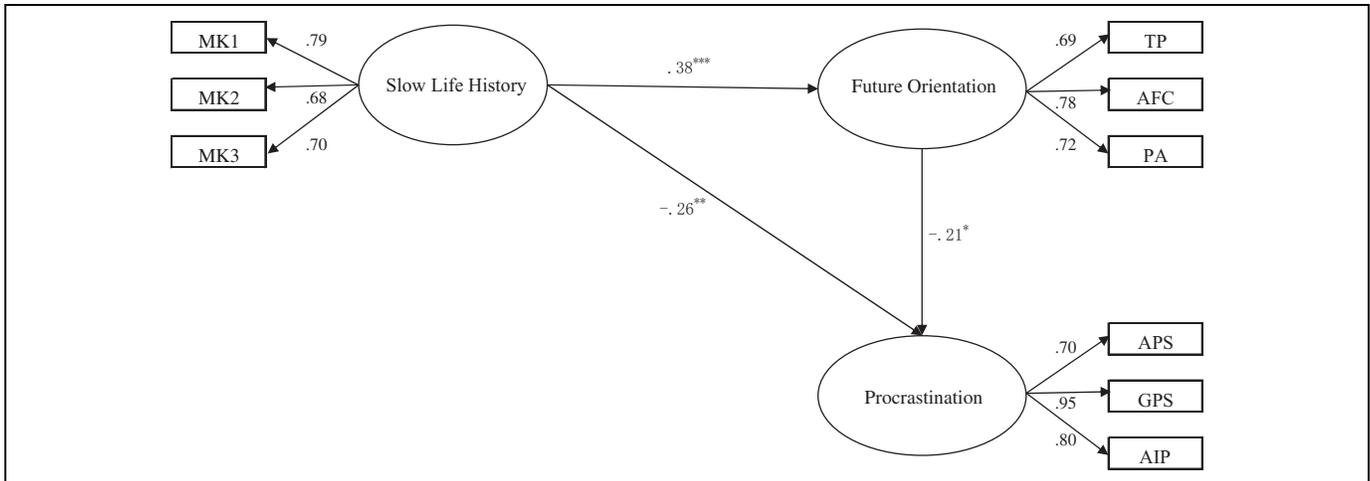


Figure 1. The model depicting the associations among LH strategy, future orientation, and procrastination. APS = Academic Procrastination Scale; GPS = General Procrastination Scale; AIP = Adult Inventory of Procrastination; TP, AFC, and PA = Time Perspective, Anticipation of Future Consequence, and Planning Ahead subscales of the Future Orientation Scale; MK1 to 3 = 3 item parcels from the Mini-K scale. * $p < .05$. ** $p < .01$. *** $p < .001$.

(Figueredo, Woodley of Menie, & Jacobs, 2015), delay gratification (Griskevicius et al., 2011), and are good students (Cutuli et al., 2013) because, fashioned by greater environmental controllability, slow LH strategies are associated with a longer time frame wherein it is cost effective to plan and work for higher future rewards. With the same logic, slow LH people are expected to be future oriented and not to procrastinate.

Within the aforementioned LH framework, procrastination serves the adaptive function of avoiding the cost of a current effort when there may not be a future in which the payoffs can be realized. As a fast LH trait, procrastination is fashioned in an unpredictable environment of high extrinsic mortality that is insensitive to an individual's survival effort. The lack of control over the environment and the lack of predictability regarding the payoff of one's effort make procrastination an adaptive strategy, particularly when the future is uncertain. Mainstream literature finds procrastination to be maladaptive (Kim & Seo, 2015) and related to poor mental health (Sirois, 2015) because the contemporary living conditions in which the studies were conducted are generally highly stable with strong future accountability of a person's current actions. Influenced by the frequent mismatch between past adaptation and the current environment (Crawford, 1998), procrastination that has the aforementioned LH origin serves an adaptive or maladaptive function depending on the environment in which the behavior occurs. It is also a personality trait that covaries with individual differences along the fast-slow, present-future LH strategic continuum. It is therefore expected to be negatively correlated with future orientation, as evidenced in the mainstream psychology literature (Sirois, 2014). In the evolutionary literature, future orientation is frequently examined as a mediator between LH strategies or between the environment shaping LH strategies and the behavioral and personality outcomes of LH predictions. For example, present and future orientations mediated the relationship between a poor neighborhood social

environment of high aggression and resource exploitation (Kruger, Reischl, & Zimmerman, 2008).

Similarly, we examined procrastination both as a direct and as an indirect correlate of LH strategy through the mediation of future orientation. Specifically, slow LH strategy was expected to be negatively correlated with procrastination and to be positively correlated with future orientation, and future orientation was expected to be negatively correlated with procrastination. The model is presented in Figure 1. We tested the three associations in a sample of college students. Using structural equation modeling (SEM), we employed the multiple-indicator approach to measure the three latent constructs. We used three scales (i.e., Academic Procrastination [AP], General Behavioral Procrastination [GP], and an Adult Inventory of Procrastination [AIP]) to measure the procrastination construct. We also used three subscales (i.e., Time Perspective, Anticipation of Future Consequence, and Planning Ahead) of the Future Orientation (FO) Scale to measure the future orientation construct. We applied the parceling approach (Little, Cunningham, Shahar, & Widaman, 2002) to create multiple indicators from the Mini-K scale to measure the slow LH construct. We relied both on the overall model fitness statistics and significance tests of specific paths to examine the direct association between LH strategy and procrastination and the indirect association between these two constructs through the mediation of future orientation.

Method

Participants and Procedure

One hundred and ninety-nine Chinese undergraduates (38 males, 161 females; mean age = 19.30 years, $SD = 1.11$) took part in the study. They were recruited from an Introductory Psychology course in exchange for partial fulfillment of course

Table 1. Correlations of Observed Variables.

	1	2	3	4	5	6	7	8	9
1. APS	1								
2. GPS	.68***	1							
3. AIP	.59***	.76***	1						
4. MK1	-.13	-.21**	-.14*	1					
5. MK2	-.22**	-.30***	-.23***	.52***	1				
6. MK3	-.19**	-.25***	-.18*	.58***	.46***	1			
7. TP	-.21**	-.28***	-.21**	.20**	.34***	.04	1		
8. AFC	-.22**	-.21**	-.23***	.24***	.25***	.14*	.54***	1	
9. PA	-.16*	-.17*	-.20**	.24***	.31***	.10	.49***	.57***	1

Note. APS = Academic Procrastination Scale; GPS = General Procrastination Scale; AIP = Adult Inventory of Procrastination; TP, AFC, and PA = Time Perspective, Anticipation of Future Consequence, and Planning Ahead subscales of the Future Orientation Scale; MK1 to MK3 = 3 item parcels from the Mini-K scale.

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

requirements. They were provided a website link and instructed to complete an online survey. Participants were asked to complete self-report measures including three procrastination scales, an LH scale, and a future orientation scale.

Measures

AP Scale. This scale (Solomon & Rothblum, 1984) consists of six areas of academic functioning (e.g., writing for an exam). Participants were asked to indicate on a 5-point scale the degree to which they procrastinate on these tasks (1 = *never*, 5 = *always*). All items were summed to generate a composite academic procrastination score where higher scores indicated higher levels of academic procrastination. Cronbach's α was .85 in the current study.

GP Scale. This scale (Lay, 1986) measures an individual's tendencies in procrastination across a variety of delay tasks (e.g., "mailing a letter"; $\alpha = .84$) on a 5-point Likert-type scale (1 = *strongly disagree* to 5 = *strongly agree*). All items were summed to generate a composite behavioral procrastination score where higher scores indicated higher levels of behavioral procrastination.

AIP Scale. This scale was used to measure the behavioral tendency to delay in beginning or completing tasks (Ferrari, Johnson, & McCown, 1995). It consists of 15 items (e.g., "I don't get things done on time"; $\alpha = .78$). Participants were asked to respond to these statements using a 5-point Likert-type scale (1 = *strongly disagree* to 5 = *strongly agree*). All items were summed to generate a composite procrastination score where higher scores indicated higher levels of procrastination.

LH strategy short-form scale (Mini-K). This scale consists of 20 items to measure a variety of cognitive and behavioral components of slow LH strategies (Figueredo et al., 2006). Participants were asked to respond to these statements (e.g., "I often make plans in advance;" "I avoid taking risks.") using a 7-point Likert-type scale (1 = *strongly disagree* to 7 = *strongly agree*). A composite score was computed by averaging the 20

items. High scores indicate a "slow" LH strategy on the "fast-slow" continuum (Figueredo, Vásquez, Brumbach, & Schneider, 2007). The existing literature has shown that this scale score is positively related to slow LHs when assessed by other LH measures or by environmental indicators theoretically related to slow LHs (Figueredo et al., 2014; Olderbak, Gladden, Wolf, & Figueredo, 2014). Internal consistency reliability estimate was .82 in the current study. Two 7-item and one 6-item parcels were randomly formed as multiple indicators of the LH construct.

FO Scale. This scale consists of 15 items to measure the tendency to take a future time perspective in everyday decision making (Steinberg et al., 2009). The example item is "Some people would rather be happy today than take their chances on what might happen in the future *but* other people will give up their happiness now so that they can get what they want in the future." Each item is scored on a 4-point scale, ranging from really true for one descriptor to really true for the other descriptor. A composite score was computed by averaging the 15 items. Internal consistency estimate was .86 in the present study. The 15 items form three 5-item subscales—Time Perspective, Anticipation of Future Consequence, and Planning Ahead (Steinberg et al., 2009). We used the three subscales as multiple indicators to measure future orientation.

Results

Descriptive Analyses

Correlations of the variables are provided in Table 1. All correlations were in the expected direction. All procrastination variables were correlated with each other. Procrastination variables were negatively related with both slow LH item parcels and with future orientation subscales. Finally, slow LH item parcels were positively related to future orientation subscales.

Main Analyses

SEM was used to test the relationships among variables. SEM is different from traditional regression analysis, because it is a

Multivariate statistical method simultaneously analyzing observed and latent variables, whereas traditional methods analyze only observed variables. Evaluation of the fit of the model was carried out on the basis of inferential goodness-of-fit statistics (χ^2), chi-square to degree of freedom ratio (χ^2/df), and a number of other indices including the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Values close to or greater than .95 are desirable on the CFI, while the RMSEA and SRMR should preferably be less than or equal to .06 (Hu & Bentler, 1999; Millsap, 2002).

The model, reported in Figure 1, has satisfactory psychometric results, with the average factor loading being above .70. The structural model also had satisfactory goodness of fit, $\chi^2(24, N=199) = 40.21, p < .05$, CFI = .98, RMSEA = .06, SRMR = .05. Although the χ^2 test was significant, the χ^2 to degree of freedom ratio ($\chi^2/df = 1.67$) was adequate according to the more stringent criterion of below 3.0 (Kline, 1998). The direct path between Mini-K and procrastination was in the expected direction and was statistically significant ($\beta = -.26, p < .01$). We used the Sobel (1982) procedure to compute and test the indirect association between LH strategy and procrastination. It was statistically significant ($\beta = .08, p < .01$). Other associations were also in the expected directions and were statistically significant (Figure 1). We also tested two alternative models by not specifying one of the three hypothesized associations. The models were much poorer fit with the data compared to the hypothesized model, $\Delta\chi^2(1) = 8.32, p < .01$ and $5.66, p < .05$.

Discussion

This study is one of the first to examine the evolutionary origin of procrastination. The results showed that procrastination was negatively correlated with the Mini-K scale, which measures slow LH strategic tendencies (Figueredo et al., 2014). Procrastination was also negatively correlated with future orientation, a widely investigated component of slow LHs (e.g., Kruger et al., 2008), which was also shown to mediate the association between procrastination and the Mini-K scale. These results confirm our hypothesis that procrastination is a part or the result of fast LHs. As a fast LH trait, procrastination serves to hedge against an unpredictable environment in which a person's survival effort may not evoke the intended fitness gains (Chen & Chang, 2012). Shaped by extrinsically caused uncontrollability, similar to most fast LH traits, procrastination is present oriented by seeking immediate hedonic reward and avoiding energetic exertion for future fitness enhancement. In the face of future uncertainty, procrastination is therefore adaptive because it improves the potential cost-benefit ratio by reducing cost-ineffective effort that may not be closely associated with future fitness payoffs. However, human evolution predominantly entails slow LH strategists (Kuzawa & Bragg, 2012) who have long controlled ecological environment (Alexander, 1989). Moreover, contemporary humans have similarly developed and adapted to a culture that emphasizes personal control and accountability. Thus, in today's socioeconomic environment of relatively high

stability, procrastination is probably maladaptive most of the time, as shown by related mainstream psychology research (e.g., Kim & Seo, 2015). Uncertainty arises occasionally when procrastination becomes surreptitiously adaptive. On other occasions, cues of environmental unpredictability may also activate this fast LH response, which may or may not prove functionally advantageous in the end.

Despite its functionality under contemporary living conditions, as shown by the present findings, procrastination exhibits individual differences along the fast-slow LH continuum. In this regard, procrastination makes a new addition to a growing repertoire of behaviors and personality characteristics that have been observed to align with fast-slow LH variations. For example, risk taking (Wang et al., 2009), financial risk management (Griskevicius et al., 2011), high calorie dieting (Hill, Rodeheffer, DelPriore, & Butterfield, 2013; Laran & Salerno, 2013), and unstable intimate relationships (Olderbak & Figueredo, 2010) have been determined to be associated with fast LHs. Fast LH people have also been found to be impulsive and aggressive (Del Giudice, 2014) and loud and domineering (Sherman, Figueredo, & Funder, 2013) as well as funny, expressive, and socially skilled (Sherman et al., 2013). The present study joins these and other studies in listing procrastination as a fast LH characteristic.

The present study has limitations. Most notably, the correlational design limits causal interpretation, and self-report measures may create method variance. Although these are viable, widely used methods, future research can employ experiments that manipulate LH strategies and the environmental conditions that shape LH strategies to observe the corresponding changes in procrastination. Despite these and other limitations, this study is one of the first to define the evolutionary origin of procrastination and to contribute a novel dimension to the fast LH strategic profile.

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