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Article:
Sirois, F.M. and Tosti, N. (2012) Lost in the Moment? An Investigation of Procrastination, Mindfulness, and Well-being. Journal of Rational-Emotive & Cognitive-Behavior Therapy, 30 (4). 237 - 248. ISSN 0894-9085

https://doi.org/10.1007/s10942-012-0151-y

The final publication is available at Springer via http://dx.doi.org/10.1007/s10942-012-0151-y

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Sirois, F. M., & Tosti, N. (2012). Lost in the Moment? An Investigation of Procrastination, Mindfulness, and Well-being. *Journal of Rational - Emotive and Cognitive - Behavior Therapy*, *30*(4), 237-248. doi:10.1007/s10942-012-0151-y

Lost in the Moment? An Investigation of Procrastination, Mindfulness, and Well-being

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This paper is based in part on data collected for Natalia Tosti's (2010) honour's thesis.

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Abstract

In this study, we extend previous work documenting links between procrastination, stress, and physical health by examining the potential role of mindfulness in explaining the high stress and poor health reported by procrastinators. A sample of 339 students (81% female) completed an on-line survey that included measures of trait procrastination, mindfulness, perceived stress, and perceived health. Univariate analyses revealed that procrastination was associated with low mindfulness, high stress, and poor perceived health. Structural equation modelling was used to test the role of mindfulness in explaining the links between procrastination and stress, and between procrastination and perceived health. The overall measurement model indicated a good fit to the data. Tests of the nested mediation models revealed that the effects of procrastination on stress and health were mediated by mindfulness, and bootstrapping analyses confirmed the significance of these effects. Our findings are consistent with previous research and theory on the salutatory effects of mindfulness for health and well-being and indicate that for procrastinators, low mindfulness may be a risk factor for poor emotional and physical well-being.

Introduction

Self-regulation, or the ability to control and regulate one's behaviours, thoughts, and emotions, has been described as the "quintessential characteristic of human beings" (Forgas, Baumeister, & Tice, 2009, p. 1). In contrast, procrastination has been described as the quintessence of self-regulatory failure (Steel, 2007). Beyond the negative consequences of procrastination for emotional well-being (Flett, Blankstein, & Martin, 1995), there is growing evidence that procrastination can also take a toll on physical well-being and that stress may play a key role (Sirois, 2007; Sirois, Melia-Gordon, & Pychyl, 2003). Evidence from experimental studies implicate avoidance of unpleasant thoughts, feelings, and actions as contributing to both procrastination itself and the stress associated with this behavioural tendency (Sirois, 2004; Tice, Bratslavsky, & Baumeister, 2001). Approaches that focus on acceptance of unpleasant states and thoughts may therefore be beneficial for reducing stress related to procrastination. Mindfulness in particular is known to foster greater awareness of difficult thoughts and feelings, reduce stress, enhance task persistence, and improve health (Brown, Ryan, & Creswell, 2007). Whether mindfulness may explain the links between procrastination, stress, and health has not been examined. In this study we extend previous work documenting links between procrastination, stress, and physical health by examining the potential role of mindfulness.

Procrastination, Stress, and Health

Consistent with theory linking personality to health in general (Friedman, 2000), the original procrastination-health model proposed that procrastination conferred risk for poor health through the involvement of both stress-mediated and behavioural routes (Sirois et al., 2003). According to the procrastination-health model, procrastination was associated with poor health through the generation of unnecessary stress and corresponding negative changes in immunity,

and the delay of health promoting behaviours. Tests of the procrastination-health model with both student and community-dwelling adults found that stress, and to a lesser extent health behaviours, explained the association between procrastination and poor health (Sirois, 2007; Sirois et al., 2003).

The reasons why procrastination creates unnecessary stress has received less attention, but at least one study suggests that cognitive styles linked to emotional regulation may play a role. In one experimental study, participants were asked to generate thoughts about what might have been (counterfactuals) after imagining themselves in a scenario where they delayed seeking care for possible skin cancer symptoms (Sirois, 2004). Rather than focus on how things could have been better (upward counterfactuals) had they acted in a timely manner thereby gaining insight to correct future behaviour, procrastinators tended to focus on how things could have been worse (downward counterfactuals) to minimize anxiety about their delay and its consequences. Similar to other forms of avoidance, procrastination is a strategy that brings immediate but temporary relief from difficult or distressing thoughts associated with a task (Tice et al., 2001), but may ultimately create more stress if the issues surrounding task completion are left unresolved. In the end, this can leave procrastinators feeling more stressed about their own procrastination, and lead to self-criticism, judgemental reactive thoughts, and embarrassment that perpetuates the cycle of procrastination.

The association of procrastination with making trade-offs that place immediate emotional regulation and self-enhancement motives above insights about actions to correct or improve future outcomes (Sirois, 2004; Tice & Bratslavsky, 2000), may also be indicative of a present versus future time orientation. At least two studies have found that procrastination is negatively associated with a future time orientation and positively associated with a present-hedonistic and

present-fatalistic time orientation (Ferrari & Díaz-Morales, 2007; Jackson, Fritch, Nagasaka, & Pope, 2003). Although the temporal focus of procrastinators is the present, this focus does not appear to involve being truly "present" to the moment, and may therefore be qualitatively distinct from other forms of present-focused awareness such as mindfulness.

Mindfulness, Stress, and Well-being

Mindfulness, whether conceptualized as an activity-based practice that can be learned or as a stable tendency arising from a certain philosophy of life and/or value system, is suggested to be a key quality for successful self-regulation (Evans, Baer, & Segerstrom, 2009). Mindfulness involves a present-centered, non-reactive self-awareness and nonjudgmental acceptance of thoughts and feelings as they occur (Baer & Allen, 2004). It is known to reduce stress and enhance well-being partly because it reflects a quality of consciousness that is vivid, non-critical, yet actively engaged in the experiences, thoughts, and feelings occurring in the moment (Brown & Ryan, 2003; Brown et al., 2007).

The mindful state can be particularly beneficial for self-regulation as theory and research indicates that self-awareness is necessary for detecting discrepancies between current states and standards in order to motivate corrective behaviour (Carver & Scheier, 1998). Unlike self-focused attention, which is critically focused on automatically detecting discrepancies and taking action to reduce them (Fenigstein, Scheier, & Buss, 1975), mindfulness permits non-automatic, non-judgmental awareness of discrepancies which can facilitate deliberate actions to regulate behaviour (Evans, Baer, & Segerstrom, 2009). A recent experimental study found that mindfulness, but not private self-consciousness, a form of self-focused attention, predicted increased persistence on a challenging anagram task (Evans et al., 2009). The authors speculated that the judgmental thoughts triggered by grappling with a difficult task may lead to frustration,

self-criticism, and impulsive abandonment of the task, whereas mindfulness promotes acceptance of such self-critical and negative thoughts allowing one to move past negative self talk and persist with the task.

With respect to health, there is growing evidence that mindfulness may have a salutary effect on both subjective reports of health and positive changes in physical health as assessed by markers of immune functioning (see Brown et al., 2007 for a review). Symptom reports and other self-reports of overall health are by nature subjective and affected by current mood states, stress, and individual differences in negative affect (Watson & Pennebaker, 1989). Mindfulness, however, involves a type of awareness that is similar to sensory focusing, a concrete and neutral perception of physical states without the emotional and interpretative qualities that amplify threat and discomfort. This may be one reason why mindfulness is positively associated with self-reported health.

The Current Study

Theory and research indicate that mindfulness may be an important type of present-focused awareness for understanding how procrastination is associated with stress and health. Although procrastination is associated with a present-oriented focus, it is also linked to cognitive styles favouring the avoidance of unpleasant thoughts and feelings and the indulgence of impulses to deal with threats to self-esteem (Sirois, 2004; Tice et al., 2001), rather than being fully present. Procrastination is associated with private self-consciousness (Ferrari, 1992), a form of self-awareness known to be distinct if not negatively associated with mindfulness (Brown et al., 2007). Findings from other studies also supports the notion that procrastinators tend to evaluate themselves negatively (Flett et al., 1995).

Taken together this evidence indicates that procrastination may be associated with low

mindfulness, and that low mindfulness may also explain the higher levels of stress associated with procrastination. Given the salutary effects of mindfulness on health, it is possible that mindfulness partially explains why procrastination is associated with poor health. To test these propositions we examined the potential mediating role of mindfulness in the procrastination-health relationship using structural equation modelling. This statistical technique provides a powerful test of complex path analyses that accounts for measurement error (Bollen & Long, 1993). Structural equation modelling allowed us to test 1) whether mindfulness mediated the relationship between procrastination and stress, and 2) whether mindfulness also mediated the relationship between procrastination and health, within the same model. The proposed relations between procrastination, stress, mindfulness, and health are shown in Figure 1.

Methods

Participants and Procedure

Participants were 350 undergraduate psychology students recruited from a psychology experiment participant pool and who received extra course credit for their participation. Data from one student were discarded because of excessive missing data on the main variables of interest, and data from another 10 participants was removed because they were identified as extreme outliers. This left a final sample of 339 (81.7% female) participants, with a mean age of 21.7 (SD = 4.9).

Materials

After reading and agreeing to an online consent form, participants completed an online survey which included demographic questions and measures of procrastination, mindfulness, perceived stress, wellness behaviours, and health status.

Lay's General Procrastination scale. Lay's General Procrastination scale (GPS; Lay,

1986) is a 20-item scale that assesses global tendencies towards procrastination across a variety of tasks. Respondents rate items on a 5-point Likert-type scale ranging from 1 (*false of me*) to 5 (*true of me*). Half of the items are reverse-scored before summing all items into a single score with high values indicating a higher tendency to procrastinate. The GPS has demonstrated good internal consistency (alpha = 0.82; Lay, 1986). In the current study the internal consistency was good (alpha = .87).

The Mindful Attention Awareness Scale (MAAS). The Mindful Attention Awareness Scale (MAAS) is a 15-item scale that assesses an individual's general tendencies and ability to remain present during daily activities. Items such as "It seems I am 'running on automatic', without much awareness of what I'm doing" are rated on a 6-point scale with responses ranging from 1 (almost always) to 6 (almost never). The MAAS has a reported internal consistency of .87 (Brown & Ryan, 2003), and the Cronbach's alpha for the current study was .88.

Kentucky Inventory of Mindfulness Skills. The Kentucky Inventory of Mindfulness Skills (KIMS; Baer & Allen, 2004) is a 29-item measure of mindfulness skills. It assesses four types of mindfulness skills: observing, describing, acting with awareness, and accepting without judgment. Items are rated on a 5-point Likert scale ranging from 1 (*never or very rarely true*) to 5 (*almost always or always true*), with high scores reflecting more mindfulness. For the purposes of this study the only the 10-item acting with awareness ("I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted") and the 9-item accepting without judgment ("I criticize myself for having irrational or inappropriate emotions") subscales were examined as they capture dimensions of mindfulness that may be most relevant for procrastination. The acting and acceptance subscales have reported alphas of .76 and .87 respectively, and the Cronbach alphas for the current study were .69 and .89.

Mindfulness practices. How often participants engaged in mindfulness practices per week was assessed with a single question designed for this study. Examples of mindfulness practices were provided – yoga, meditation, Tai Chi – and the frequency of mindfulness practices was rated on a 3-point scale ranging from 1 (0 times per week) to 3 (>2 hours per week).

Perceived Stress Scale. The Perceived Stress Scale (Cohen & Williamson, 1988) is a 10-item measure of the perceived stressfulness of events experienced within the past month . Items are rated on a 5-point scale with response options ranging from "never" to very "often". It is a widely used empirically established index of general stress appraisal that has demonstrated adequate internal consistency. The Cronbach's alpha for the current study was .84.

Stress ratings. The degree of stress experienced in the past 2 weeks and 6 months was assessed with two items rated on a 10-point scale ranging from 1 (not stressful at all) to 10 (extremely stressful). These items have been used in a previous study examining the procrastination-health model (Sirois, 2007). A stress index was formed by taking the mean of the two items.

Global health rating. Self-reported health status was assessed with the general health rating item from the Medical Outcomes Survey 36 item short form (SF-36) health questionnaire (Ware & Sherbourne, 1992). The SF-36 is a widely used and well-validated measure of subjective health and quality of life, and the general health item provides a reliable overall score of physical well-being. Respondents rated their overall health on a 5-point scale ranging from "Excellent" to "Poor" with higher values reflecting poorer perceived health.

Results

Descriptive Statistics

The bivariate correlations among procrastination, mindfulness, stress, and health

variables are presented in Table 1. Consistent with theory and previous research, procrastination was associated with high stress and poor health, and stress was correlated with poor perceived health. The expected associations with mindfulness were also found. The mindfulness measures were negatively associated with procrastination and stress, and positively associated with perceived health. Procrastination was also associated with less frequent mindfulness practices, $r = -.16$, $p < .01$.

Measurement Model of the Procrastination, Mindfulness and Health Relationship

AMOS 18.0 was used to assess the fit of the measurement model to the data. One factor loading for each latent construct was fixed to 1 and the paths among the two latent variables and the single indicator variable were allowed to correlate. Model fit was assessed with several indices suggested by Kline (2005): (i) chi-square statistic; (ii) RMSEA (root mean square error of approximation); (iii) CFI (Comparative Fit index); (iv) IFI (Incremental fit index). A very good fit of the model to the data indicated if the CFI and IFI are greater than 0.95, the RMSEA is below 0.05, and the chi-square statistic is non-significant. RMSEA values of .05 to .08 are considered to reflect adequate fit to the data (Bollen & Long, 1993). A test of the overall measurement model indicated a good fit to the data: $\chi 2$ (10, N = 339) = 29.53, $p = .001$; RMSEA = 0.07 (90% CI: 0.05–0.11); CFI = 0.96; IFI = 0.96.

Structural Model of the Procrastination, Mindfulness and Health Relationship

The mindfulness mediation models were tested using the recommendations of Holmbeck (1997). The basic premise is that the individual direct paths between the predictors, mediators and criterion variables in the model are each tested sequentially for significance. To establish mediation the path between the predictor and the criterion is constrained to zero and the model fit is compared to that of the unrestrained model. If there is no significant improvement in fit then

mediation is supported (Holmbeck, 1997). The direct paths from procrastination to stress (β = .31, p < .001), mindfulness (β = -.54, p < .001), and health (β = .25, p < .001), were significant in the predicted directions, as were the paths between mindfulness and stress (β = -.64, p < .001), stress and health (β = .37, p < .001), and mindfulness and health (β = -.41, p < .001).

Given that mindfulness was posited to mediate the links between procrastination and health in two ways (via its links with stress and with health), we tested each mediation model separately. First, the path between procrastination and stress was constrained to zero and this fully mediated model was compared to the partially mediated model (no path constraints). The fit of the fully mediated model was almost identical to that of the partially mediated model, χ^2 (10, N = 339) = 29.67, p = .002; RMSEA = 0.07 (90% CI: 0.04–0.10); CFI = 0.96; IFI = 0.96, and the chi-square difference between the two models was also non-significant, $\Delta\chi^2$ = 0.14, indicating that mindfulness fully mediated the effects of procrastination on stress. When the fully mediated model with the path between procrastination and health was constrained to zero and compared to the partially mediated model, there were minimal changes in the fit indices: χ^2 (10, N = 339) = 31.33, p = .002; RMSEA = 0.08 (90% CI: 0.05–0.11); CFI = 0.95; IFI = 0.95, and a non-significant change in the chi-square values, $\Delta\chi^2$ = 1.66. This indicated that mindfulness also mediated the effects of procrastination on health.

Bootstrapping Analyses of the Mediation

The significance of the mediation effects for mindfulness were tested using AMOS 18.0 bootstrapping according to the procedure suggested by Shrout and Bolger (2002). Bootstrap samples were generated from the data set (N = 339) using random sampling with replacement and maximum likelihood estimation, and the full mediation model was tested 1000 times with the bootstrap samples. Significant mediation effects are supported if, after estimating the indirect

effects by multiplying 1000 pairs of path coefficients, the 95% CI for the estimates of the indirect effect excludes zero (Shrout & Bolger, 2002). For the current analyses 100% of the bootstrap samples converged. For the indirect effect of procrastination on stress via mindfulness, the bootstrapping analyses found that the mean mediation effect was significant ($\beta = 0.35$, 95% [CI: 0.21, 0.51]). For the indirect effect of procrastination on health via mindfulness, the mean mediation effect from the bootstrapping analyses was also significant ($\beta = 0.17$, 95% [CI: 0.07, 0.27]).

Discussion

The aim of this study was to bridge two disparate research areas relevant for self-regulation by examining the potential mediating role of mindfulness for explaining the links between procrastination, stress, and health. As expected, procrastination was associated with higher stress, poor perceived health, and low mindfulness. Procrastination was also linked to less frequent practice of mindfulness promoting activities such as yoga and meditation. Our findings are consistent with previous research and theory on the salutatory effects of mindfulness for health and well-being (Brown et al., 2007), as low mindfulness explained the association between procrastination and stress, as well as the effects of procrastination on perceived health. This is the first study that we are aware of that has noted associations between procrastination and mindfulness, and that provides evidence supporting the mediating role of mindfulness in the procrastination-health model.

The current findings also provide a new perspective on the nature of the present time orientation of procrastinators suggested by previous research and its implications for well-being. The low mindfulness associated with procrastination indicates that the quality of the present-oriented focus noted by previous studies (Ferrari & Díaz-Morales, 2007; Jackson et al., 2003) is

not one that is truly present or accepting of current experiences. Instead, our findings with respect to the low mindfulness of procrastinators is consistent with previous work indicating that procrastinators evaluate themselves in a negative manner (Flett et al., 1995), and can be self-critical (Sirois & Stout, 2011). Thus, procrastinators may take a critical and judgmental stance towards a task they are struggling with which in turn can activate negative self-talk that interferes with task persistence (Evans et al., 2009). According to the theory of metacognitive awareness (Teasdale, Segal, & Williams, 1995), difficult tasks can activate judgemental and reactive thoughts which promote frustration, self-criticism, and impulsive decisions to abandon the task. In contrast, mindfulness facilitates non-reactive acknowledgment and acceptance of these difficult thoughts, and allows them to dissipate. Because procrastinators tend to value immediate emotional relief from distressing experiences over long term gains (Sirois, 2004; Tice et al., 2001), low mindfulness may be another factor contributing to the avoidance commonly associated with procrastination.

Beyond the implications for task completion, our findings indicate that procrastinators' self-critical stance (low mindfulness) can also generate unnecessary stress, and have negative implications for perceived health. Being non-accepting and judgemental of difficult experiences is one route to increased stress, and if this also results in lack of task persistence to avoid these difficulties, then further stress can result when the tasks are put off. Increased stress is one reason for the poor health reported by procrastinators noted in previous tests of the procrastination-health model (Sirois, 2007; Sirois et al., 2003). However, we also found a direct link between mindfulness and health that suggests that the low mindfulness associated with procrastination may affect health through other means. It is possible that low mindfulness may also be associated with the practice of fewer positive health behaviours, as procrastination is known to confer risk

for poor health through an indirect or behavioural route (Sirois, 2007). Given that engaging in health promoting behaviours such as physical activity and eating healthy can be difficult tasks for people to engage in regularly, mindfulness may promote acceptance of the difficulties encountered while engaging in these behaviours. It is in this way that mindfulness may contribute to persistence and success in practicing health promoting behaviours, and result in improved health. Although we are not aware of any studies linking mindfulness to health behaviours, this could be a fruitful area for researchers to explore that would extend research on the salutary effects of mindfulness for health, and increase understanding of the implications of low mindfulness for the health of procrastinators.

The current findings should be considered within the context of several limitations. Although structural equation modelling is appropriate for the testing of models that imply causal relationships among variables, it cannot fully establish the directionality of the causal links tested with a cross-sectional design. Longitudinal designs provide a more robust test of the directionality of links suggested by theory, and therefore future work testing the proposed model over time is needed to confirm the findings from the present study. The fit indices for the model were not within the ideal range suggesting that there is room for improvement with respect to fitting the model to the data. The stress latent variable was only assessed with two as opposed to the recommended three indicators (Kline, 2005), and this may be one reason for the less than ideal model fit. Nonetheless, the sample size should be considered when evaluating the significant chi-square, as this fit index is particularly sensitive to sample size and is almost always significant when sample size and path coefficients are large (Kline, 2005).

The role of low mindfulness in the health and well-being of procrastinators suggested by our findings also has practical implications. Because the self-critical and judgmental thoughts,

vis a vis low mindfulness, appear to play a central role in the emotional and physical well-being of procrastinators, addressing these negative self-evaluative thoughts via counselling and therapy interventions could provide far reaching benefits. Although mindfulness training appears to be an obvious choice of intervention, the procrastinators in the current study were less likely to dedicate time for mindfulness promoting practices on their own, and therefore other options may be necessary. An REBT framework may be especially useful for targeting these self-critical thoughts and the underlying irrational beliefs that may promote procrastinators' non-acceptance of current experiences.

In summary, the current study extends previous research on the associations between procrastination, stress, and health by examining the potential mediating role of mindfulness using structural equation modeling. Our results indicated that low mindfulness accounts for the association of procrastination to stress, and also mediates the association of procrastination to poor perceived health. We also found that procrastinators spent less time engaging in mindfulness promoting practices such as yoga and meditation, activities which can also be beneficial for reducing stress. For procrastinators, low mindfulness may be a risk factor for poor emotional and physical well-being. Rather than actively experiencing the present in an accepting, engaged, and aware manner, our findings indicate that procrastinators struggle with their own self-critical and reactive thoughts, and in this respect may be lost in the moment.

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Figure 1: Proposed model of the meditational role of mindfulness in the procrastination-health model

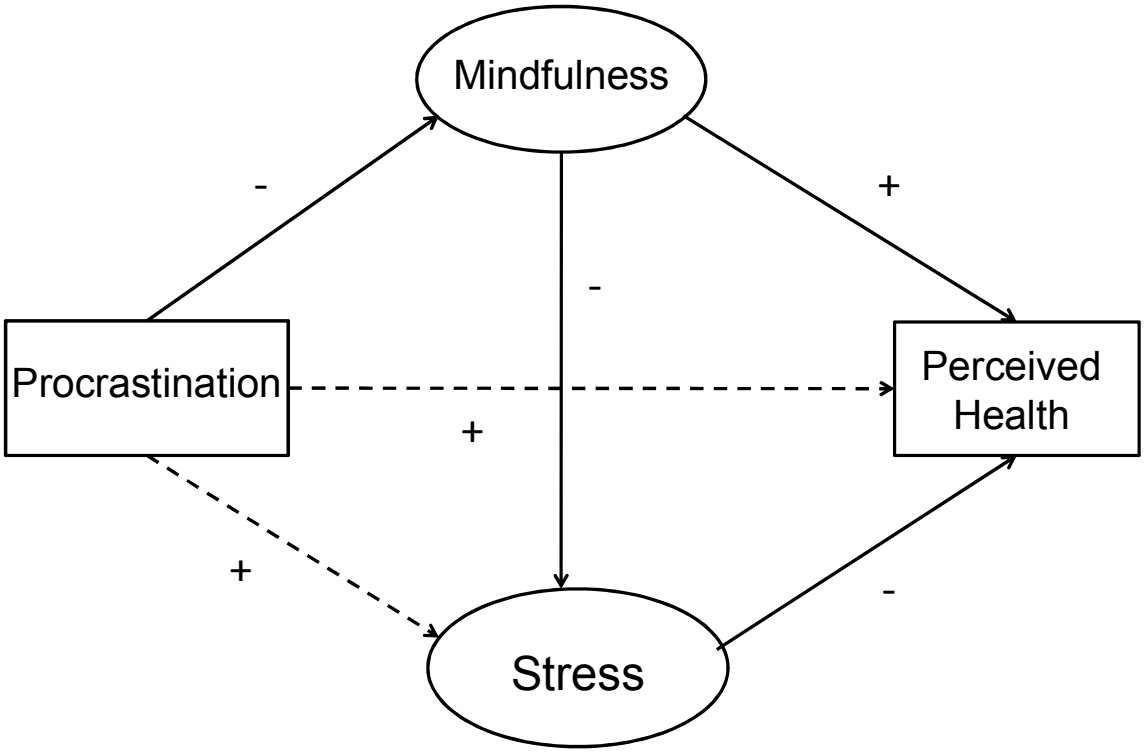

Figure 2: Structural model of the role of mindfulness in the procrastination-health relationship. Note: The latent variables are enclosed in ellipses, the measured variables are enclosed in rectangles, and the small circles reflect residual variances. Paths from residuals were fixed to 1. PSS = Perceived Stress scale; KIMS = Kentucky inventory of Mindfulness Skills; MAAS = Mindful Attention Awareness Scale.

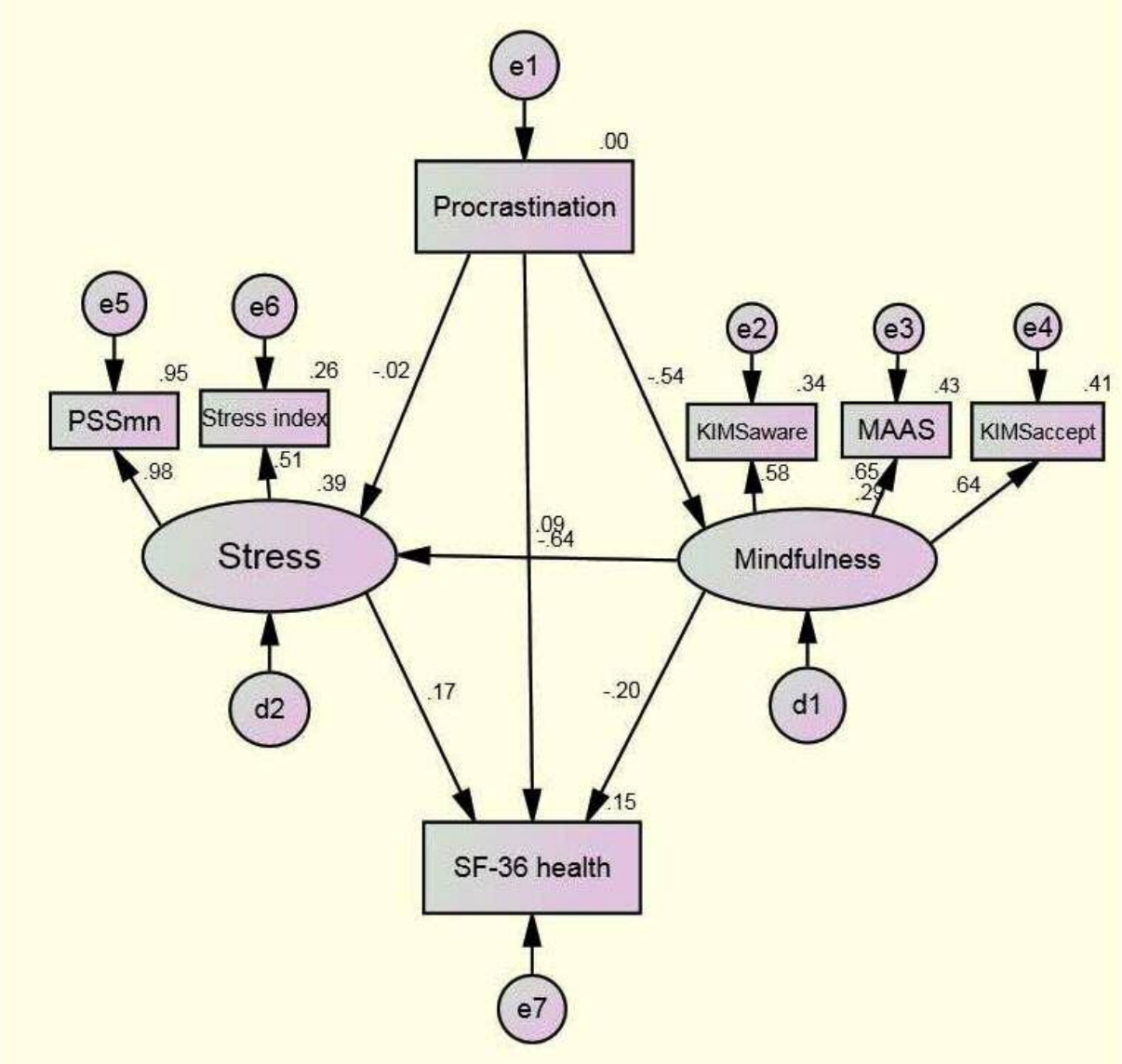

Table 1: *Bivariate Correlations Among Procrastination, Stress, Mindfulness, and Health.*

Variable	1	2	3	4	5	6	7
1. General Procrastination Scale	---						
2. Perceived Stress Scale	.32**	---					
3. Stress index	.12*	.50**	---				
4. SF-36 General health rating	.25**	-.31**	.20**	---			
5. Mindful Attention Awareness Scale	-.35**	-.37**	-.23**	-.25**	---		
6. KIMS act with awareness	-.42**	-.33**	-.18**	-.16**	.37**	---	
7. KIMS accept without judgment	-.26**	-.45**	-.17**	-.24**	.45**	.34**	---
Mean	53.59	29.64	6.09	2.36	4.08	2.92	3.26
Standard deviation	11.06	5.50	1.67	0.85	0.78	0.48	0.73

Note: KIMS = Kentucky Inventory of Mindfulness Skills; *$p < .05$, **$p < .01$