

Schemas Mediate the Link Between Procrastination and Depression: Results from the United States and Pakistan

Sobia Aftab¹ · Jeffrey Klibert²  · Nicholas Holtzman² ·
Kanwal Qadeer¹ · Saima Aftab³

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Abstract The current study extended the Procrastination-Health model by examining a multiple mediation model, with two cognitive schemas (defectiveness; insufficient self-control) serving as mediators. The models were as follows: procrastination → defectiveness → depression; procrastination → insufficient self-control → depression. Participants included 412 (271 women, 141 men) United States (US) and 240 (107 women, 133 men) Pakistani college students, who responded via self-report questionnaires. In the US sample, results revealed a non-significant direct effect between procrastination and depression after consideration for the two cognitive schemas, suggesting the schemas completely mediated the model. Both defectiveness and insufficient self-control schemas were significant individual mediators. In the Pakistani model, results revealed a significant direct effect and indirect effect through the two cognitive schemas, indicating partial mediation. Only the indirect path through defectiveness schemas was significant in the Pakistani model. Given slight differences in the two models, a moderated-mediation model was analyzed to determine if the strength of the direct and indirect effects varied by nationality. The strength of the direct and indirect effects was not moderated by nationality. Overall, this is the first study to identify cognitive mediators in the procrastination-depression relationship. Such findings represent a significant extension of the Procrastination-Health model and offer some unique cognitive insights into culturally sensitive conceptualizations and treatments for depression.

✉ Jeffrey Klibert
jklibert@georgiasouthern.edu

¹ University of Karachi, Karachi, Pakistan

² Georgia Southern University, 2670 Southern Dr., Statesboro, GA 30460, USA

³ University of Poonch Rawalakot, Rawalakot, Pakistan

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Introduction

Procrastination is a prevalent condition defined by self-regulation difficulties, particularly postponing the start and completion of important tasks (Ferrari et al. 2007; Ferrari and Tice 2000). When people procrastinate, they tend to experience a number of health-based and psychological problems, including depressive outcomes (Ferrari and Díaz-Morales 2014). The Procrastination-Health model (Sirois et al. 2003) charts this pathway. Despite this prominent model, it remains unclear what cognitive mechanisms mediate the influence of procrastination on depression. Identifying such mechanisms may be particularly useful in constructing and tailoring cognitive-based techniques to reduce depressive symptoms for chronic procrastinators.

Procrastination and Depression

Procrastination is associated with a variety of mental health problems, including depression (e.g., Spada et al. 2006; Stead et al. 2010). The question is which way the causal arrow flows. Longitudinal studies indicate that procrastination actually precedes and confers risk to mental health problems (Rice et al. 2012; Tice and Baumeister 1997). Moreover, in recent study that is critical to our model, teaching people to procrastinate less can lower depression (Rozenal et al. 2015); this randomized control trial demonstrates that the causal arrow flows from procrastination to depression. All in all, it appears procrastination is a prominent antecedent and risk factor for depression. Although we do not dispute the possibility that depression could cause procrastination as well, we hold that the extant evidence suggests that indeed the causal pathway from procrastination to depression is supported in the literature. Thus, we adopt this causal model as the basis for our study.

Despite such findings, mediating mechanisms remain unclear (Rozenal and Carlbring 2014). Consistent with the tenets of the Procrastination-Health model, Sirois et al. (2003) contend indirect pathways may be especially integral in clarifying the deleterious effects of procrastination on different health-outcomes. However, identifying cognitive mediators between procrastination and depression is an underdeveloped line of study. To this end, the current study seeks extend the Procrastination-Health model by examining the indirect effects of two cognitive variables, defectiveness and insufficient self-control schemas, on the procrastination-depression relationship in samples from two countries: the US and Pakistan.

Procrastination and Cognitive Schemas

Maladaptive schemas are stable, overgeneralized, and enduring cognitive-affective themes that distort how individuals select, store, and interpret incoming information (Riso et al. 2007). The position that chronic procrastinators suffer from a unique set

of maladaptive cognitive schemas is supported by theoretical and empirical evidence (e.g., Flett et al. 1995). For instance, Rational Emotive Behavior Therapist (REBT) theorists suggest irrational schema themes marked by defectiveness and insufficient self-control are stimulated when procrastinators encounter activating events (i.e., fast approaching deadlines; Dryden 2015; Ellis and Knaus 1977). Thus, it is important to consider the influence of cognitive schemas in explaining how procrastinators become vulnerable to different emotionally dysregulated states.

Procrastination and Defectiveness

In the literature, there are numerous indications that procrastinators engage in defective schematic processing, patterns characterized by self-defeatism, shame, and low perceptions of self-worth (Young et al. 2003). For instance, chronic and emotional procrastinators report lower estimates of self-esteem (Rebetz et al. 2015) and greater tendencies toward shame-proneness (Fee and Tangney 2000) and self-defeatism (Ferrari 1994). In addition, using an experimental design, McCown et al. (2012) evaluated the thought processes of chronic versus non-procrastinators during an induced dilatory task. Consistent with expectations, the written content from procrastinators reflected greater self-deprecating and self-disparaging beliefs when compared against their non-procrastinating peers. Overall, the research suggests that during episodes of procrastination, procrastinators tend to activate cognitive-affective themes consistent with a defectiveness schema.

Procrastination and Insufficient Self-Control

Similarly, procrastinators report a tendency to engage in insufficient self-control schematic processing, which is defined by persistent cognitive difficulties in managing frustration and restraining impulses in the pursuit of one's personal goals (Young et al. 2003). Chronic procrastinators exhibit cognitive difficulties in self-control when making rash decisions to engage in immediately pleasurable tasks in favor of tasks that require long-term goal pursuit (Sirois and Pychyl 2013; Tice et al. 2001). Research also supports the position that chronic procrastinators experience cognitive difficulties with frustration tolerance. For instance, the tendency to engage in procrastination and problems resulting from the activation of procrastination are associated with difficulties in tolerating discomfort (Harrington 2005). Moreover, cognitive and affective themes (i.e., feeling overwhelmed, fatigued, unable to cope), which are reflective of frustration intolerance, are apparent in narrative-based accounts of procrastinators who were asked to reflect on their experiences with delaying the initiation and completion of important tasks (McCown et al. 2012). Collectively, these studies highlight defectiveness and insufficient self-control schemas as important cognitive processes associated with the experience and expression of chronic procrastination.

Cognitive Schemas and Depression

The last part of our model involves the links between cognitive schemas and depression. Substantial evidence exists for maladaptive schemas as vulnerability factors in the onset and maintenance of depressive disorders (i.e., Ingram et al. 2011; Riso et al. 2007). As a broad construct, maladaptive schemas account for significant variance in depressive scores cross-sectionally and longitudinally (Halvorsen et al. 2009; Welburn et al. 2002). However, one emerging and important line of inquiry is to identify unique maladaptive schema themes specific to the experience and expression of depressive disorders (Hawke and Provencher 2011). There is some research to suggest defectiveness and insufficient self-control schemas uniquely contribute to different depressive outcomes. For instance, defectiveness schema themes (i.e., the belief that one is fundamentally different, undesirable, and inferior to others) predicted variation in the severity of depressive symptoms in clinically depressed, previously depressed, and non-depressed participants over a 9-year time frame (Halvorsen et al. 2010). Moreover, internal deficiencies associated with cognitive patterns of self-discipline, control, and frustration tolerance predicted the presence of major depressive episodes in these same participants and over the same time period (Halvorsen et al. 2010).

Current Study

An examination of the extant literature reveals that (a) procrastination increases risk to depression (Rozenal et al. 2015), (b) procrastination activates specific schemas (McCown et al. 2012), and (c) schemas contribute to the onset and maintenance of depression (Riso et al. 2007). However, no known study has examined these relationships collectively, leaving us with only speculation about potential mediational processes. This is a significant gap in the literature because cognitive processes appear important in clarifying the vulnerability of procrastinators to different mood-based difficulties, like depression. Additionally, most of this research has been conducted in the absence of an established, integrative theory. Thus, the purpose of the current study is to examine these relationships through a modified version of the Procrastination-Health model inclusive of cognitive mediators. Specifically, we believe that the relationship between procrastination and depression may be mediated by defectiveness and insufficient self-control schemas.

In addition, consistent with the recommendations from Klibert et al. (2016), the current study seeks to determine if the proposed indirect effects vary as a function of culture. Unfortunately, few studies examine personality-cognitive models for depression across cultures, which increases skepticism regarding the stability and sensitivity of currently established models. Currently, it is unknown if the strength of the hypothesized mediated effects will differ by country of origin (US vs. Pakistani students). On one hand, Pakistani students are expected to adopt and adhere to different social dynamics and norms that may alter the experience and expression of mood-based disorders when compared against US peers (e.g.,

Chentsova-Dutton et al. 2015; Schreier et al. 2010). As a result, it would be somewhat unsurprising to see country of origin variation in the indirect and direct pathways between procrastination and depression. Alternatively, the variables in our proposed model are inter-related to a moderately-high degree in samples from both countries (Aziz and Tariq 2013; Fee and Tangney 2000; Halvorsen et al. 2009; Jibeen 2015; McCown et al. 2012; Rice et al. 2012; Saleem and Rafique 2012; Sirois and Pychyl 2013). Overall, given the current extent of the literature, we are unsure if country of origin will affect the strength of the mediated effects of our proposed model. Investigating country of origin differences in the Procrastination-Health model may ultimately promote more culturally-sensitive insights into the treatment of depression.

On the basis of existing theory and established empirical evidence, we hypothesize that, in a sample of US and Pakistani emerging adults: procrastination would be positively associated with self-reports of depressive symptoms and, defectiveness and insufficient self-control schemas would mediate the relation between procrastination and depression. Finally, in an exploratory function, we examined potential nationality differences in the mediated pathways between procrastination and depression.

Method

Participants

The total sample included undergraduate students enrolled in select universities from the US and Pakistan. In the US sample, participants included 412 students, 141 men (34.2%) and 271 women (65.8%), enrolled in a large southeastern university. The participants ranged in age from 18 to 39 with a mean age of 19.67 ($SD = 2.41$) years. Participants predominately self-reported as European American ($n = 260$, 63.1%), African-American ($n = 109$, 26.5%), and multiracial ($n = 34$, 8.3%). Descriptive ethnic and racial data from the sample are reflective of the demographic profile in the southeastern region of the US. The Pakistani sample consisted of 240 undergraduate students recruited from different higher educational institutions in Karachi, a metropolitan city in Pakistan. All participants were enrolled in Grade A-Level to Graduation educational institutions of Karachi, Pakistan and fluent in English. The sample included 133 men (55.4%) and 107 women (44.6%) with an age range from 18 to 24 and average age of 18.60 ($SD = 0.99$) years.

Measures

Participants self-reported on measures of procrastination, depression, and maladaptive schemas. Considering all Pakistani participants were fluent in English, all participants completed the surveys in English. Surveys were chosen based on the availability of psychometric properties indicating that they are appropriate to administer across cultures.

Tuckman Procrastination Scale-Short Form (TPS-SF; Tuckman 1991)

The TPS-SF is 16-item assessment of procrastination traits. Each item is rated on a 4-Point Likert scale ranging from 1 (*That's not me for sure*) to 4 (*That's me for sure*). Sample items included asking participants to rate the likelihood they *postpone the start of tasks, delay making tough decisions, and wait until the last minute*. Scores range from 16 to 64 with higher totals indicating a greater tendency to procrastinate. The TPS-SF was initially normed on US college students and demonstrates good internal consistency ($\alpha = .90$) and convergent validity with self-regulation tactics (Tuckman 1991). The TPS-SF also demonstrates solid internal consistency ($\alpha = .85-.90$) and concurrent validity with measures of academic attitudes and efficacy in samples of college students enrolled in Eastern European and Western Asian universities (Özer et al. 2013; Tamadoni 2010). Finally, the TPS-SF is moderately correlated with measures of depression across culture (e.g., Stöber and Joormann 2001).

Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff 1977)

The CES-D consists of 20-items measuring different features of depressive symptoms. Participants rate each item on a 4-point scale indicating how frequently they experienced depressive symptoms (e.g., low mood, poor appetite, lethargy) over the last week. CES-D scores range from 20 to 80 with higher scores reflecting more severe depressive symptoms. With US college student samples, the CES-D demonstrates good internal consistency ($\alpha = .87-.91$; Hill et al. 2015) and excellent convergent validity with measures of anxiety, affective lability, and distress intolerance (Pearson et al. 2015). Similarly, the CES-D demonstrates solid internal consistency ($\alpha = .77$) and excellent convergent validity with measures of rumination and anxiety in Western Asian college student samples (Besharat et al. 2014).

Young Schema Questionnaire-Short Form 3 (YSQ-S3; Young 2006)

Two schema subscales (defectiveness, insufficient self-control), theoretically relevant to the aims of the current study, were assessed. The defectiveness subscale measures cognitive patterns associated with the perception one is inherently flawed, unwanted or unlovable. Sample items include prompts asking participants to rate perceptions of how “unacceptable” and “unworthy” they are to receive others’ respect, attention, and love. The insufficient self-control subscale measures cognitive patterns associated with difficulties exercising self-discipline and frustration tolerance. Sample items include prompts asking participants to rate their ability to “persist on tasks” and “delay immediate gratification” (Young et al. 2003).

The defectiveness and insufficient self-control schema subscales of the YSQ-S3 consist of 5 items each rated on a 6-point Likert scale ranging from 1 (*Completely untrue of me*) to 6 (*Describes me perfectly*). Total scores range from 5 to 30 for both subscales with higher scores reflecting greater endorsement of cognitive biases. While psychometric properties for the YSQ-S3 are only just emerging, preliminary

studies demonstrate solid internal consistency ($\alpha = .72-.90$) and excellent convergent validity with different measures of psychopathology in US older adolescent and college student samples (Damiano et al. 2015; Klibert et al. 2011). Similarly, evidence demonstrates adequate psychometric properties for the YSQ-S3 subscales in college student samples from Western Asian and Eastern Asian counties (Akbari et al. 2012; Yoo et al. 2014).

Procedure

IRB and institutional approval were obtained prior to data collection. Best ethical practices were employed to ensure participant confidentiality. Data were collected anonymously from consenting students. Measures were administered in a randomized order. The survey took approximately 30–45 min to complete. At the end of the survey, all participants were given a debriefing form explaining the purpose of the study and an agency list of local, culture-specific mental health resources.

Analytic Plan

We employed Hayes's (2013) PROCESS (Model 4) macro to examine the potential indirect effects of defectiveness and insufficient self-control schemas in the relation between procrastination and depression for both samples. The bootstrapping procedure underlying PROCESS is advantageous primarily because this nonparametric quantitative method does not assume that the indirect effect is normally distributed—an assumption that is unfounded (Preacher and Hayes 2004). Instead, the distribution for the indirect effect is constructed through repeatedly sampling (with replacement) from the original dataset, and then running each bootstrap through the mediational analysis. We used 1000 bootstrap draws. Confidence intervals (CIs) were generated to determine the significance of the indirect effects. An indirect effect reaches significance at the $p < .05$ level when 95% CI for the bootstrapped result does not contain zero. Finally, in a separate analysis, we explored moderated mediation effects using PROCESS (Model 7) to test the possibility that the mediated effects significantly differed based on country.

Results

Table 1 contains the *Ms*, *SDs*, and Cronbach's alphas for the key variables in the study as well as significance tests for the differences between nations. Participants from Pakistan reported higher scores for all of the key variables—insufficient self-control, defectiveness, depression, and procrastination.

Table 2 contains the correlations among the key variables in the study. All of the correlations were statistically significant, $p < .001$. As can be seen in Table 2, the link between procrastination and depression was .443 in the US and .423 in Pakistan. This finding replicates the effect that is central to the Procrastination-Health model (Sirois et al. 2003).

Table 1 Means, standard deviations, Cronbach alpha coefficients, and nationality differences among the study's variables

	US (<i>N</i> = 412)			Pakistan (<i>N</i> = 240)			Tests of differences between nations			
	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α	<i>t</i>	<i>df</i>	<i>p</i>	95% CI of diff.
Depression	35.78	10.67	0.91	39.82	10.30	0.87	-4.72	650	<.001	[-5.72, -2.36]
Defectiveness	8.81	4.92	0.90	9.65	4.43	0.68	-2.20	650	.028	[-1.60, -0.09]
In. self-control	11.53	4.96	0.82	15.74	6.93	0.59	-8.26	382.71	<.001	[-5.21, -3.21]
Procrastination	37.90	8.71	0.90	40.65	8.06	0.84	-4.01	650	<.001	[-4.11, -1.41]

The *t* test for Control assumed the variances were not equal, as the Levene's test was significant, indicating inequality

Table 2 Bivariate correlations among the study's variables by country

	Defectiveness	Depression	In. self-control	Procrastination
<i>US (N = 412)</i>				
Defectiveness	1.000			
Depression	0.630	1.000		
In. self-control	0.663	0.579	1.000	
Procrastination	0.431	0.443	0.717	1.000
<i>Pakistan (N = 240)</i>				
Defectiveness	1.000			
Depression	0.589	1.000		
In. self-control	0.380	0.399	1.000	
Procrastination	0.332	0.423	0.552	1.000

All correlations are significant, $p < .001$

Next, we analyzed the extent to which insufficient self-control and defectiveness schemas mediated the relationship between procrastination and depression. In order to do this, we ran PROCESS Model 4, which handles multiple mediation (Hayes 2013). First, we analyzed the multiple mediation model on only the US data; we used 1000 bootstraps. Figure 1 captures the model for the United States. The indirect effect via insufficient self-control was statistically significant; effect = .185, bootstrapped $SE = .064$, 95% CI [.064, .313]. The indirect effect via defectiveness was also statistically significant; effect = .236, bootstrapped $SE = .043$, 95% CI [.158, .330]. This model suggests that both insufficient self-control and defectiveness mediate the relationship between procrastination and depression in the US sample.

Next, we analyzed the multiple mediation model on only the Pakistani data; again, we used 1000 bootstraps. Figure 2 captures the model for Pakistan. The

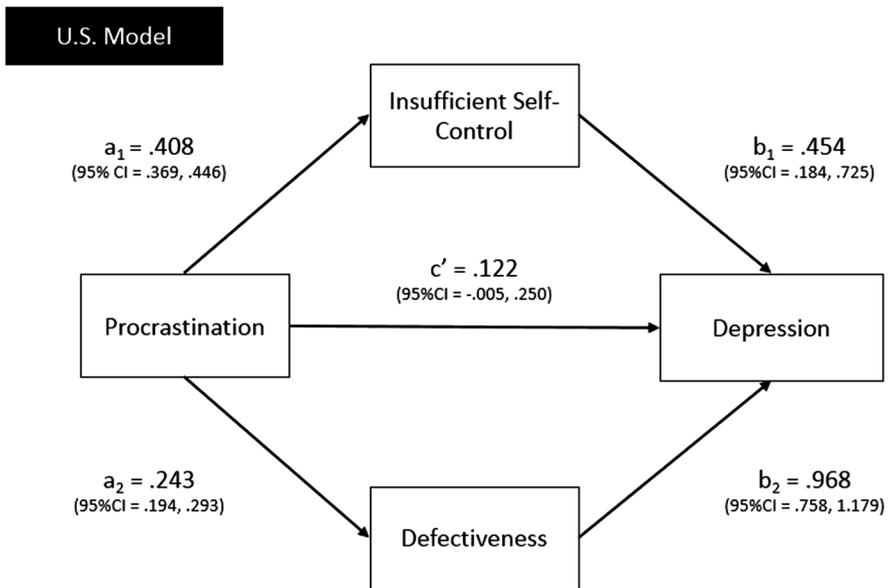


Fig. 1 The multiple mediation model illustrating the extent to which insufficient self-control and defectiveness mediate the relationship between procrastination and depression in participants from the United States

indirect effect via insufficient self-control was not significant; effect = .072, bootstrapped $SE = .044$, 95% CI $[-.004, .169]$. The indirect effect via defectiveness, however, was statistically significant; effect = .204, bootstrapped $SE = .042$, 95% CI $[.127, .290]$. This model suggests that defectiveness—but not insufficient self-control—mediates the relationship between procrastination and depression in the Pakistani sample. The non-significant indirect effect through insufficient self-control schemas was somewhat surprising. However, the high correlation between defectiveness and insufficient self-control schemas may explain why we did not get a significant result. To test this suspicion, we ran a mediation model with only insufficient self-control entered into the equation. Results indicate the indirect effect via insufficient self-control was indeed significant, effect = .168, bootstrapped $SE = .056$, 95% CI $[.082, .289]$. This finding confirms that defectiveness schemas masked the contribution of insufficient self-control schemas as a significant mediator in the model we originally analyzed.

Finally, on a purely exploratory basis, and given the fact that the insufficient self-control schema was a significant mediator in the US model but not the Pakistani model (in the multiple mediation analyses), we examined whether the results of this multiple mediation model varied by nationality. This requires a moderated multiple mediation model, PROCESS Model 7 (Hayes 2013). Both of the indices of moderated mediation were not significant, $p > .05$. Thus, even though the insufficient self-control schema variable was significant in one sample but not the other, the difference between the effects across samples was not large enough to

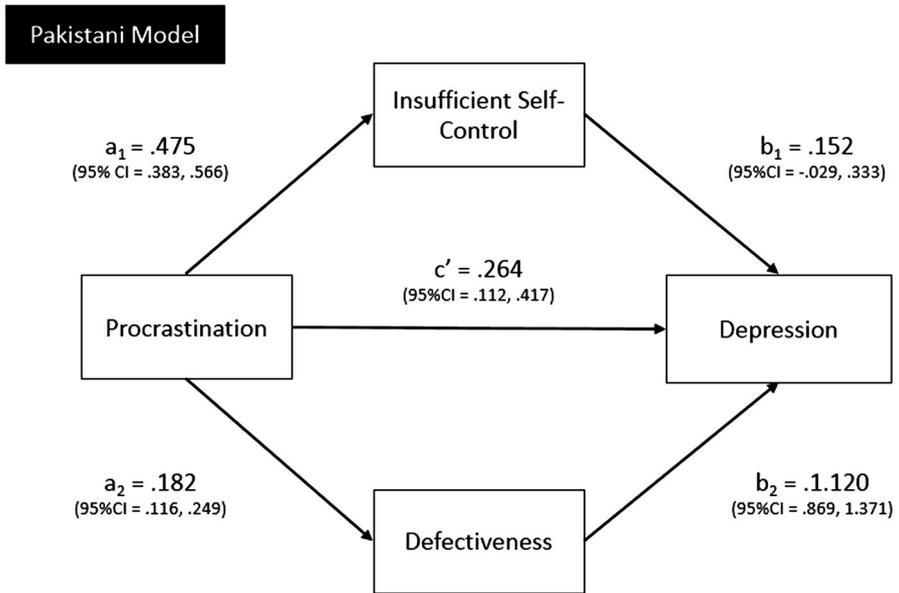


Fig. 2 The multiple mediation model illustrating the extent to which insufficient self-control and defectiveness mediate the relationship between procrastination and depression in participants from Pakistan

yield statistically significant moderation by nationality. All in all, it appears that these mediators operate quite similarly in the US and Pakistan.

Discussion

The purpose of this study was to clarify the relationship between procrastination and depression (Rozenal et al. 2015) as mediated by two cognitive schemas; we explored this in two very different samples of college students. As expected, higher levels of procrastination were associated with greater reports of depressive symptoms. Moreover, cognitive schemas entirely accounted for the association between procrastination and depression in the US sample, a pattern termed complete mediation (Hayes 2013), and partially mediated the association between procrastination and depression in the Pakistani sample. This is the first study to show which cognitive schemas mediate the link between procrastination and depression; this represents a clinically useful extension of the Procrastination-Health model (Sirois et al. 2003).

Our study combines important associations from a variety of unlinked literatures. Specifically, research demonstrates predicted paths among the variables in a manner consistent with the Procrastination-Health framework: (a) procrastination increases risk to depression (Rozenal et al. 2015), (b) procrastination activates specific schemas (McCown et al. 2012), and (c) schemas contribute to the onset and

maintenance of depression (Riso et al. 2007). However, research has yet to integrate these paths into an empirically validated model. We attempted to integrate them here.

Consistent with the prevailing literature (McCown et al. 2012), our results suggest procrastinators from both countries report greater levels of defectiveness and insufficient self-control schemas. These specific cognitive themes may be particularly important in explaining self-regulatory deficits underlying procrastination. For instance, defective schema processing often activates hypersensitivity to criticism, rejection, and shame (Young et al. 2003) that may ultimately strip procrastinators of the necessary resources (self-efficacy, optimism) needed to reduce depression. Similarly, insufficient self-control schema processing often contributes to a sense of discomfort avoidance (Young et al. 2003), which detracts from help-seeking and wellness-oriented behaviors needed to thwart the development and maintenance of emotional distress. Given our findings and their potential implications, future research should target cognitive schemas as an important area of study to better determine how procrastinators access and employ resources and support to cope with everyday life.

In addition, our results show the extent to which defectiveness and insufficient self-control schemas are useful in explaining how procrastination relates to depression. For US students, our findings support the current literature and were consistent with our expectations. Specifically, after consideration for the two cognitive schemas, the direct relationship between procrastination and depression dissolved, suggesting a completely mediated model. Of importance, results revealed two significant indirect pathways, such that greater levels of procrastination were linked to elevated activation of both defectiveness and insufficient self-control and, in turn, increased reported rates of depressive symptoms.

Our findings revealed a slightly different (albeit not significantly different) model for Pakistani students. The direct effects between procrastination and depression were significant even after inclusion of the two cognitive schemas, suggesting a partially mediated model. Moreover, only one indirect pathway was determined as statistically significant. Specifically, the procrastination-depression link was only significantly mediated by defectiveness. The lack of significant indirect effects for insufficient self-control schemas was a little surprising given previous research (Harrington 2005) and the strong bivariate associations found in the current study. However, we interpret this non-significant effect with caution because defectiveness schemas may have masked the unique contributions of insufficient self-control schemas in the model, especially given that the two constructs were highly correlated. Thus, we decided to run a simple mediation model to examine the indirect effects of insufficient self-control schemas outside of the context of defectiveness schemas. Results indicated a significant indirect effect via insufficient self-control schemas, suggesting defectiveness schemas likely accounted for the variance attributable to insufficient self-control in the model.

We also examined the strength of the indirect effects across nationality. Results indicate the paths linking procrastination and depression via two cognitive schemas were comparable for US and Pakistani students. The cross-national findings are important contributions to the current literature. Specifically, our findings highlight

some support for cognitive models of procrastination and how procrastination is linked to different mood-based outcomes across individuals with diverse backgrounds (Stainton et al. 2000). Specifically, mental health practitioners can, with some confidence, implement interventions targeting these two cognitive schemas as a means to ameliorate the link between procrastination and depression in US and Pakistani college students.

Overall, our results integrate the previously established associations among the study's variables (procrastination → cognitive schemas → depression) into a useful framework for understanding depressive symptoms. In conjunction with these chains, our results imply procrastinators are at risk to activate defective and insufficient self-control cognitive processes, which may leave them vulnerable to characteristic symptoms of depression (i.e., depressed mood, anhedonia). However, any conclusions drawn from our results should be considered in the context of the study's cross-sectional and correlational design. Experimental research is necessary in order to further substantiate our model.

Importantly, in the Pakistani sample a partial mediation model was revealed, suggesting other variables may be important in explaining the link between procrastination and depression. Thus, future research identifying factors that strengthen or extend our conceptualization of this relationship is warranted. Of importance, researchers may need to consider different contexts in which maladaptive schemas mediate the procrastination-depression relationship. Cognitive vulnerabilities, like maladaptive schemas, remain relatively latent, often activated during periods of high stress and turmoil (Cámara and Calvete 2012). Thus, future research can extend the scope of our findings by determining if the strength of the established direct and indirect effects fluctuates based on the experience of high versus low stress.

Implications for Theory and Clinical Practice

Our findings also highlight some important theoretical implications for the cross-cultural investigation of depression. This is the first known study to consider cross cultural variation in the associations between procrastination and depression. In the broader literature, consideration for culture is often limited to mean level comparisons between different cultural or ethnic groups. Such investigations provide little context for understanding if and how the stability and strength of the correlated effects between personality variables and depression vary across different ethnic groups. With this in mind, our results provide support for procrastination as a strong correlate of depression. Moreover, the degree to which cognitive schemas serve as a mediator in the procrastination-depression relationship was comparable for US and Pakistani students. These comparable effects generate further evidence for the Procrastination-Health model as a stable and culturally sensitive framework to conceptualize depression symptoms in diverse student samples. However, consideration for culture in the context of these relationships needs to be extended in future studies. Specifically, future research needs to replace crude and categorical measures of culture (i.e., country of origin) with more explicit measures of cultural

dynamics (i.e., self-construals, community resources, family systems) to better determine if and how the associations among procrastination, cognitive schemas, and depression vary across diverse samples.

Our results also underscore some important practical considerations to decrease depression-based difficulties in a diverse range of college students. Most notably, schema healing practices associated with the promotion of self-regulatory effectiveness are a promising target for intervention among students who report depressive concerns. Exposure-based, positive psychological, and cognitive restructuring techniques commonly used within Young's Schema Therapy framework may help procrastinators identify and access resources effective in preventing and altering the course of depressive states. For instance, cognitive techniques focused on re-appraising threatening circumstances and modifying misperceptions of personal strength and effectiveness may be particularly beneficial in helping procrastinators prevent and navigate through depressive mood states. Overall, such interventions may reduce avoidance in engaging in effective help-seeking behaviors, while simultaneously highlight personal assets that simulate positive perceptions of self-worth—thereby alleviating depression.

Limitations

It is important to examine these results in light of several limitations. First, it is unclear whether these findings will generalize to clinical populations outside of the US and/or Pakistan. Replication is warranted with individuals who report more persistent and dysfunctional mood difficulties. Second, estimates of the variables in this study were observed through self-reporting, a practice highly susceptible to a number of confounds, like social demand characteristics and method variance. Third, the order of the variables in the model was based on the tenets of the Procrastination-Health model. However, it is quite possible that these variables follow a directional chain that is ordered in a way other than the way we have focused on here. For instance, despite evidence suggesting procrastination serves as a risk factor to depression, it is possible that depression may contribute to more procrastinatory behaviors. It is important for researchers to examine these interrelationships longitudinally to obtain stronger inferences regarding the direction of causation. Specifically, cross-lagged panel models compare the direction of causal flow among different data structures, reduce the parameter bias resulting from cross-sectional data, and provide enough time for the causal effects to take place (Selig and Preacher 2009). Fourth, evaluation of mediated effects was limited to only two schemas subscales. As a result, we cannot fully confirm cognitive themes of defectiveness and insufficient self-control are the only indirect pathways to explain the procrastination-depression association. It is important for future research to investigate mediational effects of defectiveness and insufficient self-control hold any unique explanatory power when compared against other schemas subscales and even a general measure of cognitive dysfunction. Finally, and most importantly, the correlational design of study precludes inferences of causation. Future research should experimentally explore how procrastination activates cognitive schemas, and

how cognitive schemas cause depressive outcomes; models such as these have been advocated by Stone-Romero and Rosopa (2011). This is a promising next step.

Overall Conclusions

In summary, our results confirm indirect pathways by which procrastination could exert its effects on depression. In addition, our findings illuminate specific cognitive mechanisms, defectiveness and insufficient self-control schemas, as important in explaining the link between procrastination and depression. This represents a novel extension of the Procrastination-Health model (Sirois et al. 2003). Based on our findings, mental health practitioners have a better cognitive platform to conceptualize how chronic procrastinators may experience and express different depressive symptoms. Specifically, high procrastination traits may activate a hypersensitivity to defectiveness and low perceptions of control, which in turn may contribute to different depressive symptoms and outcomes. Given this model, effective treatment for depression may need to concurrently diminish self-regulatory deficits commonly associated with procrastination and identify and reinforce resources that minimize perceptions of defectiveness and low self-control.

In addition, the hypothesized effects were largely consistent across two diverse samples of students. To date, few, if any, studies cross-nationally examine how cognitive schemas mediate the connection between procrastination and depression. Despite dynamic demographic, political, social, and economic differences between the US and Pakistan, we were able to highlight the effectiveness of different Procrastination-Health pathways in explaining variation in depression scores cross-nationally. While considerably more research needs to be examined, our findings offer some preliminary evidence for the Procrastination-Health model as a culturally robust theory for mental health. From a practical standpoint, empirically validating models across cultures is a great benefit to clinicians who wish to use effective interventions with a diverse array of clients.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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