The Differential Framing Measure for Procrastination:

An Implicit Measure of Procrastination Cognitions

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The present study attempted to create a scale for measuring the implicit cognitions related to procrastination. Items for the measure were created from a set of cognitive rationalizations derived from existing procrastination research. Unfortunately, the items for the new measure failed to converge on to a single factor, thus inhibiting further analysis. Nevertheless, data analysis using established measures of procrastination produced a growth curve model that demonstrated the difference between non-procrastinators and procrastinators. The behavioral indicators of procrastination were based on participants' accumulation of participation credits, the order in which participants registered for their account, and the time taken by participants to activate their account. Significant correlations were found between several established self-report procrastination measures and the criterion measures of procrastination. Thus, this study's findings are limited to the procrastination and criterion measures used. Nonetheless, the utility of the criterion measure as an indicator of procrastination was demonstrated.

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INTRODUCTION

Procrastination, the irrational delay of tasks which results in missed deadlines or inferior work, costs U.S. companies 1.26 trillion dollars annually with an average loss per employee of approximately $23.49 per hour (Steel, 2012). Moreover, the impact of procrastination can be seen beyond the organization as it also negatively influences the individual. For example, as noted by Sirois (2007), regular medical exams are often delayed by many individuals, which later results in more expensive treatments for an exacerbated issue since individuals who delay preventative care are more susceptible to longer-term health issues. Furthermore, past research has noted that procrastinators engage in more downward counterfactual thinking when confronted with a health issue that requires medical attention. Financially, despite the fact that early investment allows individuals to take advantage of compound interest rates, many adults delay making contributions to retirement plans (Steel, 2012). Together, although these examples provide rudimentary descriptions of the daily cost of procrastination, the most detrimental delay to individuals may be their own pursuit of happiness. Previous research by Shu and Gneezy (2010) noted that procrastinators often postpone enjoyable activities that have clear and immediate benefits. Specifically, they concluded that procrastination often occurs because there is an expectation that the individual will have more time to pursue enjoyable activities in the future, regardless of the affect associated with the behavior.

Procrastination research has been conducted continuously for over thirty years, but until now, a unified definition has not yet been produced (Steel, 2010). Overall, researchers agree that the basic elements of procrastination include tasks, objectives,

or assignments being delayed, postponed, or avoided with and without purposeful intent (cf. Anderson, 2003; Choi & Moran, 2009; Corkin, Shirley, & Lindt, 2011; Corkin, Yu, & Lindt, 2011; Effert & Ferrari, 1989; Ferrari, Barnes, & Steel, 2009; Ferrari, O'Callaghan, & Newbegin, 2005; Rabin, Fogel, & Nutter-Upham, 2011; Schraw, Wadkins, & Olafson, 2007; Shu & Gneezy, 2010). Thus, assimilating the numerous prior definitions, procrastination can be conceptualized as the postponed completion of a task or goal that occurs when an individual becomes irrationally preoccupied with nonessential activities which in turn leads to a failure of completing the intended task or its inferior completion given that procrastination occurred. This definition emphasizes task completion as the most important event of goal attainment. Moreover, this definition is considered an extension of earlier definitions that focused only on delay and postponement. Thus, the present conceptualization attempts to expand on past definitions by acknowledging that some delayed tasks do become completed, though they may not meet expectations of quality, while also acknowledging that completed objectives, delayed prior to completion, do not necessarily fall into the procrastination category due to adjusting priorities. Subsequently, it is expected that some task delays do not coincide with procrastination when the delay is intentional and functional (e.g., a change in priorities based on external demands).

Previous procrastination research has focused on the use of self-report measures to evaluate explicit attitudes about procrastination (e.g., I prefer exciting tasks that have no objective value). Although this research has met with limited success (Chu & Choi, 2005; Fernie et al., 2009; Klassen et al., 2010; Klibert et al., 2011; Lay et al., 1989; Renn et al., 2011; Simpson & Pychyl, 2009), there are some potential problems

with the application of self-report measures to the evaluation of constructs closely tied to obvious social norms (James & Mazerolle, 2002). However, new measurement methods have been developed to evaluate individuals' implicit social cognitions relating to particular constructs.

These new measures, typified as conditional reasoning measures, are designed to resemble logic-based test items, but are indirect measures of personality characteristics (James, 1998; James, & LeBreton, 2010; James & Mazerolle, 2002; James, McIntyre, Glisson, Bowler, & Mitchell, 2004). The items for conditional response measures are based on the justification mechanisms utilized by the individual to rationalize his or her behavior; these justification mechanisms act as the biases used by individuals to help them view their behavior as legitimate and normal (i.e., within the boundaries of appropriate social norms). Unlike some self-report measures, conditional reasoning measures have demonstrated that, given normal testing conditions, faking and socially desirable responses are not pervasive issues (LeBreton, Barksdale, Robin, & James, 2007).

A conditional reasoning measure of aggression has been developed demonstrating improved criterion-related validity over traditional self-report measures of aggression (James, 1998; James & Mazerolle, 2002). The Conditional Reasoning Test of Aggression has been demonstrated to be a valuable tool helping to identify aggressive individuals in the workplace and society (James et al., 2005). Subsequently, the advantage of applying the conditional response format to procrastination research is to create a measure that will more accurately predict procrastination tendencies in the workplace and society and minimize test faking. Similar to conditional response items,

differential framing items assess adjectives that evoke responses from the user of the justification mechanism. These tests use synonym-based reasoning to efficiently and implicitly measure social cognitions (LeBreton, 2002).

This study pursued the development of a new implicit, synonym-based measure of procrastination. This new measure was designed to evaluate the social cognitions individuals utilize when postponing task engagement and overall task completion. This study was designed to identify the connection between social cognitions and procrastination, demonstrating why individuals fail to complete important tasks and goals. It is hoped that individuals and organizations, aided by implicit procrastination measures, will be able to better identify procrastinators by understanding the justifications they use to rationalize procrastination.

Procrastination

Initial research on procrastination focused on issues related to academic performance, exemplified when students delay studying or completing out-of-class assignments (Sieveking, Campbell, Rileigh, & Savitsky, 1971; Ziesat, Rosenthal, & White, 1978), and was later applied to research in organizations (Harris & Sutton, 1983). Following this initial research, Solomon and Rothblum (1984) noted that procrastination is more than just defective time management strategies and poor study habits. They concluded that it involved a complex interaction between affective, behavioral, and cognitive components. Ferrari, O'Callaghan and Newbegin (2005) further noted that procrastination was not just a convention of individualistic, English-speaking, western cultures, but a global phenomenon found in other cultures. For example, research by Klassen et al. (2010) and Özer, Demir, & Ferrari (2011) indicated

that approximately half of Singaporean students, a third of Canadian students, and over half of Turkish students admitted to regular procrastination.

Avoidant Procrastination. The procrastination model used in most research has addressed the construct via three primary facets: (1) avoidant, (2) arousal, and (3) decisional procrastination. Avoidant procrastination is the delay of a task stemming from the individual's fear of failure and serves to protect the individual's self-esteem (Ferrari, O'Callaghan, & Newbegin, 2005; Steel 2010). Furthermore, it has been noted that social loafing and avoidant procrastination both negatively correlate with conscientiousness (Ferrari & Pychyl, 2012; Rabin, Fogel, & Nutter-Upham, 2011). Additional relationships between avoidant procrastination and personality relate low conscientiousness, high neuroticism, and extroversion, but not agreeableness, with incidents of procrastination and failures in self-management (Lubbers, Van Der Werf, Kuyperb, & Hendriks, 2010; Renn, Allen, & Huning, 2011). Moreover, research by both Effert and Ferrari (1989), and corroborated by Chow (2011), has demonstrated that dissatisfied students procrastinate more indicating lower self-efficacy and lower self-esteem. Additional confirmatory relationships between personality types and procrastination have demonstrated that procrastination is negatively associated with conforming behavioral styles and positively associated with unconventional, gregarious, and passive accommodation behavioral styles (Díaz-Morales, Cohen, & Ferrari, 2008). In addition to being a delayed action, procrastination is also a form of self-regulatory failure displayed by students who are less likely to use mastery-approach goals and metacognitive strategies (Corkin, Shirley, & Lindt, 2011).

Arousal Procrastination. Arousal procrastination was noted by Ferrari et al. (2005) as the delaying of tasks in order to pursue thrilling alternatives. Research by Spiller (2011) has demonstrated that in some cases procrastinators do not consider the opportunity cost of delaying tasks when other activities are more appealing. This leads to those tasks that are put off eventually requiring more time when they are finally engaged. Furthermore, Prescott and Csikszentmihalyi (1981) indicated that unfavorable routine events are enjoyed more by older individuals, suggesting that age affects arousal-based procrastination. Previous findings also indicated increased life experience may be a factor that reduces arousal procrastination. Moreover, research suggests not just repetitive and aversive tasks are delayed (Lay 1987; Lay, 1990). Some activities that produce an instant positive gain – such as voucher redemption – are also procrastinated (Shu & Gneezy, 2010). This form of procrastination is often exemplified by the reasoning that easy tasks can be completed later (Simpson & Pychyl, 2009).

Decisional Procrastination. The final facet of procrastination, decisional procrastination, occurs when the individual delays making decisions within a given time frame (Anderson, 2003; Effert & Ferrari, 1989). Lay, Edwards, Parker, and Endler (1989) were among the first to note the relationship between procrastination and high levels of trait anxiety. Additional emotions, such as boredom, frustration, and resentment, were identified as procrastination factors that pervade the production cycle of inception, planning, action, and termination (Blunt & Pychyl, 2000; Ferrari, 2000). Though procrastination has not yet been correlated to affect using moment-to-moment measures, findings have significantly demonstrated that negative affect correlates with

trait procrastination (Pychyl, Lee, Thibodeau, & Blunt, 2000). Additionally, the previous research noted that individuals engage in more enjoyable and less aversive activities while procrastinating, but affect recovery has yet to be demonstrated. Interestingly, perfectionist concerns of doubt and error, resulting in anxiety, have been identified as a link mediating worry and procrastination (Rice, Richardson, & Clark, 2012). It has been further asserted that anxiety and depression antecedents, combined with an increased sense of regret across life domains, substantiate claims that procrastination can negatively affect the individual (Ferrari, Barnes, & Steel, 2009).

The incorporation of a third aspect of procrastination, and its proposed measurement, led to the establishment of the tripartite procrastination model (i.e., avoidant, arousal, and decisional procrastination types) and simultaneously divided procrastination into behavioral and decisional components. However, recent research by Simpson and Pychyl (2009), and the subsequent meta-analytic research by Steel (2010), do not support the multifaceted concept of procrastination. Instead, it has been proposed that procrastination is simply an irrational delay (Steel, 2010). Regardless of the most recent contribution to the procrastination literature, the defining personality characteristics of procrastinators and correlates have been well documented. Continuing with the unified view of procrastination, other research differentiates procrastinators and nonprocrastinators by each group's orientation toward time and action.

Time Orientations of Procrastinators. Indications of an alternate mode of procrastination have been suggested by Ferrari and Díaz-Morales's (2007) study of procrastinator's time orientations. Results indicate that procrastinators possess a

reduced future orientation and larger present-fatalistic and present-hedonistic orientation. Additionally, a past-negative time orientation correlates with procrastination, but the relationship between procrastination and a past-positive orientation has not yet been demonstrated (Díaz-Morales, Ferrari, & Cohen, 2008; Ferrari & Díaz-Morales, 2007). Furthermore, results suggest a differential mode specific to the individual's values, expectations, and time commitments to task achievement. Originally, the previous results were noted in relation to avoidant and indecisive procrastination; however, in light of Steel's (2010) meta-analysis it seems more relevant to apply these findings to general procrastination. Additional research corroborates previous findings regarding the time orientations of procrastinators. In comparison to the previously mentioned fatalistic views, hedonic views of the present were shown to relate more with future uneasiness and diminished future expectations (Jackson, Fritch, Nagasaka, & Pope, 2003). Previous research indicates that past punishment is a likely moderator of future expectations because goal-directed behaviors are inhibited by present fatalistic expectations. Additional research indicates that procrastinators who reflect on delayed-past tasks also perceive those tasks to have had less objective clarity, required greater effort, and that completing the task would have had a positive personal impact (Ferrari, Mason, & Hammer, 2006).

Along these lines, Choi and Moran (2009) separate procrastination into two forms: active and passive. *Active procrastination* is the intentional decision to procrastinate, or actively delay a task, using stringent time pressures to self-motivate. In contrast, *passive procrastination* is the traditional form where individuals complete tasks at the last minute due to an inability to act decisively in a timely manner. Chu and Choi

(2005) further noted that nonprocrastinators and active procrastinators use personal time more purposefully, better control their time, and possess higher self-efficacy than passive procrastinators do. Previous research by Corkin, Yu, & Lindt (2011) further demonstrates that students who use active delay report higher grades than those who do not. Moreover, those students who exhibited active delay also reported minor concerns about course objectives – indicating higher levels of self-efficacy – and appearing substandard to others. Overall, it appears that procrastinators can be differentiated from non-procrastinators by their use of and orientation towards time. However, how procrastinators differ from non-procrastinators, with respect to the use of and orientation towards action, has not yet been discussed.

Action Orientations of Procrastinators. Aside from time perspectives, procrastinators have also been examined for their orientations toward action (Pierro, Giacomantonio, Pica, Kruglanski, & Higgins, 2011). The previous research distinguishes between *assessment* and *locomotion orientations* for procrastinators. Individuals with inclinations for locomotion, as indicated by previous research, move with efficiency in the direction of the intended goal, their purpose being to complete the task. Dissimilarly, those with *assessment* inclinations are motivated to select the safest path toward goal achievement. Such assessment tendencies are likely the result of the individual's focus on ego-preservation, as indicated by Shanahan and Pychyl (2007). Procrastinators have demonstrated self-preservation concerns in response to audience conditions in experiments where their performance evaluation was known to the researcher and other participants (Ferrari, 1991a). The possibility of public feedback led procrastinators to choose social tasks they knew they could make a positive impression doing but

alternatively choosing cognitive tasks when they were not confident in their ability. Corroborative research by Lorian and Grisham (2010) indicated behavioral inhibition systems and social anxiety correlate with risk-avoidance, suggesting that safety preference prevents individuals from placing themselves in a position perceived to be harmful. In sum, the previous research indicates that procrastinators delay acting when they perceive a social imbalance.

Though not explicit in the procrastination action-orientation literature, another aspect of the safety preference is the direction of autonomous goal setting. Research by Sheldon and Elliot (1998) indicated that personal goal attainment positively predicted autonomous motivation. From this research, it seems likely that a perceived lack of autonomous motivation may explain why some people do not achieve certain predetermined goals (i.e., it is safer to attempt personal goals than it is to risk failing to achieve a goal set by someone else). The previous findings seem discordant with results found by Buehler, Griffin, and MacDonald (1997) who noted that incentivized achievement not only predicts shorter completion times and greater efficiency, but also sees more optimistic completion. However, as proposed by Eisenberger (1992), secondary rewards generalize effortful performance across behaviors. Buehler et al. (1997) used the economic incentives of tax refunds and performance pay for their studies. Thus, this should not detract from the findings of Sheldon and Elliot (1998) when economic incentives are held constant.

Steel (2010) noted that interest in procrastination research has increased and has been examined by most psychological disciplines, but has largely remained indefinable. The present study sought to expand the neurobiological foundation of

procrastination proposed by Steel by examining the social cognitive basis for procrastination that has not yet been acknowledged within the procrastination literature. As mentioned previously, the cognitive biases and heuristics that individuals use in social contexts are justification mechanisms (James & Mazerolle, 2002). Furthermore, justification mechanisms are the cognitions individuals use to frame their behavior as normal. The following procrastination justification mechanisms have been developed from a broad review of the procrastination literature.

Procrastination Justification Mechanisms

Insufficient Time Bias. Individuals justify postponing their work because there is insufficient time to do otherwise. Through maturation young adults become more aware of the tasks they accomplish, indicating that they are increasingly aware of the consequences of their choices (Demetriou & Bakracevic, 2009; Hogan et al., 2005). This indication of self-awareness, or agency, may also imply the presence of a developing sense for the capacity to act and complete tasks in a timely manner (Shanahan & Pychyl, 2007). Research on agency suggests that it is negatively related to procrastination, and that this relationship likely indicates that those individuals who procrastinate have not yet developed a sense of agency. It is also plausible that some individuals do not normally recognize the causality of their actions because they do not consciously attend to them (Fiske, 2004). Thus, adolescent college students who procrastinate lack the agentic characteristics and self-awareness required to engage and prioritize tasks in a way that best completes those task objectives signifying that some adolescents, and possibly adults, have yet to develop agentic qualities, and have repeated difficulty pursuing and completing goals – a problem that results in the lack of

prioritization. Tasks with the most distant deadline are given the lowest priority because the individual may assume that there will be enough time in the future to complete those tasks. However, the individual does not account for breaks or impediments encountered when prioritizing tasks.

Research has shown procrastinators view the past negatively, expect negative future outcomes, and have fatalistic and hedonistic views about the present (Ferrari & Díaz-Morales, 2007). Here the procrastinator is depicted as someone with regrets about past events, they do not expect things to get better in the present or future, but will find something to make them feel better in the present. The prioritization of procrastinators is too flexible, so they overreact to present mishaps due to their fear of repeating past mistakes. Further research by Schraw et al. (2007) recognized that students' reasons for procrastination were caused by feelings of insufficient time. Their justification indicates that procrastination is an accidental response to having too much to do and too little time to complete what needs to be done, even though the problem is most likely a failure to prioritize. Furthermore, the claim of insufficient time indicates that students view procrastination as an unavoidable outcome when multiple conflicting interests for a required task are pursued (Schraw et al., 2007).

Research suggests that some procrastinators anticipate their inability to fully complete a task before a deadline and create additional self-imposed deadlines in lieu of the final deadline (Ariely & Wertenbroch, 2002). The previous findings indicate that the additional deadlines created are well intended, but are not set for optimal performance enhancement. Even though individuals attempt to correct their procrastination tendencies with self-imposed deadlines, these strategies have been

shown to not be enough to complete the task earlier than the original external deadline. Previous research indicates that some students and professionals recognize their inability to meet external deadlines, but their attempt to create and adhere to earlier deadlines does not always guarantee early task completion.

Individuals should prioritize their tasks by importance and sequential deadlines. Some procrastinators are capable of prioritizing tasks and reordering their list as needed. This is how active procrastinators postpone tasks, increasing their motivation and completing tasks before deadlines (Choi & Moran, 2009). Previous research has shown that active procrastinators are different from the passive procrastinators who delay a task due to being unable to decisively act. Furthermore, passive and active procrastinators differ in how they view time constraints. Active procrastinators (i.e., those who purposely postpone task engagement) are less likely to justify procrastination by claiming insufficient time. Chu and Choi (2005) have corroborated the previous findings by showing that active procrastinators and non-procrastinators have higher levels of self-efficacy, control of their time, and purposeful use of their time. This similarity, and their ability to successfully complete tasks by a deadline, is the reason that active procrastinators are excluded from this bias.

In sum, procrastination is justified because the individual feels that there is not enough time to do everything that needs to be done. Individuals who typically make this claim are likely to be passive procrastinators who do not purposefully use their time in an effective way to meet deadlines.

Flow Bias. Flow is an experiential state wherein individuals claim possession of a heightened state of arousal that enables them to work at peak levels of efficiency

(Moneta & Csikszentmihalyi, 1999). Some individuals claim to be able to achieve this state only shortly before a deadline; entering this state has been reported to increase motivation, make boring tasks more interesting, and increase personal creativity (Schraw et al., 2007). Furthermore, many students have been shown to postpone task engagement until the last minute in anticipation of achieving this state believing that the flow state will provide the means of efficiently completing the procrastinated task (Tice, Bratslavsky, & Baumeister, 2001). The increased adrenaline levels, likely due to the stress of the looming deadline, followed by the sudden relief and euphoria for completing the task has been assumed to reward individuals for postponing tasks until right before the deadline (Schraw et al., 2007; Seo, 2011).

Some procrastinators believe that achieving a “high” before a deadline is necessary to clear their mind and achieve levels of peak efficiency (Seo, 2011). This research, however, does not corroborate claims that procrastination increases the likelihood of an individual to experience a flow state or that those individuals actually perform better. It appears that individuals justify procrastination by assuming they will be better able to complete a task in the flow state. Despite this belief, their preference for working in the flow state is not substantiated by performance results. Instead, the anxiety from the approaching deadline combines with adrenaline and euphoria at the completion of a task to provide the individual with a false sense of completing superior work (Moneta & Csikszentmihalyi, 1999; Seo, 2011). Finally, the arousal experienced by the procrastinator resulting from anxiety misinforms them about the quality of their work and the efficacy of working in the flow state.

Previous researchers have shown how perceptions of flow state efficacy can misinform individuals about task duration and personal skill level (Schraw et al., 2007; Seo, 2011). As noted by Seo (2011), whose research furthered the findings of Lee (2005), increased flow states coincide with a reduction in procrastination indicating that as an individual enters the flow-state, procrastination is less likely to occur. Additionally noted by the research, those likely to procrastinate were seen to not have clear goals or concentrate on the tasks they were engaged in. Although this may seem irrelevant to flow, Lee's (2005) research indicates that flow states may actually disrupt the individual from using the self-regulatory external and internal cues that determine the initiation, maintenance, and termination of goal-directed behaviors.

In sum, the "high" experienced by individuals during flow states prevents them from recognizing that they are not optimally performing the task because they mistake the effects of stress for the reward of waiting until the deadline to engage. Individuals repeatedly choose to procrastinate on other tasks because they feel that they have been previously rewarded for procrastinating.

Reframing Bias. Procrastinators redefine success and failure in terms that allow them to escape any negative feelings that might result from not achieving as well as they could have had they not procrastinated (Schraw et al., 2007). This may come in the form of accepting a lower grade as sufficient due to procrastination or failure to complete a task by a deadline because they were too busy. Ultimately, the excuse or reason for not performing effectively becomes their justification for being satisfied with low-quality personal work. Schraw et al.'s (2007) research showed that students believe a B grade will be more satisfying than an A grade because of the reduced effort

required to achieve the lower grade. The reduced qualification for a good grade may mean that procrastinators feel that they can correspondingly decrease the effort required to get the grade they want allowing them to spend less time on the task whenever they choose to complete it. This form of self-handicapping was viewed positively by procrastinators in the Schraw et al. (2007) interviews conducted with college students. Earlier research, however, has shown that self-handicapping rarely has positive outcomes (Beck, Koons, & Milgrim, 2000; Ferrari, 1991b; Ferrari & Tice, 2000).

In a study that evaluated participants with seemingly diagnostic tasks procrastinators were more likely than non-procrastinators to believe their evaluations would be worse – and they were – when an environmental obstacle was reported to the participant (Ferrari, 1991b). This experiment used an external obstacle (noise) described to participants as being inhibitory to task performance. For some conditions, the noise was bogus, but self-reported procrastinators still believed that noise inhibited them from performing optimally. This experiment showed that procrastinators do not recognize their own limitations when performing diagnostic tasks in private and are likely to blame their shortcomings on anything but themselves. Additionally, the research recognized that given a non-diagnostic task in public, procrastinators again handicapped themselves. Regardless of the diagnostic nature of the task, procrastinators were seen to handicap more for public tasks than private.

Additional research on procrastinator self-handicapping showed that when given the choice between practicing for a diagnostic task and engaging in a fun alternative, procrastinators chose the fun alternative (Ferrari & Tice, 2000). By procrastinating for

the purported task, procrastinators avoid preparing for the self-relevant diagnostic and suspend any self-criticism that may result. By prolonging the fun task engagement and reducing the amount of time spent practicing, procrastinators are able to reframe any criticism received from doing poorly on the diagnostic as a result of not having enough time to practice. Additional research by Beck et al. (2000) indicated that students with an inclination to procrastinate and high levels of self-esteem were more likely to self-handicap by procrastination. This implication ties back into Schraw et al.'s (2007) research indicating that procrastinators with high self-esteem are likely to divert effort from completing a task that they see as critical to their self-esteem. For students, this means procrastination offers a way of never having to expose true personal weaknesses that are revealed through diagnostic tasks because they can always blame poor scores on being a procrastinator. Furthermore, as Schraw et al. (2007) indicated, some students lower their personal standards to accept procrastination.

In sum, reframing is contextually used by procrastinators to avert suspicion that they may not have the skills required to do a task they feel their peers could easily perform. By self-handicapping and admitting to procrastination, these individuals make it difficult for equal evaluation between themselves and those who claim no tendency to procrastinate. Finally, reframing offers a means for procrastinators to accept lower performance evaluations as "good enough" because they were impeded by their procrastination tendencies even though they could have not procrastinated and been evaluated on the full extent of their ability.

Autonomous Action Bias. An unspoken rebellion against a group's assignment is likely the result of the anxiety produced by having to justify one's decisions to a group.

Some procrastinators claim a preference for independently choosing alternate tasks because they do not identify with the task and strive to find personal meaning in their work (Ferrari & Olivette, 1994; Lubbers et al., 2010; Schlenker & Weigold, 1990; Sheldon & Elliot, 1998). However, this is likely to be a pretense by the individual who inflexibly expects negative emotional outcomes in social interaction (Blunt & Pychyl, 1998; Lee, 2005). Often, this pursuit of task meaning translates into fun-engagement and the avoidance of tedious tasks, which may be difficult and could lead to criticism (Ferrari, 2000; Schlenker & Weigold, 1990).

Research shows that procrastinators disengage from tasks they perceive as disinteresting (Schraw et al., 2007). Earlier research by Sheldon and Elliot (1998) indicated that autonomous goal motivation is more likely to lead to goal attainment than if the goal was controlled. These two findings indicate that individuals with procrastination tendencies are more likely to procrastinate when goals are charted for them and not self-relevant. The procrastinators' lack of interest in the pre-set goal is the basis to claim that the lack of autonomy for choosing how the goal is attained is the individual's source of disinterest. From the previous research, it also appears relevant that tasks requiring democratic decision processes inhibit procrastinators from taking a stake in goal acquisition. This likely engenders a lack of effort when some procrastinators engage in group related tasks.

Research by Schlenker and Weigold, (1990) showed that privately self-conscious individuals were likely to focus on personal identity and autonomy more than those who are publicly self-conscious and focus on social identity and anxiety. The procrastinator's self-conscious behavior makes him defensive and fearful of public exposure. In

contrast, non-procrastinators are assumed to conform to group expectations, which may entail volunteering for tasks or promoting ideas for completing assignments. In sum, procrastinators do not like their ideas being challenged because it opens them up to social criticism (Trautmann, Vieider, & Wakker, 2008). This predilection with authoritative others has also been seen in other research areas of procrastination.

Procrastination tendencies may be learned behaviors that stem from authoritarian parenting (Ferrari & Olivette, 1994). Though this research deals with parent-child interactions, it acknowledges the first group roles most individuals encounter. An authoritarian upbringing likely motivates children to achieve goals that are pre-planned and lacking in variability; thus explaining why some individuals raised in such environments never exercise personal goal achievement and are uncomfortable with ambiguous goal parameters later in life. This ambiguity aversion is the basis for fearful negative evaluations by others, and is difficult to circumvent since most decisions an individual makes will have to be justified to others (Trautmann et al., 2008).

In sum, individuals may procrastinate because they lack the experience to justify their decisions to authority groups. In an effort to avoid having to justify their decisions in ambiguous circumstances, the individual is likely to claim a preference for engaging in preferred alternate autonomous tasks lacking ambiguity. Research has indicated that procrastinators more readily engage in tasks they perceive to be fun (Ferrari & Tice, 2000), thus supporting the assertion that some individuals justify procrastination concerning group authority by autonomously acting in their own interests.

Endless Assessment Bias. Early in the production cycle (inception and panning), assessment is a critical determining how the individual should proceed to

subsequent steps (Blunt & Pychyl, 2000). Most procrastinators become unable to remove themselves from their work and come to view any criticism leveled against their completed task as a criticism against themselves (Blunt & Pychyl, 1998). Research points to a correlation between perfectionism and procrastination, corroborating earlier research that showed procrastination and perfectionism were related (Fee & Tangney, 2000; Onwuegbuzie, 2000; Rice et al., 2012). Onwuegbuzie, (2000) further indicted that procrastination results from perfectionism.

Research shows that perfectionism and procrastination are problematic and relate to the psychological distress of the individual (Rice et al., 2012). Fee and Tangney's (2000) research points to shame as an important moderator between perfectionism and procrastination. Feelings of shame, fear of negative evaluations, and fear of success create a context procrastinators want to avoid, and to do so demands they have perfect completion (Fee & Tangney, 2000; Ferrari & Emmons, 1995; Lay, 1987; Trautman et al., 2008). Achieving perfect work requires assessing the requirements of the task and seeking out all sources that can be useful. For some perfectionists, perfect ideations trap the individual into an endless assessment loop between the inception and planning stages of the production cycle (Blunt & Pychyl, 2000). Regardless of how early they start their task, they may not be able to meet the deadline because they are motivated to achieve the "best" means of completing the task (Pierro et al., 2011).

The inability to move beyond assessing the parameters of a task signifies the individual's broad depth of search as well as her systematic pursuit of all information that could be relevant to the task; this has also been shown to be a method of

procrastination (Ferrari & Dovidio, 2000). This previous research likely indicates that perfectionists seek out all possible information for making the “best” decision and are likely to procrastinate on task completion by trying to deduce the best method of completion. Ferrari and McCown (1994) showed obsessive compulsive behavior is linked to procrastination. The perfectionist’s obsession of identifying the “best” means of task completion is a compulsion used to avoid completing objectives. Thus, perfectionism claimed by procrastinators causes the individual to become obsessed with acquiring information to make the best decision possible for completing the task. It is likely that perfectionists do not purposely wait until the last minute to engage their work, but avoid making a decision early in the production process, which results in delayed completion. This likely produces significant negative repercussions for perfectionists because they were not able to complete the task as desired.

Overall, these justification mechanisms (see Figure 1) were developed from a comprehensive review of the procrastination literature and are anticipated to be those used when individuals rationalize their procrastination behaviors. As indicated by Steel (2010, 2012), procrastination is a form of irrational delay that extends from the natural impulsivity of the limbic system. Though this impulsivity is tolerated in some instances (i.e., children and adolescents), it is not accepted in others (i.e., at work or in adult social groups), and may even lead to exacerbated health issues. Initially, investigations into procrastination were tongue-in-cheek explorations of why students fail to complete assignments, but they have grown into a field that presently aims to understand and aid the moderation of procrastination tendencies (Lay, 1987, 1990; Lay, Edwards, Parker, & Endler, 1989; Steel, 2012).

Figure 1. Justification mechanisms underlying expressions of procrastination

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1. *Insufficient Time Bias:* A tendency to not prepare for tasks or goals an individual has been given. Individuals take on additional tasks without considering other tasks that should have a higher priority. This bias generally occurs when the individual fails to consider competing interests' time requirements, thus blaming their procrastination on inadequate time when they should have planned their time better.

2. *Flow Bias*: The tendency for the individual to believe that they possess greater skill for completing their task when they wait until the last minute to start. Individuals wait to complete a task late because they misidentify stress as feelings of euphoric arousal. This bias occurs because individuals fail to realize that the adrenaline rush accompanying task completion before an immediate deadline prevents them from clearly assessing their work progress.

3. *Reframing Bias:* The tendency for the individual to lower personal goal expectations to allow procrastination behaviors. Individuals lower their expected outcome results to justify reduced effort. This bias occurs because the individual self-handicaps themselves from achieving the best possible outcome. Essentially, their self-handicap becomes the justification for poor performance.

4. *Autonomous Action Bias:* A means used by individuals to not participate in ambiguous group activities due to fears of social reprisal. Individuals claim preference for alternate tasks that have personal meaning. Instead of trying to make an ambiguous task personally relevant these individuals delay engagement and general group involvement.

5. *Endless Assessment Bias*: the tendency to camouflage procrastination as perfectionism. Individuals claim that perfectionist tendencies prevent them from moving on to subsequent phases of task completion. These individuals become obsessed with having all of the relevant information before completing the task.

In the past, procrastination has been measured using multiple self-report tests such as the Adult Inventory of Procrastination (McCown & Johnson, 1989), General Procrastination Scale (Lay, 1986), and Pure Procrastination Scale (Steel, 2010). In order to move forward with procrastination research, however, a new method of measuring justification mechanisms of procrastinators should be used to ensure that their implicit social cognitions are being adequately measured.

Conditional Reasoning

The conditioned reasoning test developed by James (1998) takes advantage of the biases individuals innately use to justify their actions as appropriate and normal. Each test item is designed to appear logically based. However, unlike regular logic problems, conditioned reasoning items have two logically correct responses and two illogical responses (James, 1998; LeBreton et al., 2007). Thus, the conditional reasoning item's resemblance to logic problems aids the measure by making participants feel as if they are actually completing a logic based test (LeBreton et al., 2007). The advantage of using conditional reasoning items over other self-report measures is that conditional reasoning items implicitly measure the test taker's personality elements (James, 1998).

Self-report measures have provided researchers with quick results, but have not always been efficient or effective. Regarding the transparency of explicit measures, test takers may not always be honest regarding their responses (James, 1998). As previously noted by Barrick and Mount (1996), self-report personality measures are susceptible to the social desirability of job applicants. They noted a potential flaw of using self-report measures, as test manipulation is easy and can lead to erroneous

results. Moreover, the open interpretation of self-report measures allows respondents to influence their overall test score however they desire (LeBreton et al., 2007).

Overall, the problem this poses is the obfuscation of the true score representation of the respondent. Furthermore, the susceptibility of test-faking and social desirability has already been noted by many procrastination researchers (Chu & Choi, 2005; Fernie et al., 2009; Klassen et al., 2010; Klibert et al., 2011; Lay et al., 1989; Renn et al., 2011; Simpson & Pychyl, 2009;). Previous applications of the conditioned reasoning items demonstrated resilience to faking and imperviousness to self-presentation (LeBreton et al., 2007). True measures of implicit procrastination attitudes will help further validate procrastination research. In sum, measures of implicit cognitions of the respondent provide a truer representation of their behavioral attitudes that self-report measures cannot provide.

As discussed by Greenwald and Banaji (1995), implicit social cognitions are biases that operate outside of consciousness but inform individuals of their attitudes towards a novel stimulus. These biases automatically affect the perceiver's labeling, judgment, and engagement of the stimuli. If individuals are neither aware they are being measured nor that their responses are being directly measured, then an indirect measure is said to be used. Alternatively, explicit cognitions are the controlled, conscious thoughts that direct and label individual action purposely. The conscious and controllable responses are directly measured – with the individual's awareness – by self-report tests.

Again, self-report inventories have often been the easiest (James & Mazerolle, 2002) to administer, although their accuracy and validity are based on the assumption

that once respondents are aware of the personal attributes being examined they will report them accurately (Bing et al., 2007). As indicated previously, implicit cognitions are first to direct behavioral action that later manifest in explicit cognitions. The advantage of implicit reasoning measures is that they require the respondent to select the best answer based on judgments informed by personal biases (James, 1998). These biases are the proclivities individuals have for viewing and reacting to some contextual stimuli and are generally perceived as normal behavior by the individual (James & Mazerolle, 2002). These biases that lie outside of the individual's awareness and guide their behavior are known as justification mechanisms.

James and Mazerolle (2002) indicate that environmental contexts provide a gamut of possible behaviors that may be engaged, but those preferred actions are likely pre-consciously determined by framing the proclivities of the individual. Framing relates to the purposeful valuations the individual ascribes to specific behaviors causally linking the contextual stimuli and the individual's action. The ascribed causality is assumed by individuals to be stable and permanent, allowing them to make predictions about their behavior across contexts. These implicit reasoning biases provide the basis for implicit measures. James (1998) presented a method for revealing implicit personality elements using conditional reasoning items.

Inductive reasoning tasks use premises; these are the stimulus in conditional reasoning measures that include evidence and causal assertions (LeBreton, 2007; James, 1998). The response set for each stem contains four possible answers and the respondent is required to conclude the most logical solution from an inferential extension made from the premise. Each response set contains two illogical solutions;

these answers serve to distract the respondent from assuming the purpose of the test and to reinforce the image that they are actual inductive reasoning tasks. Both of the other two answers are logical, but they are slanted positively or negatively depending on the personality element examined. In terms of aggression, the positively slanted response was worded so that it would be more appealing to someone with higher tendencies to aggress (James, 1998; James & Mazerolle, 2002, LeBreton et al, 2007). Scoring responses to each item is simple; while illogical responses and negatively slanted logical responses earn zero points, positively slanted logical answers are valued at one point each (James, 1998).

Synonym-based Conditional Reasoning Items

A modified version of the traditional conditional reasoning item format has been proposed by LeBreton (2002). Similar to conditional reasoning item, differential framing items use a similar format but replace the evidence and logical assertions with synonyms that are framed differently for normal participants than those with the investigated personality. Moreover, the differential framing item format is an economical variant of conditional reasoning items that has successfully identified aggression characteristics similar to the Conditional Reasoning Test of Aggression.

Unlike conditional reasoning items, which map each individual item to justification mechanisms, differential framing items map individual adjectives to one of the five procrastination justification mechanisms (LeBreton, 2002). Like the conditional reasoning items created by James (1998, 2002), there are two logical and two illogical responses. The illogical responses serve as distractor answers and are purposely created to appear irrational. Participants are instructed to match the stem-words

provided with one of two possible synonym options. One logical response is framed to appeal to procrastinators, and the other logical response is expected to appeal to non-procrastinators. The difference between the two logical responses is the designed elicitation between procrastinators and non-procrastinators. A version of the synonym-based differential framing test items for procrastination has been made available (Appendix B).

This study sought to serve as the foundation for the development of a synonym-based conditional reasoning measure of procrastination. Specifically, this study was designed to validate the *Insufficient Time Bias, Flow Bias, Reframing Bias, Autonomous Action Bias,* and *Endless Assessment Bias* as justifications used by individuals to rationalize their procrastination behaviors. Successful validation of these procrastination justification mechanisms would provide the basis for examining the implicit cognitive biases individuals use to rationalize their procrastination tendencies. In sum, this study anticipated that students completing the Differential Framing Test of Procrastination later in the semester would have higher procrastination scores for the proposed measure, and that scores from this measure would correlate appropriately with scores from traditional procrastination measures and the criterion measure of procrastination.

METHOD

Participants.

Data were collected from 985 undergraduate students enrolled in an introductory psychology course at a large university in the southeastern United States. All participants consented to have their data included in this study and received course credit in exchange for their participation. Study plans were reviewed and approved by the Institutional Review Board (see Appendix A). Participants who completed this study in less than eight minutes or greater than thirty-two minutes were removed from the final sample based on the assumption that they did not participate earnestly. This was based on an evaluation by three subject matter experts who agreed that eight minutes was the shortest amount of time in which this study could be genuinely completed. This resulted in 187 participants being removed. Furthermore, it was determined that completion times exceeding thirty-two minutes indicated that participants did not understand the instructions or that they were engaging in other activities while completing the test. Subsequently, this removed an additional 40 participants.

Next, participants who completed the Differential Test of Procrastination were evaluated on their total illogical answers chosen. James and McIntyre (2000; as cited in LeBreton et al., 2007) required the removal of participants who scored five or more illogical items on the Conditional Reasoning Test of Aggression. However, the Differential Framing Test of Procrastination is considered to have substantially more items (due to the development procedure for the new test). Participants accumulating 30 percent or more illogical responses were assumed to not understand what a synonym was or that they were answering inappropriately on purpose, this resulted in

the removal of one participant who answered more than 20 illogical responses. The final sample size was 757 participants, with 68% being female with a mean age of 19 years (*SD* = 1.28). Furthermore, of the participants sampled, 71% were Caucasian, 21% were African-American, 1% were American Indian (or an Alaskan Native), and an additional 1% were Asian Indian. The remaining participants either did not specify race or were Chinese (.01%), Filipino (.04%), Japanese (.01%), Vietnamese (.05%), or another Asian race not specified (1.3%).

Measures

The Adult Inventory of Procrastination. The Adult Inventory of Procrastination was used as an explicit measure of procrastination (McCown & Johnson, 1989; as cited in Díaz-Morales et al., 2006). The Adult Inventory of Procrastination had a mean score of 42.98 (*SD* = 5.04) and a Cronbach's alpha of 0.41. Prior research noted that the Adult Inventory of Procrastination measured the individual's tendency to avoid contexts that promote critical self-appraisal and general fear of failure (e.g., I find myself running out of time). Responses were made on a 5-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5).

The General Procrastination Scale. The General Procrastination Scale was used as an explicit measure of procrastination (Lay, 1986; as cited in Díaz-Morales et al., 2006). The General Procrastination Scale had a mean score of 35.44 (*SD* = 5.88) and a Cronbach's alpha of 0.82. Initially, the General Procrastination Scale was proposed to indicate the individual's predilection for sensation seeking (e.g., I usually make decisions as soon as possible) and was deemed significantly different from the Adult Inventory of Procrastination for measuring a different facet of procrastination

(Steel, 2010). Responses were made on a 5-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5).

Pure Procrastination Scale. Steel's (2010) Pure Procrastination Scale was used as an explicit measure of procrastination. The Pure Procrastination Scale is a composite measure created from the factor analysis of the Adult Inventory of Procrastination, General Procrastination Scale, and several other procrastination measures (Steel, 2010). The Pure Procrastination Scale had a mean score was 31.01 (*SD* = 8.18) and a Cronbach's alpha of 0.89. Similar to the previous measures, the Pure Procrastination Scale directly measures assertions related to procrastination behaviors (e.g., I am not very good at meeting deadlines). Responses were made on a 5-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5).

Differential Framing Test of Procrastination. This measure was developed from an examination of the procrastination literature identifying the rationalizations individuals use to justify delaying tasks (see Appendix B). Recurring rationalizations were apparent and became the basis for the aforementioned justification mechanisms. The results of each article were placed into a table indicating the parameters of how procrastinators are expected to react to a stimulus. Similar stimuli were aggregated into justification mechanism categories and became the basis for all items. Due to several problematic issues that will be addressed in the following section, no descriptive statistics were calculated.

Criterion Measures of Procrastination. This study measured three modes of procrastination: (1) the length of time it took for participants to register their account (*M* = 0.37, *SD* = 1.10); (2) the order in which participants signed up; and (3) the credits

earned at regular intervals (Time 1, *M* = 0.83, *SD* = 0.87; Time 2, *M* = 0.90, *SD* = 0.92; Time 3, *M* = 1.40, *SD* = 1.20; Time 4, *M* = 1.73, *SD* = 1.23; Time 5, *M* = 2.41, *SD* = 1.42; Time 6, *M* = 3.17, *SD* = 1.22; Time 7, *M* = 3.25, *SD* = 1.18). Length of time taken for participants to register an account in the introductory psychology research participant pool was measured in the number of weeks taken by participants to activate their profile after the start date of the study. The account registration rank was used in lieu of registration dates indicating the order participants registered for their account. Finally, credits earned by the participant were documented systematically throughout the study. At regular scheduled intervals, these three procrastination modes were assessed and updated.

Results

Factor Analysis for the Differential Framing Test of Procrastination.

A principal axis exploratory factor analysis was conducted on the initial items of the Differential Framing Test of Procrastination to determine its factor structure. Multiple methods were utilized to ascertain the number of extractable factors. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.55, which indicates low unique partial correlations between variables. Moreover, the anti-image correlation matrix showed that shared variance, accounted for by large partial correlations, existed within each variable but was not shared between variables. Furthermore, the initial commonalities were found to be low and accounted for only 3.00 percent of the total variance among 41 variables. Thus, it was indicated that there was not enough shared variance between items to load onto the factors outlined by the justification mechanisms for Differential Framing Test of Procrastination.

Moreover, in addition to examining the scree plot, both a Parallel Analysis (Buja & Eyuboglu, 1992), and Velicer's MAP Test (O'Connor, 2012) were conducted to determine the number of possible factors to extract. As noted in Figure 2, two sharp breaks in the scree plot indicated a two-factor structure. However, due to the subjective findings of the scree plot, the Parallel Analysis and Velicer's MAP Test were used to objectively determine the possible number of factors. The Parallel Analysis indicated a two-factor structure with eigenvalues exceeding the 95^{th} percentile of the random data (see Table 1). Next, Velicer's MAP Test (O'Connor, 2012) was used and indicated a zero factor solution. Only the Parallel Analyses concluded that a factor structure existed within the data but the MAP Test indicated no factor structure existed to account for

Figure 2. Scree plot for the differential framing test of procrastination

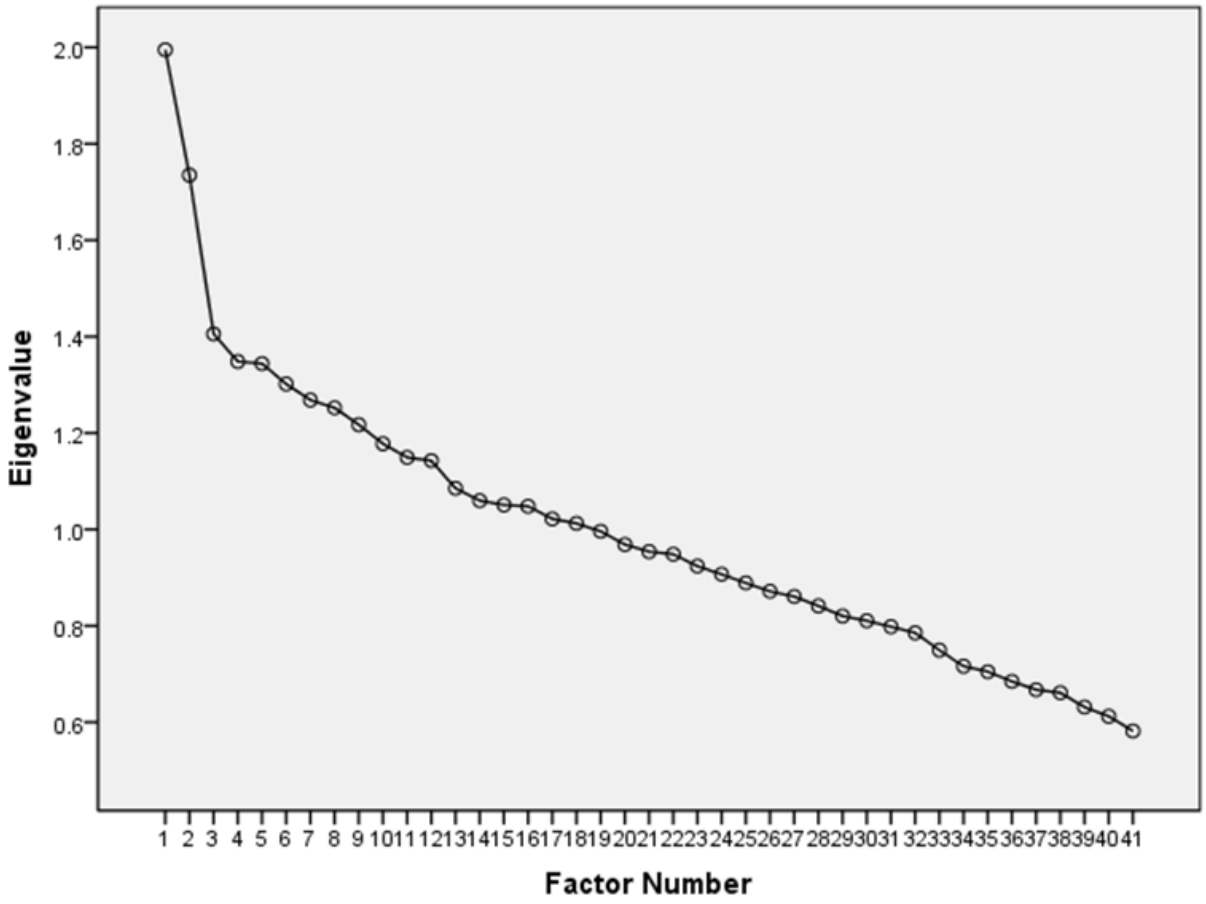


Table 1

Parallel analysis of the differential test of procrastination

Factor	Percentile	Initial Eigenvalues	Percentile < or > Initial Eigenvalues
1	1.52	1.10	<
2	**1.46**	**1.74**	**<**
3	1.41	1.40	>
4	1.38	1.35	
5	1.34	1.34	
6	1.32	1.30	
7	1.29	1.10	
8	1.26	1.74	
9	1.24	1.41	
10	1.22	1.35	
11	1.19	1.34	
12	1.17	1.30	
13	1.15	1.27	
14	1.13	1.25	
15	1.11	1.22	
16	1.09	1.18	
17	1.07	1.15	
18	1.05	1.14	

shared variance among variables. The structure identified by the Parallel Analysis was ultimately retained due to the analysis's ability to over-extract variance. Based on the findings from the Parallel Analysis a second exploratory factor rotation was conducted with two factors with an equamax rotation yielding a new factor rotation with sum of squared loadings accounting for 4.6 percent of the total variance. Thus, the factors that were extracted were all but meaningless. Subsequently, further analysis of the Differential Framing Test of Procrastination was not conducted. This study will further detail the results of the remaining procrastination measures without consideration of the Differential Framing Test of Procrastination.

Adult Inventory of Procrastination. The Adult Inventory of Procrastination correlated with both the General Procrastination Scale, $r(754) = 0.44$, $p < .001$, 95% CI [0.38, 0.50]; and the Pure Procrastination Scale, $r(754) = 0.56$, $p < .001$, 95% CI [0.51, 0.61]; signifying convergent construct-related validity (AIP; see Table 2). Additional correlations indicated that participants who scored high on this measure also took longer to register their account, $r(754) = 0.13$, $p < .001$, 95% CI [0.06, 0.2]; and earned fewer credits at each measured interval: time one, $r(754) = -0.17$, $p < .001$, 95% CI [-0.24, -0.1]; time two, $r(754) = -0.17$, $p < .001$, 95% CI [-0.24, -0.1]; time three, $r(754) = -0.17$, $p < .001$, 95% CI [-0.24, -0.1]; time four, $r(754) = -0.22$, $p < .001$, 95% CI [-0.29, -0.15]; time five, $r(754) = -0.21$, $p < .001$, 95% CI [-0.28, -0.14]; time six, $r(754) = -0.17$, $p < .001$, 95% CI [-0.24, -0.1]; and seven, $r(754) = -0.17$, $p < .001$, 95% CI [-0.24, -0.1]. Additionally, Spearman's Rank Order correlation indicated that high scores related to higher rankings for participants who waited longer to register their account, $r_s(754) = 0.18$, $p < .001$, 95% CI [0.11, 0.25]. Finally, scores were also found to correlate with the

Table 2

Correlations between procrastination measures. All correlations significant, $p < .001$

	AIP		GP		PPS	
	r	95% CI	*r*	95% CI	*r*	95% CI
AIP						
GP	0.44	0.38 to 0.50				
PPS	0.56	0.51 to 0.61	0.80	0.77 to 0.82		
Register Time	0.13	0.06 to 0.20	0.13	0.06 to 0.20	0.18	0.11 to 0.25
Time 1	-0.17	-0.24 to -0.10	-0.18	-0.25 to -0.11	-0.25	-0.32 to -0.18
Time 2	-0.17	-0.24 to -0.10	-0.18	-0.25 to -0.11	-0.25	-0.32 to -0.18
Time 3	-0.17	-0.24 to -0.10	-0.19	-0.26 to -0.12	-0.24	-0.31 to -0.17
Time 4	-0.22	-0.29 to -0.15	-0.28	-0.34 to -0.21	-0.22	-0.29 to -0.15
Time 5	-0.21	-0.28 to -0.14	-0.22	-0.29 to -0.15	-0.28	-0.34 to -0.21
Time 6	-0.17	-0.24 to -0.10	-0.17	-0.24 to -0.10	-0.21	-0.28 to -0.14
Time 7	-0.17	-0.24 to -0.10	-0.17	-0.24 to -0.10	-0.20	-0.27 to -0.13
Rank†	0.18	0.11 to 0.25	0.21	0.14 to 0.28	0.26	0.19 to 0.33

Note. † Spearman's rank order correlation

age, $r(754) = 0.13$, $p < .001$, 95% CI [0.06, 0.20], and school status $r(754) = 0.12$, $p = .001$, 95% CI [0.05, 0.19]; no other demographic relationships were shown to be significant (AIP; see Table 3). Overall, validity was shown between criterion measures of procrastination and the Adult Inventory of Procrastination.

A linear regression between participant age and Adult Inventory of Procrastination scores was significant, $r = .13$, $F(1, 756) = 12.36$, $p < .001$, 95% CI [0.06, 0.20], indicating that scores on the Adult Inventory of Procrastination increased with age. Additionally, a one-way ANOVA was employed indicating that Freshmen scored significantly lower on the Adult Inventory of Procrastination than all other status groups, $F(3, 754) = 5.62$, MSE = 25.04, $p < .001$, $h^2 = .02$, 95% CI [.00, .04], two groups (graduate student and other) were removed prior to the ANOVA because the sample populations was not numerous enough to be tested. Pairwise comparisons were made with Ryan-Einot-Gabriel-Welch tests, holding family-wise error rate at a maximum of .05. As shown in Table 2, juniors scored significantly greater on the Adult Inventory of Procrastination than all other status groups. In sum, the Adult Inventory of Procrastination scores are being influenced by more advanced students taking psychology classes later in their college career.

General Procrastination Scale. The General Procrastination Scale was shown to correlate with the Pure Procrastination Scale $r(754) = 0.80$, $p < .001$, 95% CI [0.77, 0.82]. No correlation was identified between the General Procrastination Scale and the Adult Inventory of Procrastination (GP; see Table 2). Additional correlations were found between measure scores and the time taken by participants to register their account, $r(754) = 0.13$, $p < .001$, 95% CI [0.06, 0.20] and credits earned at each interval: time

Table 3

Correlation between demographic information and all procrastination measures *(N = 757)*

		AIP					GP					PPS				
	N	*M*	Mdn	*s*	*r*	95% CI	*M*	Mdn	*s*	*r*	95% CI	*M*	Mdn	*s*	*r*	95% CI
Age					0.13*	0.06 to 0.20				-0.02	-0.09 to 0.05				0.01	-0.06 to 0.08
18	362	42.33	42	4.62			35.35	36	5.82			30.48	31	8.23		
19	277	43.03	43	5.13			35.66	36	6.10			31.45	32	7.88		
20	60	45.05	45	5.24			36.03	36	4.79			33.08	34	7.65		
21	25	45.52	45	6.25			34.36	34	6.38			30.44	31	9.95		
22	14	44.36	44	4.62			34.43	34	6.71			30.79	30	8.71		
23	6	43.00	42	4.52			33.00	33	2.76			29.33	29	5.57		
24	3	46.67	45	4.73			31.33	31	3.51			27.67	31	6.66		
26	9	43.33	42	8.69			35.56	33	7.07			29.00	27	13.09		
Sex					-0.03	-0.10 to 0.04				0.08**	0.01 to 0.15				0.00	-0.07 to 0.07
Female	518	42.88	43	4.97			35.77	36	6.17			31.03	31	8.29		
Male	238	43.20	43	5.21			34.72	35	5.13			30.96	31	7.96		
Status					0.12*	0.05 to 0.19				-0.04	-0.11 to 0.03				0.02	-0.05 to 0.09
Freshman	578	42.64	42	4.81			35.54	36	5.90			30.85	31	8.11		
Sophmore	126	43.84	44	5.66			35.30	36	5.99			31.57	32	8.28		
Junior	36	45.61	45	5.68			34.94	35	5.45			31.61	30	9.96		
Senior	14	43.64	43	4.91			33.50	34	5.32			31.00	31	5.60		
Grad Student	1	40.00	40	-			40.00	40	-			35.00	35	-		
Other	1	42.00	42	-			32.00	32	-			27.00	27	-		

* Significant at $p \leq .001$

** Significant at $p < .05$

one, $r(754) = -0.18$, $p < .001$, 95% CI [-0.25, -0.11]; time two, $r(754) = -0.18$, $p < .001$, 95% CI [-0.25, -0.11]; time three, $r(754) = -0.19$, $p < .001$, 95% CI [-0.26, -0.12]; time four, $r(754) = -0.28$, $p < .001$, 95% CI [-0.34, -0.21]; time five, $r(754) = -0.22$, $p < .001$; $p < .001$, 95% CI [-0.29, -0.15]; time six, $r(754) = -0.17$, $p < .001$, 95% CI [-0.24, -0.10]; and time seven, $r(754) = -0.17$, $p < .001$, 95% CI [-0.24, -0.10]. Spearman's Rank Order correlation, r_s (754) = 0.21, $p < .001$, 95% CI [0.14, 0.28], indicated a relationship between scores and participant account registration rank. Overall, validity was seen between criterion measures of procrastination and the General Procrastination Scale.

Furthermore, a relationship was identified between total General Procrastination Scale scores and sex, $r(754) = 0.08$, $p < .05$, 95% CI [0.01, 0.15], no other demographic correlations were found to be significant. Females ($M = 35.77$, $SD = 6.17$) were shown to score significantly higher than males ($M = 34.73$, $SD = 5.13$); $t(754) = 2.28$, $p < .05$ (GP; see Table 3). This indicates that the items of the General Procrastination Scale are biased regarding sex.

Pure Procrastination Scale. The Pure Procrastination Scale correlated with the time taken for participants to register for an account, $r(754) = 0.18$, $p < .001$, 95% CI [0.11, 0.25], and credits earned at each measured interval: time one, $r(754) = -0.25$, $p < .001$, 95% CI [-0.32, -0.18]; time two, $r(754) = -0.25$, $p < .001$, 95% CI [-0.32, -0.18]; time three, $r(754) = -.24$, $p < .001$, 95% CI [-0.31, -0.17]; time four, $r(754) = -0.22$, $p < .001$, 95% CI [-0.29, -0.15]; time five, $r(754) = -0.28$, $p < .001$, 95% CI [-0.34, -0.21]; $p < .001$; time six, $r(754) = -0.21$, $p < .001$, 95% CI [-0.28, -0.14]; and time seven $r(754) = -0.20$, $p < .001$, 95% CI [-0.27, -0.13]. A Spearman's Rank Order correlation, $r_s(754) = 0.26$, $p < .001$, 95% CI [0.19, 0.33], indicated a relationship between scores and

participant account registration rank (PPS; see Table 2). Overall, validity was seen between criterion measures of procrastination and the Pure Procrastination Scale.

Latent Growth Modeling. Latent growth modeling was utilized to ascertain the longitudinal relationship between trait procrastination and procrastination behavior. Specifically, this type of analysis evaluates the individual trajectories and intercepts of this relationship for each participant and has the ability to express change between times measured (Jackson, 2010). Following the guidelines established by Acock (2008), a latent growth model was created using Mplus with the Adult Inventory of Procrastination, General Procrastination Scale, and Pure Procrastination Scale being examined to ascertain their longitudinal relationship with credit accumulation. Overall, the Adult Inventory of Procrastination and Pure Procrastination Scale were retained due to the meaningful contribution they made to the model relating to earned credits. The Pure Procrastination Scale significantly affected the intercept term, indicating lower initial credit earning by procrastinators when compared to the initial earnings of non-procrastinators (Estimate = 2.43, *SE* = 0.16, $p < 0.001$) and the Adult Inventory of Procrastination significantly affected slope, specifying a gradual incline in the mean credit earnings of procrastinators relative to the mean credit earnings of non-procrastinators (Estimate = 3.03, SE = 1.03, $p < 0.05$), as well as the quadratic term, exhibiting shallower curving in the mean credits earned by procrastinators relative to the mean credits earned by non-procrastinators (Estimate = -0.61, SE = 0.30, $p < 0.05$). Subsequently, the overall growth model relating trait procrastination with procrastination behaviors is as follows:

Credits = π_{0p} + π_{1p}week + π_{2p}week + ε_{ip}, with (1)

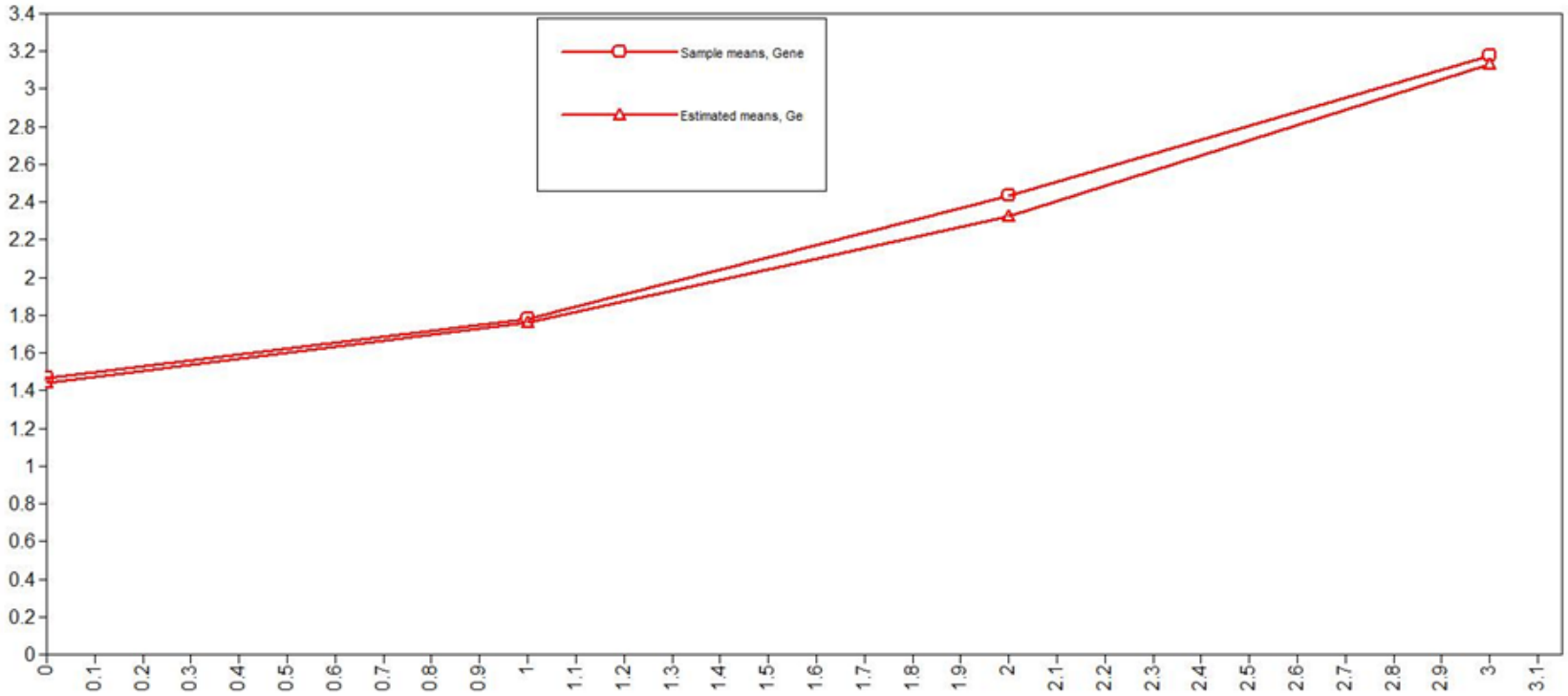
π_{0p} = 3.38 - .24PPS, (2)

π_{1p} = 3.94 - .29AIP and (3)

π_{2p} =.37 + .13 AIP. (4)

Overall, this model demonstrated a good fit to the data (CFI = 0.99, TLI = 0.98, RMSEA = 0.04, and SRMR = 0.03) and explained a substantial portion of the variance R^2 = 0.31). This growth model helps to characterize the differences between procrastinators and non-procrastinators at each time interval (see Figure 3). As indicated by Curran, Obeidat, and Losardo (2010), this latent growth model can be utilized to demonstrate the trajectory of credits earned between both groups over the course of a semester.

Figure 3. Relationship between adult inventory of procrastination and pure procrastination scale scores relative to credits earned.



DISCUSSION

Items from Differential Framing Test of Procrastination failed to converge into a unifying factor and could not be correlated to the criterion measure. However, the Adult Inventory of Procrastination, General Procrastination Scale, and Pure Procrastination Scale, all of which are well established procrastination measures, were used and demonstrated significant correlations with the behavioral indicators of procrastination. It should be noted that, in the present study, the Adult Inventory of Procrastination showed a lower level of internal consistency than had previously been reported by Steel (2010); this is possibly due to the order in which participants completed the measures or an indication of the file-drawer effect and that other researchers have yet to come forward with similar results. Nonetheless, the Adult Inventory of Procrastination and Pure Procrastination Scale were retained in the growth curve model to explain the relationship between measure scores and credits earned for both non-procrastinators and procrastinators. In fact, the Adult Inventory of Procrastination did more to explain the trajectory of the growth curve than the Pure Procrastination Scale. This is an interesting discovery given that the Adult Inventory of Procrastination was partially assimilated with the General Procrastination Scale, and other procrastination measures, into the Pure Procrastination Scale.

One explanation for this difference may be due to the factor analysis used to create the Pure Procrastination Scale, only four items from Adult Inventory of Procrastination were retained (Steel, 2010). The unused Adult Inventory of Procrastination items loaded onto factors other than those that were the basis for the Pure Procrastination Scale. These other factors were not used in the present study

because Steel (2010) suggested that the alternative factors were equivalent with regards to measuring procrastination. However, in this research it seems that both scales used for the growth curve model (i.e., the Adult Inventory of Procrastination and Pure Procrastination Scale) are measuring different aspects of a similar construct.

The present study appears unique among procrastination research in that it not only studied participants pursuing a goal by a deadline (i.e., earning credits), but it also examined the quantity of credits earned at fixed time intervals, when participants registered for an account, and the number of weeks that it took them to register. The proposed measure created for this study, the Differential Framing Test of Procrastination, could not be validated with the criterion measures or alternate measures of procrastination.

Ozer (1999) has addressed the *Four Principles of Personality Assessment*. Specifically, (1) the content of a measure logically follows a psychological theory and appropriately assesses unambiguous, distinct circumstances; (2) the internal item structure of a measure matches both psychological theory and the proposed measurement model; (3) the measure demonstrates highly valid inferences that are theoretically relevant; and (4) measure implications are well explored, the internal measure structure and inference validities do not differ across theoretical and practical criteria generalizations. With consideration of the previous principles, limitations of the Differential Framing Test of Procrastination can be addressed.

Unlike the Conditional Reasoning Test of Aggression created by James et al. (2005) or the Differential Framing Test of Aggression by LeBreton (2002), the Differential Framing Test of Procrastination fails to pass many of principles established

by Ozer. Viewing the Differential Framing Test of Procrastination as a work in progress recognizes the merits of the measure (i.e., the justification mechanisms identified in previous procrastination research) while acknowledging that the measure needs successive iterations of item development and pilot testing to become an acceptable measure of procrastination. Like the Conditional Reasoning Test of Aggression and Differential Framing Test of Aggression, the Differential Framing Test of Procrastination may not achieve the standard for personality test models established by Ozer, but future implicit measure research can focus on meeting the standards already achieved by the previous tests.

Implications. Procrastination impacts individuals and businesses (Steel, 2010); this study examines how participation pools can be used to further explain procrastination. Future research should examine procrastination and how it can be generalized beyond student populations. This research establishes a basis for procrastination justification mechanisms; however, it is unlikely that these are the only justification mechanisms. Future research can expand the current list of justification mechanisms or improve upon those already created through further definition and refinement.

Conditional reasoning and differential framing items are challenging to create because they require extensive comprehension of a field to differentiate justification mechanisms but their ability to implicitly measure cognitive rationalizations and their resilience to faking make them worth studying. Extending conditional reasoning measures to other areas of personality assessment can expand the research domain.

Finally, the current study has found that existing procrastination measures still work well when tied to the behavioral criterion of participant account registration and earned credits, however it remains to be seen if alternate criterion measures are possible. Furthermore, the growth curve model created should try to incorporate alternate procrastination measures to determine the best possible solution. In sum, alternate criterion measures and incorporating addition procrastination measures should be evaluated in future research.

Limitations. This research was carefully designed but some deficiencies became obvious. First, no pilot study was performed to verify that the synonym responses created for the Differential Framing Test of Procrastination were responses that would actually be chosen by procrastinators. Exclusive consideration was given to the connotation of each synonym but was not verified by subject matter experts. This is the most likely reason why the items failed to converge on to a single factor. Additional input could have helped determine if the expected connotations were shared within larger groups.

Second, this study only measured procrastination by the number of participation credits earned, account registration rank, and the total time it took participants to register. Alternate criterion measures for procrastination should be explored. While earned credits, registration rank, and time until account registration seem like the perfect criterion for measuring procrastination, this study does not determine if participants consider themselves to have met their goal.

Lastly, this study only incorporated three explicit procrastination tests. Several tests, in addition to the Adult Inventory of Procrastination and General Procrastination

Scale, were combined to create the Pure Procrastination Scale, yet only the Adult Inventory of Procrastination and Pure Procrastination Scale meaningfully contributed to the growth curve model. Furthermore, the Adult Inventory of Procrastination was more useful for explaining relationships between scores and earnings for procrastinators and non-procrastinators in the model than the Pure Procrastination Scale. Other procrastination measures used to create the Pure Procrastination Scale may be better at characterizing how non-procrastinators and procrastinators differ with regards to earned credits. It cannot be determined whether the current growth curve model is the best version without examining alternate procrastination measures.

Conclusion. This study concludes that the items used to create the Differential Framing Test of Procrastination did not appropriately converge to form factors useful for validating procrastination. It does, however, establish an outline for examining implicit social cognitions of procrastination in the future. Those justification mechanisms identified for procrastination were developed from a review of related research literature and typify rationalizations used by individuals who irrationally delay or postpone tasks to pursue other interests. This list is not exhaustive, but the justification mechanisms identified establish a basis for further procrastination research using conditional reasoning measures.

This study is novel it that it utilized participant scores to create a growth curve model distinguishing between non-procrastinators and procrastinators. Moreover, this study demonstrates that procrastination research has an excellent method for tracking the criterion measures of procrastination. The present studied examined procrastination related to earned participation credits using existing explicit procrastination measures.

Future procrastination research should strive to create a procrastination measure that evaluates the individual's implicit social cognitions.

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APPENDIX A: IRB APPROVAL

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board Office
4N-70 Brody Medical Sciences Building· Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office 252-744-2914 · Fax 252-744-2284 · www.ecu.edu/irb

Notification of Exempt Certification

From: Social/Behavioral IRB
To: Mark Bowler
CC:

Date: 12/10/2012
Re: UMCIRB 12-001690
A New Measure of Indolence

I am pleased to inform you that your research submission has been certified as exempt on 12/5/2012. This study is eligible for Exempt Certification under category #2.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The UMCIRB office will hold your exemption application for a period of five years from the date of this letter. If you wish to continue this protocol beyond this period, you will need to submit an Exemption Certification request at least 30 days before the end of the five year period.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

APPENDIX B: ITEMS FOR DIFFERENTIAL FRAMING TEST OF PROCRASTINATION

Please select the word that is closest in meaning to the underlined word.

Sample:

Ball A) Sphere B) Triangle C) Pleistocene D) Bag

Insufficient Time Bias

1) Priority	A) Concern*	B) Gravity	C) Gaudy	D) Important**
2) to Flex	A) to Tamper	B) to Debut	C) to Give*	D) to Open**
3) Minimum	A) Least**	B) Red	C) Void	D) Lowest*
4) Requirements	A) Detachment	B) Supply**	C) Despondency	D) Obligation*
5) Distant	A) Far-off**	B) Lethal	C) Remote*	D) Grim
6) Plan	A) Status	B) Idea**	C) Maul	D) Arrangement*
7) Organization	A) Association**	B) Pursuer	C) Order*	D) Gravity
8) to Help	A) to Read	B) to Assist*	C) to Relieve**	D) to Ensue
9) Intend	A) Lake	B) Aim**	C) Epidemic	D) Target*
10) Late	A) Capricious	B) Illiterate	C) Behind**	D) Tardy*

Flow Bias

11) Creativity	A) Vocation	B) Originality**	C) Feud	D) Vision*
12) Boring	A) Dull*	B) Toxic	C) Uninteresting**	D) Vindictive
13) Efficient	A) Well-organized*	B) Illiterate	C) Timesaving**	D) Dependent
14) Flow	A) Stream*	B) Negligent	C) Surge**	D) Candid
15) Stress	A) Vista	B) Pressure**	C) Debut	D) Anxiety*
16) Performance	A) Execution*	B) Despondent	C) Presentation**	D) Capsize
17) Peak	A) Nurture	B) Crest*	C) Notify	D) Point**
18) to Excite	A) to Debut	B) to Interest**	C) to Circle	D) to Amuse*

Reframing Bias

19) Success	A) Species	B) Achievement*	C) Coconut	D) Accomplishment**
20) Failure	A) Flop**	B) Legitimate	C) Disappointment*	D) Pelt
21) Effort	A) Attempt**	B) Trickle	C) Exertion*	D) Epidemic
22) Practice	A) Training*	B) Ensue	C) Status	D) Preparation**
23) Fun	A) Amusing*	B) Pleasure**	C) Radiant	D) Devour
24) Weakness	A) Species	B) Vulnerability*	C) Failing**	D) Gravity
25) Fulfillment	A) Satisfaction**	B) Hag	C) Lavish	D) Success*
26) Enough	A) Abundant*	B) Adequate**	C) Back	D) Pending

* = Non-procrastination Response ** = Procrastination Response

Please select the word that is closest in meaning to the underlined word.

Sample:

Ball A) Sphere B) Triangle C) Pleistocene D) Bag

Autonomous Action Bias

27) Group	A) Alliance*	B) Stiffness	C) Circular	D) Crowd**
28) Personal	A) Subjective*	B) Mull	C) Despondent	D) Private**
29) Interest	A) Curiosity**	B) Epidemic	C) Gravity	D) Notice*
30) Control	A) Restraint**	B) Acclaim	C) Cereal	D) Guidance*
31) Equal	A) Rival**	B) Maul	C) Rant	D) Peer*
32) to Volunteer	A) to Offer**	B) to Flabbergast	C) to Recede	D) to Advise*
33) Unclear	A) Unsure**	B) Peevish	C) Stodgy	D) Undecided*
34) Security	A) Detach	B) Guarantee*	C) Safety**	D) Haggle

Assessment Bias

35) Perfect	A) Round	B) Excellent*	C) Flawless**	D) Gaudy
36) Assessment	A) Judgment**	B) Epidemic	C) Vocation	D) Opinion*
37) Criticism	A) Tamper	B) Blame**	C) Pendant	D) Comment*
38) Perfectionism	A) Fussiness*	B) Orthodox	C) Despondent	D) Precision**
39) Complete	A) Overall*	B) Maternal	C) Nomadic	D) Thorough**
40) Complex	A) Compound*	B) Multipart**	C) Illiterate	D) Capricious
41) Technical	A) Methodical**	B) Enthralling	C) Toxic	D) Practical*

* = Nonprocrastination Response ** = Procrastination Response