Psychology Research and Behavior Management

Dovepress

open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

The Interactive Effect of Stressor Appraisals and Personal Traits on Employees' Procrastination Behavior: The Conservation of Resources Perspective

Qiufeng Huang[1], Kaili Zhang[2], Yafang Huang[1], Ali Ahmad Bodla[3], Xia Zou[4]

[1]School of Political Science and Public Administration, Huaqiao University, Quanzhou, People's Republic of China; [2]School of Business, East China University of Science and Technology, Shanghai, People's Republic of China; [3]Nijmegen School of Management, Radboud University, Nijmegen, the Netherlands; [4]School of Journalism and New Media, Xi'an Jiaotong University, Xi'an, People's Republic of China

Correspondence: Xia Zou, Xi'an Jiaotong University, No. 28, Xianning West Road, Xi'an, Shanxi, 710049, People's Republic of China, Tel +86-15260769186, Email M13547893885@163.COM

Purpose: Procrastination has become a pervasive phenomenon in the workplace, yet knowledge of its antecedents remains limited. Therefore, this study explains when and why employees procrastinate. As procrastination is an individual intentional behavior to escape potential resource loss by taking actions to relax; this study regards procrastination as resource-protection behavior. Building on the conservation of resources (COR) theory, the purpose of the current study is to explore the direct impact of external situational factors (ie, stressor appraisals) and individual traits (ie, personality) and their interactive effect on workplace procrastination behavior.

Participants and Methods: The study adopts a quantitative approach and uses two-wave data. Data was collected through the randomized cluster sampling technique and a structured questionnaire survey. The sample consisted of civil servants in an organization located in the Shandong province of China. Received 347 valid questionnaires representing an overall response rate of 87%. The theoretical model was tested through confirmatory factor analysis and regression analyses using Mplus 7.2.

Results: The results show that hindrance stressor appraisal is positively related to procrastination, whereas challenge stressor appraisal is negatively related to procrastination. Neuroticism had a positive relationship with procrastination, while conscientiousness had a negative relationship with procrastination. Conscientiousness moderates the relationship between challenge stressor appraisal and procrastination such that the relationship is salient under high conscientiousness.

Conclusion: Overall, our study suggests that procrastination is affected by personal traits and workplace stressor appraisals. This study makes potential contributions to employees' procrastination literature by and its understanding within the job procrastination knowledge base. Also, this study confirms the comprehensive reach and applicability of the COR theory developed by scholars such as Hobfoll (1989). In practically, the research benefits organizations by providing suggestions for managing employees' procrastination behavior.

Keywords: procrastination, hindrance and challenge stressor appraisal, conscientiousness, neuroticism, conservation of resources

Introduction

Procrastination is generally observed in individuals who consciously indulge in irrelevant work actions while delaying their assigned tasks.[1–4] Employees' procrastination has been increasingly pervasive in the workplace.[3] According to the survey, as many as 20% of normal, non-clinical adults in the US and other countries consider themselves heavy procrastinators.[5,6] In fact, procrastination behavior increases due to high workload, tight work schedule, and facing deadlines which leads to high emotional burdens, anxiety, regret, depression, and stress.[3,7–9] It decreases individuals' well-being,[10] team cohesion, and team effectiveness.[11,12] Therefore, understanding the antecedent factors that motivate employees to procrastinate is essential for organizations to develop a more efficient strategy to manage or diminish employees' procrastination.[13–15]

Received: 28 November 2022
Accepted: 28 February 2023
Published: 14 March 2023

The previous studies on the antecedents of procrastination have proposed two alternative and different theoretical perspectives to explore the relationship between the antecedent factors and procrastination (eg,[3,13]). First, the trait-based procrastination perspective highlights that procrastination is influenced by individuals' internal traits, and procrastination behavior is relatively stable and context-free.[16] For example, Steel and Chen et al stated that individuals with high neuroticism are more likely to procrastinate, while those with a high sense of responsibility are less likely to indulge in procrastination.[3,13] Van Eerder argued that individuals with weak self-control are more likely to procrastinate, while people with solid self-control generally do not. Second, in contrast, the situation-based procrastination demonstrates that external situations stimulate procrastination; as such, procrastination is fluid.[17] For example, prior research suggests that job design influences procrastination; when job design is objectionable to employees, they are more likely to procrastinate.[3] De Armond et al find that individuals who encountered a high workload are more likely to engage in procrastination behavior.[18] In a meta-analytic study, Van Eerde and Klingseick revealed that cognitive-behavioral therapy interventions help to reduce individuals' procrastination.[19]

The extant research related to these two perspectives revealed some limitations. First, trait-based procrastination views procrastination as an unchangeable behavior, while situation-based procrastination emphasizes that procrastination is dynamic and changeable.[20] Therefore, without integrating it is difficult to comprehend and explain when and why employees procrastinate in the workplace. Critical research questions are: what factors stimulate employees' procrastination and how do individuals' personal characteristics and external contextual factors contribute to procrastination behavior.[6] Second, lack of knowledge about how these two distinct aspects (internal and external) might interact with each other to impact employees' workplace procrastination. To the best of our observation, no empirical research has examined the interactive effect of external situational factors and individual traits on employees' procrastination behavior, which limits our understanding of the antecedents of procrastination. Furthermore, a recent literature review by Chauhan et al, showed that most of the research related to employees' job procrastination is from the North American and Western contexts.[21] It would be a profound contribution to examine the non-western context in examining employees' procrastination behavior.

To address these concerns, this study aims to investigate the direct impact of external situational factors (ie, stressor appraisals) and individual traits (ie, personality) and their interactive effect on workplace procrastination behavior based on Chinese samples. Essentially, procrastination is a type of passive behavior displayed by individuals to avoid work, especially when faced with demanding tasks. The conservation of resources (COR) theory can explain the phenomenon because it is recognized as one of the most influential theories for understanding how individuals behave in a situation of resources scarcity.[22–24] This theory holds that external situations and the internal sources storage are considered to have an impact on individuals' resource threat evaluations.[25] An individual's internal resource storage also impacts how they evaluate the external situation and cope with resource threats.[24] When facing resource consumption caused by task completion, employees adopt procrastination behavior to protect current resources and avoid resource consumption.

More explicitly, this study focuses on stressor appraisals as external situational factors to capture employees' evaluation of resource threats. Research has divided workplace stressors appraisals into challenge stressors appraisal and hindrance stressors appraisal,[26–28] which are believed to have a direct impact on employees' behavior. Furthermore, this study adopts the personality traits of conscientiousness and neuroticism because these two personality traits were explicitly discussed in the development of COR theory and reflected employees' internal resource storage abundance or scarcity respectively.[29] Based on COR arguments, this study inferred a positive relationship between hindrance stressor appraisal and procrastination, and a negative relationship between challenge stressor appraisal and procrastination. Also, employees high in conscientiousness are more likely to reduce their procrastination because of their abundance of internal resources, while highly neuroticism employees are prone to engage in procrastinating due to their scarcity of internal resources. Additionally, this study further proposes the moderating role of conscientious and neurotic personality in the relationship between work stressor appraisal and procrastination.

Our research makes four potential contributions to workplace procrastination literature. First, this study enriches the literature on procrastination by focusing on contextual factors that engender workplace procrastination. Procrastination behavior, although quite prevalent in the workplace,[5,6] has attracted relatively limited attention from management scholars.[13] Also, most current studies have examined procrastination in the western context and not much research has

been conducted in the Chinese context.[3,17] Second, by conceptualizing workplace procrastination as individuals' resource conservation behavior, adopted to protect personal resources and to avoid resource loss, the current study deepened the knowledge about how antecedent factors motivate individuals to conduct procrastination behavior. Third, in contrast to previous studies, this study emphasized the different influences of individual characteristics or situational factors on procrastination.[17,18] Also, by integrating the individual personality characteristics and stressor appraisals to show the impact on procrastination behavior, this study answered the question, whether procrastination was internally or externally stimulated. Finally, the current study also presents empirical evidence of interactive effects between individual personality characteristics and stressor appraisals on procrastination behavior.[23] In practice, our research benefits organizations by providing suggestions for managing employees' procrastination behavior.

Theoretical Development

Procrastination as Resource Conservation Behavior

Procrastination in the workplace refers to an employee's intentional actions to take relaxing activities and postpone or delay assigned work.[1,3,4,30] Workplace procrastination can be identified through two dimensions, namely soldiering and cyberslacking.[1,2,13] Soldiering refers to the behavior exhibited through task avoidance and participation in relaxing activities, such as taking longer coffee breaks or office gossiping. On the other hand, cyberslacking refers to the use of internet applications for personal purposes, such as doing online shopping and browsing social media.[1,2,13] While it is possible to distinguish these two dimensions of procrastination theoretically, they are difficult to separate in practice. Thus, this study viewed procrastination as the overall behavioral expression of putting work off without highlighting the various types of procrastination.

Procrastination can also be differentiated from counterproductive behavior (CPB). Both CPB and procrastination can be viewed as types of passive workplace behavior. While CPB is characterized by disobedience to rules and adopting behaviors that are harmful to work performance, such as concealing mistakes, speaking ill of others, and diverting company resources.[31] Procrastination highlights delaying tasks until the deadline.[1,2] However, if individuals nevertheless complete their tasks, there may not be destructive consequences on performance.[32] Therefore, CPB is more destructive than procrastination. In addition, CPB is more harmful to the organization, while procrastination behavior may bring more harmful outcomes, like anxiety, regret, and pressure to the individuals, who procrastinate.[7,8]

A vital tenet of the COR theory is that individuals will take action to avoid resource loss, maintain and develop additional resources, when facing potential loss.[23,33] Procrastination is characterized by individuals engaging in short-term relaxation behavior to avoid completing the work on hand. Therefore, when faced with a resource-consuming task, individuals would tend to procrastinate because they try to avoid such potential resource consumption. For example, research have noted that employees with complex tasks are more likely to engage in procrastination.[1–4] Second, procrastination behavior is manifested in short-term leisure and relaxation behavior, which helps preserve one's resources.[24,34] Procrastination prevents potential resource consumption and preserves current resources, which are the main arguments in COR theory.[22,23] Thus, the current study regards procrastination as an individual's resource conservation behavior and adopts COR theory to explain, why individuals procrastinate in the workplace.

Conservation of Resources Theory

COR theory describes that individuals are inclined to protect their current resources (conservation) and acquire new additional resources (acquisition).[24] The content of resources varies by individual. There are objective resources such as houses, cars, money, environmental resources, and job stability; as well as subjective resources such as a high sense of self-efficacy and self-esteem.[35,36] At the same time, when an individual is short of a particular resource, resource value increases. For example, for individuals who lack rest, rest time would be more valuable.[23] COR also emphasizes that, in the face of potential loss, individuals will not passively wait for the actual occurrence of resource loss, but will act to avoid resource loss and try to obtain additional resources.[23,33] In general, individuals will sense resource threat in the following three situations: 1) when encountering a potential loss, 2) when suffering actual loss, and 3) when it is difficult to obtain additional resources.[24]

Usually, external situations impact individuals' resource threat evaluations.[37] For example, studies have shown that a high workload or strict job requirements increase individuals' sense of resource threat and lead to passive workplace behavior.[17,34] Furthermore, leader treatment also impacts resource threat evaluation; for instance, when leaders adopt destructive leadership behavior, individuals may feel their resources are threatened.[22,38] As a result of the resource threat evaluation, individuals may engage in resource conservation behavior to protect their current resources and avoid further resource loss.[35,36] Additionally, COR also suggests that individuals' resource storage would impact how they cope with resource threats. When individuals have a high level of resource storage, they will proactively deal with threats, while a low level of resource storage would lead individuals to adopt avoidance behavior toward further resource consumption. Resource storage is primarily characterized by people's attributes, such as knowledge storage, work experience, and self-evaluation.[22,23] For example, studies have shown that when individuals have a high sense of self-efficacy, strong confidence, or optimism, their internal resource storage is relatively high, which will enable them to engage in positive behavior toward external resource threats.[23] However, when individuals have high emotional instability and a low degree of self-monitoring, their internal resource storage is low, and they are more likely to adopt negative coping behaviors.[39] Based on the above discussion, this study focused on employees' overall workplace stressor appraisal and their personalities and how these two factors might interact to impact procrastination.

Stressor Appraisal and Procrastination

Employees must adapt to various organizational goals that constitute workplace stressors.[40] Specifically, research has divided workplace stressors into challenge stressors and hindrance stressors.[26,41] Challenge stressors result from the work itself and comprise high job complexity, high workload, and high job responsibilities.[41] Hindrance stressors are mainly generated by unhealthy organizational norms and workplace politics (such as bureaucracy), high role ambiguity, high job insecurity, and daily hassles.[40,41] Although challenge stressors may contribute to employee anxiety and tension, they can also stimulate employees to proactively deal with their jobs and possibly enhance their work performance.[36,41,42] However, hindrance stressors are viewed as negative work experiences that erode employees' sense of control and self-determination, distract them from work engagement, reduce their passion for work, and ultimately harm overall satisfaction and work performance.[42,43]

Although stressors are believed to influence employees' work attitude and behavior— challenge stressors increase work performance hindrance stressors decrease work performance — recent studies argued that the impact of stressors on employees' outcomes occurs through the role of employees' stressor appraisals.[26,27,42] It shows that when facing a similar stressor, employees may generate different stressor appraisals that ultimately lead to different reactions.[26–28] For instance, when employees face hindrance stressors, they may not generate hindrance stressor appraisal if provided with support. Thus, the impact of hindrance stressors may not necessarily be negative. Hence, studies have argued that an employee's cognitive appraisal of a stressor is crucial in determining different reactions to outcomes.[44] Thus, stressor appraisal matters more in influencing employees' workplace behavior than the stressor itself, without context. This study primarily focused on stressor appraisals to capture employees' evaluation of resource threats. Building on COR, it argues that hindrance stressor appraisal is positively related to employees' procrastination, whereas challenge stressor appraisal is negatively related to procrastination.

More explicitly, under hindrance stressor appraisal, employees are more likely to believe that any effort to make changes or to improve their work situation is useless and hinders them to achieve goals.[26,28] Any effort expended to work would only lead to resource consumption with little efficiency,[42,45,46] which leads to a sense of resource loss threat. Also, employees with a high level of hindrance stressor appraisal generally have a high sense of burnout and fatigue.[40,46] Eroding their internal resources and making them feel exhausted mentally lead to the situation of resources shortage.[24] In this situation, individuals are motivated to take actions to protect their current resources and avoid further resource loss.[24] They are more likely to reduce the work effort and take procrastination behavior as a type of avoidance tactic. Moreover, hindrance stressor tasks are usually perceived as undesirable and unpleasant, stimulating individuals' negative emotions such as anxiety and anger.[47] It results in individuals' psychological resource depletion; thus, employees tend to escape such work tasks,[48] and employees with high level of hindrance stressor appraisal tend to procrastinate more.

Hypothesis 1a: Hindrance stressor appraisal positively relates to employees' procrastination behavior.

Differing from hindrance stressor appraisal, challenge stressor appraisal is characterized by employees' work contributions being fully valued and respected.[49] It works as a solid motivator to personal growth that stimulates employees to proactively deal with their work.[42] Therefore, employees will be less vulnerable to taking passive actions to avoid completing tasks. In addition, under challenge stressor appraisal, employees are more likely to experience positive emotions such as feelings of determination, self-worth, and overall energy,[47] because the challenge stressors are appraised as opportunities for growth, learning, and goal attainment.[26,50] Individuals with high levels of positive emotions tend to restore self-regulatory resources and self-energize;[51] therefore, they are more likely to take advantage of opportunities or pursue goals rather than conduct procrastination behaviors. Thus, this study contends that employees with prominent levels of challenge stressor appraisal would procrastinate less.

Hypothesis 1b: Challenge stressor appraisal negatively relates to employees' procrastination behavior.

Personality and Procrastination

Personality is an individual's relatively stable internal trait, which shows general behavioral tendencies across situations that stimulate behavior. The five-factor is a well-known personality model (FFM) comprising conscientiousness, neuroticism, extraversion, openness, and agreeableness.[52,53] COR highlights that individual's internal traits reflect their internal resource storage and have constant and profound influence on working behavior.[22–24,34] This study adopted the traits of conscientiousness and neuroticism, because these two traits reflected employees' internal resource storage abundance or scarcity respectively.

Individuals high in conscientiousness are generally observed to be goal-oriented, organized, careful, hard-working, self-disciplined, and tend to strive for achievement.[52] Then, highly conscientious employees would have abundant internal resource storage and tend to set higher goals.[52,53] Also, they embrace the ability to gather other personal resources in the workplace and are willing to direct resources to achieve the work performance rather than engage in procrastination behavior.[54] In line with theoretical reasoning, previous research has shown empirical evidence that highly conscientious individuals tend to adopt self-control strategies more effectively when facing temptations (eg).[55]

Hypothesis 2a: Employees' conscientiousness negatively relates to procrastination.

Neuroticism is another essential personality trait in the FFM. In contrast, highly neurotic individuals are characterized by high emotional instability and a tendency to feel uneasy; they can be anxious, nervous, fearful, lack self-confidence, and have low self-esteem.[52,53] Therefore, individuals with potent neuroticism have limited internal resource storage. They attempt to protect themselves at work by remaining inconspicuous and avoiding tasks. Moreover, there is a general agreement that neuroticism is related to negative emotional reactions such as strain and burnout (eg).[56] Accordingly, highly neurotic individuals in workplaces are more likely to adopt procrastinating behavior to avoid work-related resource consumption and preserve resources. Therefore, it posits that:

Hypothesis 2b: Employees' neuroticism positively relates to procrastination.

The Interactive Effect of Stressor Appraisal and Personality on Procrastination

Highly conscientious individuals usually have higher achievement motivation.[53] At the same time, they also have a high sense of responsibility, tend to take the initiative to complete their tasks, and reasonably arrange their work plans and leisure activities.[57] Besides, as mentioned above, individuals' conscientiousness reflects their internal resource storage, indicating that individuals will have sufficient resources to cope with external resource threats, such as high hindrance stressors.[29] Thus, when experiencing the high hindrance stressor, employees with high conscientiousness think it is difficult to change the status quo through their efforts. They would still try to improve situations and take positive actions to deal with hindrance stressors. Previous studies also show evidence that employees with high conscientiousness are more likely to take more productive ways to deal with stressful work situations (eg).[37,58] Therefore, the current study

contends that highly conscientious employees can weaken the positive relationship between hindrance stressor appraisal and procrastination.

Hypothesis 3a: Employees' conscientiousness moderates the relationship between hindrance stressor appraisal and procrastination, such that the positive relationship is mitigated when employees' conscientiousness is high.

Highly conscientious employees attach greater importance to personal achievement and have abundant internal resource storage.[52,53] Thus, when experiencing challenge stressors appraisal, highly conscientious employees will reasonably arrange their work schedules to deal with the challenging demands.[52,53,57] As discussed above that employees with high conscientiousness usually have high standards and are achievement-oriented.[52] Such characteristics enable them to view challenge stressors as opportunities rather than threats. It can lead them to deal with stressors proactively, resulting in less procrastination. In contrast, employees with low conscientiousness would face limited internal resource storage and not care about the goals at work very much. Thus, they would like to avoid further resource depletion and engage in more procrastination. Based on the above argumentation, it proposes that the negative relationship between challenge stressor appraisal and procrastination will be stronger for employees with higher conscientiousness.

Hypothesis 3b: Employees' conscientiousness moderates the relationship between challenge stressor appraisal and procrastination, such that the negative relationship is stronger when employees' conscientiousness is high.

Neuroticism reflects an individual's emotional instability. Highly neurotic employees have relatively low internal resource reserves and tend to respond negatively to challenges and difficulties.[53,57,59] In response to higher hindrance stressor appraisals, individuals with high neuroticism lack the corresponding internal resources to deal with resource threats. They may believe that hindrance stressors could threaten their growth and development, and they can do nothing to change that, resulting in more negative emotions, such as anxiety and stress. Reducing the effort and energy that is directed toward hindrance stressors at work, allows individuals to psychologically disengage from those stressors.[51] Consequently, under hindrance stressors, employees high in neuroticism will be more likely to engage in procrastination behavior. Indeed, as also noted by Hobfoll,[24] individuals' internal resource storage not only impacts how individuals react to resource loss but also how they evaluate resource loss. Those with less internal resource storage are more likely to evaluate external threats as high-level resource loss, which can ultimately lead to adverse reactions. Thus, it contends that employees high in neuroticism, who have limited internal resource storage, view hindrance stressors as more resource-consuming, leading to more procrastination behavior.

Hypothesis 4a: Employees' neuroticism moderates the relationship between hindrance stressor appraisal and procrastination, such that the positive relationship is stronger when employees' neuroticism is high.

Highly neurotic individuals are more likely to lose control of their emotions and believe they cannot complete tasks well.[52,53] When faced with challenge stressor appraisal, they tend to evaluate their challenge stressors as more resource-consuming than stimulators. Additionally, individuals with high neuroticism are characterized by low internal resources.[52,53] Thus, challenge stressors appraisal is considered a threat to goal attainment because employees will have insufficient resources to accomplish the task to reach more achievement and personal growth.[51] Therefore, to avoid resource depletion, individuals will adopt a negative response to preserve resources from detaching, which weakens the positive relationship between challenge stressor appraisal and procrastination.

Hypothesis 4b: Employees' neuroticism moderates the relationship between challenge stressor appraisal and procrastination, such that the negative relationship is stronger when employees' neuroticism is high.

The theoretical framework hypothesized is depicted in Figure 1.

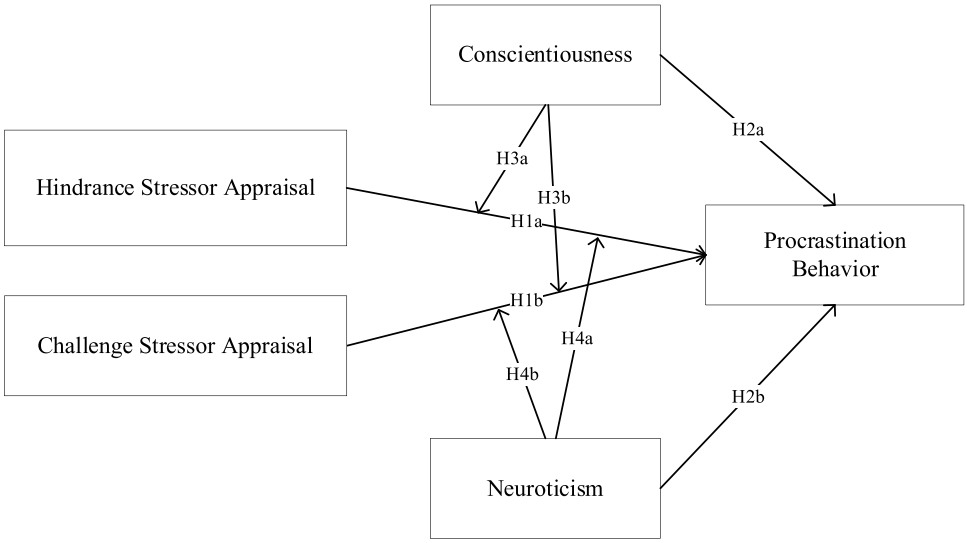

Figure 1 The Theoretical Model of This Study.

Method

Research Design

To test our model, this research followed prior studies by applying the positivism paradigms. Positivism paradigms assume that individuals' behavior is intrinsically connected, and individuals are clear about their own motivations and meanings.[60] Using rigorous methods (eg, conceptualization, measurement, surveys), researchers explore and understand the insider's interpretation of behavior. Positivism paradigms highlight that research for causes and explanations that support the causality explanation, emphasizing the generality and universality of the theory.[60] Also, positivism paradigms advocate that empirical methods of the natural sciences (such as observation, experiments, and questionnaires surveys) should be used to study social phenomena (eg).[61] In the current study, a questionnaire survey was adopted to evaluate our theoretical model by following the positivism paradigm.

Besides, the randomized cluster sampling method was taken to collect the data. In the field of organizational behavior and psychology research, researchers are often use randomized cluster sampling methods are often using by the researchers whose subjects are fragmented over larger geographical areas because it saves time and money (eg).[60,62,63] As Wilson pointed out,[64] cluster sampling is where the whole population is divided into clusters or groups; subsequently, a random sample is taken from these clusters, all of which are used in the final sample. The strengths of cluster sampling are that it is easy to implement and cost-effective.[65] The inclusion criteria for the participants included two points, participants are regular employees of the organization and have not retired; participants can understand the survey questions and participate in the survey voluntarily.

Sample and Procedures

The sample for this study was composed of civil servants from an organization located in the Shandong province of the People's Republic of China. The participants' tasks mainly focused on sorting documents and offering public services. The participants' daily work had no specific quantitative requirements; therefore, they could procrastinate and indulge in relaxing behavior. Consequently, the participation of public civil servants is suitable for this study. At the beginning of the survey, the researchers communicated with human resource managers to explain the purpose of the research and obtain their support. Our research team explained the academic nature of the survey to the participants and informed them that responses will be kept confidential and will not be shared with anyone for any purpose. Each participant was provided with a survey envelope containing a questionnaire and a cover letter. The cover letter included directions on returning the survey and indicated voluntary participation. This study also assured the participants that the research was only for academic purposes, there were no right or wrong answers, the confidentiality of their responses, and that the

personal information would be removed from the dataset at the completion of the study. All participants were informed that their participation is voluntary, and they can stop responding to the questionnaire at any time. The respondents signed a written consent form before the survey.

The data was collected in two stages with a lag time of two months. In the first stage (Time 1), the human resource department assisted with soliciting voluntary participation from employees, and the study's second author administered an on-site employee survey at the locations of the organization. Groups of 20–30 employees were scheduled to go to an on-site room for 30 minutes of organization-paid time. The participants received letters from the researcher ensuring the confidentiality of their responses and filled out their work ID, demographic information and assessed their FFM traits, proactive personality, workplace stressor appraisal, and perceived leader support. The Time 1 survey included 400 employees. In the second stage (conducted two months later, Time 2), the participants were asked to assess their procrastination. Based on the participants' work ID, the research assistants paired the two waves of responses. This study received 347 valid questionnaires, and the overall response rate was 87%. The final sample of 347 participants had an average age of 28.84 years (*SD* = 3.35), and 76% were male. All participants were graduates with bachelor's degrees.

Measures

The survey items were initially formulated in English. The survey instrument was administered in Chinese; all items underwent a standard back-translation process (Brislin, 1986). The FFM was measured with a seven-point scale from 1 ("strongly disagree") to 7 ("strongly agree"), and all other measures were rated on a scale ranging from 1 ("strongly disagree) to 5 ("strongly agree).

Stressor Appraisal

The current study measured challenge stressor appraisal and hindrance stressor appraisal using six items (three items for each type) based on a validated scale developed by LePine et al.[42] A sample item of hindrance stressor appraisal was "Working to fulfill the demands of my job thwarts my personal growth and well-being", and the reliability coefficient of hindrance stressor appraisal was 0.88 (AVE=0.71). A sample item of challenge stressor appraisal was "Working to fulfill the demands of my job helps to improve my personal growth and well-being." The reliability coefficient of challenge stressor appraisal was 0.83 (AVE=0.64).

Neuroticism and Conscientiousness

This study used the scale of the FFM traits of Shi et al.[66] Neuroticism and conscientiousness were measured using six items. A sample item of neuroticism was "calm vs worried", and the reliability coefficient was 0.89 (AVE=0.53). A sample item of conscientiousness was "disorganized and well organized, with a reliability coefficient of 0.89 (AVE=0.58).

Procrastination

Procrastination was assessed using an eight-item scale developed by Tuchman.[67] The items were as follows: "I needlessly delay finishing jobs, even when they are important", "I manage to find an excuse for not doing something", "I am an incurable time waster", "I am a time waster now, but I cannot seem to do anything about it", "I promise myself I will do something and then drag my feet", "Even though I hate myself if I do not get started, it does not get me going", "I get stuck in neutral, even though I know how important it is to get started", "Putting something off until tomorrow is now the way I do it." To verify the reliability and validity of the procrastination scale, a scale test was conducted with a separate sample of 85 MBA graduates, 67.43% of whom were female. The average age was 31.21 (*SD* = 4.57), and the average tenure was 4.5 years (*SD* = 3.21). All participants had earned a bachelor's degree. Based on eigenvalues greater than one factor-analysis, the exploratory factor analysis yielded a single factor (explaining 55.38% of the total variance, reliability =0.88). The factor loadings of all individual items ranged from 0.66 to 0.81. In this study, the reliability coefficient for procrastination was 0.91 (AVE=0.55).

Control Variables

During the analysis, this study controlled for several variables, including gender, age, educational level, and tenure, because they could affect individuals' procrastination.[3] For instance, Steel demonstrated that people procrastinate less as they age;[3] females tend to procrastinate less than males;[68] with more years of experience and repeated practice, people tend to procrastinate less.[69] This study also controlled for employees' proactive personalities because individuals with highly proactive personalities would adopt less procrastination behavior. The proactive personality variable was measured using ten items from Seibert et al.[70] A sample item of proactive personality was, "I am constantly on the lookout for new ways to improve my life." The reliability coefficient for proactive personality was 0.91. This study also controlled for perceived leader support because previous studies have indicated that perceived leader support is related to individuals' stressor appraisal.[22] Perceived leader support was assessed using the eight-item scale developed by Ilies et al.[71] A sample item of perceived leader support was "The supervisor gave advice on how to deal with a certain task or problem." The reliability coefficient of the perceived leader support was 0.90. This study also controlled for the three other variables of the Big Five personality traits using the scale developed by Shi et al.[66] Each of the five dimensions was measured using six items. A sample item of extraversion was "loner vs joiner", and the reliability coefficient of extraversion was 0.84. Sample items of openness to experience were "uncreative vs creative" and "traditional vs non-traditional." The reliability coefficient for openness to experience was 0.87. Sample items of agreeableness were "ruthless vs soft-hearted" and "suspicious vs trusting." The reliability coefficient of agreeableness was 0.91.

Analytical Strategy

A two-step strategy was applied to evaluate the theoretical model. First, a confirmatory factor analysis (CFA) and descriptive analysis were conducted. CFA was used to confirm the validity and reliability of the measurement model, and the descriptive analysis showed the correlations among the key variables. In the second step, regression analyses were done to test the hypotheses. CFA and regression analyses were performed using *Mplus 7.2*.

Results

CFA of the Measures

This study conducted a CFA analysis for the main variables. The results were shown in Table 1. When performing a CFA analysis of the stressor appraisal measure, it became clear that the estimates of the standard parameter were acceptable and all of them exceeded the ratio of 0.40.[72] The structural model had a high degree of conformity, and the model matching indicators were acceptable (χ^2 = 29.29, df = 9, RMSEA = 0.09, CFI = 0.96, TLI = 0.97, SRMR = 0.04). Also, this study showed that the factor loading score ranged from 0.74 to 0.95.

When conducting a CFA analysis of the conscientiousness measure, it showed clear that the estimates of the standard parameter were acceptable and all of them exceeded the ratio of 0.40.[72] The structural model had a high degree of conformity, and the model matching indicators were acceptable (χ^2 =30.13, df =9, RMSEA = 0.08, CFI = 0.98, TLI = 0.97, SRMR = 0.02). Also, this study showed that six items loaded on a single factor, and the factor loading score ranged from 0.63 to 0.85.

When conducting a CFA analysis of the neuroticism measure, it showed clear that the estimates of the standard parameter were acceptable and all of them exceeded the ratio of 0.40.[72] Explicitly, the structural model had a high degree of conformity, and the model matching indicators were acceptable (χ^2 =15.28, df =9, RMSEA = 0.06, CFI = 0.99, TLI = 0.98, SRMR = 0.02). Also, this study showed that six items loaded on a single factor, and the factor loading score ranged from 0.66 to 0.77.

When conducting a CFA analysis of the procrastination measure, it showed clear that the estimates of the standard parameter were acceptable and all of them exceeded the ratio of 0.40.[72] The structural model had a high degree of conformity, and the model matching indicators were acceptable (χ^2 =78.99, df =20, RMSEA = 0.09, CFI = 0.87, TLI = 0.95, SRMR = 0.04). Also, this study showed that eight items loaded on a single factor, and the factor loading score ranged from 0.62 to 0.84.

Table 1 Results of CFA

Items	Loading	Standard Error	Fit indices
Challenge stressor appraisal			χ^2 = 29.29, *df* = 9, RMSEA = 0.09, CFI = 0.96, TLI = 0.97, SRMR = 0.04
CSA1	0.74	0.03	
CSA2	0.90	0.03	
CSA3	0.75	0.03	
Hindrance stressor appraisal			
HSA 1	0.77	0.03	
HSA2	0.95	0.02	
HSA3	0.80	0.03	
Conscientiousness personality			χ^2 = 30.13, *df* = 9, RMSEA = 0.08, CFI = 0.98, TLI = 0.97, SRMR = 0.02
CP1	0.63	0.04	
CP2	0.85	0.02	
CP3	0.84	0.02	
CP4	0.84	0.02	
CP5	0.68	0.03	
CP6	0.69	0.03	
Neuroticism personality			χ^2 = 15.28, *df* = 9, RMSEA = 0.06, CFI = 0.99, TLI = 0.98, SRMR = 0.02
NP1	0.68	0.04	
NP2	0.75	0.03	
NP3	0.77	0.03	
NP4	0.76	0.03	
NP5	0.66	0.04	
NP6	0.73	0.03	
Procrastination behavior			χ^2 = 78.99, *df* = 20, RMSEA = 0.09, CFI = 0.896, TLI = 0.95, SRMR = 0.04
PB1	0.62	0.03	
PB2	0.67	0.03	
PB3	0.71	0.03	
PB4	0.84	0.02	
PB5	0.81	0.02	
PB6	0.81	0.02	
PB7	0.76	0.03	
PB8	0.70	0.03	

Preliminary Analysis

The current study conducted a series of CFAs to examine the construct validity of the multi-item variables in our study using *Mplus 7.2*. The CFA results are presented in Table 2. This study tested the hypothesized ten-factor model by loading items on their respective latent variables. The results revealed that the hypothesized ten-factor model fit the data best with χ^2 = 3039.62, df =1784, root mean square error of approximation (RMSEA) =0.05, confirmatory fit index (CFI) =0.90, Tucker-Lewis index (TLI) =0.90, standardized root mean square residual (SRMR) =0.05. The nine-factor model

Table 2 Confirmatory Factor Analysis

Model	χ^2	*df*	$\Delta\chi^2$ (Δdf)	RMSEA	CFI	TLI	SRMR
Ten-factor combing five control variables (hypothesized model)	3039.62	1784	——	0.05	0.90	0.90	0.05
Nine-factor model A	3525.79	1793	486.17** (9)	0.06	0.87	0.86	0.07
Six-factor model B	4376.87	1814	1337.26** (30)	0.07	0.81	0.79	0.08
Five-factor model C	5487.75	1819	2448.13**(35)	0.08	0.73	0.71	0.09
Five-factor model D	4862.20	1819	1822.59**(35)	0.07	0.77	0.76	0.09
Single factor model E	8162.10	1829	5122.48** (45)	0.10	0.54	0.50	0.12

Notes: N = 347. Nine-factor model A combines challenge stressor appraisal and hindrance stressor appraisal into one factor; Six-factor model B combines the FFM into one factor; Five-factor model C combines the FFM and proactive personality into one factor; Five-factor model D combines the FFM into one factor, and also combines challenge stressor appraisal and hindrance stressor appraisal into one factor; Single factor model E combines all the variables into one factor. **p < 0.01.

was constructed by combining challenge stressor appraisal and hindrance stressor appraisal (χ^2 = 3525.79, df = 1793, RMSEA = 0.06, CFI = 0.87, TLI = 0.86, SRMR = 0.07), which yielded a worse fit than the ten-factor model ($\Delta\chi^2$ = 486.17 [Δdf = 9], $p < 0.01$). All other alternative factor models fit significantly worse than the proposed model. Hence, the CFA results support the ten-factor model. Factor loadings ranged from 0.61 to. 94 ($p < 0.01$).

The means, standard deviations, and correlations of the variables studied are listed in Table 3. Hindrance stressor appraisal was positively correlated with procrastination (r = 0.16, $p < 0.01$), and challenge stressor appraisal was negatively correlated with procrastination (r = −0.29, $p < 0.01$). Conscientiousness was also negatively correlated with procrastination (r = −0.31, $p < 0.01$), and neuroticism was positively correlated with procrastination (r = 0.26, $p < 0.01$). These results provide initial support for our hypotheses.

Tests of Hypotheses

This study performed hierarchical regression analysis for hypothesis testing. The current study entered age, gender, educational level, tenure, proactive personality, perceived leader support, extraversion, openness to experience, and agreeableness as control variables in Step 1. Then, this study entered the independent variables, including hindrance stressor appraisal, challenge stressor appraisal, conscientiousness, and neuroticism in Step 2. Lastly, this study entered the interaction terms (ie, hindrance stressor appraisal × conscientiousness, hindrance stressor appraisal × neuroticism, challenge stressor appraisal × conscientiousness, challenge stressor appraisal × neuroticism) in Step 3. When testing moderation effects, this study centralized the variables. All standardized coefficients were reported in the regression results.

Direct Effects Test

Table 4 presents the regression results. After ruling out the control variables,[1] (We also did a robustness check by moving out all the controls in our regression analysis. The results remained unchanged. In particular, hindrance stressor appraisal was positively related to procrastination (B = 0.12, SE = 0.04, $p < 0.01$), and challenge stressor was negatively related to procrastination (B = −0.21, SE = 0.04, $p < 0.01$); conscientiousness was negatively related to procrastination (B = −0.19, SE = 0.04, $p < 0.01$), while neuroticism was positively related to procrastination (B = 0.10, SE = 0.03, $p < 0.01$). The interaction between challenge stressor appraisal and conscientiousness on procrastination was significant (B = −0.10, SE = 0.03, $p < 0.01$).) hindrance stressor appraisal was positively related to procrastination (B = 0.10, SE = 0.04, $p < 0.05$), and challenge stressor appraisal was negatively related to procrastination (B = −0.20, SE = 0.05, $p < 0.01$). Therefore, the current study found support for H1a and H1b. Further, the results showed that conscientiousness was negatively related to procrastination (B = −0.13, SE = 0.06, $p < 0.05$), and neuroticism was positively related to procrastination (B =0.12, SE = 0.04, $p < 0.01$). Therefore, H2a and H2b were supported.

The current study also conducted a comparison between the impact power of the stressor appraisal-procrastination relationship and the personality-procrastination relationship. The results showed that there was no significant difference between the positive impact of hindrance stressor appraisal on procrastination and neuroticism on procrastination (B = 0.02, SE = 0.06, $p > 0.05$). Moreover, there was no significant difference between the positive impact of challenge stressor appraisal on procrastination and conscientiousness on procrastination (B = 0.07, SE = 0.07, $p > 0.05$). The results revealed that there was no significant difference in the influence of contextual factors and individual traits on procrastination.

Moderating Effect Test

The interaction term between challenge stressor appraisal and conscientiousness on procrastination was negative (B = −0.10, SE = 0.04, $p < 0.01$). The results indicated that the second regression model reached explanatory ability (R^2 = 0.24), and the third regression model (R^2=0.28) was attained. There was a positive difference between the second and third models in R^2 value (ΔR^2=0.04), indicating that the difference was because of the entry of the interaction variable in the third regression model. To examine this interaction effect, this study plotted the interaction patterns in Figure 2. The relationship between challenge stressor appraisal and procrastination was negative when conscientiousness was at one standard deviation above the mean (−.32, SE = 0.06, $p < 0.01$), and this relationship became non-significant when conscientiousness was at one standard deviation below the mean (−.09, SE = 0.06, $p > 0.05$). The difference in relationship magnitude between high and low conscientiousness was significant (r = −0.23, SE = 0.08, $p < 0.01$).

Table 3 Descriptive Statistics and Correlations of Variables

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	28.84	3.35														
2. Gender	0.76	0.43	0.14**													
3. Education	2.32	0.63	0.25**	−0.03												
4. Tenure	1.26	0.61	0.51**	−0.07	0.08											
5. Proactive personality	3.36	0.83	0.07	−0.03	0.14*	0.03	(0.91)									
6. Perceived leader support	3.68	0.72	−0.03	0.07	0.06	−0.06	0.33**	(0.90)								
7. Extraversion	4.56	1.17	−0.01	0.01	−0.08	0.05	0.33**	0.34**	(0.84)							
8. Openness to experience	4.64	1.17	0.06	0.00	−0.09	0.06	0.28**	0.23**	0.65**	(0.87)						
9. Agreeableness	5.20	1.21	0.06	−0.04	0.06	0.04	0.34**	0.45**	0.63**	0.52**	(0.91)					
10. Hindrance stressor appraisal	2.70	1.03	−0.05	−0.06	−0.11†	−0.06	0.09†	−0.04	0.01	0.05	−0.03	(0.88)				
11. Challenge stressor appraisal	3.51	0.97	0.05	0.02	−0.05	−0.08	0.17**	0.31**	0.20**	0.08	0.23**	0.04	(0.83)			
12. Conscientiousness	5.23	1.16	0.05	−0.02	0.04	0.07	0.35**	0.47**	0.64**	0.55**	0.75**	0.00	0.18**	(0.89)		
13. Neuroticism	3.54	1.23	−0.09	0.03	−0.11*	0.07	−0.18**	−0.19**	0.00	−0.01	−0.17**	0.20**	−0.10	−0.15**	(0.89)	
14. Procrastination	2.39	0.86	−0.10†	−0.07	−0.07	−0.05	−0.05	−0.26**	−0.25**	−0.20**	−0.29**	0.16**	−0.29**	−0.31**	0.26**	(0.91)

Notes: N = 347. Gender: 0 = male, 1 = female. The reliabilities are shown in parentheses on the diagonal. $^{**}p < 0.01$, $^{*}p < 0.05$, $^{\dagger}p < 0.10$.

Table 4 Regression Results

Variables	Procrastination					
	Model 1		Model 2		Model 3	
	B	*SE*	*B*	*SE*	*B*	*SE*
Intercept	4.90**	0.50	4.04**	0.54	4.20**	0.53
Control variables						
Age	−0.02	0.02	−0.01	0.02	−0.01	0.02
Gender	−0.18	0.11	−0.19†	0.10	−0.19	0.10
Education	−0.05	0.08	−0.04	0.07	−0.05	0.07
Tenure	−0.07	0.09	−0.08	0.09	−0.07	0.08
Proactive personality	0.03	0.06	0.11†	0.06	0.11†	0.06
Perceived leader support	−0.32**	0.07	−0.09	0.07	−0.10	0.07
Extraversion	−0.07	0.06	−0.06	0.06	−0.07	0.06
Openness to experience	−0.04	0.05	−0.05	0.05	−0.05	0.05
Agreeableness	−0.10†	0.05	0.02	0.06	0.02	0.06
Independent variables						
Hindrance stressor appraisal (HSA)			0.09*	0.04	0.10*	0.04
Challenge stressor appraisal (CSA)			−0.20**	0.05	−0.20**	0.05
Conscientiousness			−0.13*	0.06	−0.13*	0.06
Neuroticism			0.14**	0.04	0.12**	0.04
Interaction term						
HSA x Conscientiousness					−0.06	0.04
CSA x Conscientiousness					−0.10**	0.04
HSA x Neuroticism					0.01	0.04
CSA x Neuroticism					−0.05	0.03
R^2	0.14		0.24		0.28	
ΔR^2			0.10**		0.04**	
ΔF	5.45		13.92		4.29	

Notes: N = 347.**p < 0.01, *p < 0.05, †p < 0.10.

Therefore, H4b was supported, indicating that the negative relationship between challenge stressor appraisal and procrastination became more salient under high conscientiousness.

This study then summarize our overall results regarding whether or not our proposed hypotheses (see Figure 1)are supported in Figure 3 below.

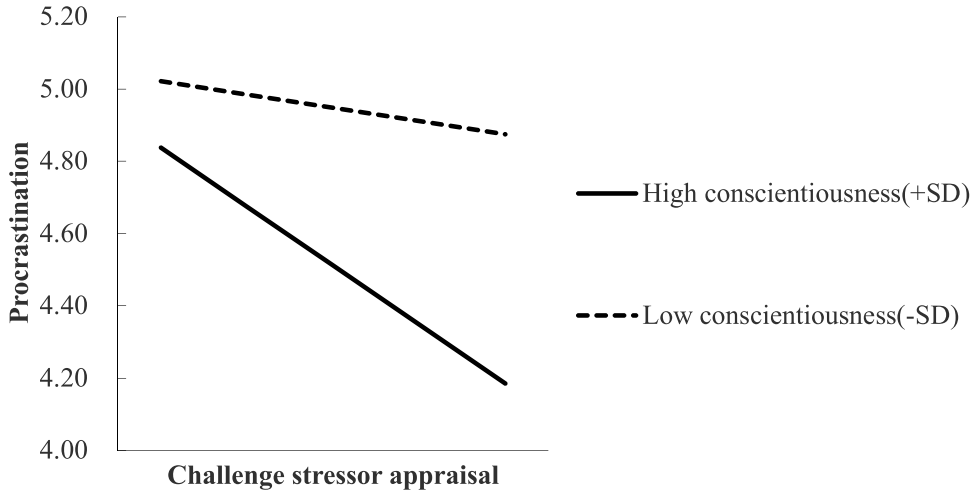

Figure 2 Interactive Effect of Conscientiousness and Challenge Stressor Appraisal on Procrastination.

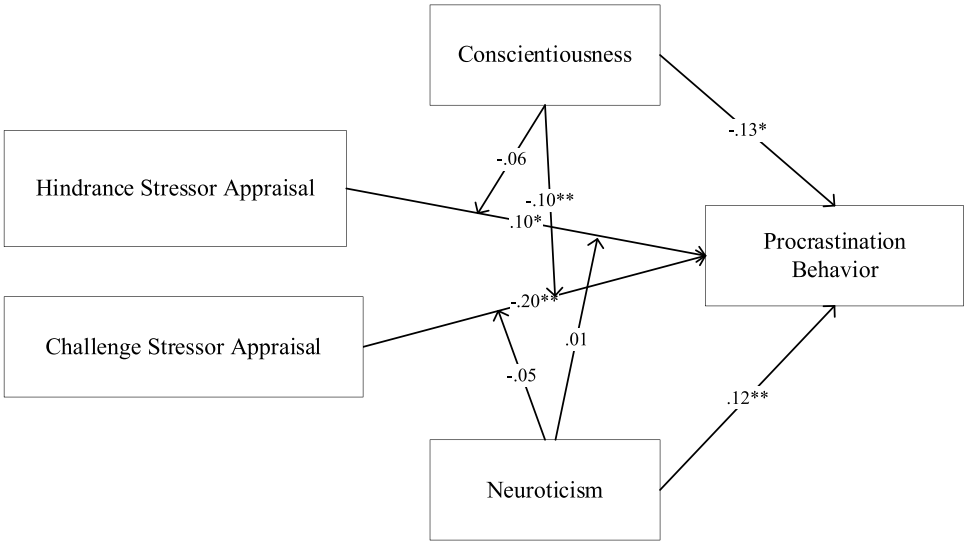

Figure 3 The Results of This Model.

Additional Analyses

Although the effect of procrastination on employees' job performance was not hypothesized in this study, the current study also conducted an analysis using the Monte Carlo method to estimate the effect of procrastination on employees' conscientiousness and CPB.[29] The results showed that procrastination was negatively related to subordinates' conscientious behavior, as assessed by supervisors ($B = -0.24$, $SE = 0.06$, $p < 0.01$). Procrastination was positively related to subordinates' CPB, as assessed by supervisors ($B = 0.16$, $SE = 0.06$, $p < 0.05$). The results indicated that individuals' procrastination led to negative evaluations of subordinates by supervisors, which also verified the negative consequences of procrastination.

Discussion

Results discussion

Building on the conservation of resources (COR) theory, the purpose of the current study is to explore the direct impact of external situational factors (ie, stressor appraisals) and individual traits (ie, personality) and their interactive effect on workplace procrastination behavior. The study adopted a quantitative approach and used two-wave data. Data was collected through a randomized cluster sampling technique and a structured questionnaire survey. Based on the data from 347 Chinese public employees, this study evaluated the hypotheses and revealed several essential conclusions that may contribute to the existing literature as follows.

First, hindrance stressor appraisal was positively related to employees' procrastination. The result is consistent with the previous findings that hindrance stressor appraisal is a destructive occupational stressor, which is detrimental to employees' attitudes and outcomes (eg).[73,74] Explicitly, hindrance stressor appraisal has been found to decrease employees' creativity,[73] work engagement,[74] and job performance,[75] and increasing employees' psychological strain and turnover intention.[76,77] This study has found that hindrance stressor appraisal also has an effect on employees' procrastination, and it has empirically supported this finding.

Second, challenge stressor appraisal was negatively related to employees' procrastination, which seems consistent with the previous empirical studies that challenge stressor appraisal would lead to positive employees' outcomes (eg).[51,78,79] For instance, Michell et al found that daily performance pressure, which was appraised as a challenge, would elicit engagement that explains enhanced task proficiency.[78] Jiang et al found that challenge stressors have a significant positive effect on affective commitment in a sample of 226 Chinese public servants.[79] Rosen et al found that, when employees experience a stable pattern of challenge stressors across time periods, they have positive indirect effects on employee performance and well-being.[51] Differing from the positive relationship between hindrance stressor

appraisal and employees' procrastination, challenge stressor appraisal was negatively related to employees' procrastination. This result also highlights the differential effects of challenge and hindrance stressors on employees' outcomes. It confirms the challenge-hindrance stress framework, which is useful for researchers and practitioners to discover different occupational stress domains (eg).[74,76,77]

Third, conscientiousness was negatively related to employees' procrastination behavior, while neuroticism was positively related to employees' procrastination behavior. The results showed that individuals with high neuroticism and low conscientiousness will procrastinate, which may shed light on the important antecedent role of conscientiousness and neuroticism. These results also seem to align with the findings of the trait-based procrastination perspective, which highlights that procrastination is affected by individuals' personality traits (eg).[3,13] In other words, individuals' procrastination, which is driven by personality traits, is a stable, domain-general behavior across settings, contexts, and time for years.[6] By revealing the relationships between neuroticism, conscientiousness, and employees' procrastination, the study complements and extends previous studies regarding the personality traits- procrastination relationship.

Fourth, this study found that when employees have rich internal resource reserves (ie, high conscientiousness), the negative relationship between challenge stressor appraisal and procrastination will be strengthened. Of note, the current study expected the moderating effect of neuroticism in the relationship between stressor appraisal and procrastination behavior, such that the positive relationship between hindrance stressor appraisal and procrastination is stronger for employees with higher neuroticism. Furthermore, the negative relationship between challenge stressor appraisal and procrastination is stronger for employees with higher neuroticism. However, no support was found for these hypotheses. A possible explanation is that highly neurotic individuals with poor internal resource storage have a relatively weak ability to cope with environmental job demands because they tend to view all external job demands (including challenge and hindrance stressors) as resource depletion threats. The result consists of the previous research argument that highly neurotic individuals are disposed toward negative cognitions and thoughts and a pessimistic interpretation of the external situation (eg).[80] Therefore, neuroticism failed to moderate the relationship between stressors appraisal and procrastination. Also, our study shows that highly conscientious individuals with rich internal resource storage can adjust their behavior according to the environmental demands that were perceived as challenging rather than hindrance stressors.

Theoretical Implications

This study makes the following four contributions: First, by focusing on procrastination in the work domain, the current study enriches the literature on procrastination in a broader context. Previous research primarily focused on the manifestation of procrastination in the general and academic context,[3,17] such as students' academic procrastination in their study assignments and individuals' procrastination in time management in their daily lives.[5,13–15] Although procrastination is generally believed to exist in the workplace, and a few studies have explored the procrastination behavior of employees,[5,13,14] however, they overlooked to understand the nature and antecedents of procrastination in the workplace. By examining the antecedents of employee procrastination, this study answers the call for understanding why and when employees procrastinate in the workplace. It helps to develop efficient intervention strategies to manage employee procrastination behavior. Besides, most previous empirical studies have examined procrastination in the western context.[3,17] The current study contribute to explore the non-western context in examining employees' procrastination behavior based on Chinese samples.

Second, by differing from previous studies that treated procrastination as a self-defeating behavior to manage one's negative emotions by engaging in leisure activities rather than tackling the task that one is dreading.[6] The current study highlights the resource conservation perspective explaining why employees engage in procrastination. Drawing on COR theory, individuals strive to protect their current resources (conservation) and acquire additional resources (acquisition).[24] Although it is a well-argued perspective, little research has been linked to the COR theory and procrastination. This study characterized procrastination as individuals' intentional actions to protect their resources from loss, then opened new avenues for future research on procrastination from a resource conservation perspective.

Third, previous studies on the antecedents of procrastination either focused on the influence of personal traits or situations, while ignoring the integration of the impact power of the two factors.[16] To show which factors may contribute to employees' procrastination, this study integrated situational and individual factors in an empirical investigation and

revealed their different impact power. Moreover, addressing whether procrastination is internally or externally driven deepens our understanding of whether procrastination is changeable or unchangeable. In addition, by proposing the different impacts of hindrance stressor appraisal and challenge stressor appraisal on employees' procrastination behavior, this study offers further evidence of the different roles of stressors on employees' procrastination of workplace outcomes.[45] It confirms that hindrance stressor appraisal has negative implications for employees, while challenge stressor appraisal has positive implications for employees.[81]

Finally, following COR, this study revealed the interactive effect between the individual's internal resource storage and their external resource threats in influencing individual procrastination behavior. It highlights that employees' personalities can indicate their resource storage, enabling them to deal with situational threats. More specifically, by examining the interactive effect of personality and situational factors on employees' procrastination behavior, this study found that conscientiousness was also found to moderate the challenge stressor appraisal–procrastination relationship to make the negative relationship more salient, when employees are high in conscientiousness. The result also offers empirical evidence that individuals' personal traits can impact their ability to deal with external resource loss. Basically, the different reactions toward resource loss may also lie in the fact that individuals with different internal resource storage view resource loss differently. These findings are consistent with the person-situation interactionist perspective in understanding behavioral reactions to environmental settings.[82] It highlights the importance of exploring why individuals may react differently when facing similar situational threats.[78,83]

Practical Implications

This study has several important implications. In a broader sense, this study did not find significant differences in the impact power of personality-procrastination and stressor-procrastination relationships. This may suggest that individuals' personalities and situational context play equal importance in procrastination behavior. This yields several insights. First, organizations or managers can create a positive pressure environment by setting challenging tasks but avoiding those that are beyond the ability of employees so that employees believe they can complete the tasks and apply more work effort. Hence, work pressure can motivate employees and promote their growth and development. At the same time, organizations should avoid giving employees the perception that no matter how hard they try, they cannot improve their work. This can harm employees' work motivation, hinder their work engagement, and lead them to adopt passive behavior. Second, practical support the organization or leader provides may reduce employees' procrastination behavior. For example, this study found that employees' procrastination behavior could be effectively reduced when the leader provided support ($B = -0.32$, $SE = 0.07$, $p < 0.01$). Therefore, necessary external support can help employees adjust and proactively deal with their work requirements. Third, conscientious employees are more likely to engage in positive behavior, even when faced with stress and a lack of external support. Therefore, organizations should consider employees' conscientiousness when recruiting and hiring. Finally, previous studies have found that when faced with different stressors, a positive response may work better to reduce negative emotions than a negative response.[46] Therefore, it is suggested that employees adopt positive behavior toward pressure rather than passive avoidance behavior such as procrastination, which may ultimately cause pressure and stress.

Limitations and Future Directions

This study had the following limitations. First, challenge stressor appraisal and hindrance stressor appraisal can have different effects on procrastination, but the underlying mechanism has not been explored. For instance, the negative impact of challenge stressor appraisal on procrastination may be due to a tight work schedule in which employees cannot procrastinate. In contrast, the negative impact of hindrance stressor appraisal may be due to employees' negative emotions distracting them from work. Therefore, future studies could further explore the underlying mechanisms linking different stressor appraisals and employees' procrastination behavior. Second, this study focused on the antecedents of procrastination; however, the outcomes of procrastination should also be further explored. While most studies mention that procrastination has adverse effects, some have argued that it can be beneficial, as employees may think of new ways to deal with a more significant workload when facing deadlines.[84] However, research on exploring the outcomes of procrastination remains limited. Therefore, this study suggests that future studies explore the paradoxical side of

procrastination and the different underlying mechanisms leading to these different outcomes. Third, the current study tries to avoid the common method issue by collecting data in two separate time spaces. However, this method calls for caution regarding the generalization of the causal relationships between variables. For instance, it is possible that with more procrastination behavior, employees can have a high evaluation of hindrance or challenge stressor appraisal because of their anxiety. Future research should seek to adopt an experimental design to show internal causality. Lastly, this study used a sample from the public service department, which may not have strict work schedules that create an environment for procrastination, so there may exist the selection bias. Future studies can use samples from other industries, such as manufacturing and financial service companies, which have stricter work schedules and assignments to examine employees' procrastination behavior.

Conclusion

Despite its prevalence, workplace procrastination has received limited research attention, especially in non-west context. This study examined the antecedents of employees' procrastination behavior in the workplace. Applying COR theory, the current study explained when and why employees procrastinate. Particularly, this study investigated the direct impact of external situational factors (ie, stressor appraisals) and individual traits (ie, personality) and their interactive effect on workplace procrastination behavior.

In conclusion, the results of this study are quite promising as they provide quantitative empirical evidence that procrastination is not only affected by internal personal traits but also by external situations such as workplace demand appraisals. More explicitly, it revealed that hindrance stressor appraisal leads to employees' procrastination, whereas challenge stressor appraisal diminishes procrastination. Neuroticism contributes to procrastination, while conscientiousness is adversely related to procrastination. At the same time, evidence is given on the interactive effect of challenge stressor appraisals and conscientiousness on procrastination. This study suggests that conscientiousness moderates the challenge stressor appraisal–procrastination relationship to make the negative relationship more salient. This could lead us to conclude that individuals may procrastinate differently when facing similar external challenge stressors. Our findings are consistent with the person-environment interaction perspective in understanding behavioral reactions to environmental settings.[82] As a final note, this study confirms the comprehensive reach and applicability of the COR theory developed by scholars such as Hobfoll.[24] It adequately explained the direct impact of stressor appraisals and individual personality traits and their interactive effect on employees' procrastination in the Chinese context. Overall, this research has not only offered scholars an interactive perspective into the research of antecedents of employees' procrastination but also provided new suggestions to organization managers about how to develop a more effective strategy to manage employees' procrastination, such as creating a positive pressure environment by setting challenging tasks.

Data Sharing Statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Ethical Approval

The study complied with the Declaration of Helsinki and followed its ethical codes for individuals, samples and data collection involved in each research procedure. And also this study was carried out following the recommendations of "Ethic of guidelines, The Institutional Review Board of the Department of Administration Management at Huaqiao University". Furthermore, the protocol for the current study was approved by the Institutional Review Board of the Department of Administration Management at Huaqiao University.

Informed Written Consent Statement

We obtained written consent from all participants. We uploaded the contents of this written informed consent provided to respondents in the Supplementary File. All participants were informed that they could skip any question they wished or quit the survey at any time, and the confidentiality of their responses and that their personal information would be

removed from the dataset after the study. Also, all participants were informed that their consent included publication of anonymized responses.

Funding

This research was only supported by grants from the National Social Science Fund of China (19CGL055).

Disclosure

The authors report no conflicts of interest in this work.

References

1. Metin UB, Taris TW, Peeters MC, Korpinen M. Validation of the procrastination at work scale: a seven-language study. *Eur J Psychol Assess*. 2019;5(36):1–10. doi:10.1027/1015-5759/a000554
2. Metin UB, Taris TW, Peeters MCW. Measuring procrastination at work and its associated workplace aspects. *Pers Individ Dif*. 2016;101:254–263. doi:10.1016/j.paid.2016.06.006
3. Steel P. The nature of procrastination: a meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychol Bull*. 2007;1(133):65–94. doi:10.1037/0033-2909.133.1.65
4. Svartdal F, Klingsieck KB, Steel P, Gamst-Klaussen T. Measuring implemental delay in procrastination: separating onset and sustained goal striving. *Pers Individ Dif*. 2020;156:109762. doi:10.1016/j.paid.2019.109762
5. Ferrari JR, Díaz-Morales JF, O'Callaghan J, Díaz K, Argumedo D. Frequent behavioral delay tendencies by adults. *J Cross Cult Psychol*. 2007;38(4):458–464. doi:10.1177/0022022107302314
6. Feyzi Behnagh R, Ferrari JR. Exploring 40 years on affective correlates to procrastination: a literature review of situational and dispositional types. *Curr Psychol*. 2022;41(2):1097–1111. doi:10.1007/s12144-021-02653-z
7. Sirois FM. Procrastination and stress: exploring the role of self-comparison. *Self Identity*. 2014;2(13):128–145. doi:10.1080/15298868.2013.763404
8. Tice DM, Baumeister RF. Longitudinal study of procrastination, performance, stress, and health: the costs and benefits of dawdling. *Psychol Sci*. 1997;6(8):454–458. doi:10.1111/j.1467-9280.1997.tb00460.x
9. Hasnawi HHA, Abbas AA. Workplace Ostracism as a mediating variable in the relationship between paradoxical leader behaviours and organizational inertia. *Organizacija*. 2020;53(2):165–181. doi:10.2478/orga-2020-0011
10. Pychyl TA, Sirois FM. *Procrastination, Emotion Regulation, and Well-Being*. Academic Press; 2016. doi:10.1016/B978-0-12-802862-9.00008-6
11. Prati LM, Douglas C, Ferris GR, Ammeter AP, Buckley MR. Emotional intelligence, leadership effectiveness, and team outcomes. *Int J Organ Anal*. 2003;1(11):21–40. doi:10.1108/eb028961
12. Mulvey PW, Bowes-Sperry L, Klein HJ. The effects of perceived loafing and defensive impression management on group effectiveness. *Small Group Res*. 1998;3(29):394–415. doi:10.1177/104649649829300
13. Chen XQH, Wang XY, Huang XM. The relationship between procrastination behavior and personality traits of college students: mediating role of emotional regulation. *Adv Psychol*. 2019;10(9):1685–1691. doi:10.12677/AP.2019.910204
14. Sharma SK, Gupta JND. Improving workers' productivity and reducing internet abuse. *J Comput Inf Syst*. 2004;(44):74–78. doi:10.1080/08874417.2004.11647569
15. Zhou M. Gender differences in procrastination: the role of personality traits. *Curr Psychol*. 2018;1–9. doi:10.1007/s12144-018-9851-5
16. Lay CH. Trait procrastination and the perception of person-task characteristics. *Soc Behav Pers*. 1992;3(7):483–494. doi:10.1037/0022-3514.62.1.168
17. Van Eerder WA. Meta-analytically derived nomological network of procrastination. *Pers Individ Dif*. 2003;6(35):1401–1418. doi:10.1016/S0191-8869(02)00358-6
18. De Armond S, Matthews RA, Bunk J. Workload and procrastination: the role of psychological detachment and fatigue. *Int J Stress Manag*. 2014;2(21):137–161. doi:10.1037/a0034893
19. Van Eerde W, Klingsieck KB. Overcoming procrastination? A meta-analysis of intervention studies. *Educ Res Rev*. 2018;(25):73–85. doi:10.1016/j.edurev.2018.09.002
20. Milgram NA, Dangour W, Raviv A. Situational and personal determinants of academic procrastination. *J Gen Psychol*. 1992;2(119):123–133. doi:10.1080/00221309.1992.9921166
21. Chauhan RS, MacDougall AE, Buckley MR, Howe DC, Crisostomo ME, Zeni T. Better late than early? Reviewing procrastination in organizations. *Manag Res Rev*. 2020;43(10):1289–1308. doi:10.1108/MRR-09-2019-0413
22. Halbesleben JR. Sources of social support and burnout: a meta-analytic test of the conservation of resources model. *J Appl Psychol*. 2006;5(91):1134–1145. doi:10.1037/0021-9010.91.5.1134
23. Halbesleben JR, Harvey J, Bolino MC. Too engaged? A conservation of resources view of the relationship between work engagement and work interference with family. *J Appl Psychol*. 2009;6(94):1452–1465. doi:10.1037/a0017595
24. Hobfoll SE. Conservation of resources: a new attempt at conceptualizing stress. *Am Psychol*. 1989;3(44):513–524. doi:10.1037/0003-066X.44.3.513
25. Halbesleben JR, Bowler WM. Emotional exhaustion and job performance: the mediating role of motivation. *J Appl Psychol*. 2007;1(92):93–106. doi:10.1037/0003-066X.44.3.513
26. Cavanaugh MA, Boswell WR, Roehling MV, Boundreau JW. An empirical examination of self-reported work stress among US Managers. *J Appl Psychol*. 2000;1(85):65–74. doi:10.1037//0021-9010.85.1.65
27. Prem R, Ohly S, Kubicek B, Korunk C. Thriving on challenge stressors? Exploring time pressure and learning demands as antecedents of thriving at work. *J Organ Behav*. 2017;1(38):108–123. doi:10.1002/job.2115

28. Liu F, Li P, Taris TW, Peeters MC. Creative performance pressure as a double-edged sword for creativity: the role of appraisals and resources. *Hum Resour Manage*. 2022;61:663–679. doi:10.1002/hrm.22116
29. Lin W, Ma J, Wang L, Wang M. A double-edged sword: the moderating role of conscientiousness in the relationships between work stressors, psychological strain, and job performance. *J Organ Behav*. 2015;1(36):94–111. doi:10.1002/job.1949
30. Howell AJ, Watson DC. Procrastination: associations with achievement goal orientation and learning strategies. *Pers Individ Dif*. 2007;1(43):167–178. doi:10.1016/j.paid.2006.11.017
31. Spector PE, Fox S. An emotion-centered model of voluntary work behavior: some parallels between counterproductive work behavior and organizational citizenship behavior. *Hum Resour Manage Rev*. 2002;2(12):269–292. doi:10.1016/S1053-4822(02)00049-9
32. Ferrari JR, Tice DM. Procrastination as a self-handicap for men and women: a task-avoidance strategy in a laboratory setting. *J Res Pers*. 2000;1(34):73–83. doi:10.1006/jrpe.1999.2261
33. Bruning PF, Campion MA. A role–resource approach–avoidance model of job crafting: a multimethod integration and extension of job crafting theory. *Acad Manage J*. 2018;2(61):499–522. doi:10.5465/amj.2015.0604
34. Hobfoll SE, Halbesleben JR, Neveu JP, Westman M. Conservation of resources in the organizational context: the reality of resources and their consequences. *Annu Rev Organ Psychol Organ Behav*. 2018;1(5):103–128. doi:10.1146/annurev-orgpsych032117-104640
35. Huang L, Krasiova DV, Harms PD. Avoiding or embracing social relationships? A conservation of resources perspective of leader narcissism, leader–member exchange differentiation, and follower voice. *J Organ Behav*. 2020;1(41):77–92. doi:10.1002/job.2423
36. Deng H, Coyle-Shapiro J, Yang Q. Beyond reciprocity: a conservation of resources view on the effects of psychological contract violation on third parties. *J Appl Psychol*. 2018;5(103):561–577. doi:10.1037/apl0000272
37. Yang J, Diefendorff JM. The relations of daily counterproductive workplace behavior with emotions, situational antecedents, and personality moderators: a diary study in Hong Kong. *Pers Psychol*. 2009;2(62):259–295. doi:10.1111/j.1744-6570.2009.01138.x
38. Cooper CD, Kong DT, Crossley CD. Leader humor as an interpersonal resource: integrating three theoretical perspectives. *Acad Manage J*. 2018;2(61):769–796. doi:10.5465/amj.2014.0358
39. Alarcon GM, Edwards JM, Menke LE. Student burnout and engagement: a test of the conservation of resources theory. *J Psychol*. 2011;145(3):211–227. doi:10.1080/00223980.2011.555432
40. Yu W, Zhang P. The influence of challenge-hindrance stressor on high-tech R&D staffs' subjective career success: result of career self-efficacy and organizational career management. *Manag Rev*. 2018;12(30):175–186. doi:10.14120/j.cnki.cn11-5057/f.2018.12.017
41. LePine JA, LePine MA, Jackson CL. Challenge and hindrance stress: relationships with exhaustion, motivation to learn, and learning performance. *J Appl Psychol*. 2004;5(89):391–883. doi:10.1037/0021-9010.89.5.883
42. LePine MA, Zhang Y, Crawford ER, Rich BL. Turning their pain to gain: charismatic leader influence on follower stress appraisal and job performance. *Acad Manage J*. 2016;3(59):1036–1059. doi:10.5465/amj.2013.0778
43. Zhang C, Mayer DM, Hwang E. More is less: learning but not relaxing buffers deviance under job stressors. *J Appl Psychol*. 2018;2(103):123–136. doi:10.1037/apl0000264
44. Lazarus RS, Folkman S. *Stress, Appraisal, and Coping*. New York: Springer; 1984.
45. Bliese PD, Edwards JR, Sonnentag S. Stress and well-being at work: a century of empirical trends reflecting theoretical and societal influences. *J Appl Psychol*. 2017;3(102):389–402. doi:10.1037/apl0000109
46. Zhang Y, Liu HQ, Wang MX, Qing P. The impact of challenge stress and hindrance stress on employee creativity: the mediating role of self-efficacy and the moderating role of justice. *Acta Psychologica Sinica*. 2018;4(50):450–461. doi:10.3724/SP.J.1041.2018.00450
47. Rodell JB, Judge TA. Can "good" stressors spark "bad" behaviors? The mediating role of emotions in links of challenge and hindrance stressors with citizenship and counterproductive behaviors. *J Appl Psychol*. 2009;6(94):1438–1451. doi:10.1037/a0016752
48. Sirois FM, Kitner R. Less adaptive or more maladaptive? A meta–analytic investigation of procrastination and coping. *Eur J Pers*. 2015;4(29):433–444. doi:10.1002/per.1985
49. Liu C, Li H. Stressor and stressor appraisals: the moderating effect of task efficacy. *J Bus Psychol*. 2018;(33):141–154. doi:10.1007/s10869-016-9483-4
50. Skinner N, Brewer N. The dynamics of threat and challenge appraisals prior to stressful achievement events. *J Pers Soc Psychol*. 2002;3(83):678. doi:10.1037/0022-3514.83.3.678
51. Rosen CC, Dimotakis N, Cole MS, et al. When challenges hinder: an investigation of when and how challenge stressors impact employee outcomes. *J Appl Psychol*. 2020;105(10):1181–1206. doi:10.1037/apl0000483
52. Barrick MR, Mount MK. The big five personality dimensions and job performance: a meta-analysis. *Pers Psychol*. 1991;1(44):1–26. doi:10.1111/j.1744-6570.1991.tb00688.x
53. McCrae RR, John OP. An introduction to the five-factor model and its applications. *J Pers*. 1992;2(60):175–215. doi:10.1111/j.1467-6494.1992.tb00970.x
54. Ten Brummelhuis LL, Bakker AB. A resource perspective on the work–home interface: the work–home resources model. *Am Psychol*. 2012;7(67):545. doi:10.1037/a0027974
55. Russell E, Woods SA, Banks AP. Examining conscientiousness as a key resource in resisting email interruptions: implications for volatile resources and goal achievement. *J Occup Organ Psychol*. 2017;3(90):407–435. doi:10.1111/joop.12177
56. Fornes-Vives J, Garcia-Banda G, Frias-Navarro D, Pascual-Soler M. Longitudinal study predicting burnout in Spanish nurses: the role of neuroticism and emotional coping. *Pers Individ Dif*. 2019;138(138):286–291. doi:10.1016/j.paid.2018.10.014
57. Witt LA, Burke LA, Barrick MR, Mount MK. The interactive effects of conscientiousness and agreeableness on job performance. *J Appl Psychol*. 2002;1(87):164–169. doi:10.1037//0021-9010.87.1.164
58. Bowling NA, Eschleman KJ. Employee personality as a moderator of the relationships between work stressors and counterproductive work behavior. *J Occup Health Psychol*. 2010;1(15):91–103. doi:10.1037/a0017326
59. Alhasnawi HH, Abbas AA. Narcissistic leadership and workplace deviance: a moderated mediation model of organizational aggression and workplace hostility. *Organizacija*. 2021;54(4):334–349. doi:10.2478/orga-2021-0023
60. Huang Q, Zhang K, Wang Y, Bodla AA, Zhu D. When is authoritarian leadership less detrimental? The role of leader capability. *Int J Environ Res Public Health*. 2023;20:707. doi:10.3390/ijerph20010707

61. Eisenhardt KM, Graebner ME, Sonenshein S. Grand challenges and inductive methods: rigor without rigor mortis. *Acad Manage J*. 2016;59(4):1113–1123. doi:10.5465/amj.2016.4004
62. Chen M, Chen CC, Sheldon OJ. Relaxing moral reasoning to win: how organizational identification relates to unethical pro-organizational behavior. *J Appl Psychol*. 2016;101(8):1082–1096. doi:10.1037/apl0000111
63. Venkataramani V, Bartol KM, Zheng X, Lu S, Liu X. Not very competent but connected: leaders' use of employee social networks as prisms to make delegation decisions. *J Appl Psychol*. 2022;107(3):458–480. doi:10.1037/apl0000902
64. Wilson J. *Essentials of business research: A guide to doing your research projects*. SAGE Publication; 2010.
65. Taherdoost H. Sampling methods in research methodology: how to choose a sampling technique for research. *Int J Acad Res Manag*. 2016;5(2):18–27. doi:10.2139/ssrn.3205035
66. Shi J, Lin H, Wang L, Wang M. Linking the big five personality constructs to organizational justice. *Soc Behav Pers*. 2009;2(37):209–222. doi:10.2224/sbp.2009.37.2.209
67. Tuckman BW. The development and concurrent validity of the procrastination scale. *Educ Psychol Meas*. 1991;2(51):473–480. doi:10.1177/0013164491512022
68. Else-Quest NM, Hyde JS, Goldsmith HH, Van Hulle CA. Gender differences in temperament: a meta-analysis. *Psychol Bull*. 2006;132(132):33–72. doi:10.1037/0033-2909.132.1.33
69. Baumeister RF, Heatherton TF, Tice DM. *Losing Control: How and Why People Fail at Self-Regulation*. San Diego, CA: Academic Press; 1994.
70. Seibert SE, Crant JM, Kramer ML. Proactive personality and career success. *J Appl Psychol*. 1999;3(84):416–427. doi:10.1108/JMP-04-2014-0139
71. Ilies R, Johnson MD, Judge TA, Keeney J. A within-individual study of interpersonal conflict as a work stressor: dispositional and situational moderators. *J Organ Behav*. 2011;1(32):44–64. doi:10.1002/job.677
72. Holtzman S, Vezzu S, Holtzman S, Vezzu S. Confirmatory factor analysis and structural equation modeling of noncognitive assessments using PROC CALIS. *NorthEast SAS Users Group*. 2011;2011:11–14.
73. Naseer S, Donia MBL, Syed F, Bashir F. Too much of a good thing: the interactive effects of cultural values and core job characteristics on hindrance stressors and employee performance outcomes. *Hum Resour Manage*. 2020;59(3):271–289. doi:10.1002/hrm.21993
74. Sawhney G, Michel JS. Challenge and hindrance stressors and work outcomes: the moderating role of day-level affect. *J Bus Psychol*. 2022;37(2):389–405. doi:10.1007/s10869-021-09752-5
75. Ma J, Peng Y, Wu B. Challenging or hindering? The roles of goal orientation and cognitive appraisal in stressor-performance relationships. *J Organ Behav*. 2021;42(3):388–406. doi:10.1002/job.2503
76. Moin MF, Spagnoli P, Khan AN, Hameed Z. Challenge-hindrance stressors and service employees job outcomes. *Curr Psychol*. 2022. doi:10.1007/s12144-022-03531-y
77. Bao Y, Zhong W. Public service motivation matters: examining the differential effects of challenge and hindrance stressors on organizational identification and turnover intention. *Public Manag Rev*. 2021;23(4):545–566. doi:10.1080/14719037.2019.1699944
78. Mitchell MS, Greenbaum RL, Vogel RM, Mawritz MB, Keating DJ. Can you handle the pressure? The effect of performance pressure on stress appraisals, self-regulation, and behavior. *Acad Manage J*. 2019;2(62):5531–5552. doi:10.5465/amj.2016.0646
79. Jiang S, Shi Z. The first disease X is caused by a highly transmissible acute respiratory syndrome coronavirus. *Virol Sin*. 2020;35(3):263–265. doi:10.1007/s12250-020-00206-5
80. Matthews G, Derryberry D, Siegle GJ. Personality and emotion: cognitive science perspectives. *Adv Personal Psychol*. 2000;1(1):199–237. doi:10.4324/9781315812175
81. Boswell WR, Olson-Buchanan JB, LePine MA. Relations between stress and work outcomes: the role of felt challenge, job control, and psychological strain. *J Vocat Behav*. 2004;1(64):165–181. doi:10.1016/S0001-8791(03)00049-6
82. Endler NS, Magnusson D. Toward an interactional psychology of personality. *Psychol Bull*. 1976;5(83):956–974. doi:10.1037/0033-2909.83.5.956
83. Mitchell MS, Baer MD, Ambrose ML, Folger R, Palmer NF. Cheating under pressure: a self-protection model of workplace cheating behavior. *J Appl Psychol*. 2018;1(103):54–73. doi:10.1037/apl0000254
84. Shin J, Grant AM. When putting work off pays off: the curvilinear relationship between procrastination and creativity. *Acad Manage J*. 2020. doi:10.5465/amj.2018.1471