

Counterproductive Work Behavior Among Chinese Knowledge Workers

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The purpose of this study was to investigate the frequency and antecedents of Chinese knowledge workers' counterproductive work behavior (CWB) by using a self-developed indigenous scale. The paper consisted of two studies. Study 1 developed an indigenous measure of knowledge workers' CWB. Study 2 investigated the frequencies and antecedents of Chinese knowledge workers' CWB using the indigenous measure with a sample of 366 participants. The results showed that CWB among Chinese knowledge workers was rather prevalent. The results also showed that personality variables (i.e., agreeableness, conscientiousness, neuroticism, and locus of control) were more important than other variables (e.g., demographic and job characteristics) in predicting CWB.

1. Introduction

Counterproductive work behavior (CWB) refers to 'a set of distinct acts that share the characteristics that they are volitional (as opposed to accidental or mandated) and harm or intend to harm organizations and/or organization stakeholders, such as clients, co-workers, customers, and supervisors' (Spector et al., 2006, p. 447). These behaviors are pervasive in organizations. CWB has become a hot topic in management and organizational research in recent years because it has enormous negative effects, such as reducing productivity, destroying organizational rules, and violating organizational members' interests. CWB has also been studied under different labels, such as deviance (Hollinger & Clark, 1982; Robinson & Bennett, 1995), aggression (Baron & Neuman, 1996; Douglas & Martinko, 2001; Fox & Spector, 1999; Hershcovis et al., 2007; Neuman & Baron, 1997), antisocial behaviors (Giacalone & Greenberg, 1997; Robinson & O'Leary-Kelly, 1998; Spector, 1997), and bad behaviors (Griffin & Lopez, 2005).

Though there are lots of studies about CWB, past studies mainly focused on traditional workers, especially manual workers, and seldom focused on knowledge workers (Raelin, 1984; Raelin, 1994). Knowledge workers refer to those who apply theoretical and analytical knowledge acquired through formal education to develop new products or services, and require continuous learning (Drucker, 1999). Knowledge workers have

high degrees of expertise, education, or experience, and the most important objectives of their work are creation, transfer, distribution, and practical use of knowledge (Davenport, 2005). The typical exemplars of knowledge workers are managers, professionals, and technologists. When compared with manual work, knowledge work can be characterized as more complex, autonomous, and flexible. Unlike manual work performance improvements made by limiting variation in procedures, knowledge work performance improvements are achieved by creating variation through worker autonomy (Pepitone, 2002). In knowledge work, processes are more difficult to monitor and performance more difficult to evaluate than in manual work. Because of these attributes, the CWB of knowledge workers is different and must therefore be managed differently. It is very important and necessary to investigate CWB among knowledge workers.

The purpose of the present study was to investigate the frequency and antecedents of knowledge workers' CWB using Chinese samples. In China, studies on CWB are rare, but the issue has been gaining more and more attention recently (Peng, 2010; Rotundo & Xie, 2008). There is good reason to look at CWB among Chinese workers because China's economy plays an increasingly important role in the 21st century global economy. In addition, as a country that typifies eastern cultures, China provides a very good contrasting context for validating those findings identified in western cultures

considering that past CWB research have been mainly conducted in western cultural settings.

The CWB measurements developed previously also were not mainly targeted at knowledge workers. That is, CWB is typically assessed using standardized self-report measures that are assumed to be applicable across all jobs and organizations (Bowling & Gruys, 2010). But some items are not suitable for measuring knowledge workers. For example, the item 'came in late to work without permission' from Bennett and Robinson's scale (2000) is not appropriate for knowledge workers because more and more knowledge workers do not have to adhere to a time clock. In addition, they potentially exclude important counterproductive behaviors that are specific to knowledge work. So, if we adhere to use the generic measures, the mean levels of knowledge workers' CWB may be artificially lowered (Bowling & Gruys, 2010). Therefore, in this paper, we conducted two studies of CWB in China. The first study aimed to develop and assess an indigenous measure for CWB among knowledge workers. The second field study aimed to investigate the frequency and antecedents of Chinese knowledge workers' CWB.

1.1. Antecedents of Chinese knowledge workers' CWB

In order to explain CWB, a great deal of research have been conducted in recent years to understand the antecedents of CWB (e.g., Lau, Au, & Ho, 2003; Marcus & Schuler, 2004; Furnham & Taylor, 2004). Some researchers emphasized personal variables (e.g., integrity, personality; Mount, Ilies, & Johnson, 2006; Ones, Viswesvaran, & Schmidt, 2003; Ouimet, 2009) while others emphasized situational variables (e.g., organizational injustice; Fox et al., 2001; Greenberg, 1990; Skarlicki & Folger, 1997). But more and more researchers have begun to combine personal and situational variables as predictors of CWB (Lau et al., 2003; Marcus & Schuler, 2004; Martinko, Gundlach, & Douglas, 2002), because it is clear that no single approach paints a complete picture. This raises a question about the personal and situational variables that are most important when it comes to predicting CWB. In this paper, we considered three broad types of knowledge workers' CWB predictors: (a) demographic variables; (b) job-related variables; and (c) personality variables. We investigate which types of variables are most important for predicting Chinese knowledge workers' CWB. In addition, we explore the interaction effects of gender and personality variables on CWB.

1.1.1. Demographics

Demographic factors refer to the characteristics of the aggregate population, such as age, gender, education, organizational tenure, ownership, and so forth. Some

demographic variables have been found to be related to CWB. Specifically, some meta-analyses have shown that men are more aggressive than women (Hershcovis et al., 2007; Eagly & Steffen, 1986). Blickle and his colleagues also found that men have higher rates of white-collar crime than women (Blickle, Schlegel, Fassbenda, & Klein, 2006). Gender role theory was often used as an explanation of sex differences in aggression. Men are expected to be tough, violent, and aggressive, while female gender role places little emphasis on aggressiveness (Eagly & Steffen, 1986). Consistent with these findings and interpretation, we proposed that male knowledge workers may conduct more CWB than females.

Previous studies also showed that young employees are associated with a greater degree of general CWB, aggression, drug abuse, and absenteeism (Ng & Feldman, 2008). This can be explained by the fact that young persons hold typically lower status and lower paying jobs, and they are less satisfied and committed than older persons. In addition, some researchers have found that older adults are better able to regulate their moods and display higher levels of emotional intelligence as well than the young (e.g., Chapman & Hayslip, 2005). Thus, we proposed that older knowledge workers who are more satisfied with their jobs, and more likely to control their emotions at work, are less likely to engage in counterproductive behaviors.

Education level also may influence CWB. According to human capital theory (Becker, 1964), abilities and knowledge acquired by individuals are likely to be rewarded with higher earnings in the labor market. Those employees with high education level may get higher salary than those with low education level. Subsequently, highly educated employees are less likely to conduct CWB than lowly educated employees. A meta-analysis has shown that education level is negatively related to on-the-job substance use and absenteeism (Ng & Feldman, 2009). Consistent with previous findings, we proposed that education level of knowledge workers is negatively associated with CWB.

Organizational tenure seems to affect CWB as well. According to human capital theory (Becker, 1964), long-tenured workers will be less likely to conduct CWB than short-tenured workers because they have accumulated more job-related and organization-specific knowledge and then can get more salary. Furthermore, attraction-selection-attrition theory (Schneider, Goldstein, & Smith, 1995) suggests that those individuals who have greater tenure are the ones who feel a good fitness with the organizations. Job embeddedness theory (Mitchell, Holtom, Lee, Sablynski, & Erez, 2001) also suggests that, as organizational tenure increases, employees become less mobile over time (Ng & Feldman, 2010). Subsequently, long-tenured individuals will have less motivation to conduct CWB than short-tenured indi-

viduals. Therefore, although a recent meta-analysis (Ng & Feldman, 2010) showed that organizational tenure is also positively related to some counterproductive behaviors (e.g., aggressive behavior and nonsickness absence), in this study we still proposed that knowledge workers' organizational tenure is negatively related to CWB.

Stock ownership may affect CWB. Because some companies adopt employee stock ownership plan to motivate knowledge workers, we also investigated the direct effects of stock ownership on CWBs. Considering ownership can satisfy individuals' needs and have a feeling of control over the company (Pierce, Kostova, & Dirks, 2001), we proposed that those employees who have stock ownership will engage in less CWB than those without stock ownership.

Taking the discussion above, we hence hypothesized that:

H1: There are significant relationships between demographic variables and knowledge workers' CWB. Specifically, (a) male knowledge workers may perform more CWB than females; (b) knowledge workers' ages are negatively associated with counterproductive behaviors; (c) education levels of knowledge workers are negatively associated with CWB; (d) knowledge workers' organizational tenures are negatively related to CWB; and (e) those employees who have stock ownership will engage in less CWB than those without stock ownership.

1.1.2. Job-related factors

Job-related factors include antecedents that are related to the nature of the job (e.g., routinization, complexity, and interdependence) and to the psychological states associated with the job (e.g., psychological empowerment and job satisfaction [JS]). Because job is the center of employees' organizational lives (Pierce, O'Driscoll, & Coghlan, 2004), work characteristics and associated psychological states can reasonably be treated as main triggers of CWB. A stronger theoretical rationale for explaining the links between job-related variables and CWB can be found in social exchange theory (SET).

One of the basic tenets of SET is that relationships evolve over time into trusting, loyal, and mutual commitments. To do so, parties must abide by certain 'rules' of exchange (Cropanzano & Mitchell, 2005). Reciprocity or repayment in kind is probably the best known exchange rule. If one party benefits from the other, the party will feel obliged to respond in kind and repay the other party. Thus, good treatment by the organization will be reciprocated by a similar degree of good behaviors by the employees, while poor treatment is reciprocated with CWB. The latter has been also coined as retaliation behavior, in which revenge plays a major role.

JS reflects the extent to which people like or dislike their jobs (Spector, 1997). According to SET, individuals who are satisfied with their jobs are likely to put more

effort into their work or to act in constructive ways toward their organization because their expectations are met. Thus, we can reasonably expect that JS is negatively related to CWB (Crede, Chernyshenko, Stark, Dalal, & Bashshur, 2007). Empirically, some studies also have shown that JS is strongly and negatively related to CWB (Marcus & Wagner, 2007).

Psychological empowerment refers to a motivational construct manifested in four cognitions: meaning, competence, self-determination, and impact (Spreitzer, 1995). In essence, psychological empowerment means the psychological perception of transferring of power and control from supervisor or organization. Thus, empowerment may be experienced by individuals as good treatment from supervisors and organizations because power often means having formal authority or control over organizational resources and the ability to make decisions relevant to a person's job or role (Lawler, 1986). Based on reciprocity rule, it is reasonable to argue that those who are empowered at work may less likely engage in CWB.

Throughout an employee's organizational tenure, the nature and quality of his or her relationship with organization is determined to a very large extent by the nature of the work that the employee performs on a day-to-day basis (Pierce et al., 2004). Therefore, task characteristics may strongly influence employees' CWB. Routinization characterized by standard operating procedures and rigid workflow patterns is one important characteristic of task. Routinization may limit individual's control over the job. In addition, an individual can easily feel boring when he or she keeps doing routine work. Subsequently, the individuals whose job is high routine are more likely dissatisfied with their job and disengaged at the organization, in turn more likely conduct CWB.

The relationship between task complexity and CWB is a little mixed. On the one hand, job characteristic theory suggests that high task complexity can increase individual's intrinsic motivation, and in turn reduce CWB. On the other hand, task complexity can increase the difficulty of finding and monitoring individual's CWB, and in turn increases CWB. In addition, task complexity may also increase individual's cognitive loads. Considering most knowledge work are rather complex and hard to monitor, we argued that task complexity mainly play a negative role. Thus, we proposed that task complexity is positively related to CWB.

The opportunity to conduct CWB is also an important factor that may influence an individual's CWB (Marcus & Schuler, 2004). Thus, if the work is designed to have more interdependence, the individual will conduct less CWB because his or her behaviors are more easily monitored by his or her peers. Hence, we proposed:

H2: Knowledge workers' CWB are negatively associated with (a) JS; (b) psychological empowerment; and (c)

task interdependence; and positively with (d) task routinization and (e) complexity.

1.1.3. Personality

Personality variables refer to individual traits, such as extraversion, conscientiousness, locus of control, and so on. The relationship between personality and CWB has been studied in many research (e.g., Ones et al., 2003) because if personality traits can predict CWB, then it may be possible to use measures of these traits to identify and select job applicants, and thereby reduce CWB rates. In the present study, we focus on the Big Five personality traits because it has achieved widespread acceptance as a meaningful description of the structure of personality traits. In addition, we investigated the relationship between locus of control and knowledge workers' CWB.

Extraversion refers to a person's tendency to be venturesome, energetic, assertive, and sociable. Collins and Schmidt (1993) found that extraversion is positively associated with white-collar crimes. Salgado (2002) also found that extraversion is positively related to turnover. Considering extremely passive and timid employees might not be capable of engaging in such behaviors as stealing from coworkers and threatening company, we proposed that extraversion is positively associated with knowledge workers' CWB.

Agreeableness refers to an individual's propensity to defer to others. Because agreeable individuals tend to be courteous, good natured, flexible, trusting, and cooperative, we can reasonably expect that agreeable individuals are more likely to inhibit harmful behaviors directed to individuals and organizations. Previous studies also showed that agreeableness is a valid predictor of some types of CWB (e.g., Salgado, 2002; Mount et al., 2006; Berry, Ones, & Sackett, 2007). Thus, we expected that agreeableness is negatively associated with knowledge workers' CWB.

Conscientiousness is a measure of reliability. Conscientious individuals are purposeful, hardworking, and persistent. Theoretically, it is negatively related to CWB. Empirical research has shown that conscientiousness is a consistent predictor of the propensity to exert effort (Mount & Barrick, 1995) and withhold CWB (Sackett & DeVore, 2001). Meta-analyses also showed that conscientiousness is strongly and negatively related to CWB (Dalal, 2005; Salgado, 2002; Berry et al., 2007). Therefore, we proposed that conscientiousness is negatively related to knowledge workers' CWB.

Neuroticism taps a person's ability to withstand stress. Individuals who are high in neuroticism tend to be anxious, insecure, fearful, and hostile. This factor is a close link to negative affectivity. Considering negative affectivity has been treated as an important predictor of CWB (e.g., Aquino, Lewis, & Bradfield, 1999), we also expected neuroticism is negatively related to CWB.

Empirically, previous reviews have shown that emotional stability is negatively related to CWB (Salgado, 2002; Berry et al., 2007). Thus, we proposed neuroticism is positively associated with knowledge workers' CWB.

Openness to experience addresses one's range of interests and fascination with novelty. Individuals who are open to experience are more likely ready to learn and welcome feedback from others, then they will also be perceived as a pleasant person by others who will be more ready to work with them. They tend to react mildly to external stimulus rather than resist radically. Thus, we expected that the knowledge workers who are open to experience are less likely to conduct CWB.

Locus of control refers to the extent to which individuals believe that they can control the events that affect them (Spector, 1982). Because stresses or pressures from outside are important factors that may trigger individuals' CWB, we can expect that those knowledge workers who are high on externals are more likely to be influenced by pressures or stressors and then conduct CWB than those who are high on internals. Some empirical studies have shown that the scores on externals are positively related to CWB (Fox & Spector, 1999; Furnham, 1992). Thus, we expected locus of control (external) to be positively related to knowledge workers' CWB.

Hence, we proposed:

H3: Knowledge workers' CWB is negatively associated with (a) agreeableness; (b) conscientiousness; and (c) openness; and positively with (d) extraversion; (e) neuroticism; and (f) locus of control (external).

1.1.4. Interaction of gender and personality

According to social role theory, males are more likely to conduct counterproductive behaviors than females because males who learn aggressive behaviors are socially acceptable (Eagly & Steffen, 1986). Sexual selection theory also suggests that evolutionary mechanism may cause gender differences in levels of aggression (Archer, 2004). Therefore, it is reasonable to argue that gender difference may moderate the relationship between personality and CWB. Specifically, the relationship between personality and CWB will be stronger for males than females. Empirical research also showed that there are gender differences in personality predictors of workplace incivility (DeGeest, Gonzalez-Mule, & Mount, 2011). Hence, we proposed:

H4: Gender will moderate the relationship between personality and knowledge workers' CWB. Specifically, for male Chinese knowledge workers, the relationship between personality [(a) agreeableness; (b) conscientiousness; (c) openness; (d) extraversion; (e) neuroticism; and (f) locus of control] and CWB will be stronger than for female Chinese employees.

2. Study 1

To develop an indigenous measure of CWB among knowledge workers, this study was conducted in four phases.

2.1. Phase 1: Item generation

The sample in this phase consisted of 130 Chinese employees. Eighty participants were enrolled in the part-time Master of Business Administration (MBA) program at one university, which is located in Shanghai, and 50 participants were enrolled in high-tech companies from Shanghai and Guangzhou. According to the university's enrollment report, the mean of work experience of the part-time MBA program was above 5 years. Those respondents from high-tech companies were also knowledge workers. So, our respondents had enough experiences to describe CWBs among knowledge workers. These respondents had an average age of 32 years ($SD = 9.43$). About 49% of the respondents were managers, 32% were technologists, and 10% were sales. Besides the sample of 130 employees, we interviewed 16 human resources (HR) managers about the manifestation and causes of knowledge workers' CWBs.

With regard to the 130 participants we recruited, we firstly presented them with a definition of knowledge workers. Then, we gave them a broad definition of CWB. We asked each one to draw on his or her work experience to list five examples of knowledge workers' CWB. As for the 16 HR managers we interviewed, we also asked them to list examples of CWB. From the two sources, we obtained 612 statements describing knowledge workers' CWB.

2.2. Phase 2: Item review

The 612 items were reviewed, combined, and refined by the same three judges (the author, a PhD student, and an HR consultant with a PhD degree). First, the judges independently reviewed each statement with two criteria: clarity and consistency with the definition of CWB. A 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) was used to rate each behavior on the two criterions. Items that received a mean score below 3 were deleted. Next, the three judges discussed how these behaviors could be sorted and reach a consensus in sorting the items retained in the first stages into 116 categories. Next, the three judges independently decided how these categories could be combined in terms of similarity of content. Sixty-six categories were obtained with the judges' agreement. Finally, the item most frequently mentioned in each category and that was relevant to a wide variety of organizations was selected as the representative statement. As a result, 66 items were

included in the questionnaire on knowledge workers' CWB. However, because 'quit organization' is one-time act that neither has repeatability nor long-lasting harm, it was removed from the questionnaire. Thus, 65 items constituted our original CWB scale. Responses were made on a 5-point Likert-type scale (1 = *never*, 2 = *once or twice a year*, 3 = *once or twice a month*, 4 = *once or twice a week*, 5 = *daily*).

2.3. Phase 3: Item refinement

The sample in this phase consisted of 145 full-time Chinese employees who finished the 65-item measure for knowledge workers' CWB in their worksites. The respondents' mean age was 32.3 years ($SD = 6.7$), and their mean organizational tenure was 4.8 years ($SD = 3.2$). All of the respondents had the bachelor's degree or the above degree. About 26%, 47%, and 10% of respondents came from state-owned company, foreign-owned enterprise, and private enterprise, respectively. The collected data also had a wide dispersion of occupational types, such as managers (35%), financial/accounting/personnel professionals (26%), technologist (22%), and salespersons (15%).

To evaluate the items, we first calculated the item-total correlations. One item (the 22nd item) was deleted because its item-total correlation was less than .40. We then conducted a series of principle factor analyses by using SPSS 15.0 (SPSS Inc., Chicago, IL) on the remaining 64 items to delete additional items. Because we wanted to develop an indigenous measure and did not presuppose the number of factors, we determined the factor number using scree plot and eigenvalues. We deleted the items that had low factor loadings (less than .40) or cross-loadings (more than .35). To make the measurement more parsimonious and easily usable, we selected the three to five items with the highest loadings from each factor. After a series of factor analyses, we finally got 6 factors and retained 22 items. The six components together accounted for 73.9 of the total variance. The factor loadings of 22 items were .53–.88. The Kaiser–Meyer–Olkin measure of sampling adequacy equaled .87, which indicated the sample data were suitable for factor analysis. We labeled the six factors unethical behavior, resistant behavior, loophole seeking, passive obedience, knowledge withholding, and storytelling. Compared with the previous CWB measures, unethical behavior and knowledge withholding are two new factors.

2.4. Phase 4: Instrument validation

A sample of 161 knowledge workers in China was collected to validate the scale. Of these participants, 63% were male. The respondents had a mean age of 34.2 years ($SD = 11.2$) and 3.14 years ($SD = 2.6$) of

organizational tenure. In terms of education, 20% of the participants reported at least some college or vocational training, 53% had a bachelor's degree, and 27% earned a master's degree or PhD. The collected data also had a wide dispersion of occupational types, such as managers (26%), financial/accounting/personnel professionals (14%), technologist (44%), and salespersons (6%).

To assess the predictive validity of the scale, we included JS, organizational citizenship behaviors, and turnover intention as factors because previous studies (e.g., Mount et al., 2006; Dalal, 2005; Hoel, Einarsen, & Cooper, 2003) have shown that CWB is negatively correlated with JS and organizational citizenship behaviors and positively correlated with turnover intention. JS was measured using the scale developed by Tsui and colleagues (Tsui et al., 1992). Organizational citizenship behavior (OCB) was measured using 13 items from Farh et al.'s scale (Farh, Earley, & Lin, 1997). Turnover intention was measured using one single item: 'It is likely that I will leave the company in the next 12 months.'

To assess the convergent validity of our knowledge workers' CWB scale, we included similar scales. The first similar scale we used for comparison was developed by Spector and his colleagues (Spector et al., 2006; Spector, Fox, Penney, Bruursema, & Kessler, 2001), who split CWB into five subscales (abuse, production deviance, sabotage, theft, and withdrawal). Because more and more knowledge workers can have flexible work time, we did not include withdrawal in our study. Meanwhile, we only chose part items from the original measure because a too lengthy questionnaire would impair the effective response rates. Thus, we used the following four shortened subscales in this study: abuse (four items), production deviance (three items), sabotage (two items), and theft (five items). The second scale we used for comparison was the deviance scale developed by Bennett and Robinson (2000). Three items for interpersonal deviance and four items for organizational deviance were used.

The results showed that the item-total correlations of CWB were .45–.87. In terms of internal consistency, the Cronbach's alphas were .82–.97. Thus, the measurement for CWB showed good reliability. The confirmatory factor analysis (CFA) results also showed that the six-factor model fit the data better (χ^2 [194] = 320.58; χ^2/df = 1.65; NFI = .97; IFI = .99; CFI = .99; RMSEA = .06) than the two-factor model (organization targeted and individual targeted; χ^2 [208] = 1,477.13; χ^2/df = 7.10; NFI = .86; IFI = .88; CFI = .88; RMSEA = .25) and the one-factor model (χ^2 [209] = 2,597.52; χ^2/df = 12.43; NFI = .86; IFI = .88; CFI = .88; RMSEA = .27). Chi-squared tests showed that the decrement between the six-factor model and the two-factor model was significant ($\Delta\chi^2$ = 1,156.55, Δdf = 14, p < .01), and that the decrement between the six-factor model and the one-factor model was also significant ($\Delta\chi^2$ = 2,276.94, Δdf = 15,

p < .01). Table 1 presents the results of the CFA of the 22-item scale for knowledge workers' CWB. In Table 1, we find that the factor loadings of the items in the six-factor model were .65–.95. All of the factor loadings were statistically significant (p < .01). These CFA results indicated that knowledge workers' CWB can be treated as a six-dimensional construct.

Table 2 presents the correlation between the knowledge workers' CWB measure and similar measures. As Table 2 reveals, six subscales were highly correlated with similar measures. The correlation coefficients between our measure and similar measures were .35–.82 (all p < .01). We also found that the scores on the resistant behavior measure were more related to the scores on the abuse (r = .80, p < .01) and interpersonal deviance measures (r = .82, p < .01) than to the scores on the sabotage (r = .57, p < .01) and organizational deviance measures (r = .60, p < .01; Hotelling's t = 4.52–6.02, all p < .01). The scores on the loophole seeking measure were more related to the scores on the production deviance (r = .70, p < .01) and organizational deviance measures (r = .70, p < .01) than to the scores on the abuse (r = .59, p < .01) and interpersonal deviance measures (r = .58, p < .01; Hotelling's t = 2.09–2.36, all p < .05). Considering the results above, our CWB measure exhibits good convergent validity.

Past studies have found that CWB is moderately and negatively related to OCB (Dalal, 2005; Spector & Fox, 2002), positively related to turnover intention (Hoel et al., 2003), and negatively correlated with JS (Mount et al., 2006). If our scale had good predictive validity, we should expect that similar relationships could be repeated in our study. The findings supported our predictions. The overall scores on the CWB scale were moderately correlated with the scores on the JS (r = -.23, p < .01), turnover intention (r = -.17, p < .05), and overall OCB (r = -.37, p < .01).

To validate a new measure, it is also important to assess its incremental validity in the prediction of other variables over and above existing measures. Toward this aim, we used our CWB measure scores as predictors of OCB, turnover intention, and JS. In these regression models, scores from Spector et al.'s measure and Bennett and Robinson's measure were used respectively as control variables in addition to the demographics. Table 3 presents the regression results. Results showed that our six-factor measure did not significantly increase the amount of variance explained in OCB and turnover intention beyond similar measures. However, it did increase the amount of variance explained in JS beyond that of Spector et al.'s measure (ΔR^2 = .12, p < .01) and Bennett and Robinson's measure (ΔR^2 = .14, p < .01).

In addition, the two new factors (i.e., unethical behavior and knowledge withholding) could explain OCB (Model 4: ΔR^2 = .02, p < .10; Model 7: ΔR^2 = .02, p < .10) and JS (Model 18: ΔR^2 = .04, p < .01; Model 21: ΔR^2 = .09,

Table 1. Confirmatory factor analysis for the Chinese knowledge workers' counterproductive work behavior measure (N = 161)

| | | 1 | 2 | 3 | 4 | 5 | 6 |
|--------------------------|--|-----|-----|-----|-----|-----|-----|
| 1. Unethical behavior | Sell company important information for personal gain. | .79 | | | | | |
| | Steal others' information and products. | .72 | | | | | |
| | Use personal knowledge and technology to threaten company. | .75 | | | | | |
| | Provide others incorrect information. | .79 | | | | | |
| | Impede others from finishing their tasks by using professional skills. | .72 | | | | | |
| 2. Resistant behavior | Disobey supervisor's instructions. | | .71 | | | | |
| | Conflict with supervisor or peers. | | .70 | | | | |
| | Obey superior's instructions passively. | | .70 | | | | |
| | Quarrel with other departments. | | .65 | | | | |
| 3. Loophole seeking | Lower your performance levels to satisfy ambiguous performance standard minimums. | | | .92 | | | |
| | Work slackly on tasks that are difficult to evaluate. | | | .88 | | | |
| | Intentionally reduce efficiency. | | | .84 | | | |
| 4. Passive obedience | Go along with supervisor's direction and never express your professional opinion. | | | | .66 | | |
| | Reluctant to innovate. | | | | .95 | | |
| | Act according to established rules, standards, and procedures without analyzing problems for better solutions. | | | | .78 | | |
| | Reluctant to take on more responsibility. | | | | .74 | | |
| 5. Knowledge withholding | Do not want to transform personal knowledge and experience into organizational knowledge. | | | | | .77 | |
| | Do not share innovative achievements. | | | | | .77 | |
| | Do not share helpful information with others. | | | | | .78 | |
| 6. Storytelling | Hide mistakes at work. | | | | | | .82 |
| | Make excuses for mistakes at work. | | | | | | .87 |
| | Make false statements about your workload. | | | | | | .86 |
| Reliability | (Cronbach's alpha) | .97 | .89 | .93 | .82 | .91 | .93 |

$p < .01$) beyond the other four factors. As Table 3 shows, knowledge withholding is negatively and significantly related to OCB and JS. However, the coefficients of unethical behavior in JS regression equations were positive and significant (Model 18: $\beta = .22$, $p < .05$; Model 21: $\beta = .67$, $p < .01$). These results were very surprising because we expected unethical behavior should be negatively related JS. To explain these surprising findings, we thought there are three reasons. First, knowledge workers are well educated and are likely to show more loyalty to their careers than the company. Subsequently, they are more likely to separate job from organization than traditional workers. Their high JS does not mean they are highly satisfied with their company. Second, knowledge workers may devote themselves to work more deeply when they experience a higher level of JS. According to psychological ownership theory, investing self is one of key routes to psychological ownership (Pierce et al., 2001; Pierce, Kostova, & Dirks, 2003). Therefore, knowledge workers may easily develop a strong self-psychological ownership over their work outcomes. Subsequently, they may treat company resources and outcomes as their own and conduct unethical behavior. Finally, knowledge worker can gain large personal economic benefits by conducting unethical behavior. Thus, they may be more satisfied with their

jobs because their jobs provide better chance of conducting unethical behavior.

Taking the discussion above, we could conclude that our measure, especially the two new factors (i.e., unethical behavior and knowledge withholding), could add unique variance beyond the existing measures. Our measure was different from the existing measures and could be used for future research.

2.5. Discussion

In Study 1, we developed an indigenous measure of knowledge workers' CWB using four substudies. Comparisons of our measure's six dimensions and those identified by previous studies (Bennett & Robinson, 2000; Gruys & Sackett, 2003; Raelin, 1994; Rotundo & Xie, 2008; Spector et al., 2006) revealed some similarities and differences. Our dimension of resistant behavior is similar to the dimensions of interpersonal deviance reported by Bennett and Robinson (2000), inappropriate verb actions by Gruys and Sackett (2003), abuse by Spector et al. (2006), and interpersonal and nontask-related CWB by Gruys and Sackett (2003) and Rotundo and Xie (2008). Our dimensions of loophole seeking, passive obedience, and storytelling can be included in the dimensions of organizational deviance reported by

Table 2. Correlations between CWB measures and measures of job satisfaction, OCB, turnover intention, and similar constructs

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|--------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|-------|-------|-------|-------|-------|-----|
| 1. Unethical behavior | .97 | | | | | | | | | | | | | | | | |
| 2. Resistant behavior | .57** | .89 | | | | | | | | | | | | | | | |
| 3. Loophole seeking | .51** | .67** | .93 | | | | | | | | | | | | | | |
| 4. Passive obedience | .30** | .51** | .63** | .82 | | | | | | | | | | | | | |
| 5. Knowledge withholding | .59** | .62** | .51** | .82 | .91 | | | | | | | | | | | | |
| 6. Storytelling | .50** | .57** | .71** | .50** | .52** | .93 | | | | | | | | | | | |
| 7. Job satisfaction | -.03 | -.24** | -.25** | -.16* | -.24** | -.18* | .87 | | | | | | | | | | |
| 8. Identification with company | -.28** | -.24** | -.26** | -.23** | -.32** | -.23** | .30** | .90 | | | | | | | | | |
| 9. Altruism toward colleagues | -.37** | -.29** | -.33** | -.20* | -.37** | -.27** | .32** | .77** | .95 | | | | | | | | |
| 10. Conscientiousness | -.28** | -.28** | -.33** | -.30** | -.36** | -.25** | .30** | .71** | .72** | .84 | | | | | | | |
| 11. Turnover intention | .07 | .19* | .22* | .10 | .20* | .17* | -.35** | -.11 | -.13 | -.15† | 1.00 | | | | | | |
| 12. Abuse | .63** | .80** | .59** | .38** | .56** | .54** | -.15 | -.26** | -.32** | -.21** | .20* | .91 | | | | | |
| 13. Production deviance | .52** | .68** | .70** | .52** | .47** | .67** | -.17* | -.23** | -.31** | -.34** | .21* | .57** | .77 | | | | |
| 14. Sabotage | .62** | .57** | .54** | .37** | .68** | .58** | -.13 | -.32** | -.32** | -.38** | .08 | .53** | .55** | .91 | | | |
| 15. Theft | .66** | .59** | .66** | .48** | .54** | .72** | -.09 | -.29** | -.33** | -.30** | .08 | .60** | .70** | .70** | .92 | | |
| 16. Interpersonal deviance | .66** | .82** | .58** | .35** | .55** | .49** | -.18* | -.26** | -.32** | -.26** | .14 | .89** | .55** | .56** | .58** | .88 | |
| 17. Organizational deviance | .49** | .60** | .70** | .58** | .53** | .61** | -.26** | -.38** | -.34** | -.41** | .20* | .49** | .73** | .54** | .62** | .52** | .69 |

Note: N = 161. †p < .10; *p < .05; **p < .01. Reliability is in the diagonal. CWB, counterproductive work behavior; OCB, organizational citizenship behavior.

Bennett and Robinson (2000) and production deviance by Spector et al. (2006). However, loophole seeking, passive obedience, and storytelling are more specific than organizational deviance or production deviance. In addition, the items under loophole seeking, passive obedience, and storytelling are more related to knowledge work than to traditional work, while the items under organizational deviance and production deviance are more related to traditional work than to knowledge work.

Two dimensions (i.e., sabotage and withdrawal) in Spector et al.'s (2006) measure and four dimensions (i.e., alcohol use, drug use, inappropriate physical actions, and poor attendance) in Gruy and Sackett's measure were not present in our CWB measure. After carefully examining the changes in knowledge work, we have found that more and more knowledge workers have a high degree of flexibility in their working arrangements. Therefore, those counterproductive behaviors that are prevalent and important among traditional workers are no longer important to knowledge workers. In addition, because of their higher educational background and good training, few knowledge workers are likely to engage in alcohol abuse, physical assault, and other acts.

Compared with those in previous studies, our measure included two new and unique dimensions: knowledge withholding and unethical behavior. The reason why knowledge withholding emerged may be that our research object focused on knowledge workers. Knowledge workers' intention to protect knowledge is stronger than that of traditional workers because knowledge is their labor tool and the basic foundation with which they bargain with organizations. Why did unethical behavior emerge? There may be two reasons. The first is that knowledge workers' ethical standards may be higher than those of traditional workers because the former generally have higher education than the latter. Knowledge workers may judge a behavior based on whether the act is ethical rather than on the specific target the act is directed at. The second reason is that Chinese culture emphasizes ethical standards in social settings. The highly emphasized ethical culture may influence individuals' behaviors and thinking styles. For example, some scholars who studied the leadership in China found that one of the three dimensions of paternalistic leadership is moral leadership (Cheng, Chou, Huang, Wu, & Farh, 2004). 'Moral First' cultural characteristics may urge people to treat 'being moral' as the first standard for behavior. Peng (2010) used multidimensional scaling to analyze the typology of CWB in Chinese knowledge work and found that CWB among Chinese knowledge workers may vary along a continuum of unethical behavior ranging from nonunethical to unethical. Thus, unethical behavior may be a very unique CWB construct in China.

Table 3. Regression analysis of effects of CWB on OCB, turnover intention, and job satisfaction

| Model | Job satisfaction | | | | | | | | | | | | | | | | | | | | |
|-------------------------|------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|--------|-------|--------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| Gender | .09 | .03 | .04 | .03 | .05 | .05 | .05 | -.17* | -.16* | -.15* | -.15† | -.16† | -.17* | -.18* | .07 | .06 | .07 | .07 | .06 | .07 | .07 |
| Age | .14† | .14† | .15† | .13† | .13† | .14† | .14† | -.29** | -.28** | -.27** | -.26** | -.28** | -.29** | -.28** | .13 | .12 | .13† | .13† | .12 | .14† | .15† |
| Education | -.10 | -.14† | -.13† | -.14† | -.11 | -.11 | -.12 | -.07 | -.05 | -.05 | -.04 | -.07 | -.06 | -.06 | -.05 | -.05 | -.04 | -.06 | -.05 | -.05 | -.05 |
| Organizational tenure | -.03 | -.06 | -.04 | -.04 | -.04 | -.03 | -.04 | -.09 | -.08 | -.09 | -.08 | -.08 | -.09 | -.10 | -.09 | -.08 | -.06 | -.07 | -.09 | -.08 | -.07 |
| Abuse | -.22 | -.06 | -.04 | -.04 | | | | .14 | .00 | .02 | | | | | -.04 | .19† | .14 | | | | |
| Production deviance | -.11 | -.07 | -.11 | | | | | .20† | .09 | .11 | | | | | -.20* | .00 | -.02 | | | | |
| Sabotage | -.23 | -.19 | -.02 | | | | | .06 | .02 | -.03 | | | | | -.04 | -.00 | .08 | | | | |
| Theft | .11 | -.02 | .10 | | | | | -.24 | -.16 | -.13 | | | | | .15 | .16 | .07 | | | | |
| Interpersonal deviance | | | | -.08 | .04 | .12 | | | | | -.01 | -.21 | .01 | | | | | .05 | .36* | -.03 | |
| Organizational deviance | | | | -.36** | -.36** | -.25† | | | | | .17 | .12 | .22 | | | | | -.25* | -.16 | -.36* | |
| Resistant behavior | | | -.15 | -.08 | | -.22 | -.15 | | .15 | .11 | | .23 | .14 | | | | | -.35** | -.29** | -.41* | -.25 |
| Loophole seeking | | | -.05 | -.04 | | .02 | -.05 | | .13 | .13 | | .22 | .20 | | | | | -.14 | -.15 | -.09 | -.10 |
| Passive obedience | | | -.08 | -.07 | | -.02 | -.03 | | -.06 | -.06 | | -.11 | -.13 | | | | | -.02 | -.01 | .02 | .07 |
| Storytelling | | | .14 | .10 | | .09 | .14 | | -.03 | -.04 | | -.11 | -.12 | | | | | -.04 | -.00 | .06 | .10 |
| Unethical behavior | | | -.13 | -.13 | | -.05 | -.05 | | -.09 | -.09 | | | -.36† | | | | | .22* | | | .67** |
| Knowledge withholding | | | | -.23* | | | -.22† | | .14 | | | | .16 | | | | | -.24* | | | -.29* |
| R ² | .03 | .20 | .21 | .24 | .21 | .23 | .25 | .11 | .16 | .17 | .18 | .14 | .17 | .19 | .024 | .06 | .15 | .18 | .07 | .12 | .21 |
| ΔR ² | .17** | .02 | .02† | .18** | .02 | .02 | .02† | .05† | .01 | .01 | .01 | .03 | .03 | .02 | .04 | .08** | .04** | .04** | .05* | .05† | .09** |
| F | 1.32 | 4.69** | 3.36** | 3.28** | 6.84** | 4.40** | 4.12** | 4.09** | 2.91** | 2.05* | 1.85* | 3.39** | 2.46** | 2.33** | 0.96 | 1.28 | 2.13* | 2.33** | 1.96† | 2.03* | 3.29** |

Note: †p < .10; *p < .05; **p < .01. CWB, counterproductive work behavior; OCB, organizational citizenship behavior.

3. Study 2

The purpose of Study 2 was to investigate the antecedents and frequency of Chinese knowledge workers' CWB using our measure.

3.1. Methods

3.1.1. Sample

The sample consisted of 366 knowledge workers from 15 companies in the IT and software industry of China. Sixty-two percent of the respondents were male. About 53% had a bachelor's degree, 21% had completed at least some college or vocational training, and 26% had a master's or doctoral degree. About 55% of the respondents were first-line employees, 23% were first-line supervisors, and 21% held middle-level positions. The sample also had a wide dispersion of occupational types, such as managers (37%), financial/accounting/personnel professionals (16%), technologists (29%), and salespersons (9%). Of the respondents, 24% were from state-owned companies, 49% from foreign-owned enterprises, 18% from Sino-foreign joint enterprises, 6% from private companies, and 3% from collectively owned enterprises.

3.1.2. Procedure

The researcher first sent the target participants a mailed invitation indicating the purpose of the survey and stating that it was confidential and only for academic use. One week later, the researcher sent them an e-mail requesting them to participate in a Web-based survey. After 1 week, the researcher sent them a reminder through e-mail. Of the individuals that received the e-mail, 366 completed the survey for an effective response rate of 71.2%.

3.1.3. Measures

All measures were presented in Chinese. All the English scales had been back-translated (Brislin, 1970). Considering that the test time for the participants was extremely limited, we measured personality using a short 10-item scale (Rammstedt & John, 2007). Locus of control was measured by six items adapted from Presson and his colleagues (Presson, Clark, & Benassi, 1997). Psychological empowerment was measured by a 12-item scale (Spreitzer, 1995). Routinization, which refers to the extent to which a task is repetitive and predictable (Perrow, 1970), was measured using a 3-item scale developed by Bacharach and his colleagues (Bacharach, Bamberger, & Conley, 1990). Complexity was measured with three items targeted at the extent to which the job calls for knowledge and difficult problem solving (Dean & Snell, 1991). Interdependence was measured with five items targeted at the extent to which individuals rely on

or collaborate with others to complete their work (Pearce & Gregersen, 1991). JS was measured using five items from the instrument developed by Tsui and colleagues (Tsui et al., 1992). The Cronbach's alphas for locus of control, psychological empowerment, routinization, complexity, interdependence, and JS were .72, .90, .69, .79, .83, and .86, respectively. CWB was measured by the 22-item scale described in Study 1. The Cronbach's alphas for unethical behavior, resistant behavior, loophole seeking, passive obedience, knowledge withholding, storytelling, and CWB total were .96, .87, .90, .78, .88, .89, and .94, respectively.

In terms of demographic variables, age was measured by four categories (i.e., 0 = *under 22*, 1 = *22–35*, 2 = *36–55*, 3 = *above 55*). Gender was coded with 0 designating man and 1 designating woman. Education was measured by five categories (i.e., 1 = *college or vocational school*, 2 = *bachelor*, 3 = *master*, 4 = *doctor*). Organizational tenure was measured in years. Stock ownership was measured by two categories (i.e., 0 = *no company shares*, 1 = *with company shares*).

Because the questionnaire was performed by self-report, we used social desirability (SD) as control variable in order to reduce common method bias (MacKenzie, Podsakoff, & Jarvis, 2005). We measured SD using a 5-item scale (Hays, Hayashi, & Stewart, 1999). The Cronbach's alpha was .69.

3.2. Results

3.2.1. Descriptive analysis

Table 4 presents the means, standard deviations, reliabilities, and correlations of the control variables, independent variables, and outcome variables.

Table 5 presents the frequencies of counterproductive behaviors. The most reported CWB was 'go along with supervisor's direction and never express your professional opinion,' reported by 76.2% of the sample. This was respectively followed by 'reluctant to take on more responsibility,' reported by 69.4%, 'reluctant to innovate,' reported by 63.1%, and 'act according to established rules, standards, and procedures without analyzing problems for better solutions,' reported by 61.5%. All these behaviors belong to the passive obedience dimension of CWB. The least reported CWB was 'sell company important information for personal gain,' reported by 9.8%. The mean percentages of unethical behavior, resistant behavior, loophole seeking, passive obedience, knowledge withholding, and storytelling were 12.3, 41.7, 44.0, 67.6, 38.8, and 51.1, respectively.

3.2.2. Revalidation of our measure

First, we ran a CFA on the 22 items of CWB using a six-factor model to revalidate our scale. The results showed that the six-factor model fit our data well ($\chi^2 [194] =$

Table 4. Means, standard deviations, reliabilities, and correlations of control, independent, and outcome variables

| | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |
|-------------------------------|-------|------|--------|-------|--------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|----|
| 1. Gender | 0.38 | 0.49 | na | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Age | 1.08 | 0.28 | -.11* | na | | | | | | | | | | | | | | | | | | | | | | |
| 3. Education | 3.02 | 0.79 | .00 | .13† | na | | | | | | | | | | | | | | | | | | | | | |
| 4. Organization tenure | 3.91 | 3.35 | -.04 | .09† | -.26** | na | | | | | | | | | | | | | | | | | | | | |
| 5. Stock | 0.09 | 0.28 | .06 | -.08 | .14* | -.22** | na | | | | | | | | | | | | | | | | | | | |
| 6. Social desirability | 1.12 | 1.36 | .14* | .06 | .04 | -.03 | .14* | .69 | | | | | | | | | | | | | | | | | | |
| 7. Extraversion | 6.69 | 1.53 | .14* | -.03 | .09 | -.08 | .17* | .13† | na | | | | | | | | | | | | | | | | | |
| 8. Agreeableness | 7.31 | 1.53 | .12 | .06 | .07 | -.04 | .13 | .34** | -.01 | na | | | | | | | | | | | | | | | | |
| 9. Conscientiousness | 7.53 | 1.64 | .02 | .17* | .10 | -.07 | .09 | .34** | .18** | .15* | na | | | | | | | | | | | | | | | |
| 10. Neuroticism | 5.59 | 1.50 | .23** | -.03 | -.13† | .19** | -.09 | -.15* | -.19** | .02 | na | | | | | | | | | | | | | | | |
| 11. Openness | 6.98 | 1.53 | -.14* | .18** | .11 | -.03 | .15* | .28** | .38** | .08 | .31** | na | | | | | | | | | | | | | | |
| 12. Locus of control | 17.98 | 2.78 | -.02 | -.09 | .03 | .03 | -.10 | -.39** | -.21** | -.12† | -.34** | .33** | na | | | | | | | | | | | | | |
| 13. Psychological empowerment | 4.30 | 0.73 | -.10† | .05 | -.14* | -.07 | -.11* | .15* | .05 | -.06 | .23** | -.40** | .17* | .72 | .90 | | | | | | | | | | | |
| 14. Routinization | 2.34 | 0.54 | .03 | -.04 | .06 | .04 | .04 | -.06 | -.13† | .01 | -.02 | .15* | -.07 | .06 | -.16** | .69 | | | | | | | | | | |
| 15. Task complexity | 3.59 | 0.69 | -.28** | .02 | .08 | .05 | -.09† | .01 | .06 | -.02 | .01 | -.06 | .05 | -.13† | -.32** | .79 | | | | | | | | | | |
| 16. Task interdependence | 3.94 | 0.67 | -.06 | .05 | .17* | -.04 | -.01 | .03 | .22** | .02 | .09 | -.07 | .10 | -.07 | .23** | .27** | .83 | | | | | | | | | |
| 17. Unethical behavior | 3.53 | 0.72 | .03 | .06 | .04 | -.07 | -.00 | .14* | .08 | .08 | .28** | -.26** | .10 | -.18** | .42** | -.04 | .00 | .16** | .86 | | | | | | | |
| 18. Resistant behavior | 1.24 | 0.67 | -.14** | -.00 | -.07 | -.07 | .01 | -.20** | -.13† | -.35** | -.34** | .08 | -.18** | .14* | -.05 | .09 | .09 | -.10† | -.05 | .96 | | | | | | |
| 19. Loophole seeking | 1.59 | 0.70 | -.15** | .01 | -.03 | .01 | -.13* | -.27** | -.18** | -.40** | -.41** | .13* | -.22** | .20** | -.11* | -.02 | .13* | -.06 | -.24** | .87 | | | | | | |
| 20. Passive obedience | 1.68 | 0.82 | -.03 | -.07 | -.03 | -.02 | .01 | -.28** | -.16* | -.34** | -.50** | .23** | -.23** | .34** | -.16** | .05 | .03 | -.06 | -.17** | .54** | .63** | .90 | | | | |
| 21. Knowledge withholding | 2.18 | 0.83 | -.04 | -.08 | .05 | .04 | -.05 | -.29** | -.15* | -.14* | -.53** | .21** | -.20** | .25** | -.30** | .06 | .02 | -.09 | -.19** | .32** | .46** | .56** | .78 | | | |
| 22. Storytelling | 1.58 | 0.79 | -.14** | -.02 | -.10 | -.04 | -.09† | -.22** | -.18** | -.27** | -.34** | .18** | -.22** | .14* | -.08 | .04 | .20** | -.08 | -.23** | .65** | .66** | .45** | .32** | .88 | | |
| 23. CWB total | 1.77 | 0.82 | -.06 | -.06 | .03 | -.07 | -.00 | -.29** | -.19** | -.20** | -.47** | .16* | -.18** | .30** | -.14** | .10† | -.01 | -.01 | -.10† | .53** | .57** | .69** | .50** | .49** | .89 | |
| 24. CWB total | 1.67 | 0.60 | -.12* | -.05 | -.03 | -.03 | -.05 | -.32** | -.20** | -.34** | -.54** | .21** | -.25** | .29** | -.19** | .07 | .09† | -.08 | -.21** | .77** | .83** | .83** | .69** | .76** | .81** | 94 |

Note: N = 221–366. †p < .10; *p < .05; **p < .01. Reliability is in the diagonal. CWVB, counterproductive work behavior.

Table 5. Percents of CWB reported ($N = 366$)

| CWBs | Dimension | % ^a |
|--|-----------------------|----------------|
| Sell company important information for personal gain. | Unethical behavior | 9.8 |
| Steal others' information and products. | Unethical behavior | 11.5 |
| Use personal knowledge and technology to threaten company. | Unethical behavior | 12.0 |
| Provide others incorrect information. | Unethical behavior | 13.9 |
| Impede others from finishing their tasks by using professional skills. | Unethical behavior | 14.2 |
| Disobey supervisor's instructions. | Resistant behavior | 35.2 |
| Conflict with supervisor or peers. | Resistant behavior | 35.5 |
| Obey superior's instructions passively. | Resistant behavior | 50.0 |
| Quarrel with other departments. | Resistant behavior | 45.9 |
| Lower your performance levels to satisfy ambiguous performance standard minimums. | Loophole seeking | 47.3 |
| Work slackly on tasks that are difficult to evaluate. | Loophole seeking | 47.3 |
| Intentionally reduce efficiency. | Loophole seeking | 37.4 |
| Go along with supervisor's direction and never express your professional opinion. | Passive obedience | 76.2 |
| Reluctant to innovate. | Passive obedience | 63.1 |
| Act according to established rules, standards, and procedures without analyzing problems for better solutions. | Passive obedience | 61.5 |
| Reluctant to take on more responsibility. | Passive obedience | 69.4 |
| Do not want to transform personal knowledge and experience into organizational knowledge. | Knowledge withholding | 34.7 |
| Do not share innovative achievements. | Knowledge withholding | 39.1 |
| Do not share helpful information with others. | Knowledge withholding | 42.6 |
| Hide mistakes at work. | Storytelling | 51.6 |
| Make excuses for mistakes at work. | Storytelling | 57.7 |
| Make false statements about your workload. | Storytelling | 44.0 |

Note: ^aPercentage of respondents who indicated that they had performed the act at least once or twice in the last year. CWB, counterproductive work behavior.

452.83; $\chi^2/df = 2.33$; $NFI = .93$; $IFI = .96$; $CFI = .96$; $RMSEA = .06$). The factor loadings of the six-factor model were .66–.97. All of the factor loadings were statistically significant ($p < .01$). Our findings once again showed that knowledge workers' CWB can be treated as a six-dimensional construct and that our scale has strong stability.

Second, we tested whether CWB, demographics, personality, and the interaction of gender and personality affect JS. Results showed that (see Table 6) conscientiousness and neuroticism were significantly associated with JS ($\beta = .19$, $p < .01$; $\beta = -.19$, $p < .01$, respectively). Gender moderated the relationships between conscientiousness and openness and JS. The four subscales (i.e., resistant behavior, loophole seeking, passive obedience, and storytelling) could explain JS beyond demographics, personality, and the interaction of gender and personality ($\Delta R^2 = .03$, $p < .05$). Moreover, the two new factors (i.e., unethical behavior and knowledge withholding) could contribute to explain the unique variance ($\Delta R^2 = .03$, $p < .01$). Our results once again showed that our measure has good predictive validity.

3.2.3. Regression analyses

The regression analyses were conducted by entering SD as control in the first step, followed by demographic variables in the second step, job-related variables (i.e., empowerment, JS, and job characteristics) in the third step, personality (i.e., the Big Five traits and locus of

control) in the fourth step, and the interaction of gender and personality in the final step. Table 7 shows the regression results in the second, third, fourth, and final steps.

In Table 7, we see no significant relationships between CWB dimensions and age and education. Thus, $H1b$ and $H1c$ were totally rejected. There was a marginal significant and negative relationship between gender and unethical behavior ($\beta = -.10$, $p < .10$). Because we coded gender as a dummy variable (0 = male; 1 = female) in this study, the results means that male knowledge workers may perform more unethical behavior than females. Thus, $H1a$ was partially supported.

In Table 7, we also see that organizational tenure is significantly and negatively related to unethical behavior ($\beta = -.14$, $p < .05$), resistant behavior ($\beta = -.13$, $p < .10$), knowledge withholding ($\beta = -.19$, $p < .01$), and storytelling ($\beta = -.13$, $p < .10$). This means that the longer the individuals stay in the enterprise, the less likely they are to conduct unethical behavior, resistant behavior, knowledge withholding behavior, and storytelling. Thus, $H1d$ was partially supported. We also found that stock ownership was significantly and positively related to CWB total ($\beta = .13$, $p < .05$), resistant behavior ($\beta = .21$, $p < .01$), and knowledge withholding ($\beta = .18$, $p < .01$). This means that individuals with stock ownership conduct more general CWB, resistant behavior, and knowledge withholding than those without ownership. This finding is very surprising because we hypothesized that those who have stock ownership will conduct less

Table 6. Regression analysis of effects of demographic, personality, and CWB on job satisfaction

| Model | 1 | 2 | 3 | 4 | 5 |
|----------------------------|------|--------|--------|--------|--------|
| Gender | .03 | .06 | .05 | .03 | .03 |
| Age | .06 | .03 | -.00 | .01 | -.01 |
| Education | .01 | -.02 | -.02 | -.02 | -.02 |
| Organizational tenure | -.07 | -.03 | -.05 | -.04 | -.04 |
| Stock | .02 | .03 | .03 | .05 | .07 |
| Locus of control | | -.03 | -.06 | -.07 | -.08 |
| Extraversion | | -.01 | .02 | .02 | .02 |
| Agreeableness | | .04 | .01 | -.03 | -.01 |
| Conscientiousness | | .19** | .19** | .17** | .18** |
| Neuroticism | | -.19** | -.14* | -.13* | -.11† |
| Openness | | -.00 | -.02 | -.04 | -.04 |
| Gender × Locus of control | | | -.07 | -.06 | -.04 |
| Gender × Extraversion | | | .07 | .08 | .08 |
| Gender × Agreeableness | | | .04 | .02 | .02 |
| Gender × Conscientiousness | | | -.19** | -.20** | -.20** |
| Gender × Neuroticism | | | -.07 | -.07 | -.08 |
| Gender × Openness | | | .11† | .11† | .10 |
| Resistant behavior | | | | -.21** | -.21** |
| Loophole seeking | | | | .01 | -.03 |
| Passive obedience | | | | -.05 | -.05 |
| Storytelling | | | | .15* | .15* |
| Unethical behavior | | | | | .25** |
| Knowledge withholding | | | | | -.19** |
| R ² | .01 | .10 | .14 | .17 | .20 |
| ΔR ² | .01 | .09** | .05** | .03* | .03** |
| F | 0.49 | 2.96** | 2.92** | 2.73** | 3.82** |

Note: † $p < .10$; * $p < .05$; ** $p < .01$. CWB, counterproductive work behavior.

CWB than those without ownership. Thus, *H1e* was rejected.

In terms of job-related variables, the results showed that none of job nature and attitude variables was associated with CWB total. Psychological empowerment was only negatively related to passive obedience ($\beta = -.18$, $p < .01$), and JS was only negatively related to resistant behavior ($\beta = -.19$, $p < .01$) and knowledge withholding ($\beta = -.18$, $p < .01$). The results also showed that job characteristics were only related to unethical behavior and knowledge withholding. Specifically, routinization ($\beta = .12$, $p < .10$) and complexity ($\beta = .17$, $p < .05$) were positively related to unethical behavior, and interdependence ($\beta = -.15$, $p < .05$) was negatively related to unethical behavior. Complexity ($\beta = .30$, $p < .01$) was positively related to knowledge withholding. Thus, *H2a* to *H2e* were partially supported.

In terms of personality variables, the results showed that extraversion and openness were not related to any type of CWB. Conscientiousness could predict all types of CWB ($\beta = -.24$ to $-.47$, $p < .01$). Agreeableness could predict any other type of CWB ($\beta = -.11$ to $-.33$, $p < .10$) except passive obedience ($\beta = -.06$, $p > .10$). Neuroticism could predict loophole seeking ($\beta = .14$, $p < .05$) and CWB total ($\beta = .12$, $p < .10$). Locus of control could predict loophole seeking ($\beta = .14$, $p < .05$). Thus, *H3b* was totally supported; *H3a*, *H3e*, and *H3f* were partially supported; and *H3c* to *H3d* were not supported.

With regard to the interaction of gender and personality, the results showed that gender didn't moderate the relationships between neuroticism and CWB. However, gender could moderate the relationship between openness and overall CWB and any type of CWB ($\beta = .18$ – $.27$, $p < .10$) except passive obedience ($\beta = .04$, $p > .10$). Gender also could moderate the relationship between extraversion and storytelling ($\beta = -.22$, $p < .01$), the relationships between agreeableness and unethical behavior ($\beta = .17$, $p < .10$) and knowledge withholding ($\beta = .22$, $p < .05$), the relationship between conscientiousness and storytelling ($\beta = .19$, $p < .05$), and the relationships between locus of control and overall CWB ($\beta = .17$, $p < .10$), passive obedience ($\beta = .18$, $p < .10$), and knowledge withholding ($\beta = .22$, $p < .05$). Because of the restriction of space, we only exhibit the interaction effect of gender and openness on overall CWB in Figure 1. From Figure 1, we can find that the relationship between openness and overall CWB is negative for males, while positive for females. Thus, *H4e* was totally rejected, while *H4a*, *H4d*, and *H4f* were partially supported.

Table 7 also shows that the fourth step of the regression analysis contributed incremental variance over and above the variance contributed by the first three steps (all $\Delta R^2 = .11$ – $.26$, $p < .01$). These results indicated that personality variables are more important than demographic and job-related variables in predicting CWB.

Table 7. Regression analysis of effects of control, independent variables on CWB

| Model | CWB total | | | | | | | | | | | | | | | |
|----------------------------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Control | | | | | | | | | | | | | | | | |
| Social desirability | -.30** | -.27** | -.02 | -.05 | -.17* | -.17* | .06 | .03 | -.23** | -.21** | .01 | .02 | -.28** | -.26** | .01 | -.02 |
| Demographic | | | | | | | | | | | | | | | | |
| Gender | -.03 | -.00 | -.02 | .00 | -.10† | -.07 | -.09 | -.08 | -.08 | -.05 | -.06 | -.04 | .04 | .05 | .03 | .05 |
| Age | -.01 | .01 | .09 | .11† | .05 | .06 | .13* | .16* | .05 | .06 | .13* | .17** | -.06 | -.05 | .03 | .03 |
| Education | -.03 | -.04 | .02 | .01 | -.10 | -.10 | -.06 | -.06 | -.03 | -.02 | .03 | .00 | -.01 | -.01 | .05 | .05 |
| Organizational tenure | -.11 | -.15* | -.17** | -.14* | -.14* | -.15* | -.17* | -.14* | -.13† | -.14† | -.16* | -.13† | -.03 | -.05 | -.07 | -.06 |
| Stock | .13* | .14* | .08 | .06 | .07 | .06 | .00 | -.02 | .21** | .22** | .16** | .14* | .04 | .05 | -.01 | -.02 |
| Job variables | | | | | | | | | | | | | | | | |
| Empowerment | -.09 | -.09 | -.01 | .02 | -.03 | -.03 | .01 | .06 | -.01 | -.01 | .03 | .05 | -.06 | -.06 | .05 | .05 |
| Job satisfaction | -.12 | -.12 | .00 | -.01 | .02 | .02 | .11† | .10 | -.19** | -.19** | -.09 | -.11† | -.12 | -.12 | -.01 | -.02 |
| Routinization | .03 | .03 | .01 | .01 | .12† | .12† | .11† | .08 | -.07 | -.08 | -.08 | -.07 | -.02 | -.03 | -.03 | -.03 |
| Complexity | .10 | .10 | .07 | .10 | .17* | .17* | .14* | .16* | .07 | .07 | .04 | .08 | .04 | .04 | .01 | .04 |
| Interdependence | -.09 | -.09 | -.08 | -.07 | -.15* | -.15* | -.15* | -.14* | -.09 | -.09 | -.08 | -.05 | -.05 | -.05 | -.05 | -.05 |
| Personality | | | | | | | | | | | | | | | | |
| Extraversion | -.06 | -.06 | -.06 | .05 | -.30** | -.30** | .01 | .10 | -.39** | -.39** | -.05 | .05 | -.03 | -.03 | -.03 | .06 |
| Agreeableness | -.26** | -.26** | -.44** | -.46** | -.46** | -.46** | -.32** | -.39** | -.37** | -.37** | -.33** | -.29** | -.28** | -.28** | -.28** | -.32** |
| Conscientiousness | .44** | .44** | .12† | .14† | .14† | .14† | -.31** | -.37** | -.37** | -.31** | -.31** | -.34** | -.39** | -.39** | -.35** | -.35** |
| Neuroticism | .12† | .12† | .12† | .14† | .14† | .14† | .07 | .04 | .04 | .09 | .09 | .09 | .14* | .14* | .14* | .19* |
| Openness | -.04 | -.04 | -.04 | -.23** | -.23** | -.23** | -.09 | -.29** | -.29** | -.08 | -.08 | -.29** | -.03 | -.03 | -.03 | -.16† |
| Locus of control | .04 | .04 | .04 | -.03 | -.03 | -.03 | .02 | .01 | .01 | .00 | .00 | -.04 | .14* | .14* | .14* | .10 |
| Interactions | | | | | | | | | | | | | | | | |
| Gender × Extraversion | | | | -.13 | -.13 | -.13 | | -.10 | | | | -.09 | | | | -.13 |
| Gender × Agreeableness | | | | .10 | .10 | .10 | | .17† | | | | -.04 | | | | .07 |
| Gender × Conscientiousness | | | | .12 | .12 | .12 | | .16 | | | | .08 | | | | .01 |
| Gender × Neuroticism | | | | -.03 | -.03 | -.03 | | .06 | | | | .01 | | | | -.06 |
| Gender × Openness | | | | .25** | .25** | .25** | | .27** | | | | .27** | | | | .18† |
| Gender × Locus of control | | | | .17† | .17† | .17† | | .09 | | | | .15 | | | | .06 |
| R ² | .12 | .17 | .43 | .47 | .07 | .11 | .30 | .37 | .10 | .18 | .38 | .42 | .09 | .12 | .37 | .39 |
| ΔR ² | .02 | .04† | .26** | .05** | .03 | .04 | .19** | .07** | .05* | .06* | .20** | .04† | .01 | .02 | .26** | .02 |
| F | 5.07** | 3.80** | 8.86** | 7.69** | 2.80** | 2.33** | 5.09** | 4.99** | 5.11** | 4.19** | 7.36** | 6.15** | 3.48** | 2.46** | 7.04** | 5.52** |

| Model | Passive obedience | | | | | Knowledge withholding | | | | | Storytelling | | | | |
|----------------------------|-------------------|--------|--------|--------|--------|-----------------------|--------|--------|--------|--------|--------------|--------|--|--|--|
| | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | | | |
| Control | | | | | | | | | | | | | | | |
| Social desirability | -.28** | -.25** | -.10 | -.08 | -.19** | -.16* | -.01 | -.07 | -.29** | -.26** | -.08 | -.12 | | | |
| Demographic | | | | | | | | | | | | | | | |
| Gender | .04 | .04 | .02 | .02 | -.06 | .01 | -.01 | .01 | .01 | -.01 | -.01 | .02 | | | |
| Age | -.06 | -.04 | .02 | .04 | .04 | .06 | .11† | .12† | -.04 | -.03 | .04 | .06 | | | |
| Education | .09 | .06 | .12† | .09 | -.12 | -.15* | -.10 | -.10 | .02 | .01 | .06 | .07 | | | |
| Organizational tenure | .04 | .00 | -.02 | -.00 | -.19** | -.23** | -.25** | -.22** | -.13† | -.15* | -.17* | -.14* | | | |
| Stock | .07 | .08 | .05 | .04 | .18** | .19** | .15* | .13* | .09 | .10 | .05 | .04 | | | |
| Job variables | | | | | | | | | | | | | | | |
| Empowerment | | -.18* | -.10 | -.10 | -.10 | -.10 | -.07 | -.04 | -.04 | -.04 | .05 | .08 | | | |
| Job satisfaction | | -.04 | .06 | .05 | -.18** | -.18** | -.11† | -.12† | -.05 | -.05 | .04 | .04 | | | |
| Routinization | | -.05 | -.07 | -.04 | .07 | .07 | .05 | .04 | .08 | .08 | .06 | .04 | | | |
| Complexity | | .04 | .00 | .01 | .26** | .26** | .23** | .26** | -.04 | -.04 | -.06 | -.04 | | | |
| Interdependence | | -.05 | -.04 | -.02 | -.10 | -.10 | -.08 | -.09 | -.03 | -.03 | -.02 | -.01 | | | |
| Personality | | | | | | | | | | | | | | | |
| Extraversion | | -.05 | -.05 | .06 | -.06 | -.06 | -.06 | .05 | -.06 | -.06 | -.09 | .06 | | | |
| Agreeableness | | -.06 | -.06 | -.01 | -.48** | -.48** | -.22** | -.34** | -.22** | -.22** | -.11† | -.17* | | | |
| Conscientiousness | | -.47** | -.47** | -.12 | .10 | .10 | -.24** | -.21* | -.41** | -.41** | -.47** | -.47** | | | |
| Neuroticism | | .10 | .10 | .12 | .10 | .10 | .10 | .16† | .08 | .08 | .09 | .09 | | | |
| Openness | | .01 | .01 | -.03 | -.03 | -.03 | -.07 | -.25** | -.04 | -.04 | -.15 | -.15 | | | |
| Locus of control | | -.02 | -.02 | -.09 | -.09 | -.09 | -.05 | -.16† | .10 | .10 | .10 | .05 | | | |
| Interactions | | | | | | | | | | | | | | | |
| Gender × Extraversion | | | | .06 | | | | -.13 | | | | -.22** | | | |
| Gender × Agreeableness | | | | -.08 | | | | .22* | | | | .14 | | | |
| Gender × Conscientiousness | | | | .05 | | | | .12 | | | | .19* | | | |
| Gender × Neuroticism | | | | -.04 | | | | -.08 | | | | -.01 | | | |
| Gender × Openness | | | | .04 | | | | .24** | | | | .24* | | | |
| Gender × Locus of control | | | | .18† | | | | .22* | | | | .13 | | | |
| R ² | .10 | .14 | .33 | .35 | .11 | .21 | .31 | .39 | .11 | .13 | .31 | .30 | | | |
| ΔR ² | .02 | .04† | .19** | .02 | .06* | .10** | .11** | .07** | .02 | .02 | .18** | .07** | | | |
| F | 3.91** | 3.14** | 5.94** | 4.57** | 4.23** | 4.97** | 5.48** | 5.35** | 4.21** | 2.71* | 5.33** | 5.18** | | | |

Note: †p < .10; *p < .05; **p < .01. CWB, counterproductive work behavior.

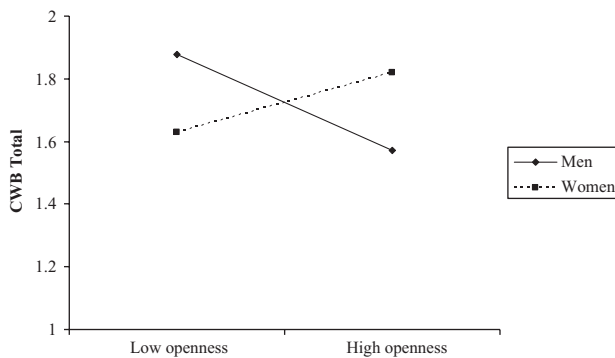


Figure 1. Openness and overall counterproductive work behavior (CWB) by gender.

3.3. Discussion

3.3.1. Frequencies of CWB

Our results showed that the least reported dimension of CWB was unethical behavior while the most reported dimension was passive obedience. This means that the more serious the act is, the less likely the individual will conduct it. Our results also indicated that the percentages of CWB among Chinese knowledge workers were relatively high. Compared with CWB among white-collar workers in Turkey (Bayram, Gursakal, & Bilgel, 2009), the frequencies of CWB among knowledge workers in China were higher. The mean frequency of production deviance was 13.5% in Bayram et al.'s study, while in our study the mean frequency of loophole seeking, which was similar to production deviance, was 44.0%. Our study provides strong empirical evidence for the argument that CWBs among knowledge workers in China are very prevalent. Thus, Chinese managers should pay attention to the most frequently reported CWB.

3.3.2. Antecedents of CWB

To begin with, we found that some demographic variables were correlated with CWB. The results showed that age and education have no significant influences on CWB, but gender, organizational tenure, and stock ownership have some influence on specific CWBs. Specifically, we found that male knowledge workers may perform more unethical behaviors than females. Individuals who have stayed in enterprises longer were less likely to conduct unethical behavior, resistant behavior, knowledge withholding behavior, and storytelling. We also found a surprising result that those who had stock ownership in their enterprises conducted more general CWB, resistant behavior, and knowledge withholding. A possible explanation for this came from psychological ownership. According to Pierce and his colleagues' (2001) argument, psychological ownership has both positive effects and negative effects. 'Much like the

overly possessive child, individuals may be unwilling to share the target of ownership with others or may feel a need to retain exclusive control over it' (Pierce et al., 2003, p. 101). Thus, stock ownership can lead to strong psychological ownership, and in turn lead to counterproductive behaviors. These findings are very useful for Chinese enterprises. We can draw several practical implications from our findings. Organizations should pay more attention to newcomers than to senior employees because the former are more likely to conduct unethical behavior and knowledge withholding. Our findings also remind organizations that stock ownership not only motivates employees but may also increase their resistant behavior and knowledge withholding behavior.

Next, we found that psychological empowerment, JS, and job characteristics were related to some types of CWB. Our findings showed that JS could only predict resistant behavior and knowledge withholding. Therefore, organizations can reduce knowledge workers' resistant behavior and knowledge withholding by increasing their JS. Results also showed that psychological empowerment could only predict passive obedience. Thus, organizations can reduce individuals' passive obedience behaviors by increasing empowerment. In terms of job characteristics, routinization and complexity were positively related to unethical behavior, and interdependence was negatively related to unethical behavior. Complexity was also positively related to knowledge withholding. The results suggest that knowledge work should not be designed to be too programmed or too nonroutine. When organizations redesign knowledge work, they should keep the work moderately complex and allow for strong interdependence.

In addition, our results showed that personality variables accounted for more CWB than did demographic and situational variables. This suggests that personality variables are more important than demographic and situational variables in exhibiting CWB. Specifically, we found that locus of control (external) was positively related to loophole seeking behaviors. We also found that the three factors (i.e., agreeableness, conscientiousness, and neuroticism) could predict CWB. Agreeableness and conscientiousness were negatively correlated with CWB, while neuroticism was positively correlated with CWB. These findings are consistent with those of studies in western cultures (Berry et al., 2007). According to our results, organizations can prevent the occurrence of CWB by selecting knowledge workers with high agreeableness, high conscientiousness, and low neuroticism.

Finally, our results showed that gender moderated the relationship between personality and CWB. This suggests that organizations should consider gender difference critically when they select knowledge workers by using personality criterions.

4. General discussion

In this paper, we developed an indigenous scale for measuring knowledge workers' CWB and used this scale to investigate the antecedents of CWB in the Chinese context. Thus, our studies make at least two important contributions.

First, we used standard procedures (Hinkin, 1995; Hinkin, 1998) to develop an indigenous scale for CWB that yielded six dimensions. These six dimensions are different from those in existing western CWB scales. Some dimensions capture Chinese cultural characteristics. For example, the Chinese culture emphasizes ethical standards. Our scale includes one dimension that is labeled unethical behavior. Our study also provides one of the first measures of knowledge workers' CWB. Though there are some existing scales for CWB, these rarely focus on knowledge workers. As some scholars suggest, the items in previous scales for CWB should be updated and refined (Bayram et al., 2009), and refocused on some emerging groups such as knowledge workers. Our findings did find some specific dimensions that were closely related to knowledge workers. For example, two dimensions (i.e., sabotage and withdrawal) in Spector et al.'s (2006) scale and four dimensions (i.e., alcohol use, drug use, inappropriate physical actions, and poor attendance) in Gruy and Sackett's scale were not present in our CWB scale. Meanwhile, our scale adds some new dimensions, such as knowledge withholding and unethical behavior.

Second, we investigated the antecedents of CWBs among Chinese knowledge workers, which included demographic, job-related, personality variables, and the interactions of gender and personality. This study found that a number of factors could predict knowledge workers' CWB. For example, empowerment predicted passive obedience, JS predicted resistant behavior and knowledge withholding, routinization and interdependence predicted unethical behavior, and complexity predicted unethical behavior and knowledge withholding. We also found that gender, organizational tenure, and stock ownership could influence knowledge workers' CWB. In particular, we found that personality variables have more important influences on CWB than did other variables. Agreeableness, conscientiousness, and neuroticism have very strong predictive power. These findings are very consistent with those of western research (e.g., Salgado, 2002; Berry et al., 2007). In addition, we found that locus of control could predict loop-hole seeking. Thus, our study suggests that the strong correlations between four personality traits (i.e., agreeableness, conscientiousness, neuroticism, and locus of control) and CWB may have cross-cultural generalizability. Moreover, this study found that gender could moderate the relationship between personality and CWB.

4.1. Limitations

First, though we presented two substudies to validate our CWB scale, our validation may still be incomplete. As Bennett and Robinson (2000) argued, 'no measure can ever be said to be validated in any final sense' (p. 357), our studies only represent a first step. Future studies are necessary to provide support to this construct and measure.

Second, we used self-report questionnaires in our studies. There are noteworthy criticisms about self-report. The main criticism is that self-report may produce common method biases. However, considering that most CWBs are covert and others cannot observe these behaviors, self-report may be a more effective way of measuring them. We agree with Bennett and Robinson's (2000) argument that 'self-report can be a valid way of assessing the broad variety of deviant behaviors in the workplace, particularly when respondents are assured anonymity' (p. 357). In our studies, we assured the participants of anonymity. In addition, we added SD as control variable in Study 2 in order to reduce common method variance bias. Thus, we were able to minimize the limitations of self-report.

Third, we did not measure some organizational variables (e.g., injustice) that have been accepted as important factors, such as procedural injustice, distributive injustice, interactional injustice, and informational injustice. Future studies may investigate the relationships between these variables and knowledge workers' CWB.

Fourth, our studies were conducted using cross-sectional design. In order to determine the direction of causality, we encourage future researchers to reexamine our findings through longitudinal design.

Finally, the samples used to develop the scale in Study 1 were relatively small. Thus, the generalization of our findings is limited. However, we used one large independent sample in Study 2 to revalidate our scale. This shows that our findings are rather robust.

4.2. Conclusions

Although CWB has become a hot topic in the western literature, there are few research on Chinese knowledge workers. In this study, we developed an indigenous scale for knowledge workers' CWB that included six dimensions: unethical behavior, resistant behavior, loop-hole seeking, passive obedience, knowledge withholding, and storytelling. We also used this scale to investigate the frequency and antecedents of CWB. Our empirical data showed that CWB among Chinese knowledge workers is rather prevalent. The results of this study also showed that personality variables (i.e., agreeableness, conscientiousness, neuroticism, and locus of control) are more important than other variables (e.g., demographic and job characteristics) in exhibiting

CWB. Although our scale validation may still be incomplete, we hope our scale proves useful for future studies of knowledge workers' CWB. We also hope more and more researchers would conduct research on Chinese knowledge workers' behaviors.

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