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Abstract

Purpose – The purpose of this paper is to examine the complex relationships between permeability, work-family conflict, moral disengagement, behavioral disengagement, job strain, and job engagement. In addition, this study aims to determine whether moral disengagement acts as a moderator and mediator in the relationship between work-family conflict and behavioral disengagement.

Design/methodology/approach – The authors apply partial least squares structural equation modeling to test the hypotheses, using a sample of 176 valid responses.

Findings – The results indicate that permeability is likely to promote work-family conflict, which in turn may trigger moral disengagement. Moral disengagement may lead to behavioral disengagement, which in turn may increase job strain and decrease job engagement. Our findings also show that work-family conflict does not have a significant effect on behavioral disengagement, suggesting that moral disengagement fully mediates the influence of work-family conflict on behavioral disengagement. In addition, the moderating effect of moral disengagement is not significant.

Originality/value – Applying the transactional model of stress and coping theory and the moral disengagement theory, this study contributes to a better understanding of employees' experience of job strain caused by work-family conflict (induced by permeability of IM usage), as well as the employee's coping response.

Keywords Behavioral disengagement, Instant message, Job engagement, Job strain, Moral disengagement, Permeability, Work-family conflict.

Paper type Research paper

1. Introduction

The ubiquity of smartphones has enabled individuals to communicate with the office and engage in a wide range of work-related tasks from anywhere at any time. Previous studies on the effects of using mobile instant messaging (IM) at work have shown that IM usage leads to enhanced communication quality, enhanced interactivity, mutual trust among employees, and an enhanced perception of task success (Hung *et al.*, 2007).

However, other studies have found that IM usage leads to an overall increase in the perceived workload (Gupta *et al.*, 2013). Using IM apps to perform additional work after hours might blur the work-home boundary, giving the staff pressure from family who want more time with them, thus leading to work-family conflict. Work-family conflict is considered a "bad stressor" since it represents a stressful situation which receives a negative appraisal as a threat. In response to work-family conflict, individuals may adopt dysfunctional (maladaptive) approaches to disengage and deny the invasion of information communication technologies (ICT).

Although there is preliminary evidence to support this notion (Gaudioso *et al.*, 2017), the information systems (IS) literature lacks a systematic and theory-driven investigation of how individuals respond to work-family conflict as a result of IM app usage after work hours. There is evidence that bad stressors are positively associated with maladaptive coping. To date, however, we have a limited understanding of the possible boundary conditions of this relationship.

Using the transactional model of stress and coping theory (Lazarus and Folkman, 1984) as the foundation and integrating it with the moral disengagement theory, this study develops and empirically tests a theory-based research model that predicts that employees may engage in cognitive disengagement coping methods in response to a task assignment from a manager or supervisor via an IM app after office hours. We

explicate this cognitive disengagement coping in the form of cognitive rationalization processes drawn from moral disengagement theory (Bandura, 1986), and we consider moral disengagement as a form of cognitive disengagement coping. In this manner of coping, employees respond to work-family conflict by disengaging their internal self-regulation related to hidden rules in the workplace, which in turn increases their intention to not respond to IM messages from their managers or supervisors to avoid engaging in additional work. Although considerable research has found that moral disengagement leads to deviant behaviors, it is less clear whether employees whose level of moral disengagement is high are more likely to engage in behaviors contrary to the hidden rules in the workplace when suffering from the stress of work-family conflict.

This study aims to (1) determine whether significant relationships exist among the research constructs (i.e., permeability, work-family conflict, moral disengagement, behavioral disengagement, job strain, and job engagement), and (2) determine whether moral disengagement acts as a moderator and mediator in the relationship between work-family conflict and behavioral disengagement.

This research contributes to the job strain research stream by incorporating the moral disengagement construct (along with its antecedents and consequences) into previous models, thus extending the transactional model of stress and coping theory, and then applying this extended model to the context of job strain caused by work-family conflict (induced by the permeability of IM usage). Our findings provide theoretical contributions based on the following three dimensions: the response to work-family conflict, the distinction between cognitive disengagement and behavioral disengagement, and the mediating role of moral disengagement. First, this study is the first to document how individuals respond to work-family conflict as a result of IM app

usage after work hours. Second, this study views moral disengagement as a form of cognitive disengagement coping. This is unlike D'Arcy *et al.* (2014) who viewed moral disengagement as a form of emotion-focused coping. This study distinguishes between cognitive and behavioral disengagement, considers them as two different types of maladaptive coping, and investigates their effects on job strain and job engagement. Third, to the best of our knowledge, no published study has investigated the mediating effect of moral disengagement in the link between work-family conflict and behavioral disengagement. Therefore, this current study attempts to fill this gap by focusing specifically on moral disengagement in relation to the IM app as a communication technology that is heavily used in the workplace.

2. Literature Review

2.1 Stress and Coping

The Transactional Model of Stress and Coping (Lazarus and Folkman, 1984) is a framework for evaluating the processes of coping with stressful events. In this context, the term "transactional" means that the stress is a product of the interaction or transaction between the person and the environment. Demands that cause people to experience stress are called stressors. Work-family conflict is a stressor. Psychological stress is "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus and Folkman, 1984, p. 19). This relationship goes through two important phases: (1) cognitive appraisals and (2) coping.

Cognitive appraisal is "a process through which the person evaluates whether a particular encounter with the environment is relevant to his or her well-being, and if so, in what ways" (Folkman et al., 1986, p. 992). The cognitive appraisal of a stressor

involves two processes: primary and secondary appraisals (Lazarus and Folkman, 1984). In the primary appraisal, the person evaluates whether he or she has anything at stake in a certain situation or encounter (Folkman et al., 1986). Situations or events are perceived as being irrelevant, benign-positive, or stressful. Stressful situations or stressors may be further subdivided into such categories as challenge, threat, and harm/loss (Lazarus and Folkman, 1984). Challenge refers to the potential for growth, mastery, or some forms of gain, whereas threat refers to possible future damage (harm/loss) that an event may cause. Harm/loss refers to injury or damage that has already taken place, as in harm to or loss of a job, a friendship, or self-esteem.

In the secondary appraisal, "the person evaluates if there is anything that can be done to overcome or prevent harm or to improve the prospects for benefit" (Folkman et al., 1986, p.993). The secondary appraisal involves the evaluation of the coping resources and options available to the individual to manage the stress, as well as controllability of the stressor or situation. Coping resources may include social, physical (e.g., health), psychological (e.g., self-esteem) and material (e.g., financial) assets (Lazarus and Folkman, 1984). Specifically, the secondary appraisal involves the individual's evaluation of the coping strategies at his or her disposal for addressing any stressful situation. The current study focuses on the stressor-coping strategy relationship.

Coping is defined as the person's "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the person's resources" (Lazarus and Folkman, 1984, p.141). There are many ways to categorize coping strategies. One of the most commonly used categorizations is problem-focused versus emotion-focused coping. Problem-focused coping refers to efforts to alter the troubled person-environment relationship causing

the distress, while emotion-focused coping refers to efforts to regulate stressful emotions (Folkman *et al.*, 1986). The present study adopted Connor-Smith et al.'s (2000) distinction between engagement and disengagement coping. Engagement coping is generally viewed as adaptive, while disengagement coping is considered maladaptive. In this study, we focus on disengagement coping since work-family conflict is viewed as a threat which usually leads to maladaptive coping. This study follows D'Arcy *et al.* (2014) to operationalize moral disengagement as a coping strategy. However, unlike D'Arcy *et al.* (2014), who viewed moral disengagement as a form of emotion-focused coping, this study views moral disengagement as a form of cognitive coping (cognitive disengagement). In addition, our operationalization of behavioral disengagement is analogous to Connor-Smith et al.'s (2000) concepts of inaction and escape.

Building on Lazarus and Folkman (1984), Blascovich and colleagues (Blascovich, 2008; Blascovich and Tomaka, 1996) introduced the Biopsychosocial Model of Challenge and Threat (BPS model) to identify the physiological responses to challenge and threat. Individuals experience challenge when appraisals of personal resources exceed situational demands, whereas they experience threat when appraisals of demands exceed their resources. According to the BPS model, challenge leads to sympathetic-adrenal-medullary (SAM) activation, whereas threat leads to both SAM activation and hypothalamic-pituitary-adrenal cortical (HPA) activation. Prior research has shown that work-family conflict leads to threat appraisal (Glaser and Hecht, 2013), and stressors appraised as threat or hindrance have the potential to harm personal growth or gain, triggering passive or disengagement coping (LePine et al., 2005). Therefore this study focuses on the relationship between work-family conflict and disengagement coping (both cognitive and behavioral). The BPS model focuses on physiological responses to challenge and threat (i.e., SAM and HPA). However, since

this study focuses on cognitive and behavioral responses to work-family conflict, we adopt the Transactional Model of Stress and Coping as the theoretical basis instead of the BPS model.

2.2 Moral disengagement

Cognitive disengagement is a mechanism for coping. Moral disengagement, a type of cognitive disengagement, is a central construct in Bandura's (1986) social cognitive theory of moral thought and action. Bandura (1990, 1999) argued that people continuously self-regulate their thoughts and actions by evaluating their behavior in accordance with their internal moral standards. Moral disengagement is the key to deactivating moral self-regulation (Bandura, 1999). Via moral disengagement, individuals free themselves from the self-sanctions and accompanying guilt that ensue when behavior violates internal standards, and they are therefore more likely to make unethical decisions (Detert *et al.*, 2008). In other words, the self-regulatory process can fail when moral disengagement mechanisms disable the cognitive links between transgressive behavior and the self-censure that should prevent it (Bandura 1986, 2002).

Bandura (1986) proposed that moral disengagement occurs through a set of eight interrelated cognitive mechanisms that facilitate unethical behavior: moral justification, euphemistic labeling, advantageous comparison, displacement of responsibility, diffusion of responsibility, distortion of consequences, dehumanization, and attribution of blame. These eight mechanisms are further classified into three main categories.

The first category, reconstruing the conduct, consists of three moral disengagement mechanisms: moral justification, euphemistic labeling, and advantageous comparison. Reconstruing the conduct involves cognitive misconstrual of reprehensible behavior in a way that increases its moral acceptability (Bandura, 1986). In other words, it serves to cognitively restructure unethical acts so that they

appear less harmful. The second category, obscuring or distorting consequences, consists of three mechanisms: displacement of responsibility, diffusion of responsibility, and distortion of consequences. This category occurs when an individual obscures or distorts the effects of harmful acts (Bandura, 1986). The third category, devaluing the target, consists of two mechanisms: dehumanization and attribution of blame. These two mechanisms can disengage moral sanctions by reducing identification with the targets of harmful acts (Detert *et al.*, 2008).

D'Arcy *et al.* (2014) integrated the transactional model of stress and coping theory with the moral disengagement theory to explore the underlying relationship between employee stress caused by burdensome, complex and ambiguous information security requirements (termed "security-related stress") and deliberate information security policy violations. However, it serves well to highlight that D'Arcy *et al.* (2014) viewed moral disengagement as a form of emotion-focused coping, and violation intention as the coping outcome. As mentioned earlier, moral disengagement consists of eight interrelated cognitive mechanisms. Therefore, this study views moral disengagement as a social-cognitive mechanism that allows individuals to justify the behavioral coping response (e.g., not responding to the supervisor's instant messaging calls) to the stressor (e.g., work-family conflict). This study extends the moral disengagement concept by proposing another type of disengagement: behavioral disengagement. Behavioral disengagement is a behavioral coping mechanism rather than the outcome of coping, whereas job strain and job engagement are the actual outcomes of coping.

2.3 Technostress

Although the use of information technology in the workplace can enhance job performance, the various characteristics of such technology (e.g., pace of change) may create new sources of stress (e.g., work overload) with which employees may find

difficulty coping and thus feel frustrated and overwhelmed (Ayyagari et al., 2011). Recent literature has described such cognitive responses to the use of information and communication technology (ICT) in the workplace as technostress (Ayyagari et al., 2011; Ragu-Nathan et al., 2008). In the early 1980s, Craig Brod was one of the first researchers to define technostress. The term refers to "modern disease of adaptation caused by an inability to cope with new computer technology in a healthy manner" (Brod 1984). Ragu-Nathan et al. (2008) defined it as the stress experienced by individuals as a result of the ICT usage. Tarafdar et al. (2010) described technostress as the phenomenon of "stress caused by an inability to cope with the demands of organizational computer usage" (p.304).

One of the streams of research on stress and technology usage focuses on factors that create technostress in the organization, and it has received considerable attention in the information systems discipline in recent years (Ayyagari et al., 2011; Ragu-Nathan et al., 2008; Tarafdar et al., 2010). For example, Ayyagari et al. (2011) argued that to understand ICT-induced stress, it is important to identify manifestations of the technologies themselves. They identified certain technology characteristics and examined their influences on stressors. Ayyagari et al. (2011) found that presenteeism, an attribute of technology, engenders work-home conflict, invasion of privacy, work overload, and role ambiguity stressors. Presenteeism was defined as the degree to which the technology enables users to be reachable, which is analogous to permeability in our research model. Note, however, that Ayyagari et al. (2011) focused on the technology characteristics-stressors-strain relationship, and ignored the mediating role of coping between stressors and strain. This study examines the technology characteristics-stressors-coping-strain relationship and extends Ayyagari et al. (2011) by integrating the transactional model of stress and coping theory with moral disengagement theory,

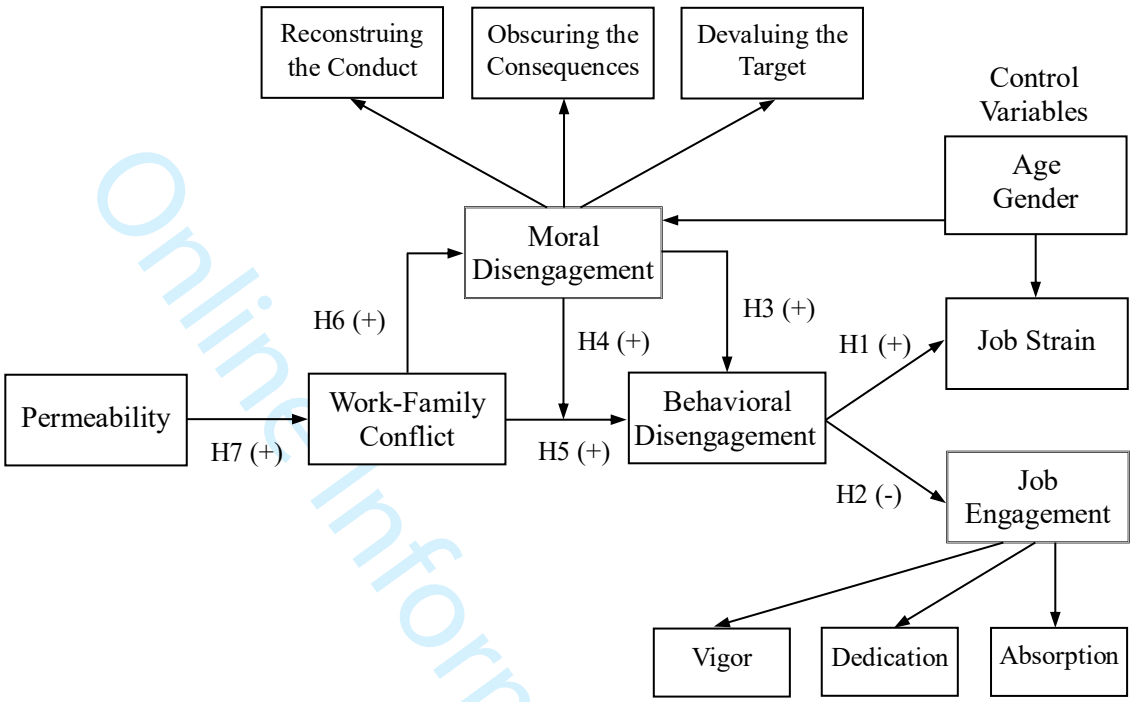
and applying the extended model to the context of job strain caused by work-family conflict (induced by the permeability of IM usage).

3. Research Model and Hypotheses

Viewing permeability as a technology characteristic that can lead to work-family conflict, this study extends the technostress concept to the domain of IM app usage. This study also offers a new avenue for understanding both the employees' job strain caused by work-family conflict (induced by the permeability of IM usage) and the employee's coping response. Similar to D'Arcy *et al.* (2014), this study incorporates the transactional model of stress and coping theory and the moral disengagement theory, and theorizes that the stress of work-family conflict causes individuals to invoke the coping processes of behavioral disengagement and moral disengagement. Moral disengagement, which we suggest moderates the relationship between work-family conflict and behavioral disengagement, is viewed as a social-cognitive mechanism that allows individuals to justify the behavioral coping response (for example, not responding to the supervisor's IM calls). However, unlike D'Arcy *et al.* (2014), we consider behavioral disengagement as a form of coping *behavior* as opposed to the coping *outcome*. Prior research has indicated that maladaptive coping is negatively associated with individuals' wellbeing at work, including job engagement and job stress. Thus, this study further theorizes that behavioral disengagement increases job strain and decreases job engagement. The research model is shown in Figure 1. Moral disengagement is a second-order construct with three sub-components (reconstruing the conduct, obscuring the consequences and devaluing the target), while job engagement is a second-order construct with three sub-components (vigor, dedication, and absorption).

Figure 1.

Research Model



Behavioral Disengagement

Behavioral disengagement means giving up, or withdrawing from coping with a stressor. In this study, behavioral disengagement refers to a subordinate giving up on or withdrawing effort from responding to his or her managers or supervisors' instant message calls. In the long run, workers' behavioral disengagement may lead to job strain (Davies and Clark, 1998). Use of the behavioral disengagement coping mechanism is likely to be linked to negative health outcomes such as anxiety and depression (Li *e al.*, 2014). In addition, behavioral disengagement is dysfunctional for workers because it allows them to only temporarily withdraw from the stressors (Jex *et al.*, 2001). Therefore:

H1: Individual behavioral disengagement is positively related to job strain.

Disengagement coping is an attempt to escape the associated stressor (Carver and

Connor-Smith, 2010). Disengaging and ignoring stressors requires mental effort, which may further deplete employees' mental resources and, consequently, can be detrimental to their wellbeing, e.g., job engagement (Lazarus and Folkman, 1984). While cognitive and behavioral coping strategies are important for predicting engagement, maladaptive coping can increase the effect of stress on work engagement (Parker and Martin, 2009). Employees adopting a behavioral disengagement strategy, giving up on or withdrawing from coping with a stressor, are less likely to be energetic, enthusiastic and immersed in their job. Kaiseler *et al.* (2014) provided support to the notion that the use of less active coping and more behavioral disengagement predict lower work engagement. Thus, this study proposes the following.

H2: Individual behavioral disengagement is negatively related to job engagement.

Moral Disengagement

In this study, moral disengagement is defined as a set of cognitive mechanisms that deactivate moral self-regulatory processes and thereby help explain why individuals often make unethical decisions without apparent guilt or self-censure (Bandura, 1986). According to Deter et al. (2008), moral disengagement increases unethical behavior because morally disengaged reasoning disconnects a contemplated act from the guilt or self-censure that would otherwise prevent it. Prior research has found that moral disengagement is positively associated with unethical behaviors in the workplace (Huang *et al.*, 2017), as well as information security policy violations (D'Arcy *et al.*, 2014). Based on this empirical evidence, moral disengagement should be relevant in the context of behavioral disengagement regarding instant messages from supervisors after hours. Thus, we postulate the following.

H3: Moral disengagement is positively related to behavioral disengagement.

According to the moral disengagement theory (Bandura, 1990), individuals who

have high levels of moral disengagement are less likely to act upon their moral emotions (e.g., guilt and self-sanctions) than are those with low levels of moral disengagement. Individuals who evaluate work-family conflict as a threat and have high levels of moral disengagement may deactivate self-regulatory mechanisms and disengage moral self-sanctions from unethical behaviors. Thus, they are more likely to adopt a maladaptive coping mechanism (e.g., behavioral disengagement) to withdraw effort or avoid dealing with the stressful event. Individuals may also rationalize that, in comparison to other seriously unethical behaviors, engaging in behavioral disengagement by not responding to instant messages from supervisors after hours is justified, especially considering the importance of work-family balance. Consequently, individuals with high moral disengagement and high work-family conflict are more likely to engage more behavioral disengagement than are those with low moral disengagement and low work-family conflict.

H4: Moral disengagement moderates the relationship between work-family conflict and behavioral disengagement.

Work-family conflict

Work-family conflict is frequently defined as "a form of inter-role conflict" in which the behavioral requirements associated with the role performed in the work and family domains are mutually incompatible (Greenhaus and Beutell, 1985). This study focuses on the situation where work roles and responsibilities interfere with family roles, which is called work interference with family. Aazami *et al.* (2015) indicated that individuals may perceive work-family conflict as not controllable; therefore they will adopt maladaptive coping strategies such as refusing to manage the stressful event.

H5: Individual perception of work-family conflict is positively related to behavioral disengagement.

D'Arcy *et al.* (2014) provided support for the notion that stressors trigger moral disengagement. The negative impacts of work-family conflict can cause individuals to doubt the value of striving hard at work at the cost of family life. Such doubts might lead employees to cognitively reclassify the behavior (e.g., not responding to the supervisors' IM calls after hours) as personally and socially acceptable, and less harmful. Individuals who value family life are more likely to diminish the importance of responding to supplemental work-related instant messages from their supervisors after work hours, and obscure or distort the effects of not responding. Employees may devalue their supervisor, in terms of how he or she deprived them of time they should spend with their families, and justify the behavior of not responding on such grounds (e.g., "my supervisor is not considerate and does not care about my wellbeing"). Hence, in this sense, employees can rationalize that employers bring the violations upon themselves.

H6: An individual's perception of work-family conflict is positively related to moral disengagement.

Permeability

For this study, permeability is defined as the degree to which IM apps enable individuals to be reachable. According to the work-family border theory, increased border permeability makes it easier for people to carry their emotions and behaviors over from one domain to another (Clark, 2000). While constant connectivity via new technologies might have benefits for some, it also comes at the cost of blurring work-home boundaries (Mann and Holdsworth, 2003). Prior studies have argued that the use of ICTs increases the permeability of work–family boundaries (e.g., Valcour and Hunter, 2005). ICT advances are blurring the boundary between work and home by providing increased access to work and to individuals (Ayyagari *et al.*, 2011). This study

postulates the following.

H7: An individual's perception of IM app permeability is positively related to perceived work-family conflict.

Control Variables

Previous research has shown that males exhibit higher levels of moral disengagement than do females (Bandura *et al.*, 1996). In addition, De Caroli and Sagone (2014) indicated that an increase in age is related to the reduced use of moral disengagement. Liu *et al.* (2008) found that female employees report more and higher levels of job strain than do their male counterparts. Chin *et al.* (2015) indicated that age is negatively associated with job strain.

4. Research Methodology

4.1 Measurement Development

Measurement items were adapted from previous studies (Appendix A). Twenty MBA students with a background in information systems were engaged in the pretest stage to identify ambiguous survey questions. Those ambiguous questions were modified accordingly to improve clarity. Items were measured with a seven-point Likert scale ranging from strongly disagree (1) to strongly agree (7).

4.2 Survey Administration

The population selected for this study is individuals who have had the experience of receiving work demands from their supervisors via the LINE app after work hours. Participants were recruited via a short message that included a hyperlink to our Web survey posted on PTT (the largest and most well-known bulletin board system in Taiwan) and Dcard (the largest anonymous virtual community in Taiwan). Individuals

who had received work demands from their supervisors via the LINE app after work hours were invited to complete the questionnaire. To increase the response rate, 30 randomly selected respondents with complete responses were offered a US$20 gift certificate. The web survey yielded a total of 176 complete, valid responses for data analysis. Table 1 lists the demographic information related to the respondents.

Table 1.

Demographic Information of Respondents (N = 176)

Measure	Items	Freq.	Percent	Measure	Items	Freq.	Percent
Gender	Male	59	33.5	Gender	Female	117	66.5
Age	< 25	8	4.5	Education	High School	10	5.7
	25-29	23	13.1		Junior College	15	8.5
	30-34	32	18.2		University	97	55.1
	35-39	51	30.0		Grad. School	54	30.7
	40+	62	35.2				
LINE	< 3 years	3	1.7	Years of	< 5	32	18.2
Usage	3 years	17	9.7	Working	5-9	27	15.3
	4 years	36	20.5	Experience	10-14	44	25.0
	5 years	52	29.5		15-19	36	20.5
	6 years	68	38.6		20 ~	37	21.0

Cohen's power tables were used to approximate the minimum required sample size. To determine the number of required observations, we can assume a small effect size ($0.020 \leq f^2 < 0.150$) for a more conservative approximation of the required sample size. The statistical power is usually set to 0.8, and a significance level of 0.05 is assumed (Cohen, 1992). Often the equation with the highest number of independent variables is considered to determine the minimum number of observations required to reliably detect an effect. In our example, the job strain construct has the highest number of independent variables (behavioral disengagement, age and gender) in an equation. Cohen's power tables suggest a minimum sample size of 76 observations, assuming a medium effect size ($f^2 = 0.150$), a statistical power of 0.8, and a significance level of 0.05. The G*Power tool suggests a minimum sample size of 77 observations, given a

medium effect size ($f^2 = 0.150$), a statistical power of 0.8, a significance level of 0.05, and 3 predictors. Our sample size is 176, indicating a sufficient sample size.

4.3 Data Analysis

SmartPLS 3.3.2 was used to assess both the measurement model and the structural model. Moral disengagement and job engagement were modeled as second-order constructs with the *reflective-reflective* approach in which the first-order and second-order constructs are reflectively defined. Since SmartPLS does not directly support second-order factors, we generated factor scores for each of their first-order dimensions, which we then used as reflective measures (indicators) of the second-order constructs (see Chin et al., 2003). To do so, we first ran the full research model in Smart PLS with the dimensions for each construct disaggregated. We then used the resulting factor scores of the dimensions as the measures of the aggregate construct (i.e., moral disengagement and job engagement).

The adequacy of the measurement model was evaluated by the criteria of internal consistency reliability, convergent validity and discriminant validity. Cronbach's alpha, composite reliability and Dijkstra–Henseler's ρA can be used to evaluate internal consistency reliability. Cronbach's alpha is a less precise measure of reliability since the items are unweighted. In contrast, composite reliability is higher than Cronbach's alpha since the items are weighted based on the construct indicators' individual loadings. While Cronbach's alpha may be too conservative, the composite reliability may be too liberal, and the construct's true reliability is typically viewed as existing between these two extreme values (Hair et al., 2019). As an alternative, Dijkstra and Henseler (2015) proposed ρA as a more exact measure of construct reliability, which usually lies between Cronbach's alpha and the composite reliability. Therefore, we used Dijkstra–Henseler's rho (ρA) to evaluate internal consistency reliability. Table 2 shows the

average variance extracted (AVE), Dijkstra–Henseler's ρA, mean, and standard deviation of each construct. As shown in Table 2, all the Dijkstra–Henseler's ρA values were above 0.7, the commonly accepted threshold. The convergent validity of the scales was assessed by two criteria (Fornell and Larcker, 1981): all indicator loadings should be significant and exceed 0.7, and the average variance extracted (AVE) should exceed 0.5. As shown in Table 3, all items exhibited a loading higher than 0.7 on their respective construct, and, as shown in Table 2, all the AVEs ranged from 0.58 to 0.82, thus satisfying both conditions for convergent validity.

Table 2.

Constructs	AVE	Dijkstra–Henseler's rho (ρA)	Mean	STD
Permeability (PA)	0.70	0.89	5.20	1.59
Work-Family Conflict (WFC)	0.81	0.92	4.04	1.83
Reconstruing the Conduct (RC)	0.74	0.94	4.18	1.63
Devaluing the Target (DT)	0.82	0.93	3.84	1.64
Obscuring the Consequences (OC)	0.58	0.86	5.34	1.43
Behavioral Disengagement (BD)	0.74	0.83	4.26	1.62
Job Strain (JS)	0.79	0.93	4.58	1.59
Vigor (VI)	0.72	0.89	4.59	1.35
Dedication (DE)	0.81	0.91	4.76	1.40
Absorption (AB)	0.72	0.81	5.06	1.29

Descriptive Statistics of Constructs

We assessed discriminant validity with three criteria. First, when the loading of each measurement item on its assigned construct is larger than its loadings on all other constructs and the cross-loading differences are much higher than the suggested threshold of 0.1 (Gefen and Straub, 2005), the scales will be considered as having sufficient discriminant validity. Second, the square root of the AVE of a construct should be greater than the correlations between the construct and all other constructs in

the model (Fornell and Larcker, 1981). Third, we employed the heterotrait-tomonotrait (HTMT) ratio of correlations, recently suggested by Henseler et al. (2015), to further check the degree to which the latent variables (constructs) are distinctly different. The HTMT is defined as the mean value of the item correlations across constructs relative to the (geometric) mean of the average correlations for the items measuring the same construct. Discriminant validity problems are present when HTMT values are high (Hair et al., 2019). The HTMT should be lower than 0.90 (Henseler et al., 2015). Table 3 shows the loadings for each indicator on its construct and the cross-loadings on the other constructs. As Table 3 shows, the differences between loadings on assigned constructs and those on other constructs were larger than the accepted threshold of 0.1. Table 4 shows the correlations between constructs (off-diagonal) and square root of the AVE for each construct (in bold). As Table 4 shows, all the AVE square roots were larger than the inter-construct correlations. Table 5 presents the HTMT ratio of correlation between pairs of constructs. As Table 5 shows, all HTMT values are lower than 0.90. This demonstrates sufficient discriminant validity.

Table 3.

PLS Confirmatory Factor Analysis and Cross-Loadings

	BD	DT	JS	OC	PA	RC	VI	DE	AB	WFC
BD1	0.88	0.60	0.24	0.50	-0.02	0.61	-0.10	-0.19	-0.13	0.10
BD2	0.83	0.64	0.25	0.46	0.06	0.58	-0.05	-0.20	-0.11	0.18
BD3	0.88	0.64	0.34	0.55	-0.03	0.52	-0.19	-0.34	-0.17	0.18
DT1	0.59	0.90	0.44	0.45	-0.08	0.57	-0.08	-0.21	-0.07	0.31
DT2	0.63	0.93	0.40	0.50	-0.07	0.60	-0.11	-0.29	-0.11	0.22
DT3	0.63	0.92	0.35	0.53	-0.14	0.58	-0.09	-0.22	-0.13	0.17
DT4	0.74	0.86	0.30	0.61	-0.13	0.65	-0.04	-0.22	-0.06	0.12
JS1	0.25	0.33	0.85	0.27	0.11	0.19	-0.18	-0.21	-0.05	0.58
JS2	0.32	0.38	0.91	0.23	0.12	0.19	-0.32	-0.33	-0.22	0.49
JS3	0.24	0.34	0.88	0.25	0.17	0.11	-0.31	-0.29	-0.19	0.47
JS4	0.32	0.40	0.92	0.27	0.12	0.20	-0.33	-0.33	-0.18	0.62
OC1	0.43	0.36	0.28	0.76	0.06	0.32	-0.04	-0.12	0.00	0.20
OC2	0.50	0.41	0.29	0.80	0.07	0.42	-0.06	-0.13	-0.01	0.15
OC3	0.40	0.50	0.32	0.72	0.01	0.37	-0.18	-0.22	-0.15	0.17
OC4	0.37	0.35	0.22	0.74	0.05	0.30	-0.12	-0.14	-0.07	0.11
OC5	0.47	0.50	0.14	0.78	-0.05	0.55	-0.11	-0.17	-0.12	-0.06
OC6	0.49	0.54	0.07	0.75	-0.10	0.59	-0.05	-0.15	-0.14	-0.05
PA1	-0.11	-0.17	0.18	-0.04	0.85	-0.25	0.17	0.13	0.18	0.19
PA2	0.11	0.00	0.14	0.06	0.90	-0.02	0.05	-0.02	0.05	0.27
PA3	-0.06	-0.21	0.00	-0.05	0.74	-0.19	0.21	0.19	0.08	0.13
RC1	0.63	0.60	0.20	0.49	-0.10	0.89	-0.10	-0.26	-0.17	0.14
RC2	0.63	0.60	0.21	0.48	-0.09	0.88	-0.12	-0.26	-0.15	0.13
RC3	0.55	0.59	0.20	0.44	-0.16	0.86	-0.01	-0.12	-0.11	0.07
RC4	0.55	0.55	0.12	0.46	-0.21	0.87	-0.07	-0.13	-0.18	-0.02
RC5	0.49	0.52	0.10	0.46	-0.17	0.84	0.02	-0.06	-0.06	-0.04
RC6	0.53	0.59	0.18	0.62	-0.12	0.83	-0.07	-0.15	-0.13	-0.01
VI1	-0.10	-0.05	-0.42	-0.10	0.14	0.02	0.86	0.66	0.59	-0.20
VI2	-0.07	-0.06	-0.37	-0.07	0.13	-0.01	0.83	0.68	0.63	-0.12
VI3	-0.15	-0.10	-0.13	-0.12	0.11	-0.14	0.86	0.57	0.63	0.01
DE1	-0.26	-0.27	-0.29	-0.16	0.08	-0.18	0.68	0.89	0.53	-0.06
DE2	-0.20	-0.19	-0.23	-0.13	0.12	-0.17	0.64	0.90	0.63	-0.01
DE3	-0.30	-0.23	-0.35	-0.24	0.05	-0.18	0.65	0.92	0.65	-0.10
AB1	-0.15	-0.10	-0.10	-0.08	0.12	-0.19	0.52	0.47	0.84	0.01
AB2	-0.13	-0.08	-0.28	-0.12	0.11	-0.08	0.66	0.64	0.80	-0.08
AB3	-0.13	-0.07	-0.10	-0.06	0.07	-0.12	0.68	0.60	0.90	0.05
WFC1	0.11	0.11	0.53	0.08	0.29	0.03	-0.12	-0.06	0.02	0.88
WFC2	0.20	0.23	0.55	0.15	0.20	0.11	-0.13	-0.07	-0.04	0.90
WFC3	0.13	0.20	0.55	0.05	0.26	0.02	-0.05	-0.04	0.04	0.92
WFC4	0.20	0.25	0.55	0.12	0.18	0.05	-0.07	-0.07	-0.03	0.88

Table 4.

Correlations Among Constructs and the Square Root of AVE

	PA	WFC	RC	JS	OC	BD	DT	VI	DE	AB
PA	**0.84**									
WFC	0.24**	**0.90**								
RC	-0.19*	0.05	**0.87**							
JS	0.13	0.61**	0.19*	**0.89**						
OC	-0.02	0.10	0.58**	0.28**	**0.76**					
BD	-0.02	0.17*	0.66**	0.31**	0.58**	**0.86**				
DT	-0.14	0.22**	0.66**	0.41**	0.59**	0.72**	**0.91**			
VI	0.17*	-0.12	-0.05	-0.36**	-0.12	-0.12	-0.08	**0.85**		
DE	0.12	-0.06	-0.19*	-0.32**	-0.20**	-0.28**	-0.26**	0.74**	**0.90**	
AB	0.12	-0.01	-0.15*	-0.19*	-0.12	-0.16*	-0.10	0.73**	0.68**	**0.85**

Note. The square roots of AVEs are in **boldface**. * $p < 0.05$ ** $p < 0.01$

Table 5.

Heterotrait-Monotrait Ratio (HTMT)

	BD	DT	VI	DE	AB	JS	OC	PA	RC	WFC
BD										
DT	0.82									
JE1	0.16	0.09								
JE2	0.32	0.28	0.87							
JE3	0.20	0.12	0.89	0.80						
JS	0.36	0.45	0.41	0.35	0.22					
OC	0.69	0.65	0.14	0.23	0.15	0.33				
PA	0.14	0.19	0.22	0.17	0.16	0.16	0.12			
RC	0.75	0.71	0.10	0.21	0.18	0.21	0.63	0.24		
WFC	0.20	0.24	0.16	0.07	0.07	0.66	0.19	0.28	0.10	

We used a two-step process to check for common method bias (CMB). First, we performed Harman's one-factor test. The merged factor accounts for less than 50% of the variance (29.91%), implying that CMB is not substantial. Second, we carried out the correlational marker analysis suggested by Lindell and Whitney (2001). To apply

this technique, we identified a marker variable before the start of the data collection. "Outside activity" was employed as a theoretically unrelated marker variable to adjust the correlations among the principal variables. Table 6 shows the CMB-adjusted correlations between principal variables in the study, and their significance. All of the originally significant correlations remained significant even after controlling for CMB (see Table 6). Thus, we conclude that common method bias is not a serious concern.

Table 6.

Correlation among Constructs after Controlling for CMV

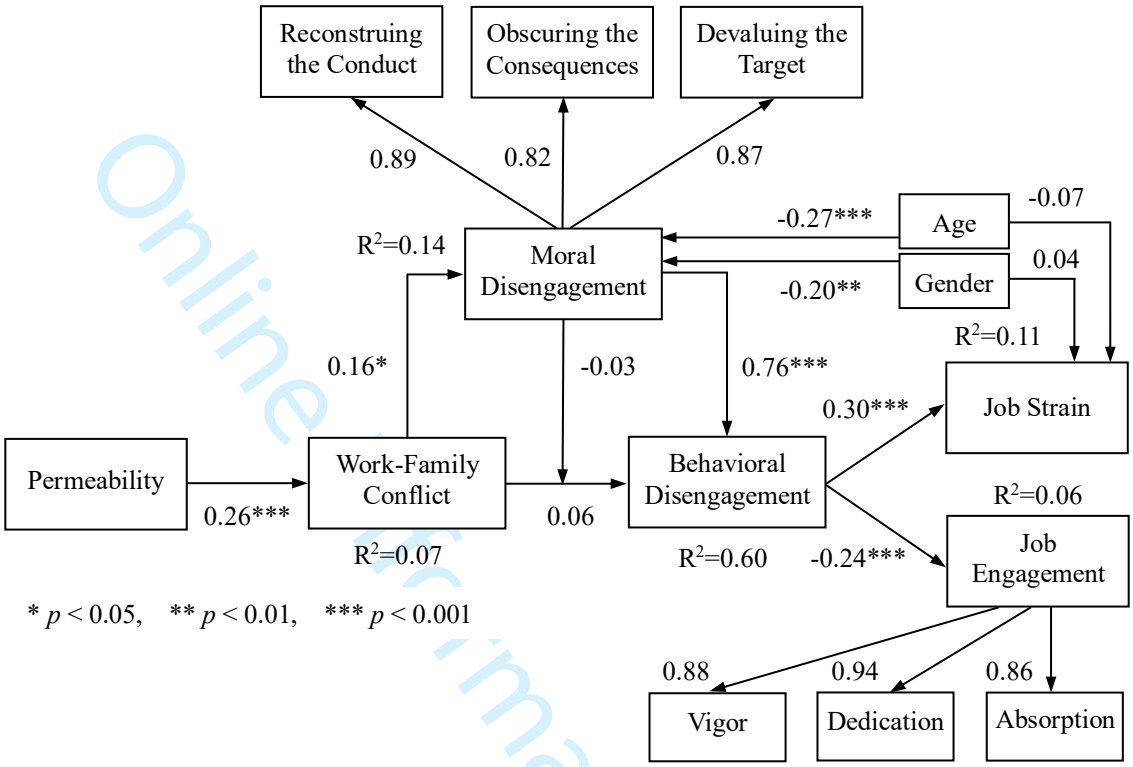
	PA	WFC	RC	JS	OC	BD	DT	VI	DE	AB
PA	1.00									
WFC	0.23**	1.00								
RC	-0.20**	0.04	1.00							
JS	0.12	0.61**	0.18**	1.00						
OC	-0.03	0.09	0.58**	0.27**	1.00					
BD	-0.03	0.16*	0.66**	0.30**	0.58**	1.00				
DT	-0.15*	0.21**	0.66**	0.40**	0.59**	0.72**	1.00			
VI	0.16*	-0.13	-0.06	-0.37**	-0.13	-0.13	-0.09	1.00		
DE	0.11	-0.07	-0.20**	-0.33**	-0.21**	-0.29**	-0.27**	0.74**	1.00	
AB	0.11	-0.02	-0.16*	-0.20**	-0.13	-0.17*	-0.11	0.73**	0.68**	1.00

Note: * $p < 0.05$ ** $p < 0.01$

Figure 2 shows the structural path analysis results. Most paths exhibited a p-value of less than 0.05. The significance of all paths was assessed with 5,000 bootstrapping runs. The PLS analysis further revealed that the research model accounts for 11% and 6% of the variance of job strain and job engagement, respectively (Figure 2). In addition, Figure 2 shows that the factor loadings of the first-order constructs of moral disengagement and job engagement are above 0.7, the commonly accepted level.

Figure 2.

PLS Analysis of the Research Model



5. Discussion and Implications

5.1 Summary of Results

Consistent with prior studies that examined the relationships between technology characteristics and stressors (e.g., Ayyagari *et. al.*, 2011), this study found that permeability has a significant effect on work-family conflict. Our findings suggest that the use of IM apps is likely to increase the permeability of work-family boundaries because these apps make individuals accessible anytime, anywhere. Further research is needed to confirm whether the boundary between work and family is likely to become increasingly blurred because the usage of IM apps provides increased access to work and to individuals.

Consistent with D'Arcy *et al.* (2014), our findings suggest that stressors are likely to activate moral disengagement. Our findings indicate that work-family conflict has a significant effect on moral disengagement, which in turn has a significant effect on behavioral disengagement. Further research is needed to ascertain whether employees who experience work-family conflict are likely to deactivate moral self-regulatory processes and cognitively appraise the behavior of not responding to supervisors' LINE messages after working hours as not against personal values or standards of moral conduct, and whether they are likely to behaviorally disengage by not responding to supervisors' LINE messages.

Our findings show that work-family conflict does not have a significant effect on behavioral disengagement. After removing the effect of moral disengagement on behavioral disengagement, work-family conflict was found to have a significant effect on behavioral disengagement (ß = 0.18; t = 2.37). The findings suggest that moral disengagement is likely to fully mediate the influence of work-family conflict on behavioral disengagement. In addition, the moderating effect of moral disengagement is not significant. A possible explanation is that the strong effect of moral disengagement on behavioral disengagement (ß = 0.76; t = 19.28) suppresses the moderating effect of moral disengagement on the relationship between work-family conflict and behavioral disengagement. Further research is needed to ascertain the full mediating role and the suppression effect of moral disengagement.

Consistent with the transactional model of stress and coping, and Hauk *et al.* (2019), our findings suggest that maladaptive coping (e.g., behavioral disengagement) is likely to increase job strain. Behavioral disengagement is dysfunctional for workers because it allows them to only temporarily resolve the work-family conflict. Further research is needed to ascertain whether, in the long run, employees' use of behavioral

disengagement may increase job strain and decrease job engagement (vigor, dedication, and absorption in one's job).

Finally, the results show that age and gender are not significantly associated with job strain. Our findings indicate that age and gender are negatively associated with moral disengagement. Inconsistent with Bandura *et al.* (1996), our findings suggest that females are more likely than males to exhibit higher levels of moral disengagement.

5.2 Theoretical Implications

The present study enriches the transactional model of stress and coping by explaining the role of a coping strategy from a different perspective. By extending technostress research to the mobile instant message usage domain, and by centering on the transactional model of stress and coping (Lazarus and Folkman, 1984) and the moral disengagement theory (Bandura, 1990), this study provides a theoretical framework for the influence of work-family conflict on employee job strain and job engagement. This study views moral disengagement as a form of cognitive disengagement coping. This is unlike D'Arcy *et al.* (2014) who viewed moral disengagement as a form of emotion-focused coping. This study emphasizes the importance of distinguishing between cognitive and behavioral disengagement and identifies two types of maladaptive coping: moral disengagement (cognitive disengagement) and behavioral disengagement.

This study is the first to document the mediating effect of moral disengagement on the link between work-family conflict and behavioral disengagement. These findings go beyond the previous literature by uncovering why stressors (e.g., work-family conflict) may amplify behavioral disengagement. Unlike previous research (i.e., D'Arcy *et al.*, 2014) which neglected the possible relationship between moral disengagement and behavioral disengagement, our innovative approach took into account the potential association of moral disengagement and behavioral disengagement and tested the

mediating role of moral disengagement in this relationship.

Our findings indicate that moral disengagement does not have a significant moderating effect on the relationship between work-family conflict and behavioral disengagement. The findings imply that when moral disengagement has a strong mediating effect (i.e., the path coefficient between moral disengagement and behavioral disengagement is 0.76), the moderating effect of moral disengagement is likely to be suppressed.

5.3 Practical Implications

Permeability is a double-edged sword for mobile IM apps. Supervisors' misuse of IM apps may lead to work-family conflict for their subordinates. Our findings indicate that IM usage is likely contribute to work-family conflict by enabling employees to be accessible to their supervisors anytime, anywhere. Organizations should develop policies that encourage supervisors not to send IM messages to subordinates after work hours unless they have important or urgent events to communicate. Also, some explicit policies or arrangements could be made so that supervisors do not abuse the constant connectivity provided by technology.

Behavioral disengagement has a strong impact on job strain and job engagement. Thus, managers could seek to reduce or eliminate its occurrence. An important way to reduce behavioral disengagement is to reduce moral disengagement. Formal sanctions have been suggested as an effective mechanism to reduce moral disengagement in regard to deviant behavior. However, in the present study, the outcome of moral disengagement is behavioral disengagement (e.g., not responding to supervisors' IM messages after work hours), which is different from serious deviant behavior. Not responding to supervisors' IM messages after work hours might go against unspoken rules, but it does not violate workplace ethics. Therefore, formal sanctions are not an

appropriate mechanism under some conditions. Organizations might choose to classify IM messages into several levels, based on the importance and urgency of the tasks, and establish rules regarding the levels of IM messages to which employees should respond, while formalizing the overtime pay due to employees who respond to the IM message and accept the task assigned by the supervisor.

5.4 Limitations and Future Research

It is important to consider the following limitations to this study, some of which suggest opportunities for future research. First, the phenomenon of moral disengagement from not responding to supervisors' IM messages after hours involves a behavior (i.e., not responding) that breaks the unspoken rules of the workplace. It is not a workplace behavior that has a strong moral dimension. Although we intentionally chose this route based on our literature review and feedback from IS researchers, there is a trade-off: our findings may not be generalizable to more extremely deviant, potentially disastrous workplace behaviors.

Second, the present study utilized cross-sectional data, and thus cannot confirm the directions of causality implied in the research model. Although our hypotheses comply with a theoretical framework, we still suggest the need for more longitudinal studies to obtain rigorous causal inferences. The research would be strengthened by a longitudinal design with a lag between the collection of the independent and dependent variables (e.g. job strain and job engagement).

Third, consistent with most psychological stress research, this study assessed work-family conflict indirectly through a self-reported process. Future research can build on our work and utilize objective measures (e.g., physiological techniques) to gauge work-family conflict.

Fourth, the current research tested only maladaptive coping mechanisms (i.e.,

moral disengagement and behavioral disengagement). Future research should explore adaptive coping mechanisms such as problem-focused coping or engagement coping. Future research should examine whether individuals would adopt adaptive coping in response to work-family conflict.

Finally, coping resources are social and personal characteristics upon which people may draw when dealing with stressors. Frequently studied personal coping resources are self-efficacy, optimism, and self-esteem. A major social coping resource is perceived social support from the social network. Prior research has suggested that the availability of social support is indeed associated with better mental and physical health, either because of the overall beneficial effect of social support (i.e. direct effect), or because of a buffering effect (e.g., Cohen and Wills, 1985). A potential research avenue is to examine the direct and buffering effects of coping resources.

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Appendix A: Questionnaire Items

Permeability (PA) (Ayyagari et al., 2011)

PA1	The use of LINE makes me accessible to the supervisors.
PA2	The use of LINE enables the supervisors to assign tasks to me after work hours.
PA3	The use of LINE enables the supervisors to keep in touch with me.

Work-family conflict (WFC) (Haslam, 2014)

WFC1	My work prevents me from spending sufficient quality time with my family.
WFC2	There is no time left at the end of the day to do the things I'd like to do at home.
WFC3	I miss out on promises to my family because of my work commitments.
WFC4	My work has a negative impact on my family life.

Reconstructing the construct (RC) (D'Arcy et al., 2014)

RC1	I have worked 8 hours during office hours, so it is alright not to reply to the supervisor's work-related LINE messages in order to fulfill my family responsibilities after working hours.
RC2	I am fully engaged at work. My family is important to me, so it is not necessary to reply to the supervisor's work-related LINE messages after working hours.
RC3	The supervisors will find other employees to deal with the tasks, so not replying to the supervisor's work-related LINE messages after working hours is not my

fault.

RC4 Not replying to the supervisor's work-related LINE message after working hours is no big deal because things can still be processed when I am in the office the next day.

RC5 An employee's work-family balance should compensate for occasionally violating unspoken rules (e.g., not replying to the supervisor's work-related LINE messages after working hours).

RC6 Compared to other kinds of behavior that violate unspoken rules (e.g., having a private meeting with employees of competitive companies), not replying to the supervisor's work-related LINE messages after working hours is minor.

Obscuring or distorting consequences (OC) (D'Arcy et al., 2014)

OC1 If the management wants employees to reply to the supervisor's work-related LINE messages after working hours, they should find a better approach instead of blaming the employees.

OC2 Employees cannot be blamed for not replying to the supervisor's work-related LINE messages after working hours because it is difficult to balance work and family.

OC3 Instead of me, the leader or chief of the team responsible for the task should reply to the supervisor's work-related LINE messages after working hours.

OC4 It is unfair to blame one employee for not replying to the supervisor's work-related LINE messages after working hours when many others do the same.

OC5 Not replying to the supervisor's work-related instant messages after working hours really won't hurt the organization or the company.

OC6 It is okay not to reply to the supervisor's work-related instant messages after working hours because no direct damage is done to the company.

Devaluing the target (DT) *(D'Arcy et al., 2014)*

DT1 I feel it is okay to violate workplace unspoken rules (e.g., not replying to the supervisor's work-related LINE messages after working hours), because my organization ignores the employees' rights.

DT2 My organization or company does not care that employees may have work-family conflicts, so I think it is not necessary to reply to the supervisor's work-related LINE messages after working hours.

DT3 I feel it is okay to violate workplace unspoken rules (e.g., not replying to the supervisor's work-related LINE messages after working hours), because my organization is so bureaucratic.

DT4 Requesting employees to work after working hours is not reasonable, so I don't want to reply to my supervisors' LINE messages after working hours.

Behavioral Disengagement (BD) (Carver et al., 1989)

BD1 When I see my supervisor's work-related LINE messages after working hours, I act like I do not see them.

BD2 When I see my supervisor's work-related LINE messages after working hours,

	I am unable to reply to them.
BD3	When I see my supervisor's work-related LINE messages after working hours, I don't want to reply to them.

Job Strain (JS) (Moore, 2000)

JS1	I feel emotionally drained from my work.
JS2	I feel fatigued when 1 get up in the morning and have to face another day on the job.
JS3	Working all day is really a strain for me.
JS4	I feel burned out from my work.

Vigor (VI) (Schaufeli and Bakker, 2003)

JE1	At my work, I feel bursting with energy.
JE2	At my job, I feel strong and vigorous.
JE3	At my work, I always persevere, even when things do not go well.

Dedication (DE) (Schaufeli and Bakker, 2003)

DE1	I find the work that I do full of meaning and purpose.
DE2	My job inspires me.
DE3	I am proud of the work that I do.

Absorption (AB) (Schaufeli and Bakker, 2003)

AB1	Time flies when I am working.
AB2	I feel happy when I am working intensely.
AB3	I am immersed in my work.

Outside Activity (D'Arcy et al., 2014)

OA1	I like outdoor sports leisure activities.
OA2	I like outdoor entertainment leisure activities.
OA3	I like outdoor social leisure activities.

Responses to Reviewers' Comments

Manuscript ID: OIR-06-2020-0214

Title: Understanding Employees' Response to Work-Related After-Hours Use of Instant Messaging Apps: A Stress and Coping Perspective

Dear reviewers,
Thank you for your in-depth developmental feedback on our manuscript. Your concerns and suggestions were very thoughtful in helping improve our research. We have carefully considered and fully responded to all of your comments. We believe you will be pleased with the major improvements that have resulted in our manuscript. Thank you again. – the Authors

Response to Reviewer 1

Thank you for your valuable comments and suggestions. We highlighted the changes in blue.

Comment 1:
First, I found the precise contribution of the paper to be somewhat lacking. Indeed, the presence of a bespoke purpose and or rationale statement would have been useful here to bring together the salient themes and points from the introduction and the review.

Response 1:
We added a paragraph to discuss the contribution of this research in the introduction section. The content of the paragraph is as follows:

This research contributes to the job strain research stream by incorporating the moral disengagement construct (along with its antecedents and consequences) into previous models, thus extending the transactional model of stress and coping theory, and then applying this extended model to the context of job strain caused by work-family conflict (induced by the permeability of IM usage). Our findings provide theoretical contributions based on the following three dimensions: the response to work-family conflict, the distinction between cognitive disengagement and behavioral disengagement, and the mediating role of moral disengagement. First, this study is the first to document how individuals respond to work-family conflict as a result of IM app usage after work hours. Second, this study views moral disengagement as a form of

cognitive disengagement coping. This is unlike D'Arcy *et al.* (2014) who viewed moral disengagement as a form of emotion-focused coping. This study distinguishes between cognitive and behavioral disengagement, considers them as two different types of maladaptive coping, and investigates their effects on job strain and job engagement. Third, to the best of our knowledge, no published study has investigated the mediating effect of moral disengagement in the link between work-family conflict and behavioral disengagement. Therefore, this current study attempts to fill this gap by focusing specifically on moral disengagement in relation to the IM app as a communication technology that is heavily used in the workplace. **(Please see page 3 and 4)**

We also added the following sentences to discuss the contribution of this research in the literature review section:

However, it serves well to highlight that D'Arcy *et al.* (2014) viewed moral disengagement as a form of emotion-focused coping, and violation intention as the coping outcome. As mentioned earlier, moral disengagement consists of eight interrelated cognitive mechanisms. Therefore, this study views moral disengagement as a social-cognitive mechanism that allows individuals to justify the behavioral coping response (e.g., not responding to the supervisor's instant messaging calls) to the stressor (e.g., work-family conflict). This study extends the moral disengagement concept by proposing another type of disengagement: behavioral disengagement. Behavioral disengagement is a behavioral coping mechanism rather than the outcome of coping, whereas job strain and job engagement are the actual outcomes of coping. **(Please see page 8)**

Note, however, that Ayyagari et al. (2011) focused on the technology characteristics-stressors-strain relationship, and ignored the mediating role of coping between stressors and strain. This study examines the technology characteristics-stressors-coping-strain relationship and extends Ayyagari et al. (2011) by integrating the transactional model of stress and coping theory with moral disengagement theory, and applying the extended model to the context of job strain caused by work-family conflict (induced by the permeability of IM usage). **(Please see page 9, Line 21)**

Comment 2:

Second, while the research is typically framed with reference to the transactional model of stress as presented by Lazarus and Folkman (1984) I would have expected greater reference to more contemporary and or psycho-physiological explanations of the stress

response. Indeed, I was surprised not to see additional reference to the work of Blascovich and colleagues and their work around the Bio-Psychosocial Model (BPM) and challenge and threat states. This framework would appear to have relevance to the current study in trying to make sense of the stress responses individuals have when engaging in IM apps and therefore I would encourage the authors to further frame their work within this theory https://onlinelibrary.wiley.com/doi/abs/10.1111/spc3.12052

Response 2:

In the literature review section, we added the following paragraph to discuss why we did not adopt the Bio-Psychosocial Model (BPM):

Building on Lazarus and Folkman (1984), Blascovich and colleagues (Blascovich, 2008; Blascovich and Tomaka, 1996) introduced the Biopsychosocial Model of Challenge and Threat (BPS model) to identify the physiological responses to challenge and threat. Individuals experience challenge when appraisals of personal resources exceed situational demands, whereas they experience threat when appraisals of demands exceed their resources. According to the BPS model, challenge leads to sympathetic-adrenal-medullary (SAM) activation, whereas threat leads to both SAM activation and hypothalamic-pituitary-adrenal cortical (HPA) activation. Prior research has shown that work-family conflict leads to threat appraisal (Glaser and Hecht, 2013), and stressors appraised as threat or hindrance have the potential to harm personal growth or gain, triggering passive or disengagement coping (LePine et al., 2005). Therefore this study focuses on the relationship between work-family conflict and disengagement coping (both cognitive and behavioral). The BPS model focuses on physiological responses to challenge and threat (i.e., SAM and HPA). However, since this study focuses on cognitive and behavioral responses to work-family conflict, we adopt the Transactional Model of Stress and Coping as the theoretical basis instead of the BPS model. **(Please see page 6, second paragraph)**

Comment 3:

Third, and aligned somewhat with the above comment, I remained unconvinced as to how the authors have actually determined ‘coping’ per se. Indeed, the measures used do not fully appear to assess coping and therefore the postulations around the effects of coping on key outcomes appear to somewhat speculative. Further, I was surprised not to see measures of the coping resources available and or used by the participants.

Response 3:

We added the following sentences to address the reviewer's concerns about how the coping was determined and the measures of coping:

The present study adopted Connor-Smith et al.'s (2000) distinction between engagement and disengagement coping. Engagement coping is generally viewed as adaptive, while disengagement coping is considered maladaptive. In this study, we focus on disengagement coping since work-family conflict is viewed as a threat which usually leads to maladaptive coping. This study follows D'Arcy *et al.* (2014) to operationalize moral disengagement as a coping strategy. However, unlike D'Arcy *et al.* (2014), who viewed moral disengagement as a form of emotion-focused coping, this study views moral disengagement as a form of cognitive coping (cognitive disengagement). In addition, our operationalization of behavioral disengagement is analogous to Connor-Smith et al.'s (2000) concepts of inaction and escape. **(Please see page 6, first paragraph)**

We added the following paragraph to address the reviewer's concerns about coping resources in the literature review section.

In the secondary appraisal, "the person evaluates if there is anything that can be done to overcome or prevent harm or to improve the prospects for benefit" (Folkman et al., 1986, p.993). The secondary appraisal involves the evaluation of the coping resources and options available to the individual to manage the stress, as well as controllability of the stressor or situation. Coping resources may include social, physical (e.g., health), psychological (e.g., self-esteem) and material (e.g., financial) assets (Lazarus and Folkman, 1984). Specifically, the secondary appraisal involves the individual's evaluation of the coping strategies at his or her disposal for addressing any stressful situation. The current study focuses on the stressor-coping strategy relationship. **(Please see page 5, second paragraph)**

In the limitations and future research section, we added the following paragraph to emphasize that future research could examine the effects of coping resources.

Finally, coping resources are social and personal characteristics upon which people may draw when dealing with stressors. Frequently studied personal coping resources are self-efficacy, optimism, and self-esteem. A major social coping resource is perceived social support from the social network. Prior research has suggested that the availability of social support is indeed associated with better mental and physical health, either because of the overall beneficial effect of social support (i.e. direct effect), or because

of a buffering effect (e.g., Cohen and Wills, 1985). A potential research avenue is to examine the direct and buffering effects of coping resources. **(Please see page 28)**

Comment 4:

Fourth, I generally found the method section to lack the specific detail I would expect to enable replication. For example, there is little insight into the participants, their selection and or the relevance of the sample size associated to a power analysis. To this end, I wonder how the sample size meets the requirements of the statistical modelling used? Indeed, no reference is made to such important considerations. I also found the measures section to lack detail around the validity and reliability of the assessment tools used. Given these are central to the research, the reader needs to be more convinced that they are appropriate and contemporary.

Response 4:

We added the following sentences to address the reviewer's concern about the selection of participants and sample size:

The population selected for this study is individuals who have had the experience of receiving work demands from their supervisors via the LINE app after work hours. Participants were recruited via a short message that included a hyperlink to our Web survey posted on PTT (the largest and most well-known bulletin board system in Taiwan) and Dcard (the largest anonymous virtual community in Taiwan). Individuals who had received work demands from their supervisors via the LINE app after work hours were invited to complete the questionnaire. **(Please see page 15)**

Cohen's power tables were used to approximate the minimum required sample size. To determine the number of required observations, we can assume a small effect size ($0.020 \leq f^2 < 0.150$) for a more conservative approximation of the required sample size. The statistical power is usually set to 0.8, and a significance level of 0.05 is assumed (Cohen, 1992). Often the equation with the highest number of independent variables is considered to determine the minimum number of observations required to reliably detect an effect. In our example, the job strain construct has the highest number of independent variables (behavioral disengagement, age and gender) in an equation. Cohen's power tables suggest a minimum sample size of 76 observations, assuming a medium effect size ($f^2 = 0.150$), a statistical power of 0.8, and a significance level of 0.05. The G*Power tool suggests a minimum sample size of 77 observations, given a medium effect size ($f^2 = 0.150$), a statistical power of 0.8, a significance level of 0.05,

and 3 predictors. Our sample size is 176, indicating a sufficient sample size. **(Please see page 16)**

We added the following sentences to address the reviewer's concern about the validity and reliability of the assessment tools used:

Cronbach's alpha, composite reliability and Dijkstra–Henseler's ρA can be used to evaluate internal consistency reliability. Cronbach's alpha is a less precise measure of reliability since the items are unweighted. In contrast, composite reliability is higher than Cronbach's alpha since the items are weighted based on the construct indicators' individual loadings. While Cronbach's alpha may be too conservative, the composite reliability may be too liberal, and the construct's true reliability is typically viewed as existing between these two extreme values (Hair et al., 2019). As an alternative, Dijkstra and Henseler (2015) proposed ρA as a more exact measure of construct reliability, which usually lies between Cronbach's alpha and the composite reliability. Therefore, we used Dijkstra–Henseler's rho (ρA) to evaluate internal consistency reliability. **(Please see page 17)**

Third, we employed the heterotrait-tomonotrait (HTMT) ratio of correlations, recently suggested by Henseler et al. (2015), to further check the degree to which the latent variables (constructs) are distinctly different. The HTMT is defined as the mean value of the item correlations across constructs relative to the (geometric) mean of the average correlations for the items measuring the same construct. Discriminant validity problems are present when HTMT values are high (Hair et al., 2019). The HTMT should be lower than 0.90 (Henseler et al., 2015). **(Please see page 19)**

Table 5 presents the HTMT ratio of correlation between pairs of constructs. As Table 5 shows, all HTMT values are lower than 0.90. **(Please see page 19, Line 12)**

Comment 5:

Finally, the cross-sectional design appears somewhat limiting in relation to the research questions and analysis procedures. To illustrate, would it not have been more beneficial to have collected temporal data to enable the exploration of the mediation effects across time? Essentially, the authors are making strong inferences based on data collected at one time point. Align to these points, the results section is not clearly presented in that

it is difficult to determine the salient findings. Descriptive narrative would be useful to accompany some of the detailed and large tables.

Response 5:

We added the following sentences to address the reviewer's concern about the cross-sectional design in the limitations and future research section:

Second, the present study utilized cross-sectional data, and thus cannot confirm the directions of causality implied in the research model. Although our hypotheses comply with a theoretical framework, we still suggest the need for more longitudinal studies to obtain rigorous causal inferences. The research would be strengthened by a longitudinal design with a lag between the collection of the independent and dependent variables (e.g. job strain and job engagement). **(Please see page 27)**

We added descriptive narrative for all the table. For example, the following descriptive narrative is for Table 3:

Table 3 shows the loadings for each indicator on its construct and the cross-loadings on the other constructs. **(Please see page 19, Line 7)**

Comment 6:

Fifth, given the nature of the design and the associated limitations, I wonder whether the data have been somewhat overstated in the discussion. Therefore, perhaps the authors could be more speculative and encourage future researchers to undertake replication of the current study. Furthermore, I think more framing of the data could come with reference to past research along with theory. The precise contribution to new knowledge would also be clearer with greater framing of the data.

Response 6:

In the summary of results section, we tried to be more speculative and encourage future researchers to undertake replication of the current study and discuss the findings with reference to past research along with theory. The following are two of the examples:

Consistent with prior studies that examined the relationships between technology characteristics and stressors (e.g., Ayyagari *et. al.*, 2011), this study found that permeability has a significant effect on work-family conflict. Our findings suggest that the use of IM apps is likely to increase the permeability of work-family boundaries

because these apps make individuals accessible anytime, anywhere. Further research is needed to confirm whether the boundary between work and family is likely to become increasingly blurred because the usage of IM apps provides increased access to work and to individuals. **(Please see page 23)**

Consistent with the transactional model of stress and coping, and Hauk *et al.* (2019), our findings suggest that maladaptive coping (e.g., behavioral disengagement) is likely to increase job strain. Behavioral disengagement is dysfunctional for workers because it allows them to only temporarily resolve the work-family conflict. Further research is needed to ascertain whether, in the long run, employees' use of behavioral disengagement may increase job strain and decrease job engagement (vigor, dedication, and absorption in one's job). **(Please see page 24, paragraph 3)**

Comment 7:

Finally, the manuscript would benefit from a thorough proofread as there are some spelling errors and missing words. Furthermore, the tables and figures do not align with APA formatting-table 4 is very busy and is not easily readable.

Response 7:

We invited a native English speaker with MBA degree to proofread the manuscript. We modified the tables and figures based on APA formatting.

Additional Questions:

Originality: Does the paper make a significant theoretical, empirical and/or methodological contribution to an area of importance, within the scope of the journal?: There is some novel contribution here-but this needs to be more clearly delineated throughout the paper.

Relationship to Literature: Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored? Is the literature review up-to-date? Has relevant material published in Online Information Review been cited?: Generally, although in my comments to the author I have provided some areas which should be considered.

Methodology: Is the paper's argument built on an appropriate base of theory, concepts or other ideas? Has the research on which the paper is based been well designed? Are

the methods employed appropriate and fully explained? Have issues of research ethics been adequately identified and addressed?: I have some concerns about the cross-sectional nature of the research along with the sample size and measures.

Results: For empirical papers - are results presented clearly and analysed appropriately?: Greater exploration is needed to make sense of the salient findings.

Discussion/Argument: Is the relation between any empirical findings and previous work discussed? Does the paper present a robust and coherent argument? To what extent does the paper engage critically with the literature and findings? Are theoretical concepts articulated well and used appropriately? Do the conclusions adequately tie together the other elements of the paper?: Some useful points-but generally greater exploration and framing within research and theory is needed.

Implications for research, practice and/or society: Does the paper identify clearly any implications for research, practice and/or society? Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? What is the impact upon society (influencing public attitudes, affecting quality of life)? Are these implications consistent with the findings and conclusions of the paper?: These are generally appropriate.

Quality of Communication: Does the paper clearly express its case, measured against the technical language of the fields and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.: Generally OK-although I have outlined areas for further consideration.

Reproducible Research: If appropriate, is sufficient information, potentially including data and software, provided to reproduce the results and are the corresponding datasets formally cited?: Not presently.