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The influence of interpersonal relationships to cyberloafing during remote work

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ABSTRACT

Cyberloafing, personal internet access during work hours, is a common form of counterproductive behavior in modern workplaces. With the growth of ICT (Information and Communication Technology), employees could easily access the internet on PCs or personal cell phones. In the case of remote work, cyberloafing is more controversial due to the freedom of access to private internet usage. Despite the benefits of remote work for both organizations and employees, concerns about productivity loss continue to hinder its widespread adoption. Here, we investigated the occurrence of cyberloafing in both remote and in-office work and explored the influence of three aspects of interpersonal relationships (home-based psychological resources, group attractiveness, and collective performance factor) on cyberloafing during remote work with primary cyberloafing antecedents. We hypothesized that positive interpersonal relationships would decrease cyberloafing during remote work, whereas supervisor support would be associated with increased cyberloafing due to social-loafing-related motivational loss. The results showed that the presence of formal internet-use rules did not effectively deter cyberloafing during remote work, while employees' perceptions of their supervisors' cyberloafing served as a significant antecedent of their own cyberloafing, both in remote and in-office work. In addition, positive attitudes toward coworkers were associated with less cyberloafing and higher family life satisfaction was associated with less cyberloafing. Interestingly, supervisor support was linked to greater cyberloafing. Overall, the findings highlight the importance of interpersonal factors both at work and at home—for promoting effective and responsible behavior in remote work environments.

1. Introduction

Today, the use of Information and Communication Technology (ICT) in business has become inevitable for achieving cost reduction and higher profitability, and the rapid advancement of artificial intelligence (AI) is expected to further accelerate this trend. With the widespread use of the internet in workplaces, deviant behaviors have evolved from traditional forms to new digital ones. Cyberloafing¹—employees' use of the internet for personal purposes during work hours (Lim, 2002)—is one such form of counterproductive work behavior that can lead to substantial organizational losses (Zakrzewski, 2016). Since the outbreak of the COVID-19 pandemic, remote work has rapidly expanded, making cyberloafing a highly controversial topic (Luna et al., 2022a, b; Mariani et al., 2023; O'Neill et al., 2014a).

As expected, the risk of engaging in cyberloafing increases in remote settings, where reduced visibility and supervision may weaken behavioral deterrents (Askew & Buckner, 2017). Even after the pandemic

subsided and some companies began returning to office-based work (e.g., “Elon Musk declares end to remote working at Tesla,” 2022), remote work continues to pose challenges to employees' motivation and productivity despite advancements in ICT (Yang et al., 2022; Zhang et al., 2023). Remote work offers several cost-related benefits for both organizations (e.g., reduced expenses for office equipment, commuting subsidies, and meal vouchers) and employees (e.g., saved commuting time and reduced clothing expenses) (Mariani et al., 2023). To promote more flexible and sustainable ways of working, it is essential to understand the mechanisms underlying the occurrence of cyberloafing in remote work contexts.

Interpersonal relationships are key determinants of work motivation and play a central role in enhancing job performance (Leiter & Maslach, 1988). Poor interpersonal relationships can even prompt employees to leave their current positions. Prior research has shown that interpersonal conflict is associated with various forms of workplace deviance (e.g., Ferris et al., 2012; Mackey et al., 2021). The importance of

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¹ i.e., cyberslacking.

interpersonal relationship factors has also been highlighted in remote work contexts (e.g., Golden & Gajendran, 2019). Building on this literature, the present study examined the influence of three interpersonal dimensions—group-level, collective, and personal variables—at both the organizational and personal levels (Table 1), along with primary antecedents of cyberloafing, on employees’ cyberloafing during remote work.

1.1. Cyberloafing

Previous research has demonstrated that the most common form of cyberloafing is checking personal email, and that such behavior is conducted not only on office computers but also on personal devices such as employees’ own cell phones (Batabyal & Bhal, 2020; Jeong et al., 2019; Vitak et al., 2011). Jeong et al. (2019) found that cell phone-based cyberloafing is particularly prevalent, with approximately 85% of employees using their phones for non-work purposes during work hours. Blanchard and Henle (2008) categorized cyberloafing into two types: minor behaviors (e.g., checking personal email, browsing news sites) and serious behaviors (e.g., online gambling, accessing pornographic websites), based on their frequency during work hours. Minor cyberloafing was positively associated with coworkers’ and supervisors’ perceived approval, suggesting that employees who engage in these behaviors do not regard them as deviant. Indeed, many employees view certain forms of cyberloafing as acceptable. Several studies have identified various psychological and social processes through which employees justify cyberloafing (Batabyal & Bhal, 2020; de Lara, 2006; Farooq, 2019; Jia et al., 2013; Lim, 2002; O’Neill et al., 2014b; Sheikh et al., 2019; Sheikh et al., 2015; Varghese & Barber, 2017).

Although fewer studies have examined cyberloafing in remote work settings compared to traditional office environments, research on this topic has increased since the onset of the COVID-19 pandemic (e.g., Luna et al., 2022a,b; O’Neill et al., 2014a; Reizer et al., 2022). O’Neill et al. (2014a) investigated the effects of job satisfaction and personality traits on cyberloafing during remote work, finding that procrastination was positively associated with cyberloafing, whereas honesty–humility, agreeableness, and conscientiousness were negatively related to its frequency. In both remote and office-based work contexts, checking non-work-related email appears to be the most common form of cyberloafing (George et al., 2023).

1.2. Normative influence of perceived supervisors’ and coworkers’ cyberloafing

Organizations may adopt formal policies that restrict personal internet use or monitor employees’ online activities to curb cyberloafing. However, such formal controls often prove less effective than informal, perceived norms (e.g., Jiang et al., 2020). Prior studies have consistently

Table 1
Three aspects of interpersonal relationships in personal and organizational levels.

| Level | Concept | Variables |
|----------------|--|--|
| Personal | Home-based Psychological Resources | |
| | Individual resources induced by private relationships | Family/Friend Support Family Life Satisfaction |
| Organizational | Group Attractiveness | |
| | Motivation induced by positive interpersonal relationships at work | Positive Attitudes toward Coworkers |
| | Collective Performance Factor | |
| | Motivation caused by the dispensability of own effort | Supervisor/Coworker Support |

found that employees’ perceptions of their supervisors’ and coworkers’ cyberloafing serve as key antecedents of their own cyberloafing behavior (Askew et al., 2019; Zhang et al., 2020). Specifically regarding cyberloafing, individuals tend to be more influenced by descriptive norms—perceptions of others’ behavior—than by explicit organizational policies. Even in remote work environments, employees tend to cyberloaf more when they believe their supervisors or coworkers also engage in such behavior (Chakraborty et al., 2024). This suggests that remote workers may perceive cyberloafing as acceptable when they perceive that others in their reference group participate in it. Social influence theory posits that people frequently use others’ behavior as a normative guide for their own actions (Cialdini et al., 1990; Deutsch & Gerard, 1955). Reference group theory further suggests that normative influences from relevant social groups can persist even in the absence of direct, face-to-face interaction (Hyman, 1960; Merton, 1957; Newcomb, 1943). Accordingly, we predict that perceived cyberloafing by supervisors and coworkers will serve as influential antecedents of employees’ own cyberloafing behavior during remote work, despite the physical separation between individuals.

H1. Perceived supervisors’ cyberloafing is positively related to cyberloafing.

H2. Perceived coworkers’ cyberloafing is positively related to cyberloafing.

1.3. Interpersonal relationships and cyberloafing at personal and organizational levels

Work–family conflict has become a critical issue in contemporary work environments (e.g., Kossek & Ozeki, 1998). Research in organizational behavior has long emphasized that employees’ family lives can significantly influence their work-related outcomes (e.g., Rain et al., 1991; Zedeck & Mosier, 1990). Numerous studies have found positive associations between job satisfaction and life satisfaction (Bialowolski & Weziak-Bialowolska, 2021; Rice et al., 1980). Remote workers may be more strongly affected by family life than those working in office settings. For instance, Wang et al. (2021) demonstrated that interference from family responsibilities—such as the need to manage both household and work tasks—can impair job performance during remote work. Dissatisfaction in one’s private life has also been linked to deviant behaviors at work (e.g., Darrat et al., 2010; Lei et al., 2023). Previous research suggests that cyberloafing often serves as a coping mechanism for work-related stress (Andel et al., 2019; George et al., 2023). We assume that a fulfilling private life provides psychological resources that enhance employees’ resilience to job stress. Accordingly, we hypothesize that better personal relationships and higher life satisfaction will mitigate work stress and thereby reduce cyberloafing during remote work.

H3. Higher family/friend support is negatively related to cyberloafing.

H4. Higher family life satisfaction is negatively related to cyberloafing.

At the organizational level, we posit that two distinct motivational processes influence cyberloafing during remote work: (1) the group-based process, characterized by psychological bonds among members, and (2) the collective-based process, where individuals are merely co-present without strong interpersonal connections. Being part of a cohesive work team contributes to the development of psychological bonds through shared goals, communication, and a sense of organizational identity. Work motivation tends to be enhanced when team members share a common vision, engage in active communication (Bass, 1990), and hold positive attitudes toward their coworkers (Lott & Lott, 1965). Although maintaining group cohesion may be more difficult in remote contexts, where physical distance and reduced visibility of colleagues constrain opportunities for interpersonal bonding, employees’ impressions of other team members may still influence their

cyberloafing behavior. Prior studies suggest that cyberloafing may serve as a coping mechanism for interpersonal stress at work (Andel et al., 2019; Hu et al., 2021), including experiences of workplace ostracism (Hu et al., 2021) and abusive supervision (Agarwal & Avey, 2020; Liang et al., 2022). Accordingly, positive interpersonal relationships in the workplace may buffer against such stressors and reduce the likelihood of cyberloafing. We therefore hypothesize that positive attitudes toward coworkers would reduce cyberloafing.

H5. Positive attitudes toward coworkers are negatively related to cyberloafing.

The second motivational process at the organizational level involves a collective-based mechanism, where individuals assess the dispensability of their own effort based on rational judgment in collective contexts. Compared to office-based work, remote work environments may reduce the sense of unity—such as the feeling of “working together”—thus making them more akin to collective situations. Research on group motivation has consistently shown that the perceived dispensability of one's own effort is a central factor influencing behavior in collective contexts (Griffith et al., 1989; Liden et al., 2004). For instance, when coworkers are seen as highly competent, individuals may feel less compelled to contribute, whereas low-performing coworkers may motivate individuals to compensate by increasing their own efforts (Karau & Williams, 1993). Supporting this notion, Golden & Gajendran (2019) found that remote work was associated with higher job performance only among employees who received low levels of social support, implying that support from colleagues may inadvertently reduce one's perceived necessity to contribute. Based on this literature, we assume that perceived support from supervisors and coworkers may enhance the sense that one's own effort is dispensable, contributing to an increase in cyberloafing. Accordingly, we hypothesize that higher levels of perceived support will be associated with more frequent cyberloafing.

H6. Supervisor support is positively related to cyberloafing.

H7. Coworker support is positively related to cyberloafing.

2. Pilot study

We conducted a pilot study to explore suitable items for cyberloafing activities and to obtain data on cyberloafing in the office to compare it during remote work.

2.1. Method

2.1.1. Sample and procedure

Data for this study were obtained from an online survey. Respondents were 190 Japanese working adults (Mean age: 43.22, 53.2 % of male, 46.8 % of female). They were briefly informed of the purpose of the survey and asked to answer the questionnaire. All data, analysis code, and study research materials are available by request to the corresponding author.

2.1.2. Cyberloafing

We modified cyberloafing items by Lim and Teo (2005). Respondents were asked to answer “How often do you perform the following activities during working hours?” to each cyberloafing activity (Receiving personal Email, Checking personal Email, Sending personal Email, Visiting stock websites, Visiting sports websites, Visiting news websites, Visiting economic websites, Online shopping, Visiting pornographic websites, Managing personal websites, Using (view, post) Facebook, Using (view, post) Twitter (X), Online gambling, Visiting dating apps and websites, Reading blogs. Downloading music, Writing a blog, Playing online games on a 5-point Likert scale “not at all(1)”-“frequently (5).”

2.1.3. Cyberloafing related variables

Respondents were asked to answer the following items on a 5-point Likert scale “strongly disagree(1)”- “strongly agree (5)”; the necessity of internet use for work (“I need to use computers and the Internet for work”), job satisfaction (“I am satisfied with my job”), perceived supervisors' cyberloafing (“I believe that my supervisor uses the Internet (including e-mail) for personal use during working hours”), supervisors' strictness for cyberloafing (“My supervisor would not allow private use of the Internet (including e-mail) during working hours”), perceived coworkers' cyberloafing (“I believe that my coworkers use the Internet (including e-mail) for personal use during working hours”), coworker's strictness for cyberloafing (“My coworkers would not allow private use of the Internet (including e-mail) during working hours”). The item about rules of internet use for non-work-related purposes (“There are rules regarding the use of the Internet for private use during working hours at the company for which you work”) was answered on “Yes (1)-No (2).”

2.2. Results and discussion

First, we examined the frequency of each cyberloafing activity. Fig. 1 shows the means of each cyberloafing activity. Similar to previous studies, the most common cyberloafing activity was receiving Email. To examine the underlying structure of the cyberloafing items, we conducted an exploratory factor analysis using the maximum likelihood method with a promax rotation. The analysis showed the three factors solution. The factor loadings after rotation, as well as the descriptive statistics and correlations of the variables, are shown in Tables 2 and 3.

We decided on items for each factor based on the factor loadings greater than 0.40. and the content. The exploratory factor analysis identified three conceptually distinct factors of cyberloafing. The first factor, routine online use, comprised behaviors such as checking personal emails, browsing information websites, and online shopping. These activities represent low-deviance, habitual, and information-oriented online behaviors, consistent with prior classifications of everyday cyberloafing (Blanchard & Henle, 2008; Lim, 2002). The second factor, social media use, included communication- and interaction-oriented activities (e.g., SNS browsing, posting, or chatting). The third factor, serious deviance, encompassed ethically questionable or high-risk behaviors (e.g., visiting dating or adult sites), reflecting severe and socially unacceptable forms of cyberloafing. Taken together, these three factors capture meaningful conceptual dimensions of cyberloafing that differ in normative acceptability, social involvement, and behavioral risk.

Next, we performed hierarchical regressions. In the first step, we entered gender and age as control variables, consistent with prior research indicating that these demographic characteristics are associated with cyberloafing. In the second step, we entered rules of internet use for non-work-related purposes, the necessity of internet use for work, perceived supervisors' cyberloafing, supervisors' strictness for cyberloafing, perceived coworkers' cyberloafing, coworker's strictness for cyberloafing, and job satisfaction. The result showed that step 2 had significant additional variances for routine online use ($\Delta R^2 = 0.34, p < .001$) and social media ($\Delta R^2 = 0.11, p < .01$). Perceived supervisors' and coworkers' cyberloafing positively predicted cyberloafing ($\beta_s = 0.19, 0.25, ps < 0.001, 0.01$) only for routine online use. Internet use rules for non-work-related purposes significantly predicted cyberloafing only for social media, showing that rules for cyberloafing affected social media activities. Gender and the necessity of internet use for work predicted cyberloafing only for serious deviance, showing that a greater need for internet use leads to less cyberloafing. Also, males are more likely to engage in severe cyberloafing than females (Table 4).

3. Main study

In the main study, we researched cyberloafing during remote work

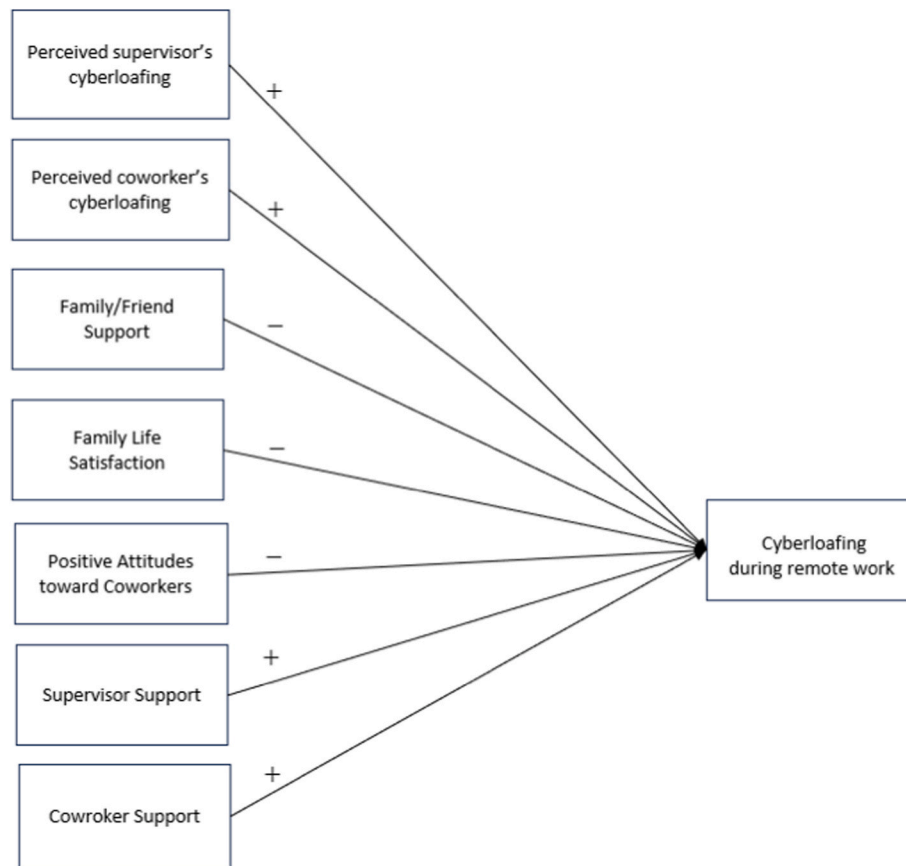


Fig. 1. The means of each cyberloafing activity during office work.

Table 2
Factor analysis of cyberloafing items.

| Item | Factor | | |
|--------------------------|--------------------|--------------|------------------|
| | Routine Online Use | Social Media | Serious Deviance |
| Receiving Personal Email | <u>0.94</u> | -0.12 | -0.09 |
| Sending Personal Email | <u>0.91</u> | -0.05 | 0.09 |
| Checking Personal Email | <u>0.96</u> | -0.05 | -0.01 |
| Stock Websites | <u>0.36</u> | 0.34 | -0.16 |
| Online Shopping | <u>0.73</u> | 0.16 | 0.02 |
| Sports Websites | <u>0.48</u> | 0.30 | -0.22 |
| Read Blogs | <u>0.51</u> | 0.28 | 0.09 |
| Facebook | 0.38 | 0.31 | <u>0.50</u> |
| Twitter(X) | 0.41 | 0.41 | <u>0.47</u> |
| Dating Apps and Websites | 0.11 | <u>0.63</u> | -0.03 |
| Online Gambling | 0.07 | <u>0.69</u> | -0.14 |
| Pornographic Websites | 0.31 | <u>0.56</u> | -0.38 |
| Eigenvalue | 4.15 | 2.41 | 2.24 |
| % of variance explained | 35 | 15 | 6 |

with interpersonal items and tested the hypotheses.

3.1. Method

3.1.1. Sample and procedure

Respondents were 760 Japanese working adults who work from home more than three days per week. The average age was 47.67 ($SD = 14.77$: 49.9 % male, 50.1 % female). The survey was conducted using a stratified sampling method. The age distribution of the participants was as follows: 20s, 20.1 %; 30s, 16.1 %; 40s, 20.6 %; 50s, 24.3 %; 60s, 17.7 %; 70s, 9.4 %; and 80s, 0.3 %. They were briefly informed of the purpose of the survey and asked to answer the questionnaire. Fig. 2 shows the

summary of the hypothesis.

3.1.2. Cyberloafing

Respondents were asked to answer the question “How often do you perform the following activities during remote work?” to 18 items of cyberloafing activities: receiving personal Email, checking personal Email, sending personal Email, using (viewing, posting) Twitter (X), using (view, post) Instagram, watching YouTube, using (view, post) Facebook, visiting stock websites, visiting sports websites, visiting economic websites, online shopping, visiting dating apps and websites, writing a blog, visiting pornographic websites, playing online games, watching movies and sitcoms on subscription services such as Netflix and Hulu, reading blogs, searching and browsing for job postings on a 5-point Likert scale “not at all(1)”-“frequently(5).”

3.1.3. Cyberloafing related variables

Respondents were asked to answer the following items on a 5-point Likert scale “strongly disagree(1)”- “strongly agree (5)”; the strictness of private internet use (“The rules regarding the use of the Internet for private use are strict”), the necessity of internet use for work (“I need to use computers and the Internet for working”), job satisfaction (“I am satisfied with my job”), perceived supervisors' cyberloafing (“I believe that my supervisor uses the Internet (including e-mail) for personal use during working hours”), supervisors' strictness for cyberloafing (“My supervisor would not allow private use of the Internet (including e-mail) during working hours”), perceived coworkers' cyberloafing (“I believe that my coworkers use the Internet (including e-mail) for personal use during working hours”), coworker's strictness for cyberloafing (“My coworkers would not allow private use of the Internet (including e-mail) during working hours”). The item about rules of internet use for non-work-related purposes (“There are rules regarding the use of the Internet for private use during working hours at the company for which

Table 3
Means, standard deviations, and correlations of variables.

| Variables | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|-------|-------|---------|-------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 Gender | — | — | | | | | | | | | | |
| 2 Age | 43.22 | 10.43 | -0.27** | | | | | | | | | |
| 3 Rules of internet use for non-work-related purposes | 1.62 | 0.49 | 0.06 | -0.01 | | | | | | | | |
| 4 Necessity of internet use for work | 4.08 | 0.98 | -0.01 | -0.02 | -0.06 | | | | | | | |
| 5 Perceived supervisors' cyberloafing | 2.96 | 1.29 | 0.19** | -0.06 | 0.13 | 0.20** | | | | | | |
| 6 Supervisors' strictness for cyberloafing | 3.11 | 1.07 | 0.12 | -0.02 | 0.31** | 0.25** | 0.59** | | | | | |
| 7 Perceived coworkers' cyberloafing | 3.07 | 1.23 | 0.12 | -0.01 | 0.12** | 0.32** | 0.62** | 0.55** | | | | |
| 8 Coworker's strictness for cyberloafing | 3.21 | 1.02 | 0.17* | -0.04 | 0.29** | 0.33** | 0.54** | 0.79** | 0.69** | | | |
| 9 Routine Online Use | 14.62 | 6.57 | 0.04 | 0.05 | 0.24** | 0.16* | 0.47** | 0.46** | 0.51** | 0.49** | | |
| 10 Social Media | 2.76 | 1.69 | 0.07 | -0.09 | 0.24** | 0.01 | 0.21** | 0.22** | 0.24** | 0.24** | 0.48** | |
| 11 Serious Deviance | 3.23 | 0.91 | -0.12 | -0.04 | -0.06 | -0.15* | 0.07 | -0.04 | 0.01 | -0.03 | 0.26** | 0.27** |

N= 190, *p< .05, **p < .01.

Table 4
Hierarchical regression for each factor of cyberloafing.

| | Routine Online Use | Social Media | Serious Deviance |
|---|--------------------|--------------|--------------------|
| Step1 | | | |
| β Gender | 0.06 | 0.05 | -0.14 [†] |
| β Age | 0.06 | -0.08 | -0.08 |
| R^2 | -0.01 | 0.00 | 0.01 |
| F | 0.50 | 1.01 | 1.84 |
| Step2 | | | |
| β Gender | -0.05 | -0.01 | -0.17* |
| β Age | 0.06 | -0.09 | -0.08 |
| β Rules of internet use for non-work-related purposes | 0.12 [†] | 0.19* | -0.07 |
| β Necessity of internet use for work | -0.01 | -0.06 | -0.18* |
| β Perceived supervisors' cyberloafing | 0.19** | 0.06 | 0.16 |
| β Supervisors' strictness for cyberloafing | 0.06 | 0.03 | -0.12 |
| β Perceived coworkers' cyberloafing | 0.25*** | 0.16 | 0.00 |
| β Coworker's strictness for cyberloafing | 0.15 | 0.04 | 0.08 |
| R^2 | 0.32 | 0.08 | 0.03 |
| ΔR^2 | 0.34 | 0.11 | 0.05 |
| ΔF | 15.75*** | 3.65** | 1.51 |

N= 190, *p< .05, **p< .01, ***p < .001.

you work”) was answered on “Yes (1)-No (2).”

3.1.4. Positive attitudes toward people at work

We adopted 18 adjectives (e.g., preferable, exciting, boring*, at ease, reliable, silly*, responsible, intelligent, easy to make enemies*, impolite*, wise, lazy*, unagreeable*, supportive, lively, self-interests*, irritated*, stubborn*) to rate positive attitudes toward people at work using organizational scales (e.g., the Job Descriptive Index) as references. We asked respondents to rate how well each of the adjectives describes people at the workplace on a 5-point Likert scale; “not at all (1)- very well (5).” The scores of negative adjectives (*) were reversed. We used the sum of the scores in the following analysis ($\alpha = .92$).

3.1.5. Support from interpersonal relationships

We adopted the subscales from the Brief Job Stress Questionnaire to measure support from interpersonal relationships at the workplace, private life, and family life satisfaction (Shimomitsu et al., 2000). Respondents were asked to answer the three items about supervisor,

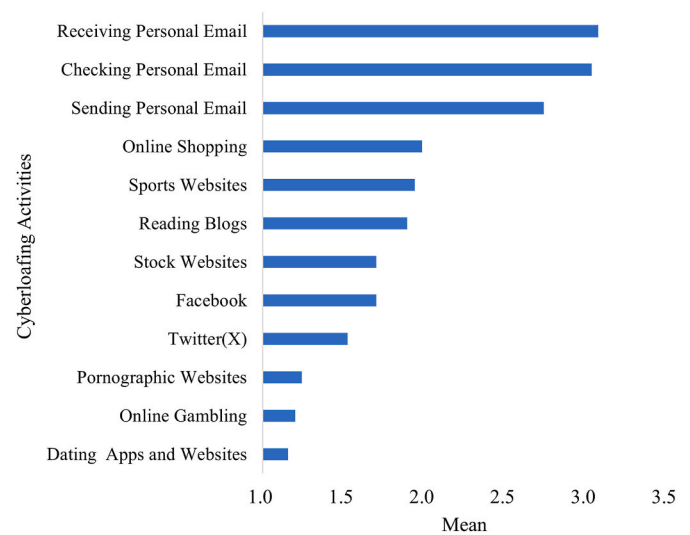


Fig. 2. The schema of interpersonal variables in the hypotheses.

coworker, and family/friend (e.g., “How reliable are the following people when you are troubled?”) on a 4-point Likert scale: “not at all (1) - extremely (4).” For family life satisfaction, they were asked to answer “I am satisfied with my family life” on a 4-point Likert scale: “dissatisfied (1) - satisfied (4).”

3.2. Results

First, we examined the frequency of each cyberloafing activity during remote work. Fig. 3 shows the means of each cyberloafing activity. Similar to the results of the pilot study, checking Email was the most common form of cyberloafing. To examine the underlying structure of the cyberloafing items, we conducted an exploratory factor analysis using the maximum likelihood method with a promax rotation. The analysis showed the four factors solution. Table 5 shows the factor loadings after rotation. We selected items for each factor based on the factor loadings greater than 0.40. Reading blogs, searching, and browsing for job postings exhibited moderate cross-loadings across multiple factors, suggesting limited conceptual distinctiveness. Reading blogs differed conceptually from other social media use items (viewing and posting Twitter (X) Instagram, YouTube, Facebook), and searching and browsing for job postings were characterized as goal-directed behaviors rather than leisure-oriented information/shopping activities. These items were removed from subsequent analyses to enhance the conceptual clarity and discriminant validity of the final factor structure.

Factor 1 consists of visiting dating apps and websites, writing blogs, visiting pornographic websites, online gaming, and watching movies

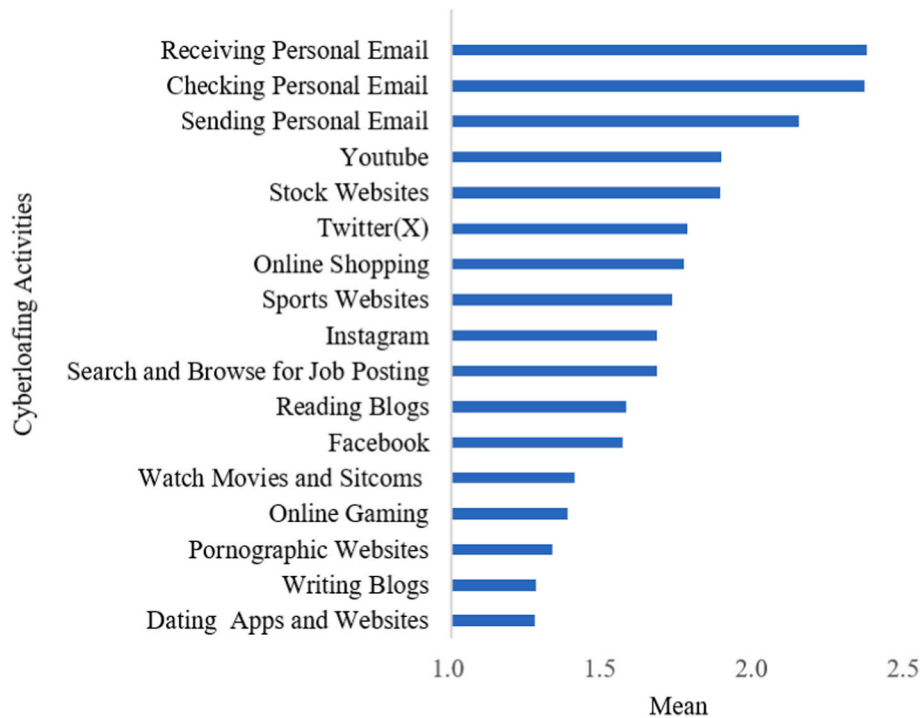


Fig. 3. The means of each cyberloafing activity during remote work.

Table 5
Factor analysis of cyberloafing items.

| Item | Factor | | | |
|---|------------------|-------------|--------------|-----------------------|
| | Serious Deviance | *Mail*** | Social Media | Information/ Shopping |
| Dating Apps and Websites | <u>0.94</u> | 0.00 | -0.06 | 0.00 |
| Write Blogs | <u>0.83</u> | 0.01 | 0.01 | -0.04 |
| Pornographic Websites | <u>0.82</u> | 0.04 | -0.10 | 0.13 |
| Online Gaming | <u>0.71</u> | 0.00 | 0.06 | 0.05 |
| Watch Movies and Sitcoms on Subscription Services | <u>0.57</u> | -0.06 | 0.26 | -0.04 |
| Read Blogs | 0.38 | 0.15 | 0.26 | 0.05 |
| Search and Browse for Job Posting | 0.31 | 0.15 | 0.18 | 0.20 |
| Receive Personal Email | -0.02 | <u>0.96</u> | -0.01 | -0.07 |
| Check Personal Email | -0.07 | <u>0.85</u> | 0.06 | 0.02 |
| Send Personal Email | 0.06 | <u>0.84</u> | -0.03 | 0.05 |
| Twitter(X) | -0.04 | 0.03 | <u>0.90</u> | -0.04 |
| Instagram | 0.06 | 0.03 | <u>0.77</u> | 0.01 |
| YouTube | 0.01 | 0.02 | <u>0.62</u> | 0.16 |
| Facebook | 0.31 | 0.06 | <u>0.41</u> | 0.10 |
| Stock Websites | -0.07 | 0.00 | 0.07 | <u>0.77</u> |
| Sports Websites | 0.22 | 0.05 | -0.04 | <u>0.52</u> |
| Online Shopping | 0.13 | 0.29 | 0.08 | <u>0.42</u> |
| Eigenvalue | 3.96 | 2.74 | 2.54 | 1.56 |
| % of variance explained | 37 | 25 | 24 | 14 |

and sitcoms on subscription services, which seem to take a longer time with enthusiasm than other cyberloafing. We named the factor “serious deviance.” Factor 2 consists of receiving personal Email, checking personal Email, and sending personal Email. We named the factor “mail.” Factor 3 consists of using Twitter (X), Instagram, YouTube, and Facebook. These items represent social media, so we named the factor “social media.” Factor 4 consists of visiting stock websites, visiting sports websites, and online shopping. The items seem to represent informational content. We named the factor “information/shopping.” Table 6

shows the descriptive analysis of variables and correlations.

To examine patterns of cyberloafing behavior during remote work, we conducted k-means clustering with 3 clusters, whose number was decided based on the elbow method. Fig. 4 shows the heatmap of the means by each cluster. It suggests that those who engage in severe cyberloafing (i.e., serious deviance) also experience other types of cyberloafing more. Some people rarely engage in cyberloafing for any cyberloafing activities.

To test the hypotheses, we conducted hierarchical regression analyses to examine whether the interpersonal relationship variables—newly introduced in this study—provide additional explanatory power beyond the basic cyberloafing antecedents established in prior research. We first entered demographic control variables (gender and age), given that previous studies have reported demographic differences in cyberloafing and general online behaviors (e.g., Lim & Chen, 2012). In the subsequent steps, primary cyberloafing antecedents were entered, followed by personal-level and organizational-level interpersonal variables. This analytic structure allowed us to assess the incremental contribution of each set of predictors.

In the first step, we entered the demographic variables: gender and age. In the second step, we entered rules of internet use for non-work-related purposes, the strictness of rules for private internet use, the necessity of internet use for work, perceived supervisors' cyberloafing, supervisors' strictness for cyberloafing, perceived coworkers' cyberloafing, coworker's strictness for cyberloafing, and job satisfaction. In the third step, we entered interpersonal variables: positive attitudes toward coworkers, supervisor support, coworker support, family/friends support, and family life satisfaction. Table 7 shows the results of these analyses for each cyberloafing factor. Step 2 revealed significant additional variances for all cyberloafing factors (mail $\Delta R^2 = 0.14, p < .001$; social media $\Delta R^2 = 0.13, p < .001$; information/shopping $\Delta R^2 = 0.16, p < .001$; serious deviance $\Delta R^2 = 0.19, p < .001$). Surprisingly, rules of internet use for non-work-related purposes and the strictness of rules for private internet use did not show any significant effects on all cyberloafing factors, while the necessity of internet use for work negatively predicted all cyberloafing factors (mail $\beta = -0.15, p < .001$; social media $\beta = -0.25, p < .001$; information/shopping $\beta = -0.27, p < .001$; serious

Table 6
Means, standard deviations, and correlations of variables.

| Variables | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|-------|-------|---------|--------|---------|---------|---------|---------|---------|---------|--------|--------|---------|--------|--------|---------|--------|--------|--------|----|----|
| 1 Gender | 47.67 | 14.77 | - | | | | | | | | | | | | | | | | | | |
| 2 Age | 3.20 | 1.45 | -0.27** | - | | | | | | | | | | | | | | | | | |
| 3 Rules of internet use for non-work related purposes | 2.99 | 1.35 | 0.04 | 0.06 | - | | | | | | | | | | | | | | | | |
| 4 Strictness of private internet use | 4.53 | 0.82 | 0.00 | 0.02 | 0.03 | - | | | | | | | | | | | | | | | |
| 5 Necessity of internet use for work | 2.86 | 1.24 | -0.07 | 0.07 | 0.08 | 0.03 | - | | | | | | | | | | | | | | |
| 6 Perceived supervisors' cyberloafing | 3.05 | 1.20 | 0.09* | 0.09* | 0.59** | 0.04 | 0.03 | - | | | | | | | | | | | | | |
| 7 Supervisors' strictness for cyberloafing | 2.88 | 1.13 | -0.02 | 0.04 | 0.46** | 0.01 | 0.01 | 0.14** | - | | | | | | | | | | | | |
| 8 Perceived coworkers' cyberloafing | 3.11 | 1.17 | 0.01 | 0.01 | -0.06 | -0.08 | 0.05 | 0.74** | -0.14** | - | | | | | | | | | | | |
| 9 Coworker's strictness for cyberloafing | 2.91 | 0.79 | -0.05 | 0.10** | 0.04 | 0.01 | 0.00 | -0.01 | -0.07 | -0.04 | - | | | | | | | | | | |
| 10 Job satisfaction | 60.92 | 11.39 | 0.03 | 0.05 | 0.10** | 0.04 | 0.01 | 0.14** | -0.04 | -0.03 | 0.37** | - | | | | | | | | | |
| 11 Positive attitudes toward coworkers | 7.24 | 2.41 | -0.09* | 0.10** | 0.04 | 0.01 | 0.04 | -0.05 | -0.07 | -0.01 | 0.39** | 0.37** | - | | | | | | | | |
| 12 Supervisor support | 7.46 | 2.31 | -0.02 | 0.10** | 0.06 | 0.06 | 0.04 | -0.02 | 0.01 | 0.02 | 0.43** | 0.48** | 0.53** | - | | | | | | | |
| 13 Coworker support | 8.88 | 2.56 | 0.06 | 0.06 | 0.08 | 0.02 | 0.18** | -0.08** | -0.03 | -0.04 | 0.20** | 0.32** | 0.48** | 0.75** | - | | | | | | |
| 14 Private support | 5.20 | 1.63 | -0.13** | 0.19 | 0.02 | 0.00 | 0.08* | -0.01 | -0.09* | -0.05 | 0.37** | 0.35** | 0.82** | 0.80** | 0.48** | - | | | | | |
| 15 Family life satisfaction | 1.34 | 0.69 | -0.09 | 0.17** | 0.10** | 0.10** | -0.38** | 0.16** | 0.04 | 0.11** | 0.11** | 0.02 | -0.22** | 0.04 | 0.03 | -0.16** | - | | | | |
| 16 Serious Deviance | 2.29 | 1.20 | -0.04 | 0.13** | -0.15** | -0.15** | -0.15** | 0.31** | -0.19** | -0.14** | 0.29** | 0.02 | -0.10** | 0.04 | 0.04 | 0.02 | 0.35** | - | | | |
| 17 Mail | 1.73 | 0.97 | -0.02 | 0.19** | -0.01 | -0.02 | -0.25** | 0.24** | -0.04 | 0.02 | 0.18** | 0.01 | -0.13** | 0.03 | 0.03 | -0.08* | -0.03 | 0.46** | - | | |
| 18 Social Media | 1.79 | 0.94 | -0.16** | 0.08 | -0.04 | -0.04 | -0.26** | 0.29** | -0.03 | 0.02 | 0.25** | 0.04 | -0.17** | 0.03 | 0.06 | -0.09* | 0.01 | 0.59** | 0.56** | - | |
| 19 Information/Shopping | | | | | | | | | | | | | | | | | | | | | |

N= 760. *p < .05, **p < .01.

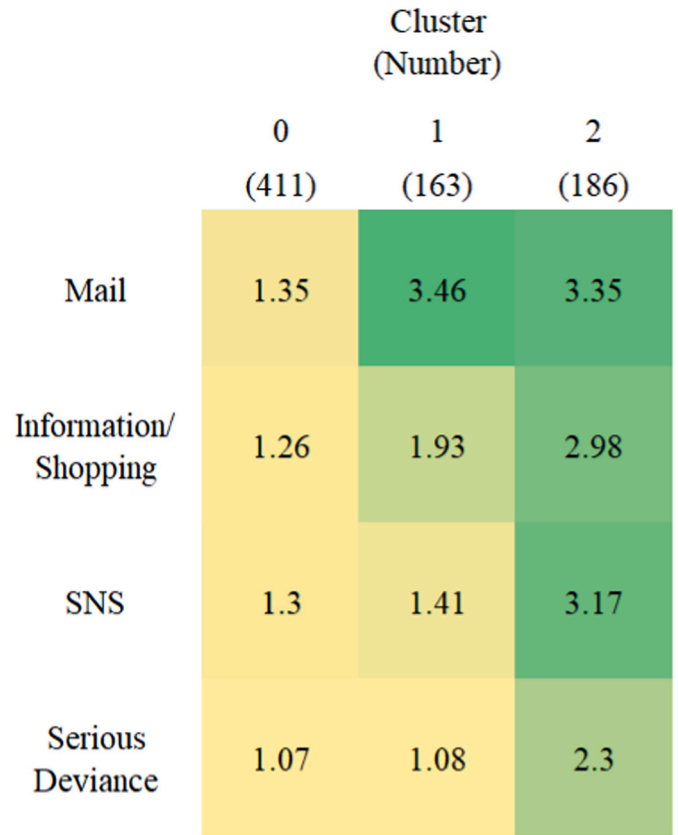


Fig. 4. The heatmap of the means of each cyberloafing factor by cluster.

deviance $\beta = -0.38, p < .001$). Perceived supervisors' cyberloafing positively predicted for all cyberloafing factors (mail $\beta = 0.18, p < .001$; social media $\beta = 0.23, p < .001$; information/shopping $\beta = 0.19, p < .001$; serious deviance $\beta = 0.16, p < .01$), supporting Hypothesis 1. Supervisors' strictness for cyberloafing negatively predicted cyberloafing for serious deviance (mail $\beta = -0.11, p = .07$; social media $\beta = -0.08, p = .15$; information/shopping $\beta = -0.01, p = .83$; serious deviance $\beta = -0.11, p = .04$) and perceived coworkers' cyberloafing positively predicted for mail and information/shopping (mail $\beta = 0.15, p < .01$; social media $\beta = 0.03, p = .52$; information/shopping $\beta = 0.15, p < .01$; serious deviance $\beta = 0.04, p = .41$). Step 3 revealed significant or marginal additional variances for all cyberloafing factors (mail $\Delta R^2 = 0.01, p < .10$; social media $\Delta R^2 = 0.02, p < .05$; information/shopping $\Delta R^2 = 0.02, p < .001$; serious deviance $\Delta R^2 = 0.05, p < .001$). Family/friend support significantly predicted lesser cyberloafing only for serious deviance (mail $\beta = 0.02, p = .72$; social media $\beta = -0.05, p = .27$; information/shopping $\beta = -0.05, p = .18$; serious deviance $\beta = -0.12, p < .01$), indicating Hypothesis 3 was supported at serious deviance. Family life satisfaction significantly predicted lesser cyberloafing for all factors (mail $\beta = -0.16, p < .05$; social media $\beta = -0.16, p < .05$; information/shopping $\beta = -0.16, p < .05$; serious deviance $\beta = -0.16, p < .05$), indicating Hypothesis 4 was supported. Positive attitudes toward coworkers predicted lesser cyberloafing for information/shopping ($\beta = -0.13, p < .001$) and serious deviance ($\beta = -0.19, p < .001$), showing Hypothesis 5 was supported to information/shopping and serious deviance (mail $\beta = -0.06, p = .13$; social media $\beta = -0.08, p < .10$). Supervisor support predicted more cyberloafing for social media ($\beta = 0.13, p < .05$) and serious deviance ($\beta = 0.16, p < .001$), not for mail ($\beta = 0.11, p < .10$) and information/shopping ($\beta = 0.07, p = .28$), showing Hypothesis 6 was supported to social media and serious deviance. Coworker support predicted more cyberloafing for social media ($\beta = 0.14, p < .05$), information/shopping ($\beta = 0.22, p < .001$), and serious deviance ($\beta = 0.19, p < .01$), not for mail ($\beta = 0.10, p = .11$), indicating

Table 7
Hierarchical regression for each factor of cyberloafing.

| | | Mail | Social Media | Information/ Shopping | Serious Deviance |
|--------------|---|--------------------|--------------------|-----------------------|------------------|
| Step1 | | | | | |
| β | Gender | -0.01 | -0.08 [†] | -0.15*** | -0.14*** |
| | Age | 0.12** | -0.21*** | 0.04 | -0.21*** |
| R^2 | | 0.01 | 0.04 | 0.02 | 0.04 |
| F | | | | | |
| Step2 | | | | | |
| β | Gender | 0.00 | -0.06 [†] | -0.13*** | -0.11** |
| | Age | 0.10** | -0.22*** | 0.03 | -0.20*** |
| | Rules of internet use for non-work-related purposes | 0.01 | 0.03 | -0.01 | 0.07 |
| | Strictness of rules for private internet use | -0.08 | -0.04 | -0.06 | 0.03 |
| | Necessity of internet use for work | -0.15*** | -0.25*** | -0.27*** | -0.38*** |
| | Perceived supervisors' cyberloafing | 0.18*** | 0.23*** | 0.19*** | 0.16** |
| | Supervisors' strictness for cyberloafing | -0.11 [†] | -0.08 | -0.01 | -0.11* |
| | Perceived coworkers' cyberloafing | 0.15** | 0.03 | 0.15** | 0.04 |
| | Coworker's strictness for cyberloafing | 0.04 | 0.12* | 0.13* | 0.17** |
| | Job satisfaction | 0.01 | 0.02 | 0.05 | 0.03 |
| R^2 | | 0.15 | 0.16 | 0.18 | 0.23 |
| ΔR^2 | | 0.14 | 0.13 | 0.16 | 0.19 |
| ΔF | | 15.90*** | 14.63*** | 18.99*** | 24.01*** |
| Step3 | | | | | |
| β | Gender | -0.01 | -0.06 | -0.14*** | -0.10** |
| | Age | 0.11** | -0.21*** | 0.04 | -0.18*** |
| | Rules of internet use for non-work-related purposes | 0.00 | 0.02 | -0.03 | 0.07 |
| | Strictness of rules for private internet use | -0.08 | -0.03 | -0.05 | 0.04 |
| | Necessity of internet use for work | -0.14*** | -0.23*** | -0.24*** | -0.33*** |
| | Perceived supervisors' cyberloafing | 0.18** | 0.22*** | 0.16** | 0.13** |
| | Supervisors' strictness for cyberloafing | -0.11 [†] | -0.09 | -0.03 | -0.12* |
| | Perceived coworkers' cyberloafing | 0.14** | 0.02 | 0.13** | 0.02 |
| | Coworker's strictness for cyberloafing | 0.03 | 0.11 [†] | 0.12* | 0.15** |
| | Job satisfaction | 0.01 | 0.02 | 0.05 | 0.06 |
| | Family/friend support | 0.02 | -0.05 | -0.05 | -0.12** |
| | Family life satisfaction | -0.16* | -0.16* | -0.16* | -0.16* |

Table 7 (continued)

| | Mail | Social Media | Information/ Shopping | Serious Deviance |
|-------------------------------------|-------------------|--------------------|-----------------------|------------------|
| Positive attitudes toward coworkers | -0.06 | -0.08 [†] | -0.13*** | -0.19*** |
| Supervisor support | 0.11 [†] | 0.13* | 0.07 | 0.16** |
| Coworker support | 0.10 | 0.14* | 0.22*** | 0.19*** |
| R^2 | 0.15 | 0.17 | 0.20 | 0.27 |
| ΔR^2 | 0.01 | 0.02 | 0.02 | 0.05 |
| ΔF | 1.88 [†] | 2.89* | 4.55*** | 9.61*** |

$N = 760$, * $p < .05$, ** $p < .01$, *** $p < .001$.

Hypothesis 7 was supported except for mail-related cyberloafing.

4. Discussion

4.1. Hypotheses

This study investigated how three interpersonal relationship aspects—home-based psychological resources (private support and family life satisfaction), group attractiveness (positive attitudes toward coworkers), and collective performance factors (supervisor and coworker support)—influence cyberloafing during remote work, along with established cyberloafing antecedents. Perceived supervisors' cyberloafing was positively related to all dimensions of cyberloafing, fully supporting Hypothesis 1. In contrast, perceived coworkers' cyberloafing was positively associated only with email-related and information/shopping cyberloafing, providing partial support for Hypothesis 2. These findings suggest that supervisors exert a stronger normative influence on cyberloafing during remote work than coworkers. Given the normative role of supervisors in organizational settings, employees may be more likely to use their supervisor's behavior as a normative reference when evaluating the acceptability of cyberloafing. Moreover, perceived supervisors' cyberloafing predicted higher levels of all types of cyberloafing in remote work, whereas it was associated only with more routine forms of cyberloafing (routine online use) in the office. Taken together, these results indicate that the normative influence of supervisors' behavior plays a particularly important role in shaping cyberloafing during remote work, highlighting supervisors' cyberloafing as a critical factor to address when attempting to reduce cyberloafing in remote environments.

For the interpersonal variables at the personal level, higher family/friend support predicted lower cyberloafing only for serious deviance, providing partial support for Hypothesis 3. In contrast, greater family life satisfaction was associated with lower cyberloafing across all dimensions, supporting Hypothesis 4. Cyberloafing has been shown to serve as a coping response to interpersonal stressors in the workplace (Andel et al., 2019; Hu et al., 2021). Moreover, dissatisfaction in one's private life has been linked to work deviant behaviors (e.g., Darrat et al., 2010; Lei et al., 2023). George et al. (2023) found that job overload is positively related to cyberloafing during remote work, further suggesting that employees may use cyberloafing as a stress-coping strategy even when working from home. Family life satisfaction may provide remote workers with psychological resources that buffer against job-related stress. The present findings also imply that common forms of cyberloafing (e.g., online shopping) and more severe forms (e.g., online gambling) may be driven by different psychological processes. Severe cyberloafing behaviors might be more likely to emerge as a response to stress.

For the interpersonal variables at the organizational level, positive attitudes toward coworkers negatively predicted information/shopping

and serious deviance, but not mail or social media cyberloafing, providing partial support for Hypothesis 5. This pattern suggests that favorable impressions of coworkers help deter more discretionary or severe forms of cyberloafing, whereas highly habitual behaviors such as checking email or browsing social media may be less sensitive to interpersonal dynamics. Prior studies have shown that conflicts with colleagues can lead to strain, psychological distress, and subsequent deviant behaviors (Harvey et al., 2007). Conversely, positive coworker relationships contribute to group cohesion, solidarity, and a sense of unity—factors known to enhance motivation and cooperative behavior in organizations. As discussed in the Introduction, developing a shared identity and maintaining harmonious interpersonal relations can foster a stronger motivational climate, even when employees are physically distant from one another in remote work settings. During remote work, maintaining interpersonal bonds becomes more challenging due to reduced face-to-face interaction, yet coworkers still serve as psychologically salient members of employees' reference groups. Positive attitudes toward coworkers may thus buffer against interpersonal stressors and reduce the likelihood of engaging in cyberloafing. Higher coworker support predicted greater cyberloafing on three dimensions—social media, information/shopping, and serious deviance—except for mail. Higher supervisor support, in contrast, predicted increased cyberloafing only on social media and serious deviance. These findings partially support Hypotheses 6 and 7. Consistent with the concept of the dispensability of one's own effort, coworker support influenced a broader range of cyberloafing behaviors than supervisor support.

According to social psychological research, individuals tend to reduce their effort in group contexts because they can rely on others' contributions, particularly when other members are perceived as capable or highly involved (Latané et al., 1979; Williams et al., 1981). The current findings extend this perspective, suggesting that collective motivational factors—specifically, the perceived dispensability of one's own effort—also contribute to cyberloafing during remote work. Interpersonal orientation has been shown to weaken compensatory or complementary effort patterns in group performance (Agata et al., 2022),

indicating that relational perceptions can shape employees' motivation even in dispersed work environments. To deter cyberloafing, fostering a stronger sense of “oneness” or psychological unity among remote workers may be beneficial. Providing regular opportunities for online communication or occasional on-site interactions may help enhance cohesion, reduce perceived dispensability, and consequently discourage cyberloafing.

Fig. 5 illustrates the supported paths among the proposed hypotheses. The results showed that incorporating these interpersonal factors increased the explained variance of three cyberloafing dimensions (social media, information/shopping, and serious deviance), with the exception of email-related cyberloafing. This suggests that email-related cyberloafing is less influenced by interpersonal relationships. Email-related activities are generally the most common and least severe forms of cyberloafing. Employees may view them as harmless and not disruptive to their work, partly because such behaviors typically require minimal time and effort. Overall, serious deviance was influenced by a larger number of variables than the other dimensions, suggesting that more severe behaviors—such as visiting pornographic websites or playing online games—are more strongly driven by situational and psychological factors. However, the increase in explained variance (ΔR^2) attributable to the interpersonal relationship factors was smaller than that attributed to the primary antecedents of cyberloafing.

More common cyberloafing activities and severe forms of cyberloafing appear to be induced by different justification processes. Previous research has shown that employees often perceive cyberloafing as permissible rather than counterproductive or harmful (Batabyal & Bhal, 2020; Garrett & Danziger, 2008; Lim & Chen, 2012). Common cyberloafing activities, such as checking email, are often justified through descriptive norms, even when organizations have established explicit rules against cyberloafing. When employees perceive that supervisors or coworkers also engage in cyberloafing, they may interpret such behavior as acceptable because “others are doing it as well.” By contrast, more severe forms of cyberloafing may be driven by self-justification processes related to stress coping. As shown in Fig. 4, employees who

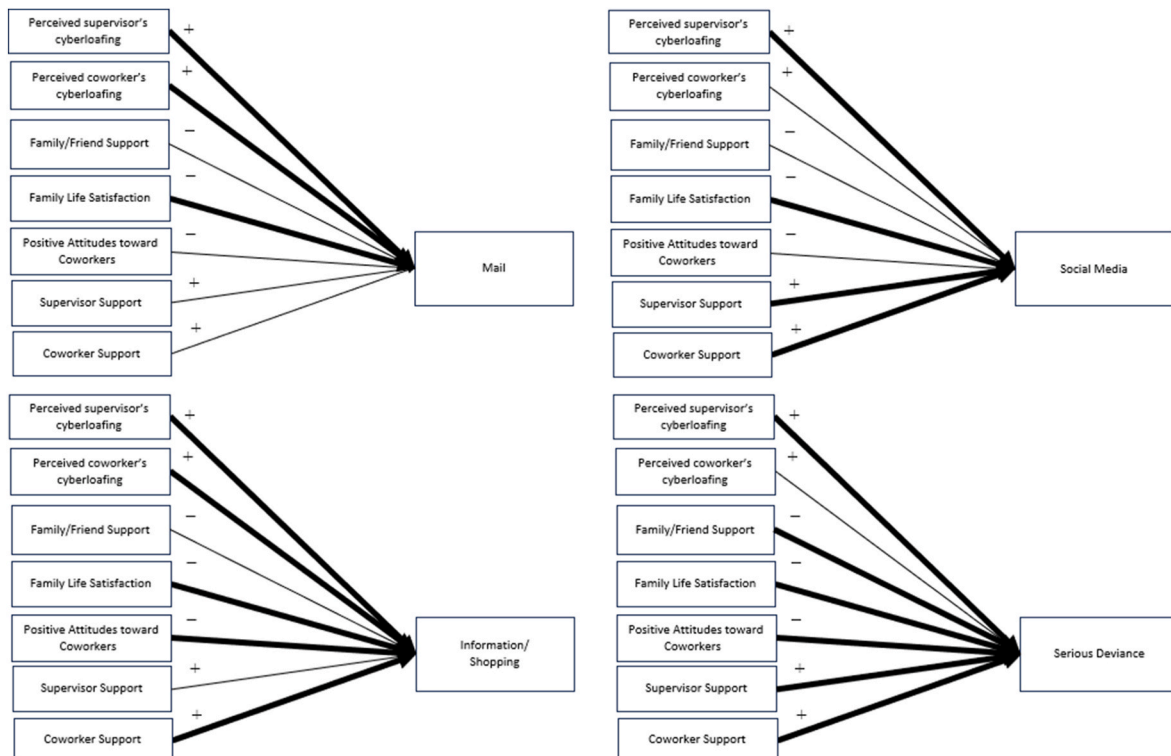


Fig. 5. The supported hypothesis for each cyberloafing factor.

engage in serious deviant cyberloafing are also likely to engage in other types of cyberloafing, suggesting an accumulation of deviant behaviors. Heightened frustration and stress may weaken self-regulatory capacity (Wang et al., 2024), thereby increasing susceptibility to situational and psychological influences and facilitating more severe cyberloafing behaviors.

4.2. General discussion: office vs. remote work

Counterintuitively, the frequency of cyberloafing during remote work was lower than in the office, particularly for common forms of cyberloafing. In contrast, more severe cyberloafing behaviors—such as using dating applications or engaging in online gambling—occurred at similar levels across both work settings. Previous studies have suggested that cyberloafing can help employees relieve or regulate stress (Koay et al., 2017). Thus, remote workers may rely on alternative stress-relief activities that do not involve cyberloafing. A notable finding of this study is that remote workers were still influenced by their supervisors and coworkers, even when working from home. Perceived supervisors' and coworkers' cyberloafing predicted employees' own cyberloafing during remote work, as well as in the office. Moreover, supervisors' cyberloafing appears to exert a stronger influence in remote work settings than in office settings. This pattern likely reflects supervisors' greater legitimacy and higher hierarchical status compared to coworkers. In office environments, coworkers' cyberloafing may more strongly influence individual behavior because coworkers are physically present and their actions are more directly observable. In contrast, the influence of coworkers may weaken during remote work due to reduced visibility and interaction. According to social impact theory, the strength of social influence is diluted as the number of influence sources increases (Latané, 1981). Taken together, remote work settings may amplify the normative influence of supervisors while attenuating the influence of coworkers.

Furthermore, while organizational rules regarding internet use significantly deterred routine online use and social media cyberloafing in the office, these rules did not reduce cyberloafing during remote work. This suggests that remote workers rely more on descriptive norms—their perceptions of others' behavior—than on formal rules when evaluating the acceptability of cyberloafing. Employees may expect that supervisors and coworkers also cyberloaf when working remotely without direct supervision. These findings imply that reducing cyberloafing during remote work may depend more on ensuring that supervisors and coworkers model appropriate behavior than on implementing strict prohibitive rules. Lower visibility and reduced interaction with supervisors may increase employees' perceptions that others are cyberloafing. Therefore, the proactive use of communication tools and intentional opportunities for supervisor–employee interaction may help mitigate cyberloafing by clarifying normative expectations (Yang et al., 2023).

4.3. Contributions and limitations

Overall, interpersonal factors at the organizational level influenced employees' cyberloafing even during remote work, despite the physical absence of supervisors and coworkers. Although the findings showed that supervisor and coworker support were associated with increased cyberloafing during remote work, this study did not examine which specific types of support (e.g., emotional, instrumental, informational) contributed to these effects. Future research should explore what forms of support are most effective for facilitating remote work and fostering teamwork. The present findings also emphasize the importance of positive workplace relationships as a form of psychological capital. Even in remote settings, interpersonal relationships with colleagues and supervisors may play a pivotal role in shaping employees' motivation and behavior.

Although this study identified meaningful interpersonal predictors of

cyberloafing during remote work, the cross-sectional design does not allow for causal inferences. Therefore, the relationships observed in this study should be interpreted as associations rather than causal effects. In addition, while interpersonal variables increased the explanatory power of the models, their incremental contribution was smaller than that of the basic cyberloafing antecedents identified in prior research. This suggests that interpersonal factors are important but may function as secondary or context-dependent predictors. These limitations should be taken into account when interpreting the findings, and future longitudinal or experimental research would help clarify the causal mechanisms underlying these relationships.

Additionally, this study did not account for the influence of job descriptions or task requirements on cyberloafing. The purpose and necessity of internet use vary widely across occupations—for example, sales employees may frequently use online platforms for client meetings, whereas engineers may rely more heavily on internet-based programming tools or AI coding environments. Such differences may influence the frequency and form of cyberloafing during remote work. It would be valuable for future research to examine how such job-related factors influence cyberloafing during remote work.

CRediT authorship contribution statement

Ako Agata: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Ryuji Takahara:** Formal analysis, Conceptualization. **Yu Kasagi:** Formal analysis. **Naoki Kugihara:** Conceptualization.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

Data will be made available on request.

References

- Agarwal, U. A., & Avey, J. B. (2020). Abusive supervisors and employees who cyberloaf: Examining the roles of psychological capital and contract breach. *Internet Research*, 30(3), 789–809. <https://doi.org/10.1108/intr-05-2019-0208>
- Agata, A., Ando, K., Kasagi, Y., & Kugihara, N. (2022). Seeking harmony rather than efficiency: The effect of self-construal on social compensation. *Japanese Psychological Research*, 65(4), 347–359. <https://onlinelibrary.wiley.com/doi/10.1111/jpr.12399>.
- Andel, S. A., Kessler, S. R., Pindek, S., Kleinman, G., & Spector, P. E. (2019). Is cyberloafing more complex than we originally thought? Cyberloafing as a coping response to workplace aggression exposure. *Computers in Human Behavior*, 101, 124–130. <https://doi.org/10.1016/j.chb.2019.07.013>
- Askew, K. L., & Buckner, J. E. (2017). The role of the workstation: Visibility of one's computer screen to coworkers influences cyberloafing through self-efficacy to hide cyberloafing. *Psychologist-Manager Journal*, 20(4), 267–287. <https://doi.org/10.1037/mgr0000061>
- Askew, K. L., Ilie, A., Bauer, J. A., Simonet, D. V., Buckner, J. E., & Robertson, T. A. (2019). Disentangling how coworkers and supervisors influence employee cyberloafing: What normative information are employees attending to? *Journal of Leadership & Organizational Studies*, 26(4), 526–544. <https://doi.org/10.1177/1548051818813091>

- Bass, B. M. (1990). From transactional to transformational leadership: Learning to share the vision. *Organizational Dynamics*, 18(3), 19–31.
- Batabyal, S. K., & Bhal, K. T. (2020). Traditional cyberloafing, Mobile cyberloafing and personal mobile-internet loafing in business organizations: Exploring cognitive ethical logics. *Journal of Information, Communication and Ethics in Society*, 18(4), 631–647.
- Bialowolski, P., & Weziak-Bialowolska, D. (2021). Longitudinal evidence for reciprocal effects between life satisfaction and job satisfaction. *Journal of Happiness Studies: An Interdisciplinary Forum on Subjective Well-Being*, 22(3), 1287–1312. <https://doi.org/10.1007/s10902-020-00273-1>
- Blanchard, A. L., & Henle, C. A. (2008). Correlates of different forms of cyberloafing: The role of norms and external locus of control. *Computers in Human Behavior*, 24(3), 1067–1084. <https://doi.org/10.1016/j.chb.2007.03.008>
- Chakraborty, T., Dhir, S., Al-Busaidi, A. S., & Dwivedi, Y. K. (2024). Can remote work be adopted when phubbing and cyberloafing behavior are on the rise? *Journal of Global Information Management*, 32(1), 1–25.
- Cialdini, R. B., Reno, R. R., & Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of Personality and Social Psychology*, 58, 1015–1026.
- Darrat, M., Amyx, D., & Bennett, R. (2010). An investigation into the effects of work-family conflict and job satisfaction on salesperson deviance. *Journal of Personal Selling and Sales Management*, 30(3), 239–251.
- de Lara, P. Z. M. (2006). Research note: Fear in organizations: Does intimidation by formal punishment mediate the relationship between interactional justice and workplace internet deviance? *Journal of Managerial Psychology*, 21(6), 580–592. <https://doi.org/10.1108/02683940610684418>
- Deutsch, M., & Gerard, H. B. (1955). A study of normative and informational social influences upon individual judgment. *Journal of Abnormal and Social Psychology*, 51, 629–636.
- Elon Musk declares end to remote working at Tesla. (2022). BBC. <https://www.bbc.com/news/business-61666339>.
- Farooq, N. (2019). The relationship between cyber loafing and task performance and an examination of general self-efficacy as a mediator. *City University Research Journal*, 9(2), 332–339.
- Ferris, D. L., Spence, J. R., Brown, D. J., & Heller, D. (2012). Interpersonal injustice and workplace deviance: The role of esteem threat. *Journal of Management*, 38(6), 1788–1811. <https://doi.org/10.1177/0149206310372259>
- Garrett, R. K., & Danziger, J. N. (2008). Disaffection or expected outcomes: Understanding personal internet use during work. *Journal of Computer-Mediated Communication*, 13, 937–958.
- George, S., Johnson, J., & Devan, K. (2023). Are employees cyber loafing during remote work? Influence of demographic and organizational factors on cyberloafing behavior. *Theoretical & Applied Economics*, 30(4), 147–164. <https://www.ebsco.com/ro/Theoretical%20and%20Applied%20Economics%202023%20Winter.pdf#page=147>.
- Golden, T. D., & Gajendran, R. S. (2019). Unpacking the role of a telecommuter's job in their performance: Examining job complexity, problem-solving, interdependence, and social support. *Journal of Business and Psychology*, 34(1), 55–69. <https://doi.org/10.1007/s10869-018-9530-4>
- Griffith, T. L., Fichman, M., & Moreland, R. L. (1989). Social loafing and social facilitation: An empirical test of the cognitive-motivational model of performance. *Basic and Applied Social Psychology*, 10(3), 253–271.
- Harvey, P., Stoner, J., Hochwarter, W., & Kacmar, C. (2007). Coping with abusive supervision: The neutralizing effects of ingratiation and positive affect on negative employee outcomes. *The Leadership Quarterly*, 18(3), 264–280.
- Hu, Y., Chen, Y., & Ye, M. (2021). Eager to belong: Social cyberloafing as a coping response to workplace ostracism. *Current Psychology*, 42, 3372–3381. <https://doi.org/10.1007/s12144-021-01690-y>
- Hyman, H. H. (1960). Reflections on reference groups. *Public Opinion Quarterly*, 24(3), 383–396.
- Jeong, Y., Jung, H., & Lee, J. (2019). Cyberslacking or smart work: Smartphone usage log-analysis focused on app-switching behavior in work and leisure conditions. *International Journal of Human-Computer Interaction*, 36(1), 15–30. <https://doi.org/10.1080/10447318.2019.1597574>
- Jia, H., Jia, R., & Karau, S. (2013). Cyberloafing and personality: The impact of the Big Five traits and workplace situational factors. *Journal of Leadership & Organizational Studies*, 20(3), 358–365. <https://doi.org/10.1177/1548051813488208>
- Jiang, H., Tsohou, A., Siponen, M. T., & Li, Y. (2020). Examining the side effects of organizational internet monitoring on employees. *Internet Research*, 30, 1613–1630.
- Karau, S. J., & Williams, K. D. (1993). Social loafing: A meta-analytic review and theoretical integration. *Journal of Personality and Social Psychology*, 65, 681–706.
- Koay, K. Y., Soh, P. C. H., & Chew, K. W. (2017). Do employees' private demands lead to cyberloafing? The mediating role of job stress. *Management Research Review*, 40(9), 1025–1038.
- Kossek, E. E., & Ozeki, C. (1998). Work-family conflict, policies, and the job-life satisfaction relationship: A review and directions for organizational behavior-human resources research. *Journal of Applied Psychology*, 83, 139–149.
- Latané, B. (1981). The psychology of social impact. *American Psychologist*, 36, 343–356. <https://doi.org/10.1037/0003-066X.36.4.343>
- Latané, B., Williams, K., & Harkins, S. (1979). Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology*, 37, 822–832.
- Lei, S., Zhang, Y., & Cheah, K. S. L. (2023). Mediation of work-family support and affective commitment between family supportive supervisor Behaviour and workplace deviance. *Heliyon*, 9(11), Article e21509. <https://doi.org/10.1016/j.heliyon.2023.e21509>
- Leiter, M. P., & Maslach, C. (1988). The impact of interpersonal environment on burnout and organizational commitment. *Journal of Organizational Behavior*, 9(4), 297–308. <https://doi.org/10.1002/job.4030090402>
- Liang, X., Guo, G., Gong, Q., Li, S., & Li, Z. (2022). Cyberloafing to escape from the "Devil": Investigating the impact of abusive supervision from the third-party perspective. *Frontiers in Psychology*, 12, Article 722063. <https://doi.org/10.3389/fpsyg.2021.722063>
- Liden, R. C., Wayne, S. J., Jaworski, R. A., & Bennett, N. (2004). Social loafing: A field investigation. *Journal of Management*, 30(2), 285–304.
- Lim, V. K. (2002). The IT way of loafing on the job: Cyberloafing, neutralizing and organizational justice. *Journal of Organizational Behavior*, 23(5), 675–694. <https://doi.org/10.1002/job.161>
- Lim, V. K., & Chen, D. J. (2012). Cyberloafing at the workplace: Gain or drain on work? *Behaviour & Information Technology*, 31(4), 343–353. <https://doi.org/10.1080/01449290903353054>
- Lim, V. K. G., & Teo, T. S. H. (2005). Prevalence, perceived seriousness, justification and regulation of cyberloafing in Singapore: An exploratory study. *Information & Management*, 42, 1081–1093.
- Lott, A. J., & Lott, B. E. (1965). Group cohesiveness as interpersonal attraction: A review of relationships with antecedent and consequent variables. *Psychological Bulletin*, 64(4), 259–309. <https://doi.org/10.1037/h0022386>
- Luna, A., Levy, Y., Simco, G., & Li, W. (2022a). Towards assessing organizational cybersecurity risks via remote workers' cyberslacking and their computer security posture. In *2022 KSU conference on cybersecurity education, research and practice*. GA, United States: Kennesaw State University. <https://digitalcommons.kennesaw.edu/cgi/viewcontent.cgi?article=1150&context=ccepr>.
- Luna, A., Levy, Y., Simco, G., & Li, W. (2022b). Proposed empirical assessment of remote workers' cyberslacking and computer security posture to assess organizational cybersecurity risks. In *2022 IEEE high performance extreme computing conference (HPEC) online*. <https://ieeexplore.ieee.org/document/9926394>.
- Mackey, J. D., McAllister, C. P., Ellen, B. P., & Carson, J. E. (2021). A meta-analysis of interpersonal and organizational workplace deviance research. *Journal of Management*, 47(3), 597–622. <https://doi.org/10.1177/0149206319862612>
- Mariani, M., Wamba, S. F., Castaldo, S., & Santoro, G. (2023). The rise and consolidation of digital platforms and technologies for remote working: Opportunities, challenges, drivers, processes, and consequences. *Journal of Business Research*, 160, 1–4. <https://doi.org/10.1016/j.jbusres.2022.113617>
- Merton, R. K. (1957). The role-set: Problems in sociological theory. *British Journal of Sociology*, 8(2), 106–120.
- Newcomb, T. M. (1943). *Personality and social change; attitude formation in a student community*. Dryden Press.
- O'Neill, T. A., Hambley, L. A., & Bercovich, A. (2014a). Prediction of cyberslacking when employees are working away from the office. *Computers in Human Behavior*, 34, 291–298. <https://doi.org/10.1016/j.chb.2014.02.015>
- O'Neill, T. A., Hambley, L. A., & Chatellier, G. S. (2014b). Cyberslacking, engagement, and personality in distributed work environments. *Computers in Human Behavior*, 40, 152–160. <https://doi.org/10.1016/j.chb.2014.08.005>
- Rain, J. S., Lane, I. M., & Steiner, D. D. (1991). A current look at the job satisfaction/life satisfaction relationship: Review and future considerations. *Human Relations*, 44(3), 287–307.
- Reizer, A., Galperin, B. L., Chavan, M., Behl, A., & Pereira, V. (2022). Examining the relationship between fear of COVID-19, intolerance for uncertainty, and cyberloafing: A mediational model. *Journal of Business Research*, 145, 660–670.
- Rice, R. W., Near, J. P., & Hunt, R. G. (1980). The job-satisfaction/life-satisfaction relationship: A review of empirical research. *Basic and Applied Social Psychology*, 1(1), 37–64. https://doi.org/10.1207/s15324834basop0101_4
- Sheikh, A., Aghaz, A., & Mohammadi, M. (2019). Cyberloafing and personality traits: An investigation among knowledge-workers across the Iranian knowledge-intensive sectors. *Behaviour & Information Technology*, 38(12), 1213–1224. <https://doi.org/10.1080/0144929X.2019.1580311>
- Sheikh, A., Atashgah, M. S., & Adibzadegan, M. (2015). The antecedents of cyberloafing: A case study in an Iranian copper industry. *Computers in Human Behavior*, 51, 172–179. <https://doi.org/10.1016/j.chb.2015.04.042>
- Shimomitsu, T., Haratani, T., Nakamura, K., Kawakami, N., Hayashi, T., Hiro, H., Arai, M., Miyazaki, S., Furuki, K., Ohya, Y., & Odagiri, Y. (2000). Final development of the brief job stress questionnaire mainly used for assessment of the individuals. In M. Kato (Ed.), *The Ministry of Labor sponsored grant for the prevention of work-related illness, FY 1999 report* (pp. 126–164). Tokyo: Tokyo Medical University (in Japanese).
- Varghese, L., & Barber, L. K. (2017). A preliminary study exploring moderating effects of role stressors on the relationship between big five personality traits and workplace cyberloafing. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 11(4), Article 4. <https://doi.org/10.5817/CP2017-4-4>
- Vitak, J., Crouse, J., & LaRose, R. (2011). Personal internet use at work: Understanding cyberslacking. *Computers in Human Behavior*, 27(5), 1751–1759. <https://doi.org/10.1016/j.chb.2011.03.002>
- Wang, T., Lin, Q., Zong, Z., & Zhou, Y. (2024). Work-related computing at home and nonwork-related computing at work: A self-determination perspective. *Information Technology & People*, 38(3), 1137–1151. <https://www.emerald.com/insight/content/doi/10.1108/ITP-02-2023-0127/full/pdf?title=work-related-computing-at-home-and-nonwork-related-computing-at-work-a-self-determination-perspective>
- Wang, B., Liu, Y., Qian, J., & Parker, S. K. (2021). Achieving effective remote working during the COVID-19 pandemic: A work design perspective. *Applied Psychology*, 70(1), 16–59.

- Williams, K., Harkins, S., & Latané, B. (1981). Identifiability as a deterrent to social loafing: Two cheering experiments. *Journal of Personality and Social Psychology*, 40, 303–311.
- Yang, L., Holtz, D., Jaffe, S., Suri, S., Sinha, S., Weston, J., Joyce, C., Shah, N., Sherman, K., Hecht, B., & Teevan, J. (2022). The effects of remote work on collaboration among information workers. *Nature Human Behaviour*, 6(1), 43–54. <https://doi.org/10.1038/s41562-021-01196-4>
- Yang, Y., Yan, R., Li, X., Meng, Y., & Xie, G. (2023). Different results from varied angles: The positive impact of work connectivity behavior after-hours on work engagement. *Behavioral Sciences*, 13(12), 971. <https://doi.org/10.3390/bs13120971>
- Zakrzewski, C. (2016). The key to getting workers to stop wasting time online. *The Wall Street Journal*. <http://www.wsj.com/articles/the-key-to-getting-workers-to-stop-wasting-time-online-1457921545>.
- Zedeck, S., & Mosier, K. L. (1990). Work in the family and employing organization. *American Psychologist*, 45(2), 240.
- Zhang, J., Akhtar, M. N., Zhang, Y., & Sun, S. (2020). Are overqualified employees bad apples? A dual-pathway model of cyberloafing. *Internet Research*, 30(1), 289–313.
- Zhang, Z., Hu, J., Xu, W., & Jia, J. (2023). Work outside work-hours, not work during work-hours: How digital connectivity leads to cyberloafing. In *Academy of management proceedings 2023*. Briarcliff Manor, NY 10510: Academy of Management.