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ORIGINAL ARTICLE

A dual pathway model of remote work intensity: A meta-analysis of its simultaneous positive and negative effects

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Abstract

As the COVID-19 pandemic wanes, many organizations are asking employees to return to the office concerned that more extensive remote work could hurt employee morale and productivity. Employees, however, prefer to work remotely because of the flexibility it provides. In light of such competing perspectives, we conducted a meta-analysis examining remote work intensity's (RWI) effects on employee outcomes. RWI refers to the extensiveness of remote work ranging from one or two days a week to full-time remote work. We propose a dual pathway model linking RWI to employee outcomes arguing that it has indirect but opposing effects on the same outcomes via two mediators—perceived autonomy and isolation. Findings from a meta-analysis of RWI's effects based on 108 studies (k = 110, N = 45,288) support the dual pathway model. Allaying organizational concerns about remote work, RWI had overall small but beneficial effects on multiple consequential employee outcomes including job satisfaction, organizational commitment, perceived organizational support, supervisor-rated performance, and turnover intentions. We also conducted a meta-analysis of the effects of remote work use (RWU), a binary construct taking on two values—remote workers (users) versus office-based workers (non-users of remote work). Findings from the RWU meta-analysis based on 62 studies (k = 63, N = 41,904) suggest that remote

workers generally have better outcomes than their office-based colleagues. Altogether, findings suggest that remote work offers modest upsides with limited downsides—even for those who spend more time working away from the office.

KEYWORDS
autonomy, isolation, remote work, remote work intensity, telecommuting, telework

1 | INTRODUCTION

Remote work arrangements involve employees performing work-related tasks typically completed at a central office at home or other non-office locations for at least some part of their regular work schedule (T. D. Allen et al., 2015; Gajendran & Harrison, 2007; Raghuram et al., 2019). Globally, an estimated 48% of knowledge workers work remotely at least part of the time (Gartner, 2023). Although remote work has been steadily increasing over the past three decades (Global Workplace Analytics, 2021), the COVID-19 pandemic accelerated its adoption. In the U.S., where an estimated 70 million employees work in jobs that can be performed remotely, the percentage of employees in remote-capable jobs who worked remotely almost doubled after the pandemic—from 40% in 2019 to 78% in 2022 (Wigert & Agrawal, 2022).

As the COVID-19 pandemic recedes, concerns about remote work have prompted multiple high-profile executives to ask employees to return to the office (Wense, 2023). For instance, Tesla CEO Elon Musk banned remote work at Tesla (and at X, formerly known as Twitter) expressing concerns about remote worker productivity (Garfinkle, 2023). Echoing such concerns, many prominent organizations are urging their employees to return to the office (Caminiti, 2023), while the vast majority of employees prefer to work remotely due to its flexibility benefits (Wigert & Agrawal, 2022). Such divergence of opinions between employers and employees regarding remote work is not new and reflects long-standing debates among scholars and practitioners about the advantages and disadvantages of remote work. Proponents argue for the upsides of remote work pointing to research showing that it provides employees greater flexibility and autonomy (Gajendran & Harrison, 2007). Detractors focus on downsides due to remote workers' physical and psychological "separation from coworkers, supervisors, and other organization members, leading to feelings of isolation" (Wiesenfeld et al., 2001, p. 214; see also D. G. Allen et al., 2003; Breslau & Ramseur, 2021; Feldman & Gainey, 1997; George, 2021), which they argue could hurt remote worker morale, productivity, and organizational attachment.

As more organizations consider curtailing or banning remote work, a central question is whether more time spent working remotely is helpful or harmful for employees and organizations. Following prior research (e.g., Gajendran & Harrison, 2007; Raghuram et al., 2019), we use the term *remote work intensity* (RWI) to describe time spent working remotely. Remote work intensity is defined as the frequency or amount of time spent working remotely typically assessed in terms of days/hours per week or percent of work week. Evidence-based insights addressing RWI's impacts on employee outcomes could help bridge the gap between managerial skepticism about remote work and employees' preferences to continue to work remotely. Therefore, we undertake a comprehensive meta-analysis of remote work incorporating over three decades of research, including recent studies conducted during the pandemic. Our meta-analysis addresses two important questions relevant to research and practice: does RWI matter for employee performance, attitudes, and well-being? And, what are the mechanisms through which RWI influences these outcomes?

By answering these questions, our meta-analysis advances knowledge about remote work beyond prior meta-analyses (e.g., T. D. Allen et al., 2013; Gajendran & Harrison, 2007) in significant ways. First, prior meta-analyses do

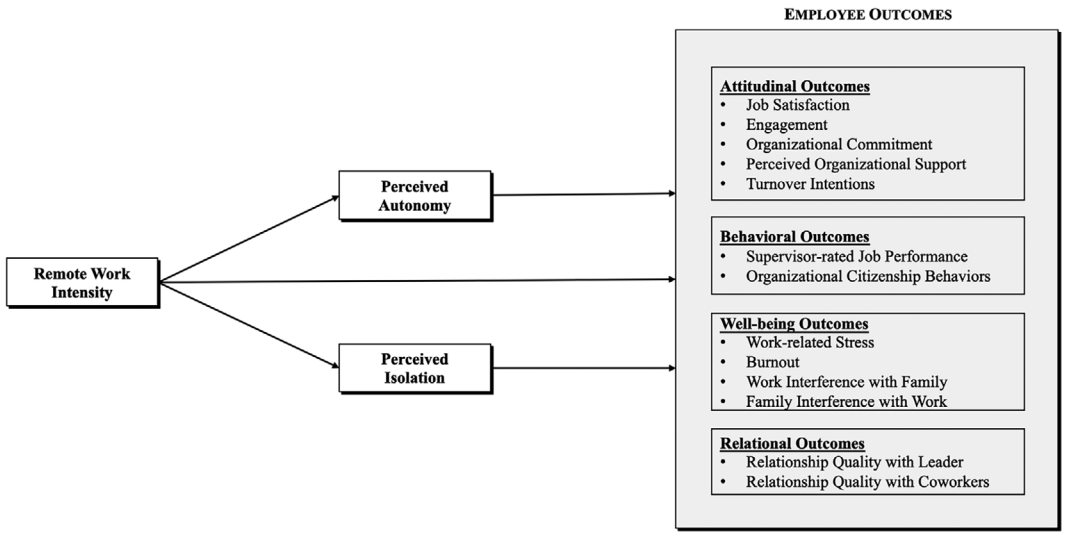

FIGURE 1 Overarching theoretical model.

not directly examine RWI's associations with key employee outcomes and instead have focused on outcomes from remote work use (RWU). Research on remote work use compares remote workers (users) to their office-based colleagues (non-users of remote work) to examine whether the former have better or worse outcomes than the latter (Raghuram et al., 2019). Although such comparisons provide useful insights, the widespread adoption of remote work shifts the focus from remote vs. office-based work to whether variance in time spent working remotely during the work week matters for employee outcomes. By meta-analytically examining RWI's relationships with key outcomes, our study provides new insights about remote work's consequences unavailable from previous meta-analyses.

Second, our study advances theorizing on remote work by developing and testing a theoretical model that explores the psychological mechanisms connecting RWI to key employee outcomes. Specifically, we propose a *dual pathway model* (see Figure 1) wherein RWI's effects on employee outcomes are mediated by perceived autonomy and perceived isolation, which have simultaneous but opposing effects on the same set of outcomes. Although prior research has examined remote work's effects on autonomy and isolation separately, the possibility that RWI could have simultaneous countervailing indirect effects on the same employee outcomes via these two mediators has not been theorized or tested so far.

Incorporating isolation in our model is another theoretical and empirical differentiator from previous meta-analyses, which do not include isolation as a mechanism or outcome in their analyses. Isolation is particularly sensitive to variance in RWI—the more time spent working remotely, the greater the feelings of isolation. Echoing this, recent employee surveys highlight isolation as one of the biggest downsides of remote work (Goredema, 2023; Stone et al., 2018). Yet, only recently has empirical attention turned towards this important downside of remote work (Golden et al., 2008) and this meta-analysis provides novel insights into its role.

Another notable point of distinction of this meta-analysis is the inclusion of studies of remote work conducted during the COVID-19 pandemic. Remote work during the pandemic was performed under very different circumstances than earlier. It was a widespread, often mandatory, intervention driven by safety concerns. Remote workers, many of whom were working from home for the first time, were doing their jobs remotely for a large proportion of the workweek while also isolating alongside their family members. They were working longer hours using newer and more intensive ways of interacting such as Zoom and Teams calls. Therefore, comparing outcomes of remote work before and during the pandemic could provide insights relevant to future research and practice.

A final contribution to advancing research on remote work is that we also conduct a meta-analysis of the outcomes of RWU. This meta-analysis has an expanded set of RWU studies ($k = 63$, $N = 41{,}904$) compared to Gajendran and

Harrison's (2007) meta-analysis ($k = 46$, $N = 12{,}883$). This allows us to (a) compare consistency (or lack of) in findings over time across meta-analyses, (b) provide updated estimates of key relationships, and (c) explore RWU's associations with outcomes not examined prior due to a lack of sufficient primary studies.

1.1 | Background and hypotheses

Remote work—also referred to as telecommuting, telework, virtual work, work from home, or flexplace—involves employees[1] performing their jobs at home or other non-office locations (e.g., cafés) for at least some part of their regular work schedule, using information and communication technologies to coordinate work and interact with other organizational members (T. D. Allen et al., 2015; Gajendran & Harrison, 2007). Researchers initially focused on comparing remote workers to their office-based colleagues to address questions about the viability of remote work as a legitimate work arrangement (Raghuram et al., 2019). In part, this was because remote work was initially viewed from the lens of a family-friendly "flexible" or "alternate" work arrangement, a perquisite benefitting the employee but imposing potential costs on the organizations such as shirking and loss of managerial control (Gajendran et al., 2015). The focus, therefore, was on examining whether remote work, compared to office-based work, offered other upsides such as improved employee attitudes and performance. Research typically assessed RWU as a binary variable: remote workers (users) vs. office-based workers (non-users) (e.g., Delanoeije & Verbruggen, 2020; E. J. Hill et al., 1996; Hornung & Glaser, 2009; ten Brummelhuis et al., 2010). Prior research finds that RWU has modest beneficial effects on job attitudes (Hornung et al., 2008; Hysmith, 2012; Taskin et al., 2019; Taveras, 1998) and job performance (Bloom et al., 2015; Gajendran et al., 2015; Solís, 2017).

Distinct from the issue of whether remote workers have better or worse outcomes than office-based workers is the matter of RWI *among remote workers*. As remote work becomes widespread, whether employees who work remotely more days a week have better or worse outcomes than those who spend fewer days doing so becomes a more central question than comparing remote workers with their office-based colleagues. Prior meta-analyses (T. D. Allen et al., 2013; Gajendran & Harrison, 2007) do not directly address the effects of RWI on employee outcomes. Extant research suggests that RWI is associated with mixed findings. While some research suggests that remote work can enhance job performance (e.g., Gajendran et al., 2015; Golden & Gajendran, 2019), other research suggests it can diminish job performance (e.g., Alexander, 2014; Golden et al., 2008). Additionally, some research has found no relationship between the two (e.g., Golden & Veiga, 2008; Spilker, 2014). Such mixed findings suggest a need to meta-analytically clarify the nature of RWI's effects on employee outcomes.

The focus, therefore, in this meta-analysis is on RWI's effects on employee outcomes and the mechanisms through which RWI influences them. We propose a dual pathway model (Figure 1) theorizing RWI's effects on employee outcomes. This model is derived from theoretical intuitions underlying conceptual models developed by Feldman and Gainey (1997) and D. G. Allen et al. (2003). These theory papers conceptualize RWI as distinct from RWU and identify autonomy and isolation as psychological consequences of remote work. Drawing on job design theory, Feldman and Gainey (1997) propose that flexibility afforded by remote work is likely to translate to employee perceptions of autonomy. They also identify isolation as a key psychological effect of remote work. Likewise, D. G. Allen et al. (2003) also propose that autonomy and isolation are key mediators linking RWI to employee outcomes. The dual pathway model advances theorizing beyond these papers by proposing that autonomy and isolation due to remote work could have simultaneous opposing effects on the same set of outcomes, a possibility that Feldman and Gainey (1997) and D. G. Allen et al. (2003) do not address.

Our dual pathway model also differs from Gajendran and Harrison's (2007) theoretical framework in important ways. First, the independent variable in our model is RWI, which is conceptualized and operationalized as a continuous variable. In contrast, the modal study in their meta-analysis assessed RWU as the independent variable, operationalized as a dichotomous variable. Furthermore, although they included RWI in their model, they coded RWI as a categorical moderator taking on two values: high- and low-intensity telecommuting. Thus, their moderator analysis

can be interpreted as examining whether differences in outcomes between remote workers and their office-based colleagues vary based on whether the average remote worker in the sample was engaged in high- or low-intensity telecommuting. In contrast, our paper explores a different research question by providing a more straightforward test of the effects of RWI on remote worker outcomes by (a) directly examining associations between RWI and employee outcomes and (b) treating RWI as a continuous variable rather than a dichotomous one. In this way, we are able to provide new insights about a feature of remote work that was not explicitly addressed in previous meta-analyses.

Second, because the dual pathway model has a different independent variable (RWI), it involves a different set of psychological mechanisms compared to those theorized by Gajendran and Harrison (2007). According to their paper, the beneficial effects of RWU are theorized to flow through enhanced perceived autonomy and lower work-family conflict while the detrimental effects occur via impoverished relational outcomes at work. The dual pathway model retains perceived autonomy as a key mechanism consistent with prior theorizing but proposes a countervailing pathway via perceived isolation. Further, work-family conflict and relational quality are conceptualized as outcomes in the dual pathway model, rather than mediators, because they are theoretically downstream of perceived autonomy and perceived isolation in the causal logic connecting RWI to these constructs.

1.2 | The dual pathway model: Key implications

The dual pathway model proposes that RWI has indirect and opposing effects via perceived autonomy and perceived isolation on a range of outcomes including attitudinal and behavioral outcomes. Thus, any significant effects could either be due to perceived autonomy or perceived isolation overpowering the other. Alternatively, there could be residual direct effects of RWI on employee outcomes that could work in tandem with one of the two indirect effect pathways to overcome the effects of the other pathway. This latter possibility is represented in our dual pathway model by the direct path connecting RWI to employee outcomes. The upshot of such countervailing effects in the dual pathway model is that it increases the likelihood of RWI having modest or non-significant effects on employee outcomes. Such effects are nonetheless informative for theory and practice. If RWI has null or modest beneficial effects on employee outcomes, it could alleviate organizational concerns about allowing employees to work remotely more extensively. Equally, any detrimental effects would also be relatively modest, which could also temper organizational concerns about potential harms. Moreover, null or modest effects would also imply that organizational policies and practices aimed at improving the design of remote work will have to simultaneously boost employees' experience of autonomy while minimizing their experience of isolation when working remotely.

1.3 | The dual pathway model: Effect of RWI on perceived autonomy and perceived isolation

Perceived autonomy, sometimes referred to as perceived control, flexibility, or decision-making latitude (Humphrey et al., 2007; Spector, 1986), is an employee's belief that he or she has the discretion, freedom, and independence to determine their work-related location, schedule, and procedures (Gajendran et al., 2015; Hackman & Oldham, 1975). Theorizing on remote work has long emphasized that remote work enhances perceived autonomy (Dubrin, 1991; Gajendran et al., 2015; Kossek et al., 2009), arguing that remote workers' physical and psychological separation from coworkers and direct supervision gives them greater discretion over where, when, and how they complete their work (D. G. Allen et al., 2003). As RWI increases, more time is spent away from direct supervision, translating into higher levels of perceived autonomy. Likewise, as RWI increases, remote workers may experience greater latitude over their work schedules (Lapierre & Allen, 2006), their work location (e.g., home or café), and what tasks they work on at any given time. Higher RWI means less time at the office and hence more control over work-related interruptions and the timing of their work breaks (Golden & Gajendran, 2019). It also means remote workers can spend less time

getting ready for work and less time commuting, translating to higher schedule control (Gajendran & Harrison, 2007). Altogether, these arguments suggest that RWI will be positively linked to perceived autonomy.

Hypothesis 1: RWI will be positively related to perceived autonomy.

Perceived isolation refers to employees' feeling that they are out of touch with or do not feel socially connected to others at work (Baumeister & Leary, 1995). Although scholars have long argued that remote workers can experience isolation, this issue has received relatively limited empirical attention (Cooper & Kurland, 2002; Golden et al., 2008). As RWI increases, fewer opportunities for in-person interpersonal interactions could lead to remote workers becoming "out of sight and out of mind" of their supervisors and out of sync with their coworkers (McCloskey & Igbaria, 2003). Supervisors may overlook remote workers for projects or assignments and, instead, extend these opportunities to those who work out of the office more frequently. As a result, those working more days remotely may find themselves out of the loop of information networks and may feel shunned or isolated compared to those working fewer days remotely (Bartel et al., 2007; Becker et al., 2022; Farrer, 2019; Morganson et al., 2010).

As RWI increases, employees have to increasingly rely on electronic communication media such as email, phone call, and Zoom to remain connected to the organization and its members. Such electronic media are less rich compared to in-person interactions and are less effective at conveying subtle emotional, nonverbal, and symbolic cues that help foster a sense of inclusion among employees. Leaner media convey fewer informational cues (Daft & Lengel, 1986), relay lower social presence, and diminish feelings of intimacy and immediacy (Short et al., 1976). Furthermore, electronically mediated interactions tend to be more formal in nature as they are more likely to be deliberate, scheduled, less frequent, and task-focused (Daft & Lengel, 1986; Gajendran et al., 2022; Riordan & Kreuz, 2010). They also cannot substitute for rich social interaction opportunities such as water-cooler chats, workplace celebrations, and meals with coworkers. As RWI increases, remote workers are more likely to miss out on such social activities, which could erode their sense of belonging and contribute to feelings of isolation and loneliness (Bartel et al., 2007, 2012; Biron et al., 2023; Golden et al., 2008; Wang et al., 2021).

Hypothesis 2: RWI will be positively related to perceived isolation.

1.4 | RWI's indirect effects via perceived autonomy and isolation on attitudinal and behavioral outcomes

To the degree that RWI is positively associated with greater autonomy perceptions, we could expect that its effects on key employee attitudes and behaviors are at least partly conveyed by perceived autonomy. Job characteristics theory proposes that autonomy is a central work characteristic that is associated with enhanced positive behavioral (e.g., job performance) and attitudinal outcomes (e.g., job satisfaction) and with diminished negative behavioral outcomes (e.g., turnover) (Fried & Ferris, 1987; Spector, 1986). Prior research finds that employee autonomy perceptions translate to greater meaning in and ownership over work, which can contribute to better job attitudes, improved task performance, and reduced withdrawal behavior (Humphrey et al., 2007; Morgeson et al., 2005). Remote workers experiencing autonomy are likely to perceive their organizations as supportive and attractive (Onken-Menke et al., 2018; Wörtler et al., 2020) and develop greater commitment to their organizations (Rhoades & Eisenberger, 2002); this should also reduce their likelihood to leave the organization (Gajendran & Harrison, 2007). Likewise, self-determination theory argues that autonomy is a fundamental human need (Deci & Ryan, 2000). Work contexts that satisfy this need are likely to motivate higher levels of employee effort and persistence (Gagné & Deci, 2005), translating into higher performance. Employees' experience of autonomy leads to psychological empowerment (Liden et al., 2000) and motivates contributions at work that go beyond formal job descriptions (Biron et al., 2023) in the form of organizational citizenship behaviors (OCBs) (Van den Broeck et al., 2016). Meta-analytic evidence supports these arguments

(e.g., Humphrey et al., 2007; Spector, 1986) and suggests that perceived autonomy is likely to be positively related to a broad set of favorable work attitudes (e.g., organizational commitment, job satisfaction, etc.) and behavioral outcomes (e.g., job performance) and negatively related to unfavorable work attitudes (e.g., turnover intentions).

Hypothesis 3: RWI will have indirect positive effects on (a) job satisfaction, (b) engagement, (c) organizational commitment, and (d) perceived organizational support via perceived autonomy, and (e) it will have an indirect negative effect on turnover intentions via perceived autonomy.

Hypothesis 4: RWI will have indirect positive effects on (a) task performance and (b) organizational citizenship behaviors via perceived autonomy.

According to the dual pathway model, RWI has indirect but detrimental effects on employee outcomes via employee perceptions of isolation. Self-determination theory proposes that feeling connected to others and having a sense of belonging are fundamental employee needs at work, the satisfaction of which favorably influences a wide range of employee attitudes and performance (Deci et al., 2017; Van den Broeck et al., 2016). When the need to belong is satisfied at work, employees experience greater well-being and meaning from work (Deci et al., 2001), which leads to improved job and organizational attitudes (Allan et al., 2019). Further, social connections at work are a source of knowledge, feedback, and support that are associated with improved job performance (Humphrey et al., 2007). As RWI increases, employees are likely to feel more isolated from their colleagues and feel less socially integrated and accepted. By thwarting employees' fundamental need to belong (Baumeister & Leary, 1995), feelings of isolation worsen their perceptions of their job and negatively impact their willingness to invest in their work or go the extra mile. Employees who feel disconnected from others are also less likely to seek help or feedback about their work and lose out on tacit knowledge that is often available only through interpersonal interactions (Morrison, 1993), which puts at risk remote workers' own knowledge base that is essential for higher job performance (Golden & Raghuram, 2010). This reduced sense of belonging is likely to be generalized to the broader organization thus eroding remote workers' connection to their organizations (Ozcelik & Barsade, 2018), which may lead them to feel less bound to their organizations, less likely to engage in OCBs, and more likely to quit (Golden et al., 2008).

Hypothesis 5: RWI will have indirect negative effects on (a) job satisfaction, (b) engagement, (c) organizational commitment, and (d) perceived organizational support via perceived isolation, and (e) it will have an indirect positive effect on turnover intentions via perceived isolation.

Hypothesis 6: RWI will have indirect negative effects on (a) task performance and (b) organizational citizenship behaviors via perceived isolation.

1.5 | RWI's indirect effects via perceived autonomy and isolation on well-being outcomes

As RWI increases, the enhanced autonomy experiences it affords can promote employee well-being. Prior theorizing and research on stress (Demerouti et al., 2001; Hobfoll, 1989; Karasek, 1979) have identified autonomy as a key job resource that helps employees cope with high job demands (Halbesleben et al., 2014). Autonomy allows individuals to better cope with work-related stressors and, in turn, minimize the experience of psychological strain. In a practical sense, having discretion over work location, timing, and processes means that employees have the resources to more effectively contend with workplace demands like time pressures, workloads, and other workplace hassles, and deploy other resources (personal, emotional, and cognitive) available to them to deal with such stressors. Experiencing psychological freedom also helps employees protect themselves from potential resource loss that causes feelings of stress (Demerouti et al., 2001; Hobfoll, 2001) and minimizes burnout (Fernet et al., 2013; H. I. Park et al., 2014).

Buttressing these arguments, meta-analytic evidence finds that perceived autonomy is negatively associated with stress (Humphrey et al., 2007).

Increased autonomy should also help alleviate stress emanating from the conflicting demands of the work and family domains (Thompson & Prottas, 2006). Employees who perceive greater psychological control over work location, timing, and processes are likely able to rearrange their work to cater to their family demands more effectively, thus mitigating conflict from work interfering with family (WIF, T. D. Allen et al., 2013; Kossek et al., 2006). Likewise, greater control over their work schedules and work activities allows employees to better align work in tune with the ebbs and flows of family demands, minimizing family interference with work (FIW, Kossek et al., 2006; Leung & Zhang, 2017).

Hypothesis 7: RWI will have indirect negative effects on (a) work-related stress, (b) burnout, (c) WIF, and (d) FIW via perceived autonomy.

As RWI increases, employee feelings of isolation are likely to increase, which can be a stressful experience. Feeling disconnected from coworkers and supervisors can leave employees feeling unsupported and anxious, and lead them to question their self-worth (Leary & Downs, 1995; Reis et al., 2000; Wright, 2005). Isolated employees are also likely to miss out on cues about what they should and should not do as well as how they should go about their work. As a result, isolated employees may feel uncertain about their work roles and feel overburdened by work (Chiaburu & Harrison, 2008). Furthermore, because isolated employees lack adequate socio-emotional resources needed to cope with such stressors, they are apt to become frustrated and burned out (Halbesleben, 2006).

Negative feelings associated with experiencing isolation at work are likely to spill over into the family domain (Edwards & Rothbard, 2000; Grzywacz & Marks, 2000; Staines, 1980). Coping with feelings of isolation drains personal resources and leaves employees with less energy to invest in their family roles, not only leading to higher strain-based WIF (Grandey & Cropanzano, 1999) but also making it difficult for remote workers to fulfill family obligations. As RWI increases, it should also increase the permeability of work boundaries to family demands. More time working at home means more opportunities for interruptions from family members, resulting in greater FIW. Equally, the experience of isolation may also make employees turn to their families for social support and connection making it more difficult to maintain boundaries between work and family domains, exacerbating FIW (Edwards & Rothbard, 2000; Staines, 1980). Taken together, as isolation increases due to RWI, it may not only increase remote workers' stress and burnout, but also increase WIF and FIW.

Hypothesis 8: RWI will have indirect positive effects on (a) work-related stress, (b) burnout, (c) WIF, and (d) FIW via perceived isolation.

1.6 | RWI's indirect effects via perceived autonomy and isolation on relational outcomes

Autonomy is a valuable job resource for employees and often emerges as a result of supervisors' trust in and support for employees (Seppälä et al., 2011). Supervisors are often key decision-makers when it comes to approving remote work arrangements (Gajendran et al. 2015; Lautsch et al., 2009). To the extent that more time spent remotely leads to higher autonomy perceptions, employees likely recognize their managers' role in providing access to this valuable job resource. Prior research suggests that employees are likely to reciprocate the autonomy attributable to their managers allowing them to work remotely by investing in developing and maintaining a high-quality relationship with their managers (Volmer et al., 2011). Likewise, conservation of resources theory suggests that individuals tend to act in ways that preserve and protect valuable resources and that to do so they often also strategically invest their personal resources as a means of gaining additional resources in the future—a process known as a resource gain spiral (Halbesleben & Wheeler, 2015; Hobfoll, 2001). Such a perspective would also argue for investments of time and effort towards maintaining their autonomy from remote work by protecting and maintaining their relationships with leaders (Halbesleben, 2006; R. Park & Jang, 2017; Thompson & Prottas, 2006).

Further, coworkers at work can also influence whether or not employees are able to fully capitalize on the autonomy available at work. Coworkers facilitate employee perceived autonomy by offering timely advice and information, clarifying roles, and providing instrumental and emotional support (Moreau & Mageau, 2012). Therefore, conservation of resources theory would suggest that as RWI increases, remote workers may do more to invest in maintaining good coworker relationships to ensure that they continue to fully enjoy the benefits of autonomy available to them. Supporting these lines of reasoning, a prior meta-analysis finds positive associations between autonomy and relationship quality with leader and coworkers (Luchman & González-Morales, 2013).

Hypothesis 9: RWI will have indirect positive effects on (a) relationship quality with leader and (b) relationship quality with coworkers via perceived autonomy.

Even as gains in perceived autonomy as RWI increases are likely to be associated with employee efforts at maintaining high-quality relations, feelings of isolation due to more time spent away can simultaneously make it harder to maintain such relationships. As RWI increases, fewer opportunities for rich, in-person interactions and greater reliance on electronic communication can thwart remote workers' ability to connect to others. According to self-determination theory, interpersonal relationships at work are key to satisfying employees' relatedness needs (Deci et al., 2017; Deci & Ryan, 2000). However, when relatedness needs are not fully satisfied—as is the case when experiencing isolation due to remote work—people may feel like it is harder to make meaningful connections and are likely to experience anxiety and insecurity when it comes to building and maintaining relationships (Hawkley et al., 2003; Leary & Downs, 1995; Marshall et al., 2007; Ozcelik & Barsade, 2018).

Hypothesis 10: RWI will have indirect negative effects on (a) relationship quality with leader and (b) relationship quality with coworkers via perceived isolation.

1.7 | RWU meta-analysis: Updating prior meta-analytic findings

In addition to an RWI meta-analysis, we also conducted a meta-analysis of RWU's associations with key employee outcomes. Several new studies on RWU have been conducted since Gajendran and Harrison's (2007) meta-analysis. By including those studies, this latest RWU meta-analysis could provide updated evaluations of relationships examined in the previous meta-analysis. This allows us to gauge with a higher degree of confidence whether the inclusion of new studies reinforces (or challenges) prior meta-analytic findings. More importantly, these newer studies could also allow us to examine outcomes of RWU not featured in the earlier meta-analysis. Given this meta-analysis's focus on the consequences of RWI, we do not provide formal hypotheses for the tests of RWU–outcomes relationships but expect that our findings will be consistent with those reported in the previous meta-analysis. Specifically, Gajendran and Harrison's (2007) meta-analysis reported significant and positive associations between RWU and perceived autonomy, job satisfaction, supervisor-rated/objective performance, and relationship quality with supervisor. RWU was also significantly associated with reduced work-family conflict, stress, and turnover intent.

2 | METHOD

2.1 | Transparency and openness

We adhered to APA's methodological checklist in our literature search, inclusion and exclusion criteria, coding procedures, and data analytical procedures. A complete list of primary studies and relevant information coded can be found in online supplements A and B.

Online supplements C-I include information relevant to coding procedures and additional analyses not included in the paper. Appendix A provides a table with a description of information contained in each of the online supplements.

Data were analyzed using the "metafor" package (Viechtbauer, 2010) for computing meta-analytic estimates and the "lavaan" package (Rosseel, 2012) for assessing path models in R 4.0.2. R code used to analyze the data is available from the corresponding author upon request.

2.2 | Literature review

We began with a systematic literature review to identify all relevant primary studies that examined RWI, RWU, or both. In particular, we performed a broad electronic search of the remote work literature using the following search terms: *remote work*, *telework*, *telecommuting*, *telecommuting intensity*, *extent/frequency of telecommuting/telework*, *distributed work*, *mobile work*, *work at home*, *virtual work*, and *flex-place*. We used electronic databases (Google Scholar, ProQuest PsycINFO®) and a snowball method, that is, relevant citations found within the references of eligible articles (Lipsey & Wilson, 2001). During the search, we attempted to minimize publication bias by including unpublished conference papers, master's theses and doctoral dissertations, and academic books in our review. Studies with a publication (or presentation) date until March 2023 were examined in the current literature search.

2.3 | Inclusion/exclusion criteria

Our search efforts yielded 3,106 potentially relevant studies. Figure 2 presents a flowchart summarizing the literature search and screening process. First, we examined the titles and abstracts of all studies and discarded studies that (a) were not about remote work, (b) did not contain quantitative information (e.g., qualitative reviews, theory papers), (c) were duplicates, (d) were not written in English, or (e) did not include an employee sample (e.g., undergraduate sample). This stage resulted in 354 unique studies that included quantitative empirical analyses that could provide potentially relevant information for the current meta-analysis. Next, we examined each study in detail and excluded studies that: (a) did not include variables that fit the definition of RWI or RWU (b) did not report a bivariate correlation (or information that can be used to calculate a bivariate correlation—e.g., Cohen's *d*, means and standard deviations between a remote work and a control group) between relevant independent and dependent variables, and (c) did not include a relevant dependent variable of interest.

2.4 | Sample details

Our final sample includes 162 studies ($k = 166$, $N = 78{,}610$) among which 108 studies ($k = 110$, $N = 45{,}288$) provide RWI effect sizes, 62 studies ($k = 63$, $N = 41{,}904$) provide RWU effect sizes, and 8 studies reported effect sizes for both RWI and RWU. The 162 studies also include 122 studies ($k = 123$, $N = 58{,}897$) and 43 studies ($k = 43$, $N = 20{,}010$) reporting data collected before and during the COVID-19 pandemic respectively (three studies reported data both before and during the pandemic).

2.5 | Coding and meta-analytic procedures

Our comprehensive coding scheme captured key study characteristics and relevant metrics from each eligible article including sample size, bivariate correlation (Pearson *r*), reliabilities of the criteria (Cronbach's α), and means and standard deviations of the predictors and criteria[2]. If Pearson correlations were not explicitly reported in the study, we calculated and/or transformed a reported effect size (e.g., Cohen's *d*, *t*-statistic, *F*-statistic, chi-squared value) between the predictors and criteria into a Pearson *r*[3].

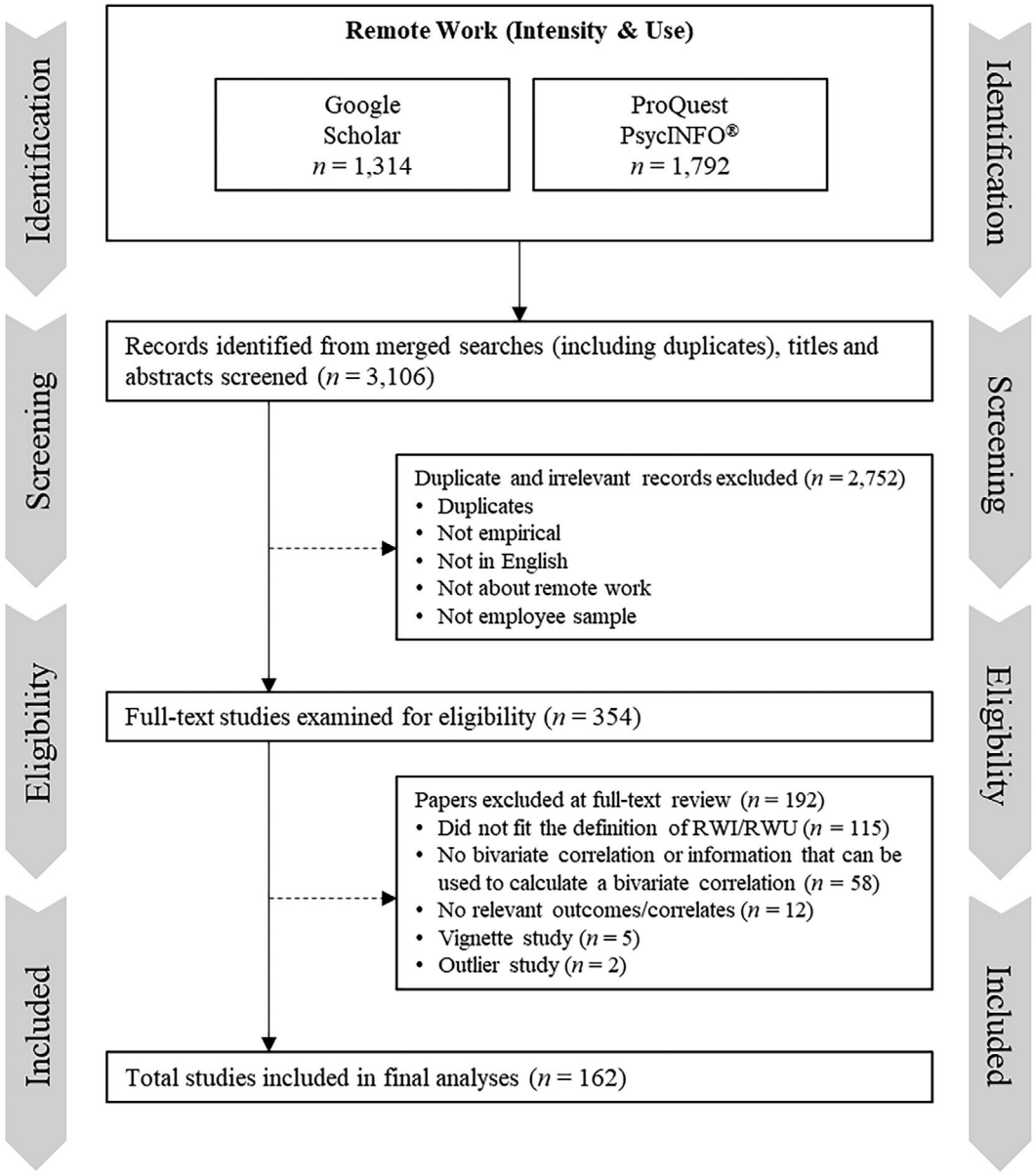

FIGURE 2 PRISMA-style flow diagram for the literature search.

We followed Hunter and Schmidt's (2004) random-effects procedures for conducting psychometric meta-analyses. We used Cronbach's α to correct for unreliability in all of the criteria[4]; we did not correct for range restriction given the absence of normative information about the population-level distributions of RWI and RWU. Following prior research, we assigned a reliability coefficient of 1.00 for measures of RWI and RWU treating them as objective indicators of remote working (Gajendran & Harrison, 2007). RWI was typically measured as a continuous variable in one of three ways: days per week worked remotely, hours per week worked remotely, or percentage of week spent working remotely; RWU was typically measured as a binary variable (e.g., 1 = "worked remotely" and 0 = "did not work remotely").

2.6 | Assessing outliers and publication bias

We examined the data for outliers using the "metafor" package in R (Viechtbauer & Cheung, 2010). Adopting Morris et al.'s (2015) heuristics, a datapoint was considered to be an outlier if the following conditions were true: (a) the absolute standardized residual was larger than 2.5, and (b) either Cook's D or standardized dfbeta was larger than 1.0. In all cases where an outlier(s) was detected, we re-analyzed the data without the outlier(s). Because outliers can introduce additional heterogeneity in the data, we followed prior research (e.g., Fang et al., 2021; Zhong et al., 2017) and reported the results with outliers removed. We indicate outlier data points in our dataset in online supplement B.

We also conducted a publication bias analysis that involved two steps (Kepes et al., 2012): (a) Egger's regression test (Egger et al., 1997) to assess the statistical significance of funnel plot asymmetry and (b) random-effects trim and fill (Duval, 2005; Duval & Tweedie, 2000a, 2000b). Our analyses indicated that publication bias was not a major concern (see online supplement C for a complete description).

2.7 | Indirect effects analyses

We conducted dual-path mediation analyses to test the indirect effects of RWI on four different clusters of employee outcomes mirroring *Hypotheses 3* to *10*. These clusters include: (a) *Attitudinal* (i.e., job satisfaction, engagement, organizational commitment, perceived organizational support, and turnover intentions), (b) *Behavioral* (i.e., supervisor-rated job performance and organizational citizenship behaviors), (c) *Well-being* (i.e., work-related stress, burnout; WIF and FIW), and (d) *Relational* (i.e., relationship quality with leader, relationship quality with coworkers). Details regarding the operationalization of constructs within each cluster in this meta-analysis are presented in online supplement D. For each of these four clusters of employee outcomes, we tested the effects of RWI via the two mediators—perceived autonomy and isolation—by using meta-analytic path analysis (Landis, 2013; Viswesvaran & Ones, 1995), and in total we tested our mediation hypotheses using four separate models. To test these models, we created disattenuated meta-correlation matrices containing all variables of interest (details provided in online supplement E). Following recommendations by Landis (2013) and Viswesvaran and Ones (1995), we computed the harmonic mean of the sample sizes in our correlation matrix for all path analysis models. Maximum likelihood estimation was used for obtaining parameter estimates, and all models tested in our mediation analyses were fully saturated models by design.

2.8 | Remote work pre- versus during-pandemic

Remote work during the pandemic was performed in different circumstances than before. Remote work during the pandemic was a mandatory measure aimed at infection control in contrast to it being largely a voluntary work arrangement pre-pandemic. It was, therefore, more widespread during the pandemic than before with remote workers working more days per week remotely than pre-pandemic. It was performed under challenging home and family circumstances, often with spouses and children at home all the time (Cummings, 2022). It also altered how remote workers communicated and interacted with one another. For instance, Zoom (and Teams) meetings became ubiquitous so much so that a new term "Zoom fatigue" entered the lexicon reflecting the connectivity demands on remote workers during the pandemic (Fosslien & Duffy, 2020; Shoshan & Wehrt, 2022). Managers were explicitly encouraged to check in with and remain in constant communication with remote workers to counter the potentially isolating effects of pandemic-related lockdowns and mandatory work from home policies (Honigmann et al., 2020; Janove, 2020).

Such differences are also likely to be reflected in the descriptive information provided in the primary studies. For instance, we would expect that mean RWI during the pandemic would be higher than pre-pandemic. Therefore, prior to estimating meta-analytic relationships between RWI and employee outcomes, we examined the average levels of

RWI, perceived autonomy, and perceived isolation for pre-pandemic and during-pandemic studies separately. Among studies that reported such information, we averaged study-level mean RWI, mean autonomy, and mean isolation for pre- and during-pandemic studies. We found that: (a) RWI was higher during the pandemic (average 3 days per week, $k = 16$) compared to pre-pandemic (average 2 days per week, $k = 61$); (b) there was no difference in autonomy (during = 3.63/5, $k = 6$; pre-pandemic = 3.61/5, $k = 21$); (c) remote workers reported slightly higher levels of isolation during the pandemic (average = 2.87/5, $k = 11$) compared to pre-pandemic (average = 2.45/5, $k = 9$). Overall, the descriptive data available from our primary studies are suggestive of differences in remote work pre- and during-pandemic.

3 | RESULTS

Preliminary to testing the dual pathway model, we estimated RWI's meta-analytic correlations with each of the constructs included in the dual pathway model. Table 1 presents the meta-analytic correlations along with associated confidence and credibility intervals of RWI with our proposed mediators (perceived autonomy and perceived isolation) and the other employee outcomes. Additionally, given differences in scale and extensiveness of remote work before and during the pandemic, we also estimated RWI's meta-analytic correlations separately for pre-pandemic and during-pandemic studies. Specifically, for each RWI-outcome relationship in Table 1, correlations are first presented using data from the *overall* dataset in the first row, followed by correlations from the *pre-pandemic*, and *during-pandemic* datasets (where available). Additionally, the *Z*-test column in Table 1 highlights whether correlations in pre- and during-pandemic datasets are significantly different from each other. Table 2 provides a summary comparing the meta-analytic associations across these three datasets. Across datasets, RWI's uncorrected correlations with outcomes included in the dual pathway model were small in magnitude ranging between 0 to 30th percentile of effect sizes in the field of organizational behavior (Paterson et al., 2016).

3.1 | RWI's meta-analytic associations with key outcomes

3.1.1 | RWI's associations with perceived autonomy and perceived isolation

RWI had positive and significant associations with perceived autonomy in the overall ($\rho = .14$, 95% CI [.06, .21]) and pre-pandemic datasets ($\rho = .12$, 95% CI [.05, .19]) but had a non-significant association with perceived autonomy in the during-pandemic dataset ($\rho = .17$, 95% CI [−.01, .36]). We found a similar pattern for RWI's association with perceived isolation: it had positive and significant associations with perceived isolation in the overall ($\rho = .07$, 95% CI [.003, .14]) and pre-pandemic dataset ($\rho = .13$, 95% CI [.05, .22]) but had a non-significant association with perceived isolation in the during-pandemic dataset ($\rho = .04$, 95% CI [−.05, .12]). A comparison of the pre- and during-pandemic effects (see Raju & Brand, 2003) reveal significant differences for both perceived autonomy ($Z = -2.95$, $p < .05$) and perceived isolation ($Z = 3.86$, $p < .05$). Considering that the average values of RWI and isolation in the during-pandemic dataset were somewhat higher than those in the pre-pandemic dataset, range restriction in perceived isolation during the pandemic could be one explanation for the non-significant RWI-isolation correlation in the during-pandemic dataset (Ernst et al., 2022; Holt-Lunstad, 2020).

3.1.2 | RWI–Attitudinal outcomes

In the overall dataset, RWI was positively associated with job satisfaction ($\rho = .09$, 95% CI [.05, .14]) and perceived organizational support ($\rho = .09$, 95% CI [.04, .15]), and negatively associated with turnover intentions ($\rho = -.11$, 95% CI [−.15, −.07]); RWI was not significantly associated with engagement ($\rho = .01$, 95% CI [−.04, .05]) or organizational commitment ($\rho = .03$, 95% CI [−.01, .07]). We observed a similar pattern of associations for RWI with attitudinal

TABLE 1 Meta-analytic summary of remote work intensity with employee outcomes.

	k	*N*	*r*	SD_r	ρ	SD_ρ	*CV LL*	*CV UL*	*CI LL*	*CI UL*	*Z* test
Psychological mediators											
Perceived autonomy	35	15822	.12	.14	**.14**	.15	−.06	.03	.06	.21	
Pre-pandemic	27	10268	.11	.12	**.12**	.13	−.04	.28	.05	.19	
During-pandemic	8	5544	.15	.17	.17	.19	−.07	.41	−.01	.36	**−2.95**
Perceived isolation	22	7813	.06	.12	**.07**	.12	−.08	.22	.003	.14	
Pre-pandemic	11	2684	.12	.12	**.13**	.11	−.01	.27	.05	.22	
During-pandemic	11	5129	.03	.11	.04	.11	−.10	.18	−.05	.12	**3.86**
Attitudinal outcomes											
Job satisfaction	43	14154	.08	.11	**.09**	.11	−.04	.23	.05	.14	
Pre-pandemic	35	10985	.06	.11	**.07**	.10	−.06	.20	.02	.12	
During-pandemic	8	3169	.16	.09	**.17**	.08	.06	.27	.09	.24	**−4.64**
Engagement	10	2986	.01	.06	.01	.03	−.03	.05	−.04	.05	
Pre-pandemic	7	2130	.02	.07	.02	.04	−.02	.07	−.04	.08	
During-pandemic	3	856	−.03	.04	−.03	.00	−.03	−.03	−.10	.04	.42
Organizational commitment	18	8081	.03	.07	.03	.06	−.05	.11	−.01	.07	
Pre-pandemic	16	6966	.03	.07	.03	.06	−.05	.11	−.02	.08	
During-pandemic	-	-	-	-	-	-	-	-	-	-	
Perceived organizational support	10	4454	.09	.07	**.09**	.06	.02	.17	.04	.15	
Pre-pandemic	9	3726	.11	.07	**.11**	.05	.04	.18	.05	.17	
During-pandemic	-	-	-	-	-	-	-	-	-	-	
Turnover intentions	11	2882	−.10	.05	**−.11**	.00	−.11	−.11	−.15	−.07	
Pre-pandemic	10	2722	−.10	.05	**−.11**	.00	−.11	−.11	−.15	−.07	
During-pandemic	-	-	-	-	-	-	-	-	-	-	
Behavioral outcomes											
Supervisor-rated job performance	10	1894	.10	.12	**.11**	.11	−.02	.25	.02	.20	
Pre-pandemic	10	1894	.10	.12	**.11**	.11	−.02	.25	.02	.20	
During-pandemic	-	-	-	-	-	-	-	-	-	-	
Organizational citizenship behaviors	6	1365	.03	.09	.04	.07	−.05	.12	−.06	.13	
Pre-pandemic	6	1365	.03	.09	.04	.07	−.05	.12	−.06	.13	
During-pandemic	-	-	-	-	-	-	-	-	-	-	
Well-being outcomes											
Work-related stress	20	9585	−.03	.12	−.03	.12	−.19	.13	−.11	.06	
Pre-pandemic	11	3933	−.04	.15	−.04	.16	−.25	.16	−.16	.08	
During-pandemic	9	5652	−.02	.10	−.02	.09	−.14	.10	−.11	.07	−.92

(Continues)

TABLE 1 (Continued)

	k	*N*	*r*	SD_r	ρ	SD_ρ	*CV LL*	*CV UL*	*CI LL*	*CI UL*	*Z* test
Burnout	21	17353	−.02	.09	−.02	.08	−.12	.09	−.09	.06	
Pre-pandemic	11	11189	−.06	.07	−.06	.07	−.15	.02	−.15	.02	
During-pandemic	10	6164	.06	.05	**.06**	.04	.01	.11	.02	.10	**−7.45**
Work interference with family	31	13975	.00	.12	−.002	.12	−.15	.15	−.06	.06	
Pre-pandemic	22	7776	−.03	.14	−.04	.14	−.22	.14	−.12	.04	
During-pandemic	9	6199	.04	.07	.04	.06	−.04	.12	−.02	.10	**−4.52**
Family interference with work	18	6387	.00	.11	.001	.10	−.13	.13	−.06	.06	
Pre-pandemic	12	3909	.00	.12	.001	.11	−.15	.15	−.09	.09	
During-pandemic	6	2478	.00	.09	.00	.08	−.10	.10	−.08	.08	.04
Relational outcomes											
Relationship quality with leader	27	8070	.03	.14	.03	.14	−.15	.20	−.04	.10	
Pre-pandemic	23	6146	.00	.15	.001	.15	−.19	.19	−.09	.09	
During-pandemic	4	1924	.10	.05	**.11**	.03	.07	.14	.05	.16	**−3.86**
Relationship quality with coworkers	22	12784	−.01	.10	−.01	.10	−.14	.12	−.08	.05	
Pre-pandemic	15	6234	−.02	.10	−.02	.09	−.14	.10	−.09	.05	
During-pandemic	7	5950	−.01	.10	−.01	.12	−.16	.14	−.12	.11	−.38

Note. Effects in **bold** font are statistically significant.
k = number of independent effect sizes; *N* = total sample size; *r* = sample-size weighted mean observed correlation; SD_r = standard deviation of sample-size weighted mean observed correlation; ρ = estimated true score correlation; SD_ρ = standard deviation of estimated true score correlation; 80% *CV LL* = lower bound of 80% credibility interval; *CV UL* = upper bound of 80% credibility interval; *CI LL* = lower bound of the 95% confidence interval; *CI UL* = upper bound of the 95% confidence interval; *Z* test = tests whether effect sizes are significantly different between pre- and during-pandemic datasets such that $Z > |1.96|$ indicates that effect sizes are significantly different ($p < .05$).

outcomes in the pre-pandemic dataset. Data available in the during-pandemic dataset only permitted us to estimate RWI's relationships with job satisfaction and engagement and analyze how they differ in the pre- vs. during-pandemic datasets. We observed that the positive RWI-job satisfaction association was stronger in the during-pandemic dataset ($\rho = .17$, 95% CI [.09, .24]) relative to that in the pre-pandemic dataset ($\rho = .07$, 95% CI [.02, .12]), and that difference in the effects was statistically significant ($Z = -4.64$, $p < .05$). However, the difference in the RWI–engagement associations in the pre-pandemic ($\rho = .02$, 95% CI [−.04, .08]) and during-pandemic ($\rho = -.03$, 95% CI [−.10, .04]) datasets was not significant ($Z = .42$, $p > .05$).

3.1.3 | RWI–Behavioral outcomes

RWI had a significant positive association with supervisor-rated job performance ($\rho = .11$, 95% CI [.02, .20]), though it was not significantly related to OCBs ($\rho = .04$, 95% CI [−.06, .13]). All primary studies that contributed correlations used in estimating these relationships were conducted before the pandemic. We were unable to identify sufficient studies to assess RWI's relationships with behavioral outcomes in the during-pandemic dataset.

TABLE 2 Comparison of meta-analytic correlations between remote work intensity and employee outcomes across overall[a], pre-pandemic, and during-pandemic datasets.

	Overall dataset		Pre-pandemic dataset		During-pandemic dataset		Significant difference between pre- and during-pandemic dataset
Relationship tested	*k*	*ρ*	*k*	*ρ*	*k*	*ρ*	
Remote work intensity							
Perceived autonomy	35	**.14**	27	**.12**	8	.17	Yes
Perceived isolation	22	**.07**	11	**.13**	11	.04	Yes
Job satisfaction	43	**.09**	35	**.07**	8	**.17**	Yes
Engagement	10	.01	7	.02	3	−.03	
Organizational commitment	18	.03	16	.03	-	-	
Perceived organizational support	10	**.09**	9	**.11**	-	-	
Turnover intentions	11	**−.11**	10	**−.11**	-	-	
Supervisor-rated job performance	10	**.11**	10	**.11**	-	-	
Organizational citizenship behaviors	6	.04	6	.04	-	-	
Work-related stress	20	−.03	11	−.04	9	−.02	
Burnout	21	−.02	11	−.06	10	**.06**	Yes
Work interference with family	31	−.002	22	−.04	9	.04	Yes
Family interference with work	18	.001	12	.001	6	.00	
Relationship quality with leader	27	.03	23	.001	4	**.11**	Yes
Relationship quality with coworkers	22	−.01	15	−.02	7	−.01	

Note. Effects in **bold** font are statistically significant.

k = number of independent effect sizes; *ρ* = estimated true score correlation.

[a]Analyses were based on studies conducted prior to and during the COVID-19 pandemic.

3.1.4 | RWI–Well-being outcomes

There were no significant associations between RWI and any of the well-being outcomes in the overall, pre-, or during-pandemic datasets with one exception. The RWI-burnout relationship was significant and positive in the during-pandemic dataset ($\rho = .06$, 95% CI [.02, .10]) and the difference between pre- and during-pandemic effects was statistically significant ($Z = -7.45$, $p < .05$). The significant RWI-burnout relationship during the pandemic is consistent with reports of blurred of work-home boundaries, long work hours, and higher burnout among remote workers (Abramson, 2022; Beheshti, 2021a).

3.1.5 | RWI–Relational outcomes

There were no significant associations between RWI and any of the relational outcomes in the overall, pre-, or during-pandemic datasets, with one exception. The RWI-relationship quality with leaders was significant and positive in the during-pandemic dataset ($\rho = .11$, 95% CI [.05, .16]) vs. non-significant in the pre-pandemic dataset, and the difference in effect sizes was statistically significant ($Z = -3.86$, $p < .05$). The significant RWI-relationship quality with leaders during the pandemic perhaps reflects organizations prompting managers to have regular check-ins on remote employees (Honigmann et al., 2020; Janove, 2020).

Overall, echoing anecdotal reports that during-pandemic remote work was conducted in different circumstances than pre-pandemic (K. Parker et al., 2020; Vasel, 2021), we found some differences in the RWI-employee outcomes relationships across the pre- and during-pandemic datasets.

3.2 | The dual pathway model: Hypothesis tests of mechanisms and indirect effects[5]

Hypothesis 1 and 2 proposed that RWI would be positively associated with perceived autonomy and isolation, respectively. Meta-analytic findings in Table 1 support this prediction: RWI was significantly related to both perceived autonomy ($\rho = .14$, 95% CI [.06, .21]) and perceived isolation ($\rho = .07$, 95% CI [.003, .14]).

Hypotheses 3–10 referred to the indirect effects of RWI on employee outcomes through the two proposed psychological mechanisms—perceived autonomy and isolation—that make up the dual pathway model. We examined these relationships using four independent path models—one for each of the employee outcome clusters: attitudinal, behavioral, well-being, and relational outcomes. Because the path models specified in our indirect effects analysis were fully saturated by design, they displayed perfect model fit (CFI = 1.00, TLI = 1.00, RMSEA = .00, and SRMR = .00). Following Badura et al. (2018), for each of the four categories of employee outcomes we conducted two tests of mediation: (a) a joint significance test (MacKinnon et al., 2010), and (b) an indirect effects test (Hayes & Scharkow, 2013). First, in the joint significance test, we examined if the path from RWI to perceived autonomy or perceived isolation (X → M: first stage mediation path coefficient *a*) and the path from perceived autonomy or perceived isolation to employee outcomes (M → Y: second stage mediation path coefficient *b*) were both statistically significant. Second, we examined the statistical significance of the indirect effects (*ab* = Path coefficient *a* * Path coefficient *b*) by using Monte Carlo simulations to construct 95% confidence intervals. The indirect effects tests also provided estimates of the direct (*c'*) and total effects (*c*). Our notation and terminology for the mediation paths in the dual pathway model are based on Hayes (2017) and Edwards and Lambert (2007).

The results of the tests of the dual pathway model are presented in Tables 3–6 (Table 3: attitudinal outcomes; Table 4: behavioral outcomes; Table 5: well-being outcomes; Table 6: relational outcomes). Supporting the predictions of the dual pathway model for Hypotheses 1 and 2, the first stage mediation paths (i.e., *Path a*) linking RWI to perceived autonomy ($\beta = .14$, $p < .05$) and perceived isolation ($\beta = .07$, $p < .05$) were significant. In addition, the second stage mediation paths linking perceived autonomy and isolation to each one of the employee outcomes (i.e., *Path b*) were also significant across attitudinal, behavioral, well-being, and relational outcomes. Collectively, findings from the

TABLE 3 Summary of dual pathway models between remote work intensity and attitudinal outcomes.[a]

X	M	Y	First Stage Path *a*	Second Stage Path *b*	Direct Effect Path *c'*	Indirect Effect *ab*	Total Effect *c*	*CI LL*	*CI UL*
RWI	-	Job satisfaction			**.06**			.04	.08
RWI	Autonomy	Job satisfaction	**.14**	**.42**		**.06**		.05	.07
RWI	Isolation	Job satisfaction	**.07**	**−.42**		**−.03**		−.04	−.02
							.09	.06	.12
RWI	-	Engagement			−.01			−.03	.02
RWI	Autonomy	Engagement	**.14**	**.32**		**.05**		.04	.06
RWI	Isolation	Engagement	**.07**	**−.38**		**−.03**		−.04	−.02
							.01	−.08	.04
RWI	-	Organizational commitment			.02			−.01	.04
RWI	Autonomy	Organizational commitment	**.14**	**.31**		**.04**		.04	.05
RWI	Isolation	Organizational commitment	**.07**	**−.44**		**−.03**		−.04	−.02
							.03	.002	.06
RWI	-	Perceived organizational support			**.05**			.03	.08
RWI	Autonomy	Perceived organizational support	**.14**	**.45**		**.06**		.05	.08
RWI	Isolation	Perceived organizational support	**.07**	**−.39**		**−.03**		−.04	−.02
							.09	.06	.12
RWI	-	Turnover intentions			**−.11**			−.13	−.08
RWI	Autonomy	Turnover intentions	**.14**	**−.20**		**−.03**		−.04	−.02
RWI	Isolation	Turnover intentions	**.07**	**.39**		**.03**		.02	.04
							−.11	−.14	−.08

Note. Significant effects are in **bold** font.

X = independent variable; M = mediator; Y = dependent variable; Path *a* = effect of X on M; Path *b* = effect of M on Y; Indirect Effect = Path *a* × Path *b*; Path *c'* = effect of X on Y; Total Effect *c* = sum of indirect effect and Path *c'*; *CI LL* = lower bound of the 95% CI; *CI UL* = upper bound of the 95% CI; RWI = Remote Work Intensity.

[a]Analyses were based on the Overall dataset.

TABLE 4 Summary of dual pathway models between remote work intensity and behavioral outcomes.[a]

X	M	Y	First Stage Path *a*	Second Stage Path *b*	Direct Effect Path *c'*	Indirect Effect *ab*	Total Effect *c*	*CI LL*	*CI UL*
RWI	-	Supervisor-rated job performance			**.11**			.06	.15
RWI	Autonomy	Supervisor-rated job performance	**.14**	**.18**		**.03**		.01	.04
RWI	Isolation	Supervisor-rated job performance	**.07**	**−.31**		**−.02**		−.04	−.01
							.11	.06	.16
RWI	-	Organizational citizenship behaviors			.02			−.03	.06
RWI	Autonomy	Organizational citizenship behaviors	**.14**	**.31**		**.04**		.03	.06
RWI	Isolation	Organizational citizenship behaviors	**.07**	**−.30**		**−.02**		−.04	−.01
							.04	−.01	.09

Note. Significant effects are in **bold** font.

X = independent variable; M = mediator; Y = dependent variable; Path *a* = effect of X on M; Path *b* = effect of M on Y; Indirect Effect = Path *a* × Path *b*; Path *c'* = effect of X on Y; Total Effect *c* = sum of indirect effect and Path *c'*; *CI LL* = lower bound of the 95% CI; *CI UL* = upper bound of the 95% CI; RWI = Remote Work Intensity.

[a]Analyses were based on the Overall dataset.

TABLE 5 Summary of dual pathway models between remote work intensity and well-being outcomes.[a]

X	M	Y	First Stage Path *a*	Second Stage Path *b*	Direct Effect Path *c'*	Indirect Effect *ab*	Total Effect *c*	*CI LL*	*CI UL*
RWI	-	Work-related stress			–.03			–.07	.01
RWI	Autonomy	Work-related stress	**.14**	**–.18**		**–.03**		–.04	–.02
RWI	Isolation	Work-related stress	**.07**	**.35**		**.02**		.01	.04
							–.03	–.07	.01
RWI	-	Burnout			–.02			–.06	.02
RWI	Autonomy	Burnout	**.14**	**–.16**		**–.02**		–.03	–.01
RWI	Isolation	Burnout	**.07**	**.31**		**.02**		.01	.04
							–.02	–.06	.02
RWI	-	Work interference with family			–.01			–.05	.03
RWI	Autonomy	Work interference with family	**.14**	**–.12**		**–.02**		–.02	–.01
RWI	Isolation	Work interference with family	**.07**	**.34**		**.02**		.01	.04
							–.002	–.05	.04
RWI	-	Family Interference with work			.01			–.04	.05
RWI	Autonomy	Family interference with work	**.14**	**–.09**		**–.01**		–.02	–.01
RWI	Isolation	Family interference with work	**.07**	**.09**		**.01**		.002	.01
							.001	–.04	.05

Note. Significant effects are in **bold** font.

X = independent variable; M = mediator; Y = dependent variable; Path *a* = effect of X on M; Path *b* = effect of M on Y; Indirect Effect = Path *a* × Path *b*; Path *c'* = effect of X on Y; Total Effect *c* = sum of indirect effect and Path *c'*; *CI LL* = lower bound of the 95% CI; *CI UL* = upper bound of the 95% CI; RWI = Remote Work Intensity.

[a]Analyses were based on the Overall dataset.

TABLE 6 Summary of dual pathway models between remote work intensity and relational outcomes.[a]

X	M	Y	First Stage Path *a*	Second Stage Path *b*	Direct Effect Path *c'*	Indirect Effect *ab*	Total Effect *c*	*CI LL*	*CI UL*
RWI	-	Relationship quality with leader			.01			−.02	.03
RWI	Autonomy	Relationship quality with leader	**.14**	**.34**		**.05**		.04	.06
RWI	Isolation	Relationship quality with leader	**.07**	**−.32**		**−.02**		−.03	−.01
							.03	−.002	.06
RWI	-	Relationship quality with coworkers			**−.05**			−.07	−.02
RWI	Autonomy	Relationship quality with coworkers	**.14**	**.43**		**.06**		.05	.07
RWI	Isolation	Relationship quality with coworkers	**.07**	**−.36**		**−.03**		−.04	−.01
							−.01	−.04	.02

Note. Significant effects are in **bold** font.

X = independent variable; M = mediator; Y = dependent variable; Path *a* = effect of X on M; Path *b* = effect of M on Y; Indirect Effect = Path *a* × Path *b*; Path *c'* = effect of X on Y; Total Effect *c* = sum of indirect effect and Path *c'*; *CI LL* = lower bound of the 95% CI; *CI UL* = upper bound of the 95% CI; RWI = Remote Work Intensity.

[a]Analyses were based on the Overall dataset.

joint significance test support the possibility of indirect effects of RWI on employee outcomes via perceived autonomy and perceived isolation.

Next, we examined indirect effects of RWI on employee outcomes via the two psychological mediators by constructing 95% confidence intervals around the indirect effect *ab*. The dual pathway model proposes countervailing indirect effects of RWI on employee outcomes via two psychological mediators. Specifically, RWI was hypothesized to have beneficial indirect effects on employee outcomes via perceived autonomy ($H3_{a\text{-}e}$. $H4_{a,b}$, $H7_{a\text{-}d}$, and $H9_{a,b}$) and countervailing detrimental effects on employee outcomes via perceived isolation ($H5_{a\text{-}e}$, $H6_{a,b}$, $H8_{a\text{-}d}$, $H10_{a,b}$). Examination of the indirect effects column across Tables 3–6 suggests that for each cluster of outcomes, RWI had significant beneficial indirect effects on employee outcomes via perceived autonomy and countervailing detrimental indirect effects on the same outcomes via perceived isolation, providing support for the indirect effects proposed in hypotheses 3–10 of the dual pathway model. For example, consider the indirect effect of RWI on job satisfaction in Table 3 (attitudinal cluster) shown in the column labeled "indirect effect": the indirect effect via perceived autonomy is positive and significant (*ab* = .06, 95% CI [.05, .07]) while the indirect effect via perceived isolation is negative and significant (*ab* = −.03, 95% CI [−.04, −.02]). An inspection of these indirect effects across the four clusters of outcomes in Tables 3–6 reveals that for each of the employee outcomes examined in hypotheses 3–10, the detrimental indirect effect of RWI via perceived isolation eroded the beneficial indirect effect of RWI via perceived autonomy. In keeping with the predictions of the dual pathway model, such a pattern of opposing effects suggests that any significant overall beneficial effect (see column Total Effect *c* in Tables 3–6) of remote work on employee outcomes would be due to the residual direct effect (column Path *c'* in Tables 3–6) combining with the significant indirect effect via perceived autonomy to overcome the detrimental effect of perceived isolation. This was indeed the case in the instances where RWI had a significant total effect on employee outcomes. For example, in Table 3, RWI has an overall significant and positive effect (total effect *c* = .09) on job satisfaction due to the significant residual direct effect (Path *c'* = .06) combining with the significant positive indirect effect via perceived autonomy (*ab* = .06) to overcome the significant negative indirect effect via perceived isolation (*ab* = −.03).

An inspection of the Total Effect *c* Column across Tables 3–6 reveals that after accounting for opposing indirect effects, RWI had beneficial and significant total effects for 5 of the 13 employee outcomes in the dual pathway model. Specifically, RWI had overall significant, beneficial effects on the following consequential employee outcomes: job satisfaction, organizational commitment, perceived organizational support, turnover intentions, and supervisor-rated performance. The magnitude of these total effects is small (Paterson et al., 2016), indicating changes to RWI are likely to be associated with modest changes to these outcomes. Crucially, RWI had no detrimental *total* effects on any of the employee outcomes in the dual pathway model. Instead, RWI had null total effects on the other 8 of 13 employee outcomes in the dual pathway model (engagement, OCB, work-related stress, burnout, WIF, FIW, relationship quality with leader, and relationship quality with coworker) that are in part due to countervailing indirect effects via perceived autonomy and perceived isolation.

3.3 | RWU meta-analysis: Updating prior research and examining new outcomes

We also conducted a meta-analysis of RWU's relationships with key employee outcomes using a larger collection of primary studies (*k* = 63, *N* = 41,904 compared to *k* = 46, *N* = 12,883 in Gajendran & Harrison, 2007), which also allowed us to test outcomes that were not examined in the Gajendran and Harrison (2007) meta-analysis. Table 7 includes a summary of findings from the updated RWU meta-analysis and a comparison to findings from prior meta-analyses (e.g., T. D. Allen et al., 2013; Gajendran & Harrison, 2007). However, detailed tables for the updated RWU meta-analysis with confidence and credibility intervals are presented in online supplement G (Table G1). The magnitude of RWU's uncorrected correlations with outcomes ranged from small to moderately strong. The strongest effects were for its associations with perceived autonomy and perceived isolation, which corresponded to the 75th percentile of effect sizes in the field of organizational behavior (Paterson et al., 2016).

TABLE 7 Comparison of current and prior findings for remote work use.[†]

Relationship tested	Finding from current study		Finding from prior research		New to the literature/Different from prior meta-analysis/Consistent with prior meta-analysis
	k [a]	*ρ*	*k*	*ρ*	
Remote work use					
Perceived autonomy	24	**.26**	11	**.22**[1]	Consistent
Perceived isolation	3	**.27**			New
Job satisfaction	25	**.11**	28	**.10**[1]	Consistent
Engagement	4	.08			New
Organizational commitment	9	.04			New
Perceived organizational support	5	.02			New
Turnover intentions	6	−.09	9	**−.10**[1]	Different
Supervisor-rated Job performance	6	**.16**	4	**.19**[1]	Consistent
Organizational citizenship behaviors	4	−.04			New
Work-related stress	18	−.01	11	**−.13**[1]	Different
Burnout	6	.06			New
Work interference with family	24	.05	7/17	**−.16**[1]/**−.08**[2,b]	Different
Family interference with work	11	−.04	6/11	**−.15**[1]/−.01[2,b]	Different/Consistent
Relationship quality with leader	10	.07	14	**.12**[1]	Different
Relationship quality with coworkers	11	−.03	14	.00[1]	Consistent

Note. Effects in **bold** font are statistically significant.

[†]Detailed tables available in Online Supplement G.

k = number of independent effect sizes; *ρ* = estimated true score correlation.

[a]*k* for current study is lower for some relationships than prior meta-analyses likely because prior research combined studies examining remote work use and remote work intensity.

[b]uncorrected correlation.

[1] Gajendran & Harrison (2007).

[2] Allen et al. (2013).

Consistent with prior meta-analytic findings, RWU had significant positive relationships with perceived autonomy (ρ = .26, 95% CI [.18, .34]), job satisfaction (ρ = .11, 95% CI [.07, .15]), and supervisor-rated job performance (ρ = .16, 95% CI [.05, .28]). Our non-significant findings for RWU's association with relationship quality with coworkers (ρ = −.03, 95% CI [−.11, .06]) also align with Gajendran and Harrison (2007). The non-significant RWU-WIF association (ρ = −.04, 95% CI [−.12, .03]) aligns with T. D. Allen et al. (2013) but is different from Gajendran and Harrison (2007).

Different from prior meta-analytic findings, RWU was not significantly associated with turnover intentions (ρ = −.09, 95% CI [−.21, .03]), although the magnitude of the effect was similar to that in prior research. In addition, unlike in prior research, we failed to find significant associations for RWU with work-related stress (ρ = −.01, 95% CI [−.12, .10]), WIF (ρ = .05, 95% CI [−.06, .16]), or relationship quality with leader (ρ = .07, 95% CI [−.01, .16]).

New findings. We provide meta-analytic estimates of RWU's associations with multiple previously unexamined outcomes. Remote workers reported significantly higher levels of perceived isolation (ρ = .27, 95% CI [.14, .41]) compared to office-based workers but showed no differences regarding their organizational commitment (ρ = .04, 95% CI [−.04, .12]), perceived organizational support (ρ = .02, 95% CI [−.03, .08]), OCBs (ρ = −.04, 95% CI [−.12, .04]), or burnout (ρ = .06, 95% CI [−.07, .20]).

3.4 | Additional exploratory analyses: Key implications

We also conducted various exploratory analyses examining the associations of RWI and RWU with a variety of demographic variables (see online supplement H). In addition, we examined whether publication type (journal vs. non-journal) was a moderator of associations between RWI and employee outcomes (see online supplement I Table I1). We summarize key implications from these analyses below.

The positive association between RWI and work hours (online supplement H, Table H1: ρ = .17, 95% CI [.03, .30]) suggests the possibility that time saved due to working remotely (e.g., commute time) is perhaps deployed towards working longer hours. This finding, echoed by survey and anecdotal evidence before and during the pandemic (Beheshti, 2021b; Felstead & Henseke, 2017), suggests that as RWI increases, remote workers work longer hours because they lack clear cues around when to start and stop work when working remotely. The positive association between RWI and marital status (ρ = .07, 95% CI [.01, .13]) suggests that married individuals—likely with greater family responsibilities—may prefer higher intensity remote work. We also observed a significant positive relationship between RWI and remote work experience (ρ = .14, 95% CI [.05, .22]). Finally, the positive association between RWI and remote work normativeness (ρ = .27, 95% CI [.003, .54]) suggests that in organizations where remote work is more normative, employees may choose to (or are permitted to) work remotely to a greater extent.

With regards to RWU's associations with demographic variables (online supplement H, Table H2), we found that relative to their office-based counterparts, remote workers tended to be male (ρ = −.10, 95% CI [−.16, −.03]) and held longer job tenures (ρ = .16, 95% CI [.07, .24]). Our moderator analysis with publication type (journal vs. non-journal) was not supportive of a pattern of systematic bias. There were only significant subgroup differences in the RWI–outcome relationships for 3 out of 13 outcomes (see online supplement I, Table I1): the magnitude of the relationship was stronger in journal publications for supervisor-rated performance, but it was weaker in journal publications for work-related stress. Although the difference in effect sizes was statistically significant, the RWI–relationship quality with coworkers association was non-significant for both non-journal or journal publications.

4 | DISCUSSION

Against a backdrop of increasing organizational skepticism about remote work and ongoing efforts by many organizations to limit the extent to which employees can work remotely (e.g., Canal et al., 2023; Cerullo, 2023), findings from this meta-analysis provide reassurance that higher levels of remote work are associated with several upsides for employees with no major downsides except for perceived isolation. These upsides associated with RWI were modest

in magnitude. Findings from tests of the dual pathway model explain why RWI has modest to null effects on employee outcomes and offer a more nuanced picture about how RWI influences employee outcomes.

Results of tests of the dual pathway model suggest that RWI had overall beneficial (total) effects on multiple employee outcomes of interest to scholars and organizations. RWI was linked to higher job satisfaction, POS, organizational commitment, and supervisor-rated performance, and to reduced turnover intentions. The overall effects of RWI on these outcomes were small in magnitude as anticipated by the dual pathway model. For each of the employee outcomes in the dual pathway model, RWI had opposing indirect effects via perceived autonomy and perceived isolation. In the instances where RWI had overall significant and beneficial effects on employee outcomes, it was due to the combination of RWI's indirect effect via perceived autonomy and its residual direct effect (*c'*) that outweighed the detrimental effect of perceived isolation. In almost all of the instances where RWI had non-significant effects on outcomes, these countervailing indirect effects along with weak residual direct effects resulted in null total effects. Altogether, the multiple modest but beneficial effects along with the null effects cut against narratives that argue for significant downsides from higher intensity remote work. Even though the only clear downside of increasing RWI is higher levels of perceived isolation, its detrimental effects are mitigated by the simultaneous experience of increased autonomy.

Overall, findings from tests of the dual pathway model are consistent with its predictions that the opposing effects of perceived autonomy and perceived isolation would result in small to null indirect effects of RWI on employee outcomes. This pattern of findings provides important guidance for the design of remote work arrangements. Organizational policies and managerial practices around remote work could be designed to simultaneously enhance employee autonomy (e.g., allowing schedule flexibility) and reduce isolation (e.g., regular team and manager check-ins), which could amplify RWI's beneficial effects across the range of outcomes examined in this meta-analysis.

4.1 | Comparing RWI's associations with employee outcomes pre- and during-pandemic

Data and findings from this meta-analysis indicate some differences between pre- and during-pandemic remote work. Data from primary studies reveal that RWI and perceived isolation were higher on average during the pandemic compared to before. As summarized in Table 2, there were also differences in multiple RWI-outcome relationships between the pre- and during-pandemic datasets. For instance, RWI had a significant and positive association with perceived isolation pre-pandemic but this relationship was not significant in the during-pandemic dataset. One possible explanation is limited variance in both RWI and perceived isolation, which were higher during the pandemic relative to before. During the pandemic, lockdowns, organizational policies limiting time spent at office, and employees' own preferences to limit social contact resulted in widespread high-intensity remote work and employee experiences of higher social and workplace isolation. Amidst such isolation, there were also media reports of work intensification and Zoom fatigue during the pandemic (Shoshan & Wehrt, 2022). Reflecting this, RWI had a significant and positive association with burnout during the pandemic but this relationship was not significant in the pre-pandemic data. Likewise, RWI's effect on relationship quality with leaders was significant during the pandemic but not significant in the pre-pandemic data. During the pandemic, many organizations explicitly encouraged managers to have regular check-ins to stay connected with a workforce that was forced to abruptly transition to high-intensity remote work (Honigmann et al., 2020; Janove, 2020).

4.2 | Findings regarding RWU's consequences

Overall, findings from the RWU meta-analysis suggest that remote workers did not have worse outcomes compared to office-based workers. In many instances, they experienced more beneficial outcomes than their office-based colleagues. These results cut against narratives arguing for a return to office as a means to enhance employee morale and productivity (Shultz, 2023; Smith, 2023). Findings from the RWU meta-analysis indicate consistencies and differences

with prior meta-analyses (see Table 7). Furthermore, the RWU meta-analysis includes RWU–outcome relationships not reported in prior meta-analyses.

4.3 | Key contributions and implications

Our paper is the first comprehensive meta-analysis of the consequences of RWI. Prior meta-analyses have addressed the consequences of RWU but have not examined the consequences of RWI directly. A comprehensive RWI meta-analysis is especially relevant given the competing narratives around remote work. Many organizations are rolling back or substantially limiting the time employees can work remotely due to worries that it could harm employee morale and productivity (Shultz, 2023; Smith, 2023). Employees, however, prefer working remotely to a greater degree arguing that the flexibility it provides enhances well-being and productivity (Wigert & Agrawal, 2022). This meta-analysis addresses these tensions around remote work using evidence from three decades of research on the topic drawn from 162 primary studies. This provided 110 independent samples with RWI–outcome correlations and 63 samples with RWU–outcome correlations. Our findings that RWI has modest upsides and a limited downside offer clear implications for research and practice.

An additional contribution that also informs ongoing debates around remote work is that we conduct a separate RWU meta-analysis providing a cleaner and more robust estimate of RWU's associations with key employee outcomes. Findings from RWI and RWU meta-analyses complement each other by shedding light on distinct aspects of remote work. Specifically, the RWI meta-analysis focuses on remote workers and examines whether more or less extensive remote work leads to better or worse employee outcomes. The RWU meta-analysis compares remote workers to office-based colleagues and examines whether the former have better or worse outcomes than the latter. The RWU meta-analysis in this paper ($k = 63, N = 41{,}904$) includes several new primary studies compared to prior meta-analyses. It not only updates RWU–outcome meta-analytic associations reported in prior meta-analyses but also reports several new associations of RWU with employee outcomes not examined in prior meta-analyses. Taken together, findings from both the RWI and RWU meta-analyses squarely address and allay organizational concerns about remote work.

Another way in which our meta-analysis is comprehensive is that it includes the latest research on remote work conducted during the COVID-19 pandemic. This enables the comparison of RWI–outcomes associations pre- and during the pandemic. Remote work during the pandemic was conducted under very unique circumstances (Al-Habaibeh et al., 2021; Cummings, 2022). This also led to an uptick of research on remote work during the pandemic (e.g., Hu et al., 2023; Shockley, Allen et al., 2021; Shockley, Gabriel et al., 2021). By identifying differences in descriptive data and RWI–outcome associations between the pre- and during-pandemic datasets, our meta-analysis alerts researchers to be mindful when generalizing findings from research on remote work conducted during the pandemic to post-pandemic remote work.

This paper's central theoretical contribution is the development of a dual pathway model linking RWI to employee outcomes via the countervailing autonomy and isolation pathways. Although prior theorizing in the remote work literature emphasizes perceived autonomy as the primary mechanism through which remote work influences various outcomes (e.g., Dubrin, 1991; Gajendran et al., 2015; Gajendran & Harrison, 2007; Kossek et al., 2009), our theory and findings present a more nuanced view suggesting that the beneficial effects of RWI on outcomes via perceived autonomy are counteracted by its detrimental effects via perceived isolation on the same set of outcomes. This theoretical perspective is new to the remote work literature. Another key theoretical contribution is that our meta-analysis calls attention to perceived isolation from remote work as a consequential mechanism. Perceived isolation did not feature in the theorizing and empirical tests in the Gajendran and Harrison (2007) RWU meta-analysis.

An important potential implication of findings from this meta-analysis concerns how organizations view remote work arrangements. Remote work has for long been viewed as a family-friendly flexible work arrangement. Managers view remote work primarily as a work-family perquisite that benefits employees but imposes organizational costs in the form of reduced employee productivity and availability (Gajendran et al., 2015). However, this meta-analysis's

findings about upsides of RWI—such as improved job satisfaction and supervisor-rated performance and reduced turnover intentions—make a *business* case for remote work that could not only alleviate misgivings about remote work prevalent in organizations but also promote a more upbeat outlook towards it based on available evidence.

The lack of any significant main effects of RWI or RWU on work-family outcomes echoes a recent review of the evidence by T. D. Allen et al. (2015) who note that "there is little empirical evidence to suggest that telecommuting is a generally effective way to mitigate work-family conflict" (p. 46). The dual pathway model offers some additional insight as to why this might be the case. The pattern of findings in Table 5 appear to suggest that RWI's beneficial impacts via the autonomy pathway on WIF and FIW are countered by its detrimental effects on these outcomes via perceived isolation. This finding is new to the literature and, to our knowledge, isolation from remote work has not been theoretically or empirically linked to work-family outcomes (cf., Firoz & Chaudhary, 2021). Perhaps, employees experiencing isolation may feel they need to work harder to be noticed by others, fueling WIF conflict. Indeed, surveys and anecdotal reports (Maurer, 2020; Murillo, 2021) find that employees work longer hours when working remotely. Future research should more closely examine how feeling isolated affects work-family outcomes. Further, another reason organizations and employees can take comfort is that our study finds RWI to have no discernible damaging effect on workplace relationships, assuaging concerns raised in the popular press (e.g., Baym et al., 2021). Additionally, higher RWI poses no major detrimental effects for employee well-being.

Findings from the test of the dual pathway model provide clear levers for organizations to enhance the effectiveness of remote work through policies and practices that enhance employee autonomy and reduce employee isolation. Autonomy supportive practices include redesigning tasks and workflows to enhance employee experience of autonomy while working remotely. Ironically, remote work may prompt managers to act in ways that erode employees' perceived autonomy. For instance, managers may feel the need to enhance their control over remote employees via instituting various forms of monitoring, including electronic monitoring (Jeske, 2022; Zielinski, 2020) to assure themselves that their subordinates are not slacking off (Kurkowski, 2021). They may require subordinates to be on call during standard work hours, curtailing schedule flexibility. Therefore, organizations should train managers to enable remote working in ways that are autonomy-supportive. For instance, managers could be trained to evaluate employees by their results rather than by monitoring their behaviors (S. K. Parker et al., 2020). Buttressing such autonomy support, prior research finds that empowering leadership has a greater impact in remote work settings (Gajendran & Joshi, 2012; N. S. Hill & Bartol, 2016).

Organizations should also carefully plan isolation-reducing practices by facilitating employees' connections with colleagues and the organization. Isolation and loneliness have been recognized as profound threats to public health and well-being in the United States (U.S. Surgeon General, 2023) and globally (The Lancet, 2023). Furthermore, recent research hints at isolation and loneliness not only being issues relevant to remote workers alone, but also to their office-based counterparts as they too have fewer opportunities to engage in high-quality face-to-face interactions with their remote coworkers (see Rockmann & Pratt, 2015). Managers should therefore schedule regular check-ins with employees and also plan for regular unit-wide meetings. These meetings should follow an appropriate cadence of some in-person and some virtual meetings to maximize employee feelings of being connected and included. Such thoughtfully planned interactions can build interpersonal connections between employees and ensure that everyone is kept in the loop about important information (Baym et al., 2021). Finally, organizations can formally assess employee autonomy and isolation perceptions when working remotely via quarterly surveys and link them to employee attitudes and performance to understand whether and how policies and practices to enhance employee autonomy and reduce isolation are making a difference.

4.4 | Limitations

Our study is not without limitations. Our conclusions about remote work arrangements and their consequences were limited by the collection of available primary studies, the methodological and design choices within these studies, as

well as the selection of variables tested. Conclusions relating to causality for the relationships in this meta-analysis are tentative as the vast majority of studies included in this research were correlational and non-experimental. In many cases, the data were collected at a single point in time using cross-sectional designs.

To our knowledge, there are no theories predicting that higher levels of autonomy or higher perceived isolation would lead to higher RWI. Furthermore, in most instances, remote work had existed as an ongoing work arrangement prior to assessments of employee outcomes, which increases confidence in RWI as an independent variable in these analyses. Therefore, theoretically, RWI's links to employee outcomes via perceived autonomy and perceived isolation are less susceptible to reverse causality as an explanation. Nonetheless, we acknowledge the possibility of reverse causality in the case of the direct effect pathways linking RWI to employee outcomes. This is especially so for supervisor-rated performance where prior research has also expressed concerns about supervisors granting remote work arrangements to high performers who they trust and are part of their inner circle (Gajendran & Harrison, 2007; Lautsch et al., 2009). Future research on remote work would benefit from field-based quasi-experiments wherein employees may be randomly assigned to various conditions (e.g., Bloom et al., 2015, 2022). However, we also recognize that it is challenging to design a truly randomized experiment with double-blind conditions in a field setting for a complex work arrangement like remote work. Employing longitudinal designs that may allow for remote work's consequences to manifest over time while controlling for baseline levels of those consequences could be one approach to teasing out causality.

Finally, our meta-analysis reflects a common limitation of primary studies of remote work, which is a focus on spatial dispersion assessed by RWI (Bell et al., 2023; Raghuram et al., 2019). A recent review critiqued this aspect of the remote work literature noting that "telecommuting scholars typically examine effects of the extent of telecommuting rather than effects related to relevant subdimensions (e.g., working in a specific out-of-office location, spatial distance from coworkers, and properties of technologies used when working from home)" (N. S. Hill et al., in press, p. 28). Future research on remote work would benefit from understanding how different aspects of technology and dispersion (e.g., asynchronicity, temporal dispersion; see N. S. Hill et al. [in press] for a comprehensive review) influence employee outcomes from remote work over and above the effects of spatial dispersion.

In conclusion, our meta-analysis suggests that remote working is generally a good thing with modest upsides and with limited downsides. Further, organizations can maximize the benefits of remote work while simultaneously minimizing its downsides by adopting policies and practices that enhance remote workers' autonomy experiences and connections to other organizational members.

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ENDNOTES

[1] Remote workers are part of a broader organization (Allen et al., 2015; Feldman & Gainey, 1997; Gajendran & Harrison, 2007) and hence freelance or gig workers working from home or other locations are not considered as remote workers in this study. Likewise, full-time employees who continue to work at home after spending their regular work hours in the central office (i.e., supplementary telework: e.g., Xie et al., 2018) are not considered remote workers either.

[2] Each study was coded by at least two researchers independently. Our initial inter-rater reliability (examined using percent agreement) between the coders was 91%. All discrepancies in coding were resolved after discussion among the coders, and 100% inter-rater agreement was achieved for the final database used for analyses.

[3] To ensure that we retained only one predictor-criterion correlation per sample, we carried out one of two procedures. First, we calculated composite correlations (Hunter & Schmidt, 2004; Nunnally, 1978) for a) different facets of the same construct (e.g., affective, continuance, and normative commitment were composited to overall organizational commitment; cf. Meyer & Allen, 1991), and b) correlations across multiple time-points of measurement (e.g., time 1 and time 2 correlations were composited to an overall correlation). In both of these cases, we calculated composite reliabilities of these multiple facets using Mosier's (1943) formula. Second, in cases where intercorrelations among different facets of an overall construct were not

available or where we aggregated distinct constructs (e.g., trust in leader, LMX) under an umbrella construct (e.g., relationship quality with leader), we computed a simple average correlation.

[4] If a primary study did not report reliability of the measures, we imputed a Cronbach's α estimate using the mean of the reliabilities of all criteria in the relationship of interest (e.g., mean of all Cronbach's αs of organizational commitment within all studies that examined the RWI–organizational commitment relationship).

[5] Reported findings are from tests of the dual pathway model using the overall dataset. Results of the same hypotheses tests using the pre-pandemic dataset are reported in online supplement F (Tables F1-F4) for comparison purposes. Results from tests of the dual pathway model in the pre-pandemic dataset are largely consistent with those from the overall dataset with two exceptions: RWI had significant and negative associations with stress and burnout in the pre-pandemic dataset but had null effects on the two outcomes in the overall dataset.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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APPENDIX A: GUIDE TO INFORMATION IN ONLINE SUPPLEMENTS

Content Topic	Location
List of studies included in the meta-analysis	Online Supplement A
Information coded from primary studies included in the meta-analysis	Online Supplement B
Assessment of publication bias	Online Supplement C
Operationalization of employee outcomes in the meta-analysis	Online Supplement D
Correlation matrices for path analyses	Online Supplement E
Supplemental tests of the dual pathway model (pre-pandemic dataset)	Online Supplement F
Supplemental analyses for remote work use with employee outcomes	Online Supplement G
Supplemental analyses for remote work intensity and remote work use with demographics	Online Supplement H
Supplemental moderator analyses for remote work intensity	Online Supplement I