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Work and family interaction management: the case for zigzag working

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ABSTRACT

The present study seeks to advance understanding of the interaction of work and family roles. Typically, while the intersection of these domains is established as either being detrimental (i.e. work-family conflict) or beneficial (i.e. work-family enrichment), we argue there is a fundamental issue with timing. Specifically, we offer *zigzag working* as an approach to understanding how work and family interact. We suggest, rather than roles operating separately (e.g. work to family or family to work), the reality of work is where employees have work and family roles intersecting simultaneously. We believe this provides unique insights for those with dependent responsibilities, representing potentially both a unique challenge and benefit. Our study has two samples ($n=318$ employees and $n=373$ managers) and we find support for zigzag working at the day-level and while it is positively related to work-family conflict dimensions it is also positively related to happiness. Overall, our paper offers a new lens on work-family border negotiation, providing empirical evidence showing that zigzag working does occur and that it appears to have unique properties. Importantly, zigging and zagging around work and dependents during a typical day represents both positive and negative effects, highlighting a unique occurrence within the literature.

KEYWORDS

Zigzag working;
work-family conflict;
happiness; micro-role
transitions; employees;
managers

Introduction

The interface between work, family and life has courted considerable academic interest. Previous academic studies of work-family and work-life often treat home and work as separate domains, with clearly demarcated tasks performed in distinct locations and at different times. Well established literatures exist around work-family conflict (WFC, Greenhaus & Beutell, 1985), work-family enrichment (WFE, Greenhaus & Powell,

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2006), work-family balance (WFB, Greenhaus et al., 2003), and work-life balance (WLB, Haar, 2013). These are all approaches that seek to understand the interplay between work and non-work roles. Additional theories have explored how roles are managed, including boundary theory, which focuses on the meanings people assign to work and life roles (e.g. Nippert-Eng, 1996) and the ease of transition between the two (e.g. Ashforth et al., 2000).

Based on the premises of boundary theory, work-family border theory explains how individuals negotiate the work and family spheres and the borders between them to attain balance (e.g. Clark 2000). Role transitions refer ‘to the psychological and (if relevant) physical movement between positions in a social system(s), encompassing disengagement from one role (role exit) and subsequent engagement in another (role entry)’ (Ashforth, 2015, p. 1). Micro-role transitions are posited as frequent and usually recurring transitions, such as the commute between home and work as opposed to ‘macro’ transitions, which are infrequent and often permanent changes, such as a promotion (Ashforth, 2000). Micro-role transitions though typically denote the moving from one role to another (e.g. work to home) rather than the frequent intersections and dynamism between such roles. Kossek (2016) described ‘daily work-life interruptions, with easy switching back and forth between work and personal texts, emails, and websites, often resulting in fragmented and brief attention, and process losses from lack of sustained focus on the work or nonwork role’ (p. 260). While multitasking has been used as an umbrella term for doing several things at once, this term is often equated with notions of distraction and outcomes of negativity (Carrier et al., 2015).

Theoretically, such concepts setup work and home domains as distinct arenas that intersect somewhat. Aligned with these theories is that domains are explored together, typically how factors in one role (e.g. work) affect the other (e.g. family) (Greenhaus & Beutell, 1985; Greenhaus & Powell, 2006). Theoretically, as work and family/life domains have been posited as distinct, it is the involvement or interference of the two that typically creates challenges or benefits, yet the simultaneous nature of role interactions from work and family have remained untheorized. Here, we focus more the minutia-level, and moments of work and life intersecting. Specifically, the swift movements between work and family roles, reflecting the simultaneous performance of both, that arguably can be both proactive and reactive, causing both beneficial and detrimental effects. Of the scant research that exists on micro-role transitions, most takes a negative view (e.g. Wu et al., 2021) and we argue that such transitions work is not so ‘micro’ in terms of how many role transitions can be performed in a workday.

The present paper argues that to understand the lives of individuals (i.e. employees and managers) we need to re-examine the way we currently capture the intersection of work and family/life. Indeed, the growth of working-from-home throughout the Covid-19 pandemic and the growth of hybrid working has made this especially opportunistic. Ultimately, we have conceived a new concept that we argue more accurately describes individual experiences of juggling paid work (formal employment) and unpaid work (e.g. caregiving, household duties, volunteering etc.). Importantly, we suggest that such activities are both likely to be performed during the same block of time and typically in the same space (environment). We call it *zigzag working*, which reflects the continuous and concurrent diving amongst paid and unpaid work as micro sessions. Zigzagging can occur in such micro-sessions that it can even reflect managing paid and unpaid tasks simultaneously. We suggest that interspersing family with work demands does happen; and zigzagging is a metaphor which enables the conceptualization, and discussion, of how this can happen as microbursts in varied work environments. Akin and Palmer (2000) describe metaphors as having the effect of both describing and constructing our organizational realities. They can help people describe and understand their lives, and can serve as a source of motivation, humour and/or gratitude.

We suggest that zigzag working could be done in a traditional workplace or office, or at home where a Zoom work call and dependent needs (e.g. children, parents) might intersect. Zigzag working is likely to occur for a wide variety of workers with care responsibilities, whether that is care of a biological, financial, emotional and/or physical sense and across the lifespan, including elder care. It may also be performed by single employees with wider family, cultural, sport etc. demands. Next, we provide our theoretical framework and then provide a brief overview of the literature and theory and build our new approach to work and generate hypotheses.

Theoretical framework

The earlier works around work and family or life have their own theoretical approaches for examining relationships, such as work-family conflict (Greenhaus & Beutell, 1985) or role balance theory for WLB (Haar, 2013). Further, many studies use the conservation of resources (COR) theory (Hobfoll et al., 2018) to understand the existence, occurrences, and outcomes of conflict, enrichment, and balance (e.g. Haar & Brougham, 2022), and we suggest zigzag working aligns well with COR theory. Simply, COR theory suggests that all individuals can have potential access to many resources, including time, energy, or physical factors

like money, tools etc. Those with more resources can manage challenges better, for example, enlisting coworkers to help when there is a sudden rise in work demands. Workplaces and jobs fundamentally provide opportunities to consume, maintain, or acquire resources, and thus organizations can play an important role on employees under COR theory (Hobfoll et al., 2018). Importantly, COR theory contends that employees with greater resources will enjoy enhanced wellbeing because they are better able to manage work stressors because they have more resources to draw on (Hobfoll et al., 2018). Our zigzag working approach adds to COR theory because we argue and subsequently test whether resources can be simultaneously lost and gained, and how this might be captured, *via* different work-family pathways, with divergent effects (beneficial and detrimental).

Hobfoll (2001) provides a broad list of resources, with examples including time to work, quality time with family, and energy, as well as good health and retirement security. Typically, researchers use COR theory to focus on resources (workload pressures, organizational context, or family context), and fundamentally, contends that individuals are motivated to gain resources, maintain them, and ultimately guard against resource loss (Hobfoll, 1989). COR is a useful approach and has been especially popular in the WLB literature (e.g. Haar & Harris, 2021; Haar & Brougham, 2022). COR theory is especially relevant for studying zigzag working because the interplay within physical and temporal spaces means that the zigzag interactions might represent resources losses and/or gains simultaneously. Zigzag working means this potential interplay can be adequately captured. The next section builds our hypotheses.

Traditional concepts of work and non-work

Zigzag working aligns with several concepts of work and life intersections, including WFC, WFE, WFB, and WLB. Chronologically, the literature first brought attention to the work and family interface via role conflict in the 1960s, which ultimately cemented the theoretical approach of WFC (Greenhaus & Beutell, 1985). WFC is defined as a ‘form of role conflict in which the pressures from work and family domains are mutually incompatible in some respect’ (Greenhaus & Beutell, 1985, p. 76.) Theoretically, conflict can occur in either domain (Haar, 2013), with work interfering with the family domain (work to family conflict, WFC) and from the family domain into work (family to work conflict, FWC). Thus, the literature was strongly focused on the detrimental effects of work and family interaction. Indeed, meta-analyses show that conflict is detrimentally linked with a vast array of work and wellbeing outcomes

(e.g. Amstad et al., 2011; Shockley & Singla, 2011). Under COR theory, high work-family conflict reflects a state of resource loss leading to detrimental effects.

While the work-family literature explored the potential positive spill-over between work and family (e.g. Grzywacz & Marks, 2000), it wasn't until the mid-2000s that this became more formally theorized. Greenhaus and Powell (2006) defined WFE 'as the extent to which experiences in one role improve the quality of life in the other role' (p. 73), with WFE enjoying meta-analytic support (e.g. Shockley & Singla, 2011). Thus, high WFE reflects a state of employees gaining resources leading to beneficial effects under COR theory. Ultimately, the conflict and enrichment theories and associated evidence highlight that activities outside the workplace can have important influences on employees and vice-versa.

The next theoretical approaches deal with single dimensional approaches capturing the importance of balance between domains. This includes WFB with a focus on family (Greenhaus et al., 2003) and then extended beyond the family to non-work or life issues (i.e. WLB), with Haar (2013) stating 'WLB is defined as the extent to which an individual is able to adequately manage the multiple roles in their life, including work, family and other major responsibilities' (p. 3308). Fundamentally, WLB refers to individuals' perceptions of successfully balancing work and non-work domains (Haar, 2013) and has been found to be a significant factor when examining employee wellbeing (Haar et al., 2014). Overall, high WLB reflects a personal evaluation that role management is strong and positive (Haar & Brougham, 2022) and reflects an individual's perceptions of how well work and non-work roles are managed in accordance with their personal system of life values, goals, and aspirations (Haar, 2013). Overall, the theories around work/family/life show they can have opposite effects (e.g. conflict and enrichment), or focus on balancing roles, including having unique effects beyond conflict and enrichment (Haar, 2013). Under COR theory, high work-life balance reflects resource gains which leads to positive outcomes (e.g. Haar & Brougham, 2022).

Fundamentally, these theories examine work/home/life as separate places with influence occurring in different places at different times, rather than having the potential for frequent interplay in sessions, such as within an hour or day. Thus, a long stressful day at the office leaves an employee strung out and leads to home problems due to a lack of time, energy, or attention. There are also distinct theoretical approaches to understanding the interplay between roles. Park et al. (2020) explained that work-family boundary theory posits that both personal and situational factors determine the *permeability* of the boundaries through which work demands encroach on the home domain. Kerman et al. (2022) posit that home-related unfinished tasks may be detrimental to satisfaction in both domains, while

work-related unfinished tasks may be detrimental for work-related satisfaction only. While such studies make important contributions, they still consider work and home as distinct domains.

Ultimately, boundary theory regards role transitions as boundary crossing activities in that work and family roles can be arrayed on a continuum, ranging from high segmentation to high integration (Ashforth et al., 2000). The boundaries separating work and family roles are idiosyncratic, influenced by job-related factors, individual circumstances, personalities, and preferences (Ilies et al., 2009). Indeed, individuals can have their own preferences for separating aspects of work and family from each other by creating impermeable boundaries around the work and family domains. One potential approach closest to zigzag working might be managing work-life boundaries, which Kossek (2016) argues can be managed with different approaches. The closest style to our focus here is integration, which refers to ‘blending work and nonwork roles can lead to positive outcomes by facilitating flexibility to combine work and nonwork however works best for the individual’ (p. 261). However, her approach is broadly about roles, such as taking a work call during a child’s sporting event. In effect, workers consciously ‘integrate’ work and family roles and might achieve beneficial effects because these two separate roles are being integrated, with the parent being able to work and ‘parent’ (being at the sports game) together. Instead, zigzag working focuses on the micro sessions and suggests they might potentially be both beneficial and detrimental and might occur way more frequently and be simultaneously beneficial and detrimental. There is also less likely to be any conscious planning or strategy to work-life role interactions.

We suggest zigzag working adds a unique aspect to the literature because it captures the activity surrounding the continuous and concurrent boundary work of conducting paid and unpaid work in micro sessions, with this occurring simultaneously. Ashforth et al. (2000) posits that ‘micro’-role transitions occur frequently and are usually recurring transitions (e.g. the daily commute). Such scholarship has tended to view micro-role transitions at a large level—such as being ‘to’ and ‘from’ work transitions. An exception is the work of Wu et al. (2021) who investigated how different types of encounters with family during a workday break influenced affective resource gain, which then influences family-to-work enrichment and work and family outcomes. However there remains a gap in the literature about role integration and role transition at a simultaneous level and in a highly active and frequent manner.

We suggest that established, distinct, but overlapping concepts of WFC, FWC, WFE, WFB, WLB, boundary management, role transition, and role integration, are all limited in their ability to reflect and describe a reality that has seen many workers with dependent responsibilities conduct

work and other life activities in the same domain, and often at the same time. For example, leading a meeting on Zoom while a child or forgetful parent stands next to you seeking attention (e.g. food, answering questions) are not well captured by the current literature. The following scenario illustrates how zigzagging can occur in a more formal and traditional workplace setting. Raj is a senior team leader working in the banking sector and a solo parent of twin boys aged 14 years old.

11.02am. While listening online in the office to the CEO's year-end financial update, Raj is texting his twin boys encouraging them during their school break time to get out to shoot some baskets, rather spend their whole break gaming on their phones with friends as they usually do. Which is in violation of school rules. Only one son replies to his text, with the word 'whatever'. Raj sighs frustrated.

11.06am. While still listening to the CEO's update, Raj replies to his son's text with 'yes whatever – please just do as I ask!'

11.42am. After the CEO update, Raj grabs some food for an early lunch, while also remembering that school camp fee payments are due today (by 5pm), so scribbles on a post-it note to remind himself to pay them.

11.50am. Walking back up to his office, lunch in bag, Raj takes a phone call from a team member.

12.02pm. In his office, when checking his diary for a follow up meeting date with the team member still on the phone, Raj realises it is his mother's birthday. The team member – still on the phone – reminds him about the key report due next week for which they are still missing key information. When the team member hangs up Raj calls his mother about dinner tonight.

12.09pm. Raj finishes the call and going online, orders flowers and a print of the district his mother grew up in, all to be sent with priority! He also remembers he was prone to saying 'whatever' to her a fair bit as a teen. He starts to text his son back to apologize but another team member drags him off to an emergency meeting.

12.32pm. After 15 minutes, Raj realises the emergency doesn't impact his team that much. Thus, he surreptitiously texts his son in the meeting, replies to several work emails, and notices another urgent issue he does need to address. While he makes a mental list of what to do after this meeting, his lunch, still in bag, remains untouched. He also sees there is no reply from the son or the florist.

A review of the literature shows there is a further gap in our understanding of the specifics of how and when individuals strive to manage and achieve both paid work and unpaid work in the same environment within the same short blocks of time. This leads to two research questions: (1) *Does zigzag working occur?* and (2) *What effects does it have, and can it potentially be both detrimental and beneficial?* The present paper proposes and measures the zigzag work concept to highlight that work and life tasks are not separate, but instead in the twenty first

Century, it is about engaging in the continuous and concurrent diving amongst paid and unpaid work as micro sessions, or even managing paid and unpaid tasks simultaneously. This reflects both the technological advancements in peoples' workplaces (e.g. Teams/Zoom) and lives (e.g. smartphones), but also a unique pace of life which is fast, evolving, and 'messy'. Next, we detail our hypotheses drawing on COR theory.

Zigzag hypotheses

We suggest COR theory allows us to explore the potential for zigzag working to be simultaneously detrimental and beneficial, reflecting how simultaneous interactions might both reduce and enhance resources. For example, a teen interrupting Dad on a Zoom meeting might be viewed as increasing WFC because work is interrupted. But, under zigzag working, it might also provide a parent with a positive engagement, enacting a 'zig' because the working parent knows where their child is, and the 'quick' inspection of their homework for example, might also elicit a resource gain, as the parent's praise and engagement (e.g. giving an encouraging nod), enacts a positive reaction from their dependent. Then a 'zag' in the next moment as they pick up work feeling happier about their teenager doing something and them knowing it. Perhaps 10min later the next engagement leads to dinner plans, with the teenager mouthing 'pizza' and the father's 'thumbs up' sign adding further resource gains (positive energy) from the otherwise distraction. Theoretically, typically interruptions of work/family roles on family/work role are viewed as detrimental. They drain resources through taking time and focus, and energy (on the original task). This aligns well with WFC, representing a loss of resources under COR theory. However, sharing a positive engagement with a work colleague while at home, or a family member while at work (e.g. a 'thank you mom!' email) might represent resource gains, here, around positive mood. Importantly, zigzag working seeks to capture these simultaneous interactions.

We propose zigzag working represents these aspects simultaneously and occurring within the same space. Being in a work meeting that is draining energy and attention and gaining the above-mentioned email represents zigzagging for someone with dependents. Indeed, instant messages might go back and forth around the dependent's homework, chores, etc. all while in a work meeting. The existing theory is limited in understanding what this would mean and the likely effects. Indeed, it could be argued that theoretically, we do not see work and non-work activities occurring simultaneously. We can view them as occurring with a balance focus (e.g. Haar, 2013) but we see zigzag working quite distinctly. We argue that zigzag working represents potentially both simultaneous resource losses and gains under COR theory. Zigzag working is not about

balancing the ‘zigs’ and ‘zags’ but instead flowing with them and experiencing both the positives and negatives simultaneously. Of course, with extreme events such as a family emergency, a state of flow between paid and unpaid work would be thrown into flux.

We suggest that workers who experience more zigzag working are likely to report greater happiness, even while leading to greater work-family conflict. Happiness is our focus because Fisher (2010) states ‘happiness has important consequences for both individuals and organizations’ (p. 384). We suggest that the modern workspace and lifestyles are more flexible and accommodating of zigzagging between work and non-work, especially for employees caring for others. It is the interaction from roles within micro moments that produces resource gains while simultaneously producing resource losses in another. Thus, zigzag working is expected to produce unique resources and build happiness but also produce challenges operationalized as higher work-family conflict. We posit the following.

Hypothesis 1. Zigzag working will be positively related to happiness.

Hypothesis 2. Zigzag working will be positively related to (a) WFC and (b) FWC.

Given the exploratory nature of the present study and seeking to provide evidence that zigzag working can be simultaneously beneficial and detrimental, we further explore whether the beneficial effects on happiness are mediated by work-family conflict. There is strong meta-analytic evidence that work-family conflict is related to multiple employee well-being indicators (Amstad et al., 2011). There is also individual evidence that work-family conflict is detrimental to employee happiness (Gu et al., 2022), which involved testing effects across 37 countries and over 23,000 employees. Testing the potential mediating effects of WFC on zigzag working towards happiness is important because if we find full mediation effects, then we can understand that any potential benefit from zigzag working is ultimately countered by the adverse addition to WFC. However, if significant indirect effects (Hayes, 2018) from zigzag working are found, this would provide empirical evidence that even when WFC/FWC might mediate the influence of zigzag working, its beneficial effects towards happiness are supported.

Hypothesis 3. WFC and FWC will mediate the influence of zigzag working on happiness.

Methods

Participants and samples

Data were recruited in New Zealand with a Cint survey panel in late 2021. Such panels are becoming increasingly popular (Haar, 2021) due to

the ease of data collection via participant payment. Further, meta-analytic evidence (Walter et al., 2019) shows panel data is not significantly different from data via traditional methods (e.g. mail surveys). To participate in the present study, respondents had to meet four requirements: (1) be 18 years and older in age, (2) be in paid employment, (3) work a minimum 20 h per week, and (4) have dependents (broadly defined including young children, older parents etc.—anyone requiring care). Using a panel provider enabled us to target workers with dependents which might otherwise be more difficult to obtain. We conducted two samples (1) employees and (2) managers, to aid confidence in findings establishing zigzag working. Given the growth in panels, Bernerth et al. (2021) made recommendations which we followed: (1) screen respondents on time spent completing survey, and we rejected respondents whose time was 30% or less of the median time; (2) included items that tested respondents' attention, such as 'for this question select 'strongly disagree' only', with those failing the attention test being terminated. Study demographics including our overall response rates are provided in Table 1. The data shows that respondents on average are similar to the average New Zealand workforce by biological sex and tenure, and slightly younger on age (average 40–44 year age band) and slightly higher on hours worked (average 32.5 h/week) (see Statistics New Zealand, 2022).

Measures

Zigzag Working was measured using items created for the present study. We worked through the items and their meanings with two HR academics and three HR managers until we achieved adequate items. We focused on a 'typical workday' as we sought to establish whether zigzag working occurred at all. We suggest that capturing zigzag working is best done via subjective experiences, similar to measuring work-life balance (Haar,

Table 1. Study details and demographics.

Details	Sample 1	Sample 2
Sample size and type	318 Employees	373 Managers
Overall response rate	51.2%	60.9%
Gender (male)	51.9%	59.0%
Age (years)	38.3 (SD = 9.2)	37.9 (SD = 6.0)
Ethnicity (white)	54.0%	65.0%
Tenure (years)	4.62 (SD = 2.7)	4.95 (SD = 1.8)
Hours worked per week	37.4 (SD = 7.7)	38.9 (SD = 6.3)
Education		
High school	16.0%	7.5%
Technical qualification	33.6%	29.8%
University degree	38.4%	52.0%
Postgraduate qualification	11.9%	10.7%
Sector		
Private	66.7%	88.7%
Public	28.9%	10.5%
Not-for-profit	4.4%	0.48%

2013). Our rationale is that zigzagging is likely to be best captured through personal assessment rather than having another person rate the zigzagging experiences of another. Further, the interplay is likely to be reported differently by individuals as they assess their day and experiences around zigzagging. Hence, self-perception is the best approach. We measure workers' perceptions of their zigzagging experiences at work in a typical day and our items focus on the interplay between work and dependent care because this aligns with our samples. In both samples, we conducted an exploratory factor analysis (principal components, direct oblimin). Table 2 has items and psychometric properties of each construct. We utilized four items for exploring zigzag working.

Work-family conflict was measured across both samples using three-items each for *WFC* and *FWC* by Carlson et al. (2000), coded 1=strongly disagree, 5=strongly agree, using the strain dimension. This scale has been well validated internationally including in New Zealand (Haar, 2013; Haar et al., 2014) and adequately capture the detrimental effects of conflict between work and family roles. Following the approach of Haar (2013), the stem was "The following sections relate to your work, family, and life roles [if you have no children, family might still include partner, parents, siblings, friends, flatmates, etc.]". Sample items are 'When I get home from work, I am often too frazzled to participate in family responsibilities' (*WFC*) and 'Due to stress at home, I am often preoccupied with family matters at work' (*FWC*). Across both samples, very good reliability was found for the *WFC* construct ($\alpha=0.88$ sample 1, 0.79 sample 2) and *FWC* construct ($\alpha=0.90$ sample 1 and 0.84 sample 2).

Happiness was measured across both samples using a single-item measure which is common when researching happiness (e.g. Lyubomirsky et al., 2005) including in samples of New Zealand employees (e.g. Haar, Schmitz, et al., 2019). Item is 'Overall, how would you rate your happiness from 0 (extremely unhappy) through 10 (extremely happy)?'

Table 2. Zig-zag measures (samples 1 and 2).

Variables	Factor loadings	
	Sample 1	Sample 2
	Zigzag working	
Responses coded 1=strongly disagree, 5=strongly agree In a typical workday...		
I often find myself juggling work and dependents in the same physical space	0.891	0.816
I often find myself juggling work and dependents at the same time	0.859	0.739
It feels like my work and dependents' issues intersect every few minutes, making it a challenge to do either role well	0.860	0.710
When I feel like I am getting on top of my work, my dependents come along and break my rhythm	0.859	0.702
Item number in measure		
Eigenvalues	3.009	2.207
Percentage variance	75.2%	55.2%
Cronbach's alpha	0.89	0.72

We included two other measures for validity tests (more below). Perceived Organizational Support (*POS*) was measured with a 4-item scale by McCallum et al. (2024), based on Eisenberger et al. (1986). Sample item 'My organization really cares about my well-being' ($\alpha=0.84/0.70$). *Fun at Work* was measured by 3-items by Karl et al. (2005), sample item 'Having fun at work is very important to me' ($\alpha=0.72/0.72$).

Control variables

Several demographic variables were controlled for because these are likely to influence WFC (Haar, 2013; Haar et al., 2014). These were *Age* (in years), *Job Tenure* (years) and *Hours Worked* (in number of hours per week on average). There is meta-analytic evidence that older workers, workers with longer tenure, and working longer hours, will report better job outcomes (Ng & Feldman, 2008, 2010). Given the potential gender issues aligned with work and family (Shockley & Singla, 2011) including potentially zigzag working, we also controlled for biological sex (2 = female, 1 = male). Finally, given the nature of zigzag working we also controlled for currently working-from-home (WFH), coded 1 = yes, 0 = no.

Analysis

Hypotheses were tested in SPSS (version 28) using the hierarchical regression analysis. Controls were entered in Step 1 and in Step 2, zigzag working was entered. Three dependent variables were tested: WFC, FWC, and happiness. In both samples, for happiness a mediation model was run where WFC and FWC were entered in Step 3. To ensure robust analysis we included bootstrapping (5,000 times) and confidence intervals across the 95% intervals, with lower limits (LL) and upper limits (UL). For mediation tests, we calculated indirect effects using the PROCESS macron (version 4.0). We conducted t-test (see below) to provide additional analyses.

Measurement models

The constructs in each study were confirmed using CFA with AMOS (version 28), using three goodness-of-fit indices: (1) the comparative fit index (CFI ≥ 0.95), (2) the root-mean-square error of approximation (RMSEA ≤ 0.08), and the standardised root mean residual (SRMR ≤ 0.10). Overall, the hypothesized measurement model was the best fit for the data across sample 1: $\chi^2(df) = 110.9(59)$, CFI = 0.98, RMSEA = 0.05, and

SRMR = 0.04; and sample 2: $\chi^2(df)=144.7(59)$, CFI = 0.95, RMSEA = 0.06, and SRMR = 0.04. We confirmed the best fit by testing alternative CFA models (e.g. combining WFC and FWC, zigzag working and WFC etc.) with all additional models resulting in significantly poorer fitting models (all $p < 0.001$).

Test of validity

Due to the unique nature of zigzag working we ran tests of both convergent and discriminant validity (Campbell & Fiske, 1959). This refers to established measures we might expect to have a significant correlation with zigzag working (convergent) and non-significant correlation (divergent). For convergent validity, POS had significant correlations for employees ($r=0.21$, $p < 0.01$) and managers ($r=0.29$, $p < 0.01$). For divergent validity, fun at work had non-significant correlations for sample 1 ($r=0.07$, $p=0.204$) and sample 2 ($r=0.06$, $p=0.285$). Overall, this analysis provides additional confidence that the zigzag working measure operates as expected.

Results

Descriptive statistics for the variables (samples 1 and 2) are shown in Table 3.

Table 3 shows that zigzag working is significantly correlated with WFC and FWC in samples 1 and 2 ($0.65 < r > 0.50$, all $p < 0.001$), and with happiness in sample 1 ($r=0.19$, $p < 0.001$) and sample 2 ($r=0.26$, $p < 0.001$). However, WFC and FWC are all not significantly related to happiness (all $p > 0.05$).

Results of the hierarchical regression analysis is shown in Table 4.

Table 4 shows that zigzag working is significantly related to happiness in samples 1 and 2 (both $p < 0.001$), accounting for modest variance (3% sample 1, 4% sample 2). This supports Hypothesis 1. Further, zigzag work is significantly related to WFC and FWC in samples 1 and 2 (all $p < 0.001$), accounting for large amounts of variance to both WFC (18% sample 1, 21% sample 2) and FWC (26% sample 1, 27% sample 2). This supports Hypotheses 2a and 2b.

Beyond the direct effects of zigzag working, Hypothesis 3 tested WFC and FWC as mediators of zigzag working. Step 3 in the regression model for happiness in sample 1 shows WFC is significantly and negatively related to happiness ($\beta = -0.47(0.18)$, $p = 0.008$, [LL = -0.82, UL = -0.12]) but FWC is not ($p = 0.950$). In sample 2 (managers), both WFC and FWC are not significantly related ($p > 0.05$). In both sample 1 and 2, zigzag working remains a significant predictor of happiness and indeed

Table 3. Correlations and descriptive statistics of variables (samples 1 and 2).

Variables	Sample 1		Sample 2		1	2	3	4	5	6	7	8	9
	M	SD	M	SD									
1. Age	38.3	9.2	37.9	6.0	---	0.36**	0.08	-0.14**	-0.04	-0.19**	-0.17**	-0.10	-0.10*
2. Job tenure	4.62	2.72	4.95	1.81	0.21	---	0.11**	0.03	-0.13*	-0.01	0.03	0.06	-0.02
3. Hours worked	37.4	7.68	38.9	6.3	0.06	0.08	---	0.09	0.03	0.11*	0.12*	0.08	0.22**
4. POS	3.80	0.76	4.07	0.52	0.01	0.10	-0.06	---	0.25**	0.29**	0.19**	0.15**	0.30**
5. Fun at work	3.71	0.81	3.82	0.78	-0.06	-0.00	0.02	0.14*	---	0.06	0.05	0.05	0.10
6. Zigzag working	3.28	1.05	3.73	0.71	-0.26**	0.10	-0.05	0.21**	0.07	---	0.51**	0.55**	0.26**
7. WFC	3.26	1.09	3.57	0.91	-0.31**	0.09	0.09	0.08	0.12*	0.55**	---	0.76**	0.07
8. FWC	3.11	1.16	3.52	0.98	-0.33**	0.07	-0.06	0.14*	0.10	0.64**	0.77**	---	0.08
9. Happiness	6.89	1.16	7.65	1.88	-0.06	0.11	0.05	0.49**	0.16**	0.19**	-0.03	0.05	---

Sample 1 (N = 318 employees) below the diagonal, and Sample 2 (N = 373 managers) above the diagonal.

*p < 0.05; **p < 0.01.

Table 4. Regression analysis results (samples 1 and 2).

Variables	WFC		FWC		Happiness	
	Sample 1	Sample 2	Sample 1	Sample 2	Sample 1	Sample 2
	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)	β (SE)
Step 1 controls						
Age	-0.04 (0.01) [‡]	-0.04 (0.01) [‡]	-0.04 (0.01) [‡]	-0.03 (0.01)**	-0.02 (0.01)	-0.04 (0.02)*
Tenure	0.05 (0.02)*	0.03 (0.02)	0.05 (0.02)*	0.05 (0.03)	0.10 (0.05)*	-0.00 (0.06)
Hours worked	0.01 (0.01)	0.01 (0.01)	-0.01 (0.01)	0.02 (0.01)	0.01 (0.02)	0.07 (0.02) [‡]
Gender	-0.29 (0.11)*	-0.34 (0.08) [‡]	-0.43 (0.12) [‡]	-0.39 (0.10) [‡]	-0.11 (0.25)	-0.31 (0.19)
WFH	0.47 (0.12) [‡]	-0.10 (0.10)	0.50 (0.12) [‡]	0.34 (0.12)**	-0.13 (0.25)	0.44 (0.23)
R ² change	0.19 [‡]	0.09 [‡]	0.21 [‡]	0.08 [‡]	0.02	0.08 [‡]
Step 2 independent variable						
Zigzag working	0.50 (0.05) [‡]	0.63 (0.06) [‡]	0.64 (0.05) [‡]	0.76 (0.06) [‡]	0.43 (0.13) [‡]	0.58 (0.14) [‡]
R ² change	0.18 [‡]	0.21 [‡]	0.26 [‡]	0.27 [‡]	0.03**	0.04 [‡]
Step 3 mediation						
WFC					-0.47 (0.18)**	-0.19 (0.16)
FWC					0.01 (0.18)	-0.13 (0.15)
R ² change					0.03**	0.01
Overall R ²	0.37	0.30	0.47	0.35	0.09	0.13
Adjusted R ²	0.36	0.29	0.46	0.34	0.07	0.11
Total F	30.806 [‡]	26.415 [‡]	46.732 [‡]	32.948 [‡]	3.837 [‡]	6.994 [‡]

Unstandardized regression coefficients (β) and standard errors (SE). * $p < 0.05$; ** $p < 0.01$; [‡] $p < 0.001$.

strengthens the direct effect strength of zigzag working in samples 1 and 2, providing no evidence of mediation. This fails to support Hypothesis 3. Overall, the addition of WFC and FWC accounts for an extra 3% variance in sample 1 ($p = 0.003$) but only 1% in sample 2 ($p = 0.050$).

Additional analysis

Given this is the first zigzag working study, we explore potential differences to aid understanding. We argued a driving realization around zigzag working was WFH, so we tested for differences. We found significant differences in zigzag working by WFH status ($t(316) = 7.335$, $p < 0.001$) with sample 1 (employees) WFH ($M = 3.59$) reporting significantly higher zigzag working than employees not-WFH ($M = 2.77$). In sample 2 (managers), again we find similar significant differences: ($t(371) = 4.645$, $p < 0.001$) with managers WFH ($M = 3.82$) reporting higher zigzag working than managers not-WFH ($M = 3.42$). Gender is a popular topic in the work-family field, with meta-analysis findings some support for both conflict and enrichment (Shockley & Singla, 2011). Our analysis here shows no significant differences by biological sex in zigzag working across sample 1 ($t(316) = -0.548$, $p = 0.584$) or sample 2 ($t(371) = 1.602$, $p = 0.110$). Finally, given the methodological focus here of capturing both employee and manager samples, and findings that managers experience work pressures higher than employees (see Ten Brummelhuis et al., 2014) we also test for zigzag working differences between employees and managers. We find significant differences in zigzag working by employment

status ($t(689) = 6.727, p < 0.001$) with managers ($M = 3.73$) report higher zigzag working than employees ($M = 3.28$).

Discussion

The findings suggest that zigzag working likely exists and can be empirically measured. It also operates as expected. While being detrimental to conflict it was also beneficial to happiness, indicating unique effects for individuals that zig and zag through simultaneous work and family interactions. This supports our argument that zigzag working occurs, is distinct from other forms of work and family interactions (specifically conflict) and is unique within the field. While we did find significantly higher zigzag working amongst both employees and managers WFH, those non-WFH individuals still recorded moderate levels of zigzag working. Interestingly, despite gender differs being found in meta-analyses of WFC (Shockley & Singla, 2011), we found no evidence towards zigzag working. Finally, managers did report higher levels of zigzag working than employees, perhaps highlighting the additional challenges and usefulness that zigzag working—as a working strategy—might play for managers.

Across two samples we showed that zigzag working can be captured at the day-level, and these were distinct from existing forms of work and family interactions, especially WFC/FWC. Zigzag working was found across both samples to be positively related to WFC but also happiness. This places zigzag working in a unique position within the work, family, and life literature. Importantly, the mean scores across the two samples are above the midpoint (all 3.0) with zigzag working being found to occur across the day, with some frequency. We argued that the modern workforce might encourage and facilitate the juggle of work and dependents in the same physical, and/or emotional space, at the same time, with the intersection occurring frequently (i.e. every few minutes), and thus representing a new way of understanding work and dependent care. The findings support our notion that COR theory is useful for capturing zigzag working because the simultaneous flow between work and dependents might represent simultaneous resource gains and losses. The unique contribution is that under COR theory, zigzag working reflects both resource gains and losses occurring simultaneously.

We found support that zigzag working makes like more challenging and conflicting (higher WFC) but also happier and thus more beneficial. Indeed, we found while zigzag working influenced beneficially to happiness and detrimentally to WFC, WFC did not mediate the influence of zigzagging. Thus, the beneficial effects of zigzagging occur independently of its influence on conflict and might represent that it has a unique nature on outcomes, at least happiness in the present study. We suggest

that zigzag working can be positioned in a unique space that warrants a new way to understand the world of work and to bring into focus a much sharper lens on micro-role transitions. While WFH was found to be a context whereby zigzag working was greater than those not WFH, even those not WFH reported moderate levels of zigzag working. This could be for several reasons including because of workplace changes brought on by the Covid-19 pandemic, and/or technology advances whereby dependents can contact carers continuously, such as *via* smart-phone messaging. This indicates that while zigzag working occurs more often for those WFH, it is not exclusively experienced by this group.

The findings support our concept of zigzag working, which can describe individual experiences of the continuous and concurrent diving amongst paid and unpaid work. The zigzag working approach aids our understanding and perhaps better captures the nature of work, where employees have work and family roles intersecting frequently across time including simultaneously. While to date the intersection of work/family domains is established as either being detrimental as WFC or beneficial for WFE (Wu et al., 2021), we argue there is a fundamental issue with timing, where conducting both work and non-work responsibilities in the same place and in the same periods of time mean such intersections can influence WFC, and happiness simultaneously. This also shows workers can cope with greater levels of work and family role intersections than has been assumed by efforts to position them as separate roles in need of balancing (Hunter et al., 2019) to reduce WFC.

Being able to meet responsibilities in both the work and life domains in a more intersecting manner, while no doubt makes workers busy, it also was found to make them happier. It could be that for an employee being able to engage with children (e.g. text, messaging) while also conducting work, creates a concurrent juggling of paid and unpaid work roles, with simultaneous resource gains and losses, leaving individuals happier, even in the face of distractions. Zigzagging behavior can be considered with a metaphor of a zigzag. Such a metaphor is apt for discussing how employees and managers weave between frequent work and family responsibilities and interruptions. This is beyond what Mintzberg (1973) discussed as 'fragmentation in managerial work', where the focus was very much on work tasks. Patterns of zigzagging though can be unique to the individual's world in terms of their work and family responsibilities, with experiences of the work-life interface being situated in specific cultural contexts. Zigzagging is also not a precise action and as found in the samples, as an individual's zigzagging behaviors can vary by person with a high standard deviation in sample 1, although more modest in sample 2. We acknowledge that in both samples the levels for WFC/FWC are similar or slightly higher (especially sample 2). Work

and/or family demands that drive zigzagging behaviors are likely unplanned but giving attention to them was found to not only influence WFC as expected, but also influence happiness, suggesting zigzagging might be beneficial through giving workers greater control of their time to manage the work-life interface.

Implications

While we offer zigzag working as a new approach to understanding how work and family interact, it also has several implications. Given zigzagging is a practice that has been found to be performed by men, women, managers, and employees, it is of particular importance that human resource and other senior leaders encourage discussions of normal zigzagging in their own lives and workplaces. This could counteract notions of being an ideal high performer with clear work and family boundaries and balance between roles. It might acknowledge that messy zigzagging behaviors are normal. Zigzagging also challenges the idea that staff leave their dependents at the 'workplace door' when coming to work. As leaders have been found to shape subordinates WLB, they could be integral for zigzagging as a work practice to be recognized and supported. Such discussions could also help answer Ashforth's (2015) question about to what extent do individuals develop *transition scripts* to facilitate recurring transitions.

Organizational support has meta-analytic support to support towards role balance and conflict (Kurtessis et al., 2017), and thus organizations and managers can likely play a role in encouraging and facilitating zigzagging at work. This is supported with our convergent validity test around POS. Employers might also consider tweaks for zigzag working, including recognizing that workers maybe frequently interrupted, understanding that prolonged periods of 'focus time' might not exist for some (or be desired), and that there is likely no such thing as 'silence' from dependents during the workday. Managers may also consider simple initiatives to support WFH such as breaking up long online meetings with breaks for all participants.

Given the findings of our studies show that men certainly engage in zigzagging behaviors, it is important for men to share and articulate zigzagging behaviors, to help normalize what appears to be a common behavior or reality for many with dependent care roles. Male managers being 'loud' about zigzag working could shift conversations away from work and family role challenges as a gendered experience that have frustrated others over their careers (Harris et al., 2019), to instead indicate that work and family intersections are normal, accepted, manageable, and desirable. Finally, individuals should understand that engaging in zigzagging is quite natural and normal, and while complex and challenging at times (higher conflict), is also beneficial and thus to be encouraged.

Future research

Zigzagging also provides numerous research opportunities, including the role of organizational and leadership effects (e.g. support), and organizational and professional contexts. For example, is zigzagging easier for Data Analysts versus Police Officers? Or home-based Call Centre workers versus long distance Truck Drivers? Future studies could build on COR theory to focus on resources at the individual, organizational, and family contexts that gain or drain resources, to understand how these effect zigzagging, and especially how employees can build resources. Employee demographics and life circumstances might also be explored in future research. How does zigzagging differ amongst those caring for older parents? Or for same sex couples? Extending the outcomes studied to focus on specific human resource relevant factors is encouraged such as productivity, absenteeism, and retention. Cross-national differences in work-family policy and culture could influence zigzagging practice. Given the study was conducted in New Zealand, values such as *whanaungatanga* (collectivistic/relational orientation) (Haar, Roche, et al., 2019) could be explored with zigzagging.

Does zigzagging differ by number of dependents in their household, or with multi-generational family living structures etc? Is zigzag working intensified if an employee who is hybrid working also has a partner doing hybrid work at home? Further, the role of technology in facilitating zigzagging also warrants attention. Researchers might extend the focus to WFE and WLB to provide additional insights to those found here, and further, explore other roles beyond dependents, to understand whether zigzagging work occurs in those without dependents. Further, examining the role of WFC as a moderator of zigzag working might also produce interesting effects. Finally, a daily diary study of zigzagging work would provide additional evidence. Indeed, a personal daily diary followed with interviews to tease apart interactions and their consequences might also add much needed depth to understanding zigzag working. Further, research examining whether co-workers can recognize the occurrence of zigzagging and potential effects, such as reduced helping behaviors, would be a useful extension.

Limitations

While the data is cross-sectional in nature, the use of two samples and similar effects provides strong confidence in the findings. However, we acknowledge that causality is not proven with such designs and indeed our approach relies on recall and the micro-interactions between roles might not be adequately captured by some—encouraging future research

approaches such as videoing an hour of a worker's day. Further, we conducted CFAs across the samples, and this has been suggested as minimizing method bias issues (Haar et al., 2014). This study includes two samples, focusing on managers and employees, and examines zigzagging work at the day-level. Overall, the data provides strong generalizability albeit with a focus on those with dependents, although that is likely needed to study zigzagging at least in the current conceptualization. We acknowledge that other roles besides dependent care might be explored.

Conclusion

The present study found support for zigzag work and understanding the effects of such behaviors on conflict and happiness. The consistent findings whereby zigzag work is positively related to conflict and happiness (both samples) highlight how, under COR theory, zigzag working can produce simultaneous resource drains and gains, providing new insights. Overall, our paper offers a new lens on work-family border negotiation, providing empirical evidence showing that zigzag working does occur and that it appears to have unique properties.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Data availability statement

Data available on request due to privacy/ethical restrictions.

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