Testing an integrated model of the work–family interface in Chinese employees: A longitudinal study

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The purpose of this study was to examine an integrated model of the work–family interface (WFI) linking work–family demands (workload and family conflict), resources (supervisory support and family support) and role satisfaction in a Chinese context. The four-factor structure of WFI comprises direction of influence (work to family *vs* family to work) and types of effect (work–family conflict *vs* work–family enrichment). A longitudinal design was used to collect data from 409 Chinese employees at three time points, separating measures of antecedents (T1), WFI (T2) and outcomes (T3) in time. The results based on structural equation modelling (SEM) reveal that: (1) the direction and types of effect were two underlying dimensions of the WFI, supporting the four-factor structure; (2) demands were more strongly related to conflict, while resources were more strongly related to enrichment; (3) work–family conflict and enrichment were related to role satisfaction, regardless of the direction of influence.

Key words: Chinese employees, work and family demands, work and family interface, work and family resources, work and family satisfaction.

Research on the work and family interface (WFI) has focused on a four-factor structure that comprises direction of influence and types of effect (e.g. Frone, 2003; Greenhaus & Powell, 2006). Specifically, work may interfere with family (work-to-family conflict, WFC) and vice versa (family-to-work conflict, FWC); and work may enrich family (work-to-family enrichment, WFE) and vice versa (family-to-work enrichment, FWE). There has been supporting evidence for this four-fold taxonomy from US and European samples (Innstrand, Langballe, Espnes, Falkum & Gjerl, 2008; Proost, De Witte, De Witte & Schreurs, 2010). However, as most of the work is been carried out in the developed West, we know relatively little about the WFI experiences of those living in non-Western societies. For example, the only Chinese study supporting the four-fold taxonomy used a small sample ($N = 189$) of working parents in Mainland China (Lu, Siu, Spector & Shi, 2009a). While almost all of the existing studies have focused on either the antecedents–WFI linkage (e.g. Aryee, Srinivas & Tan, 2005; Proost *et al.*, 2010) or the WFI–consequences linkage (e.g. Innstrand *et al.*, 2008), very few have tested the integrated model of the four-fold WFI including both its antecedents and

consequences (Cowlishaw, Birch, McLennan & Hayes, 2014; Witt & Carlson, 2006). However, Cowlishaw *et al.* (2014) tested a structural model of WFI among Australian volunteer firefighters, who are arguably different from paid employees. Also, their model did not include any variables from the family domain. Witt and Carlson (2006) did not test a structural model; instead they focused on the moderating effects of personality (conscientiousness) and work environment (perceived organizational support) on the relationships between various aspects of the WFI and job performance, in a sample of American employees. It is thus important to obtain empirical support for an integral model of WFI, which will inform us of the overall relationships among different aspects of the WFI and their pertinent antecedents and outcomes in both the work and family domains. Testing such a comprehensive model in the Chinese context, which has not yet been done, will be of added value in generalizing knowledge gained in the Western cultures to a very different societal background.

WFI: a demand–resource dual approach

Conservation of resources theory (COR, Hobfoll, 1989) proposes that people seek to acquire and maintain resources. On the one hand, work–family conflict occurs because resources are lost in the process of juggling both work and home life (Grandey & Cropanzano, 1999). If people cannot cope with work and family demands, or if

people deplete all resources, stress or conflict will develop. On the other hand, adequately managing multiple roles may create energy and enhance the availability of resources. When resources generate new resources, work–family enrichment occurs. Such a dual approach is also in line with the Job Demands–Resources (JD–R) model, which delineates the health impairment process and the motivational process, and examines the impact of work demands and resources on work–family conflict and enrichment (ten Brummelhuis & Bakker, 2012). These integrated frameworks highlighting the loss and gain processes of resources mobilization have already received some support from longitudinal studies in the Chinese context (Lu, 2011; Lu & Kao, 2013).

Applying the JD–R model, physical and psychic exertions associated with work overload and family responsibilities may trigger the health impairment process, causing negative WFI (i.e. positively associated with work and family conflict). Meta-analytic reviews summarizing findings from the West (Byron, 2005; Michel, Kotrba, Mitchelson, Clark & Baltes, 2011) have confirmed that both work and family demands were consistently related to WFC and FWC respectively. This is because physical and psychic exertions associated with both work and family role overload are related to the time and strain bases of the work–family conflict (Carlson, Kacmar & Williams, 2000). A recent meta-analysis (Michel *et al.*, 2011) confirmed that among the significant relations found in the work domain, work–role overload had the largest relationship with WFC ($\rho = 0.55$). Michel *et al.* define work-role overload as 'the perception of having too many work-role tasks and not enough time to do them' (p. 693), which is nicely captured by the Quantitative Workload Inventory (QWI) developed by Spector and Jex (1998). Thus, we used workload measured by QWI as an indicator of work demands in the present study.

In the family domain, an earlier meta-analysis (Byron, 2005) found that family conflict was strongly related to FWC ($\rho = 0.32$). Family conflict has been reported as a major source of family pressure and highly demanding for Taiwanese couples (Kao & Lu, 2006). In Byron's (2005) meta-analysis, family conflict encompassed marital conflict, parental conflict, marital tension, relationship agreement and marital anger, which substantially overlaps with our conceptualization and measurement of family conflict as disagreement among family members (not restricted to married couples) due to lack of congruence on important aspects of Chinese family life (e.g. filial piety; Kao & Lu, 2006). We thus attempted to capture the psychological reality of family pressure by assessing the level of family conflict, which has not often been done in WFI research (Michel *et al.*, 2011).

Corroborating the above-cited Western findings, heavy workload has been consistently identified as a precursor of WFC (Lu, Hwang & Kao, 2005; Lu, Kao, Chang, Wu & Cooper, 2008) while family conflict has been related to FWC (Lu & Kao, 2013) for Chinese employees. Thus, we focused on workload and family conflict as indicators of work and family demands.

In contrast, resources available in the work and family domains may energize the motivational process, as predicted by the JD–R model, which then facilitates better adjustment (i.e. less work and family conflict). A most recent meta-analysis (Michel *et al.*, 2011) established that work social support is an antecedent of WFC while family social support is an antecedent of FWC.

Applying the JD–R model to the positive aspect of WFI, demands in work and family domains may trigger the health impairment process, preventing enrichment between the two domains. This is because demands deplete resources, which may hamper both the amount and the effectiveness of resource transfer between the two domains (i.e. less work and family enrichment). In contrast, resources in work and family domains may trigger the motivational process, facilitating enrichment between the two domains. Consistent with the COR theory and the JD–R model, Hobfoll (1989) regards social support as a critical form of resources, which generate feelings of love, care and value. Such a positive state of mind then enables individuals to transfer more effectively resources gained in the family domain to the work domain, and vice versa (ten Brummelhuis & Bakker, 2012). The beneficial effects of supervisory support (one form of work resources) for reducing work-to-family conflict are even stronger for Taiwanese employees working in organizations with greater power distance compared to their British counterparts (Lu *et al.*, 2009b). Siu *et al.* (2010) also found a direct beneficial effect of supervisory support for WFE in a sample of Mainland Chinese workers.

In the family domain, family support has been identified as an important form of social support promoting personal adjustment in the West (e.g. Cohen & Syme, 1985) and in Taiwan (Lu, 2006). Indeed, family support has been found as an antecedent of both WFE and FWE in the West (Grzywacz & Mark, 2000; Greenhaus & Powell, 2006).

Corroborating Western findings, supervisor support at work not only helped Chinese employees to mitigate work and family conflict (Chang & Lu, 2009), but also enhanced work and family enrichment (Lu, 2011; Siu *et al.*, 2010). As found in a recent meta-analysis (Kossek, Pichler, Bodner & Hammer, 2011), work–family-specific support had a greater impact on various aspects of the WFI. We thus focused on work–family supervisor support and family support as indicators of resources from the work and family domains.

COR and the JD–R model can also explain the effects of WFI on work and family outcomes. Applying the central

idea of resource mobilization, the work–family conflict as a stressor may deplete individual resources and worsen both work and family satisfaction (Grandey & Cropanzano, 1999), while work–family enrichment as the process of obtaining new resources may facilitate both work and family satisfaction (ten Brummelhuis & Bakker, 2012). In this study we focused on work and family role satisfaction, as they are most consistently related to all aspects of the WFI in meta-analyses in the West (Allen, Herst, Bruck & Sutton, 2000; McNall, Nicklin & Masuda, 2010). The few studies with Chinese samples also produced the same results (e.g. Aryee, Fields & Luk, 1999; Lu, 2011). Moreover, work-originated WFI was proven to be more strongly associated with work-related outcomes than family-related outcomes, and vice versa (Ford, Heinen & Langkamer, 2007). Based on the resource theories and existing empirical evidence, we thus hypothesized:

H1: WFI will mediate the relationships between work and family demands and role satisfaction. Specifically, workload will be positively related to WFC which in turn will be negatively related to job satisfaction (H1a); family conflict will be positively related to FWC which in turn will be negatively related to family satisfaction (H1b); workload will be negatively related to WFE which in turn will be positively related to job satisfaction (H1c); family conflict will be negatively related to FWE which in turn will be positively related to family satisfaction (H1d).

H2: WFI will mediate the relationships between work and family resources and role satisfaction. Specifically, supervisory support will be negatively related to WFC which in turn will be negatively related to job satisfaction (H2a); family support will be negatively related to FWC which in turn will be negatively related to family satisfaction (H2b); supervisory support will be positively related to WFE which in turn will be positively related to job satisfaction (H2c); family support will be positively related to FWE which in turn will be positively related to family satisfaction (H2d).

Work and family permeability: a Chinese case

The Chinese culture has traditionally considered being 'hardworking' as a virtue, and working long hours is still the norm in contemporary Chinese societies (Lu, 2011). However, compared to individualists, collectivists such as Chinese are more flexible in how they view work and family issues, and the demarcation between work and family is far from rigid in daily life (Yang, Chen, Choi & Zou, 2000). A recent qualitative study revealed that Taiwanese employees often view work as a means of maintaining and improving the living standards of their families, or as a

way of fulfilling their duties and commitments to glorifying the family name (Lu, Chang & Chang, 2012). A few studies indeed found that Chinese employees took a more integrated rather than segmented approach to work and family issues, and were more tolerant of the spillover between the two domains (Olson-Buchanan & Boswell, 2006; Yang *et al.*, 2000). These cultural expectations and flexible role boundaries may explain the lack of association between WFC and strain found in some Asian samples (e.g. Aryee *et al.*, 1999). Previous studies conducted in Chinese societies have also noted that the cross-domain effects of WFI on work and family outcomes are rather prevalent. For instance, work interfering with family was associated with family satisfaction (Lu *et al.*, 2005), while family interfering with work was associated with work-related outcomes (Lu *et al.*, 2008). One recent study conducted in Mainland China provided direct support for the cross-domain effects of family-to-work conflict on work outcomes (Li, Lu & Zhang, 2013). Similarly, we would expect that the strong linkage between work and family will also amplify the positive mutual influences across the two domains, such that when one's family experiences benefit work performance, one will have greater satisfaction for both work and family (FWE → job satisfaction, FWE → family satisfaction). Based on the above analysis of the distinct features of the Chinese cultural context and existing empirical evidence, we thus hypothesized:

H3: WFI will have cross-domain effects on role outcomes. Specifically, WFC will be negatively related to family satisfaction (H3a); FWC will be negatively related to job satisfaction (H3b); WFE will be positively related to family satisfaction (H3c); FWE will be positively related to job satisfaction (H3d).

The proposed research model is presented in Figure 1. Although WFI as a *mediator* has been tested in past studies (e.g. Frone, Yardley & Markel, 1997; Jansen, Kant, Kristensen & Nijhuis, 2003; Noor, 2003; Wayne, Grzywacz, Carlson & Kacmar, 2007), these researchers did not combine both work–family conflict and enrichment/ facilitation simultaneously in their models. Thus, the first purpose of the present study was to extend Western theories of the four-factor structure of WFI to a Chinese sample, testing a comprehensive model including work and family antecedents and consequences along with all four aspects of the WFI. Second, we set out to investigate the mediating roles of all four aspects of the WFI on the paths from work and family demands and resources to work and family satisfaction. Testing both conflict and enrichment, in both directions, will allow us to explore cross-domain effects and how conflict and enrichment relate to one another. Testing an integrated WFI model in a diverse Chinese sample will offer a significant contribution to the validation and generalization of the results gained in the Western studies. Finally, we adopted a three-wave study design to
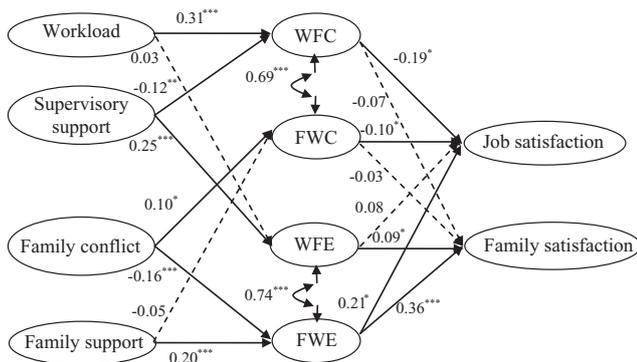
Figure 1 The hypothesized research model and the summary of standardized path coefficients for the modified model (*N* = 409).
Notes: All the one-way arrows represent the hypothesized research model.
Solid lines represent significant coefficients, dotted lines represent non-significant coefficients. The double arrows represent the correlations between residual terms.

model the processes through which WFI arises and affects employees' role satisfaction. Such an approach can remedy the methodological limitation caused by the scarcity of longitudinal data in the existing work and family literature, which should provide a stronger basis for causality inferences than cross-sectional data. A longitudinal dataset can also mitigate the risk of potential common method biases (Podsakoff, MacKenzie, Lee & Podsakoff, 2003).

Method

Procedure and participants

We adopted a three-wave longitudinal design to test the hypotheses. The participants were recruited from executive education programs in several universities in Taiwan. All of them, whether they were married or single, were full-time employees working in different organizations in diverse industries. Furthermore, all were living with their families. The surveys were administered three times to the respondents with a six-month interval between each pair of time points. The span of 6 months was designed to provide ample separation between our measures while not spacing surveys so far apart as to unnecessarily increase participant attrition. The first-wave survey included scales for all the antecedent variables, namely, workload, family conflict, supervisory support and family support. The second-wave survey included scales for all aspects of the WFI, namely, WFC, FWC, WFE and FWE. The third-wave survey included scales for outcome variables, namely, job satisfaction and family satisfaction. Questionnaires of the three surveys were matched through self-identifiable coding.

At the beginning of the study, each participant received an introductory letter informing them of the purpose of the study, the commitment required, and assuring them of anonymity. The response rate was 100% in the first-wave data collection, 91% in the second-wave, and 90% in the third-wave. At the end of the study period, 409 participants contributed data for all three times. The high response rate is probably attributable to the fact that the surveys were conducted in class sessions and participants returned completed questionnaires on site.

As a precaution, we systematically examined differences between employees in the panel sample and the dropouts with regard to demographic characteristics as well as the mean scores on the study variables. Analyses revealed no significant difference. We thus concluded that no serious selection problems owing to panel loss had occurred. The sample was 48.7% male (*N* = 199) and 51.3% female (*N* = 210), with a mean age of 36.14 (SD = 10.16, range = 19–60), and mean job tenure of 8.50 years (SD = 8.58). About half of the sample (50.6%, *N* = 207) was married. Mean years of formal education was 15.99 (SD = 2.08). About a quarter of the respondents (24.2%) were managers at various levels. More people worked in manufacturing (20.8%), the service industry (11.5%), and culture and education (17.1%), than other occupations (e.g. civil service, bio-medical industry).

It is worth noting why we included single respondents in the sample. We believe that role experiences should not be exclusively those of care providers, that is, spouses or parents; the experiences of living in extended families with parents and other family members can interfere or enhance the quality of work life, and vice versa. This is especially salient for Chinese employees, as most young adults live with parents before marriage in Taiwan. Indeed, recent Taiwanese studies have found that the experiences of work–family conflict (Chang & Lu, 2009) and enrichment (Lu, 2011) did not vary between married and single Chinese workers.

Measures

The survey was administered in Chinese, and all the Chinese-version scales have been used in previous studies with satisfactory reliability and validity. These references will be given along with the original English version when every scale is introduced below. In this paper, all scales used five-point rating scales, and higher scores represented higher levels of the designated constructs.

Work and family demands. Quantitative workload was used to indicate work demands. Five statements from the Quantitative Workload Inventory (QWI, Spector & Jex, 1998) were listed describing quantitative aspects of work demands (e.g. 'How often is there a great deal to be

done?'). The Chinese version of QWI was used in Lu and Kao's study (2013) with good psychometric property. The internal consistency of the QWI was 0.82 in the present sample.

Family conflict was used to indicate family demands. The Family Conflict Scale (FCS, Lu & Kao, 2013) measures the extent of conflict caused by disagreement in major aspects of Chinese family life (e.g. 'How often is there a disagreement regarding caring for older parents in your family?'). The four items we used pertained to filial piety, household chores, communication/expression and friends/social life. Previous research in Taiwan has demonstrated that both married and non-married people could relate to these aspects of family life, but they may use different reference points to draw on their own 'family' experiences (Chang & Lu, 2009). This scale was originally developed in Chinese. The internal consistency of the FCS was 0.84 in the present sample.

Work and family resources. Supervisory support was assessed according to a three-item scale developed by Clark (2001), tapping perceived understanding and psycho-emotional support provided by direct supervisors regarding workers' family role obligations (e.g. 'My supervisor listens when I talk about my family'). The Chinese version of the supervisory support scale was used in Chang and Lu's study (2011) with good psychometric properties. Family support, in which four statements (e.g. 'Sympathetic understanding and concern') were listed describing informational, emotional, feedback and practical support received from family members (O'Driscoll, Brough & Kalliath, 2004). The Chinese version of the family support scale was recently used in Lu's study (2011) with acceptable validity. The internal consistency of the supervisory support scale was 0.90 and that of the family support scale was 0.87 in the present sample.

WFC and FWC. The Work–Family Conflict Scale (WFCS, Netemeyer, Boles & McMurrian, 1996) was used to assess WFC and FWC separately. Sample items included: 'The amount of time my job takes up makes it difficult to fulfil family responsibilities' (WFC) and 'I have to put off doing things at work because of demands on my time at home' (FWC). The Chinese version of WFCS was recently used in Lu and Kao's study (2013) with acceptable validity. The internal consistency of the WFC scale was 0.94 and that of the FWC scale was 0.91 in the present sample.

WFE and FEW. The Work–Family Enrichment Scale (Carlson, Kacmar, Wayne & Grzywacz, 2006) was used to assess WFE and FWE respectively. Sample items included: 'My involvement in my work provides me with a sense of accomplishment and this helps me be a better family member' (WFE) and 'My involvement in my family helps

me expand my knowledge of new things and this helps me be a better worker' (FWE). The Chinese version of WFES was recently used in Lu's study (2011) with acceptable validity. The internal consistency of the WFE scale was 0.86 and that of the FWE scale was 0.81 in the present sample.

Work and family satisfaction. Three items from the Michigan Organizational Assessment Questionnaire (Cammann, Fichman, Jenkins & Klesh, 1979) were used to assess job satisfaction (e.g. 'In general, I like working here'). The Family Satisfaction Scale (Edwards & Rothbard, 1999) was used to assess family satisfaction (e.g.,'My family life is very enjoyable'). The Chinese versions of these two scales were used for the Chinese sample with acceptable validity (Lu & Kao, 2013). The internal consistency of the job satisfaction scale was 0.80 and that of the family satisfaction scale was 0.80 in the present sample.

In addition, information on sex (coded *male = 0*, *female = 1*), age, marital status (coded *married = 1*, *unmarried = 0*), education years, job tenure and job position (coded *managers = 1*, *employees = 0*) were recorded. These were intended as control variables.

Results

Descriptive statistics

Table 1 displays means, standard deviations, coefficient alphas and correlations among all the variables. None of the demographic variables, except marital status, was systematically related to our research variables. However, the correlation pattern was similar for married and single respondents. As a precaution, we also checked that the results were generally the same when only married respondents were used for model testing, with a few non-significant paths probably due to the smaller sample size (see below for model specification). Thus to facilitate model estimation, the demographics were excluded from all further analyses.

Model testing

As suggested by Anderson and Gerbing (1988), a two-step approach to SEM analysis was employed in the current study. Measurement models were first tested to examine the distinctiveness of the measures, then the nested structural model test was employed to test the research hypotheses. We employed confirmatory factor analysis to compare separate measurement models. Specifically, we compared the hypothesized 10-factor model (measurement model, workload, supervisory support, family conflict, family support, WFC, FWC, WFE, FWE, job satisfaction and family satisfaction) with four alternative models: the

Table 1 Means, standard deviations (SD) and correlations for the research variables (N = 409)

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Gender	–	–	–															
2. Age	36.14	10.16	0.03	–														
3. Marital status	–	–	-0.02	0.68***	–													
4. Years of education	15.99	2.08	-0.10	-0.13*	-0.02	–												
5. Job tenure	8.50	8.58	0.07	0.77***	0.52***	-0.23**	–											
6. Job position	–	–	-0.09	0.25***	0.21***	0.07	0.14*	–										
7. Workload	18.17	2.92	0.09	0.07	0.13	0.19***	0.05	0.11*	(0.82)									
8. Supervisory support	8.79	2.55	-0.02	0.12	0.14*	-0.13	0.18**	0.09	-0.04	(0.87)								
9. Family conflict	10.02	3.12	-0.06	-0.09	-0.15*	0.07	-0.13	0.01	0.12	-0.08	(0.83)							
10. Family support	16.24	4.64	0.13	0.08	0.15*	0.16**	0.03	-0.04	0.00	0.16**	-0.26***	(0.90)						
11. WFC	12.56	3.57	-0.04	0.04	0.10	0.11*	0.06	0.10	0.36***	-0.08	0.21***	-0.07	(0.93)					
12. FWC	10.70	2.90	-0.11	0.10	0.15*	0.04	0.13	0.08	0.13	0.00	0.20***	-0.09	0.65***	(0.91)				
13. WFE	9.41	2.01	0.01	0.12	0.12	0.00	0.12	0.09	0.03	0.32***	-0.16**	0.22***	-0.10	-0.05	(0.86)			
14. FWE	10.15	1.84	0.04	0.11	0.08	-0.02	0.10	0.12*	0.04	0.20***	-0.23***	0.31***	-0.03	-0.15**	0.66***	(0.81)		
15. Job satisfaction	9.67	1.10	0.05	0.05	0.13	0.11*	0.05	0.06	0.07	0.11	-0.15*	0.19***	0.00	-0.01	0.09	0.04	(0.73)	
16. Family satisfaction	12.13	1.95	0.07	0.05	0.09	0.05	0.14*	-0.03	-0.08	0.13**	-0.35***	0.36***	-0.14**	-0.17***	0.24***	0.34***	0.31***	(0.96)

Notes: Sex: 0 = male, 1 = female; Marital status: 1 = married, 0 = unmarried; Job position: 1 = manager, 0 = non-manager; FWC, family-to-work conflict; FWE, family-to-work enrichment; WFC, work-to-family conflict; WFE, work-to-family enrichment. Cronbach's alpha reliabilities are in parentheses on the diagonal. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

eight-factor model (combining WFC and FWC, WFE and FWE), the seven-factor model (combining WFC, FWC, WFE and FWE), the six-factor model (combining work-load, supervisory support, family conflict, and family support, job satisfaction and family satisfaction), and the one-factor model. Table 2 displays fit indices for each of the nested models listed in order, with chi-squared change statistics. The results clearly suggest that the measurement model (10-factor) fits the data best.

The hypothesized Research Model (Model A, the structural model shown in Fig. 1) was compared to a Base Model (Model B) in which all path coefficients to and from work–family conflict and enrichment were constrained to zero. Some SEM experts recommend against the use of the GFI, AGFI, χ^2/df ratio and NFI, as these fit indices can be substantially affected by factors extrinsic to model misspecification (e.g. sample size and number of indicators per factor) and do not generalize well across samples; instead they advocate the use of the CFI and RMSEA (e.g. Anderson & Gerbing, 1988). We thus followed these recommendations.

We found that Model A ($\chi^2 = 1830.45$, $df = 686$, $p < 0.001$, CFI = 0.89, RMSEA = 0.07) fitted the data significantly better than Model B ($\chi^2 = 2017.19$, $df = 697$, $p < 0.001$, CFI = 0.87, RMSEA = 0.07; Δ $df = 11$, Δ $\chi^2 = 186.74$, $p < 0.001$). However, the results of Model A are less than desirable (CFI < 0.90, RMSEA > 0.06). We thus modified the research model by allowing the error terms of WFC and FWC, WFE and FWE to correlate (shown in Fig. 1). This is because theoretically WFC and FWC may be indicators of a higher-order factor, namely work–family conflict; similarly, WFE and FWE may be indicators of a higher-order factor, namely work–family enrichment (see Table 1). The modified research model (A1) produced a significantly better fit to the data ($\chi^2 = 1457.79$, $df = 684$, $p < 0.001$, CFI = 0.93, RMSEA = 0.05) compared to Model A (Δ $df = 2$, Δ $\chi^2 = 372.66$, $p < 0.001$) and Model B (Δ $df = 13$, Δ $\chi^2 = 559.40$, $p < 0.001$). The value of CFI for Model A1 was above 0.90 and the value of RMSEA was below 0.06. Therefore, we concluded that Model A1 provided the most parsimonious fit to the data.

The paths and parameter estimates for Model A1 are shown in Figure 1. Among relations between antecedents and WFI, all estimated paths were significant except for paths between workload and WFE, and family support and FWC. Among relations between WFI and role satisfaction, all estimated paths were significant except for paths between WFC and family satisfaction, FWC and family satisfaction, and WFE and job satisfaction. Taken together, Hypotheses 1a, 1d, 2a and 2d were supported, but Hypotheses 1b, 1c, 2b and 2c were not supported. In addition, the cross-domain paths between FWC and job satisfaction, WFE and family satisfaction, and FWE and job satisfaction

Table 2 Model fit summary and measure models comparison (*N* = 409)

Model	χ^2	*df*	χ^2/df	*p*	GFI	CFI	NFI	RMSEA
10-factor model (M1)	1224.69	657	1.86	<0.000	0.87	0.95	0.89	0.05
Eight-factor model (M2)	2102.84	674	3.12	<0.000	0.75	0.86	0.81	0.07
Seven-factor model (M3)	3288.95	681	4.83	<0.000	0.63	0.75	0.71	0.10
Six-factor model (M4)	3675.90	687	5.35	<0.000	0.64	0.71	0.67	0.10
One-factor model (M5)	8160.89	702	11.63	<0.000	0.39	0.28	0.27	0.16

Notes: χ^2, chi-square; *df,* degree of freedom; GFI, goodness of fit index; CFI, comparative fit index; NFI, normed fit index; RMSEA, root mean square error of approximation. The 10-factor model (M1) assumes that workload, supervisory support, family conflict, family support, WFC, FWC, WFE, FWE, job satisfaction and family satisfaction are 10 distinct factors. The eight-factor model (M2) is the same as M1 except that WFC and FWC were combined, and WFE and FWE were also combined. The seven-factor model (M3) is the same as M1 except that WFC, FWC, WFE and FWE were combined. The six-factor model (M4) is the same as M1 except that workload, supervisory support, family conflict and family support were combined, and job satisfaction and family satisfaction were also combined. The one-factor model (M5) assumes that all items for workload, supervisory support, family conflict, family support, WFC, FWC, WFE, FWE, job satisfaction and family satisfaction loaded on the same factor.

were also significant. Thus, Hypotheses 3b, 3c and 3d were supported, but Hypothesis 3a was not supported.

Discussion

One aim of the present three-wave study was to empirically test an integrated model of work–family interface, highlighting the mediating roles of all four aspects of the WFI (i.e. WFC, FWC, WFE, FWE). Existing studies have assessed effects of antecedents on WFI (e.g. Aryee *et al.*, 2005; Proost *et al.*, 2010), or those of WFI on outcomes (e.g. McNall *et al.*, 2010). To the best of our knowledge, the present study is the first to link the antecedents, outcomes and all four WFI mediators in a comprehensive structural model. Extending the previous studies mentioned above, we systematically included demands, resources and role satisfaction in both work and family domains. We also examined processes involving the dual direction and dual nature of the WFI. Another feature of the present study is the use of Chinese employees for validating and extending Western-based theories and inferences on work and family issues. Instead of using a convenient but restricted sample from one or two organizations, we recruited a large sample from diverse organizational and industry backgrounds, thus enhancing the generalizability of our findings (c.f. Lu *et al.*, 2009a). Last but not least, we enhanced the methodological strength of the work–family research through the inclusion of a longitudinal dataset, which is uncommon in the literature. Longitudinal data not only provide a stronger basis for causality inferences than cross-sectional data, but they also mitigate the risk of potential common method biases (Podsakoff *et al.*, 2003).

The most important findings that emerged from our study are as follows: (1) the direction and nature of influence were two underlying dimensions of the WFI; (2) demands

were mostly related to conflict, while resources were mostly related to enrichment; and (3) both conflict and enrichment were related to role satisfaction, regardless of the nature of the work or family origin.

Regarding the first finding, our confirmatory factor analysis supported the validity of the fourfold taxonomy of work and family interface in the Chinese context. Specifically, combining WFC and FWC into one factor, WFE and FWE into one factor, or all four aspects into one factor, resulted in a worse fit than examining the four as distinct constructs. Further, the four aspects of the WFI acted as separate mediators linking different antecedents with different outcomes in the structural model (Fig. 1). Our results corroborate Western findings that WFC, FWC, WFE and FWE are four discernable constructs of the WFI and each deserves research attention (Frone, 2003; Grzywacz & Mark, 2000). It seems, therefore, that the dynamism of balancing work and family is essentially the same for employees working and living in diverse cultural and economic systems, lending support for the universality of the current work and family theories.

Regarding the second finding, we found empirical support for half of the hypothesized mediating paths (Hypotheses 1 and 2). If we focused on the segment of antecedents → WFI, six out of eight paths were significant (Fig. 1), generally corroborating the 'domain-specific' patterns of antecedents and WFI established by meta-analyses studies in the West (Allen *et al.*, 2000; Michel *et al.*, 2011). Our results thus lend support to the demand–resource dual approach advocated by the COR and JD–R theories, in a Chinese context. Our findings also corroborate the results of some existing research. For example, Proost *et al.* (2010) found that job demands and job control (a job resource) were positively negatively related to work-family conflict, respectively. In addition, we noticed that demands more than resources seemed to be associated with work–family

conflict (2 *vs* 1), whereas resources more than demands seemed to be associated with work–family enrichment (2 *vs* 1). Since this is the first test of an integrated model of WFI, we will need to conduct more studies to conclude whether demands are indeed more salient for conflict and resources are more salient for enrichment.

In contrast to the 'domain-specific' relations regarding the antecedents, we hypothesized additional cross-domain effects of WFI on role satisfaction (Hypothesis 3). We found support for five out of eight hypothesized paths linking up WFI and outcomes (Fig. 1). That is, work-originated WFI is associated with both work and family outcomes while family-originated WFI is also associated with both work and family outcomes. Our results provide some support for the 'cross-domain' patterns of WFC and outcomes established by meta-analysis in the West (Ford *et al.*, 2007). Our findings also corroborate the results of some recent research. For example, Boyar and Mosley (2007) found in the USA that both work interfering with family and family interfering with work negatively predicted work and family satisfaction. Similar cross-domain effects have been reported with non-Western samples too. For example, Chang and Lu (2009) reported that for Chinese employees in Taiwan, WFC was negatively related to family satisfaction, while FWC was negatively related to job satisfaction. Li *et al.* (2013) also reported cross-domain effects of FWC on work outcomes for Mainland Chinese workers. These existing findings and the results of the present study seem to suggest that role satisfaction is jointly enhanced by work–family enrichment and depressed by work–family conflict, regardless of the initiating domain.

Finally our findings advance research of the JD–R model by adding family demands and family support in parallel to work demands and work resources. Providing evidence linking the JD–R model, the work–family conflict model, and the work–family enrichment model, we have shown that the work–family theories developed in a Western context are largely generalizable to Chinese workers. However, the fact that some of the hypothesized mediational paths (e.g. H1b, H1c) and cross-domain paths (e.g. H3a) were *not* supported in the current dataset, should remind us that the quest for understanding the complex processes and mechanisms underlying work–family experiences is far from over. A comprehensive model depicting exactly what antecedents go through which mediator to impact on what outcomes can only be mapped out with more systematic research. Also, it may be fruitful to work with a partial mediation model that encompasses both direct and indirect effects as shown in this study.

Limitations

Some limitations of this study need to be acknowledged. First, we used self-reports to collect data, which may increase the possibility of contamination of the reported relationships through common method variance (CMV). However, the results of confirmatory factor analyses show that all of our study constructs could be empirically distinguished, and the one-factor CMV model fitted the data poorly (Table 2). In addition, our three-wave design separating assessments of antecedents, WFI and outcomes in time lowers the likelihood of finding correlations due to consistency in responses. Nonetheless, it would be beneficial to include additional sources of data such as co-workers, supervisors and family members.

Another limitation of the present study is that we only surveyed Chinese workers in Taiwan; thus caution needs to be exercised in generalizing our conclusions to other Chinese societies, such as Mainland China, which has its own political, economic and social characteristics. Nevertheless, a recent comparative study found that the experiences of WFC and FWC were not different between Taiwanese and Mainland Chinese employees (Kao, Lu & Lu, 2008).

Finally, the correlation pattern (Table 1) shows high correlations between WFC and FWC (0.65) and between WFE and FWE (0.66), implying that they may be measuring similar constructs. In fact, the high correlation between WFC and FWC is a consistent finding in the work–family research in the West (cf. Byron, 2005; Michel *et al.*, 2011) and in Chinese societies (e.g. Lu *et al.*, 2008). A similar pattern has been observed for the relationship between WFE and FWE (e.g. Carlson, Grzywacz & Zivnuska, 2009; Lu, 2011). Nonetheless, through comparison of nested models, researchers have argued that the four-factor model (WFC, FWC, WFE, FWE) fits the data better than the one-factor or two-factor models (distinguishing only conflict and enrichment, or distinguishing only work-to-family and family-to-work) (Carlson *et al.*, 2009; Lu, 2013). It thus seems that the four aspects of WFI can be discerned both theoretically and empirically, though more rigorous measurements are still desired.

Practical implications

As work and family demands are related to work–family conflict, organizations should attempt to reduce employees' workload and provide counselling to help them resolve family discord. Such actions will alleviate work and family interferences in both directions (e.g. workload → WFC; family conflict → FWC). Furthermore, our findings should remind managers of the importance of employees' family lives because family life is an important source of both demand and support, which through the work–family interface, contributes to employees' work satisfaction (e.g. family conflict → FWC → job satisfaction; family support → FWE → job satisfaction).

For employees striving to balance work and family roles, getting support from direct supervisors may be crucial, and gaining support from family members may be equally important. Family support can help transfer gains in the family realm to work, which in turn fosters more positive experiences of both work and family life (e.g. family support $\rightarrow$ FWE $\rightarrow$ job satisfaction/family satisfaction). Family resources have largely been overlooked in the extant work and family research and practice, which is an opportunity for future work. The challenge now for organizations and individuals is to break the destructive flow of demands $\rightarrow$ conflict $\rightarrow$ dissatisfaction, and to nurture the constructive flow of resources $\rightarrow$ enrichment $\rightarrow$ satisfaction. This way, work and family can be allies.

Acknowledgement

References

Allen, T. D., Herst, D. E., Bruck, C. S. & Sutton, M. (2000). Consequences associated with work-to-family conflict: A review and agenda for future research. *Journal of Occupational Health Psychology, 5*, 278–308.

Anderson, J. C. & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*, 411–423.

Aryee, S., Fields, D. & Luk, V. (1999). A cross-cultural test of a model of the work–family interface. *Journal of Management, 25*, 491–511.

Aryee, S., Srinivas, E. S. & Tan, H. H. (2005). Rhythms of life: Antecedents and outcomes of work–family balance in employed parents. *Journal of Applied Psychology, 90*, 132–146.

Boyar, S. L. & Mosley, D. C. (2007). The relationship between core self-evaluations and work and family satisfaction: The mediating role of work–family conflict and facilitation. *Journal of Vocational Behavior, 71*, 265–281.

Byron, K. (2005). A meta-analytic review of work–family conflict and its antecedents. *Journal of Vocational Behavior, 67*, 169–198.

Cammann, C., Fichman, M., Jenkins, D. & Klesh, J. (1979). *The Michigan Organizational Assessment Questionnaire*. Ann Arbor, MI: University of Michigan.

Carlson, D. S., Grzywacz, J. G. & Zivnuska, S. (2009). Is work–family balance more than conflict and enrichment? *Human Relations, 62*, 1459–1486.

Carlson, D. S., Kacmar, K. M., Wayne, J. H. & Grzywacz, J. G. (2006). Measuring the positive side of the work–family interface: Development and validation of a work–family enrichment scale. *Journal of Vocational Behavior, 68*, 131–164.

Carlson, D. S., Kacmar, K. M. & Williams, L. J. (2000). Construction and initial validation of a multidimensional measure of work–family conflict. *Journal of Vocational Behavior, 56*, 249–276.

Chang, T. T. & Lu, L. (2009). The effects of resource loss and resource gain on work–family conflict: The perspective of resource conservation. *NTU Management Review, 20*, 69–98.

Chang, Y. Y. & Lu, L. (2011). Sex differences in the relationships between work and family demands, resources, and work–family conflict. *International Journal of Commerce and Strategy, 3*, 25–38.

Clark, S. C. (2001). Work cultures and work/family balance. *Journal of Vocational Behavior, 58*, 348–365.

Cohen, S. & Syme, S. L., eds. (1985). *Social Support and Health*. Orlando, FL: Academic Press.

Cowlishaw, S., Birch, A., McLennan, J. & Hayes, P. (2014). Antecedents and outcomes of volunteer work–family conflict and facilitation in Australia. *Applied Psychology: An International Review, 63*, 168–189.

Edwards, J. R. & Rothbard, N. P. (1999). Work and family stress and well-being: An examination of person–environment fit in the work and family domains. *Organizational Behavior and Human Decision Processes, 77*, 85–129.

Ford, M. T., Heinen, B. A. & Langkamer, K. L. (2007). Work and family satisfaction and conflict: A meta-analysis of cross-domain relations. *Journal of Applied Psychology, 92*, 57–80.

Frone, M. R. (2003). Work-family balance. In J. C. Quick & L. E. Tetrick (Eds.), *Handbook of occupational health psychology* (pp. 143–162). Washington, DC: American Psychological Association.

Frone, M. R., Yardley, J. K. & Markel, K. S. (1997). Developing and testing an integrative model of the work–family interface. *Journal of Vocational Behavior, 50*, 145–167.

Grandey, A. A. & Cropanzano, R. (1999). The conservation of resources model applied to work–family conflict and strain. *Journal of Vocational Behavior, 54*, 350–370.

Greenhaus, J. H. & Powell, G. N. (2006). When work and family are allies: A theory of work–family enrichment. *The Academy of Management Review, 31*, 72–92.

Grzywacz, J. G. & Mark, N. F. (2000). Reconceptualizing the work–family interface: An ecological perspective on the correlates of positive and negative spillover between work and family. *Journal of Occupational Health Psychology, 5*, 111–126.

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *The American Psychologist, 44*, 513–524.

Innstrand, S. T., Langballe, E. M., Espnes, G. A., Falkum, E. & Gjerl, O. (2008). Positive and negative work–family interaction and burnout: A longitudinal study of reciprocal relations. *Work & Stress, 22*, 1–15.

Jansen, N. W. H., Kant, I., Kristensen, T. S. & Nijhuis, F. J. N. (2003). Antecedents and consequences of work–family conflict: A prospective cohort study. *Journal of Occupational and Environmental Medicine, 45*, 479–491.

Kao, S. F. & Lu, L. (2006). The relationship of conjugal congruence in psychological traditionality/modernity to marital adjustment. *Indigenous Psychological Research in Chinese Societies, 25*, 47–100.

Kao, S. F., Lu, L. & Lu, C. Q. (2008). Demands and resources in work/family domains, work/family conflict and their consequences: A regional comparison between Taiwanese and Mainland Chinese. *Chinese Business Review-USA, 8*, 39–47.

Kossek, E. E., Pichler, S., Bodner, T. & Hammer, L. B. (2011). Workplace social support and work–family conflict: A

meta-analysis clarifying the influence of general and work–family-specific supervisor and organizational support. *Personnel Psychology, 64,* 289–313.

Li, C., Lu, J. & Zhang, Y. (2013). Cross-domain effects of work–family conflict on organizational commitment and performance. *Social Behavior and Personality, 41,* 1641–1654.

Lu, J. F., Siu, O. L., Spector, P. E. & Shi, K. (2009a). Antecedents and outcomes of a fourfold taxonomy of work–family balance in Chinese employed parents. *Journal of Occupational Health Psychology, 14,* 182–192.

Lu, L. (2006). The transition to parenthood: Stress, resources and gender differences in a Chinese society. *Journal of Community Psychology, 34,* 471–488.

Lu, L. (2011). A Chinese longitudinal study on work/family enrichment. *Career Development International, 16,* 385–400.

Lu, L. (2013). The dynamism of balancing work and family in a developing society: Evidence from Taiwan. *Research in Applied Psychology, 59,* 49–79.

Lu, L., Chang, T. T. & Chang, Y. Y. (2012). The meanings of work and family and their roles in coping with work and family conflict: Practicing the Chinese bicultural self. *Indigenous Psychological Research in Chinese Societies, 37,* 141–189.

Lu, L., Hwang, M. T. & Kao, S. F. (2005). The bi-directional conflict of work and family: Antecedents, consequences and moderators. *Research in Applied Psychology, 27,* 133–166.

Lu, L. & Kao, S. F. (2013). The reciprocal relations of pressure, work/family interference, and role satisfaction: Evidence from a longitudinal study in Taiwan. *Human Resource Management, 52,* 353–373.

Lu, L., Kao, S. F., Chang, T. T., Wu, H. P. & Cooper, C. L. (2008). Work/family demands, work flexibility, work/family conflict, and their consequences at work: A national probability sample in Taiwan. *International Journal of Stress Management, 15,* 1–21.

Lu, L., Kao, S. F., Cooper, C., Allen, T. D., Lapierre, L. M., O'Driscoll, M., *et al.* (2009b). Work resources, work-to-family conflict, and its consequences: A Taiwanese–British cross-cultural comparison. *International Journal of Stress Management, 16,* 25–44.

McNall, L. A., Nicklin, J. M. & Masuda, A. D. (2010). A meta-analytic review of the consequences associated with work–family enrichment. *Journal of Business and Psychology, 25,* 381–396.

Michel, J. S., Kotrba, L. M., Mitchelson, J. K., Clark, M. A. & Baltes, B. B. (2011). Antecedents of work–family conflict: A meta-analytic review. *Journal of Organizational Behavior, 32,* 689–725.

Netemeyer, R. G., Boles, J. S. & McMurrian, R. (1996). Development and validation of work–family conflict and family–work conflict scales. *Journal of Applied Psychology, 81,* 400–410.

Noor, N. M. (2003). Work- and family-related variables, work–family conflict and women's well-being: Some observations. *Community, Work & Family, 6,* 297–319.

O'Driscoll, M. P., Brough, P. & Kalliath, T. J. (2004). Work/family conflict, psychological well-being, satisfaction and social support: A longitudinal study in New Zealand. *Equal Opportunities International, 23,* 36–56.

Olson-Buchanan, J. B. & Boswell, W. R. (2006). Blurring boundaries: Correlates of integration and segmentation between work and nonwork. *Journal of Vocational Behavior, 68,* 432–445.

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y. & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88,* 879–903.

Proost, K., De Witte, H., De Witte, K. & Schreurs, B. (2010). Work–family conflict and facilitation: The combined influence of the job demand–control model and achievement striving. *European Journal of Work and Organizational Psychology, 19,* 615–628.

Siu, O. L., Lu, J. F., Brough, P., Lu, C., Bakker, A. B., Kalliath, T., *et al.* (2010). Role resources and work–family enrichment: The role of work engagement. *Journal of Vocational Behavior, 77,* 470–480.

Spector, P. E. & Jex, S. M. (1998). Development of four self-report measures of job stressors and strain: Interpersonal conflict at work scale, organizational constraints scale, quantitative workload inventory, and physical symptoms inventory. *Journal of Occupational Health Psychology, 3,* 356–367.

ten Brummelhuis, L. L. & Bakker, A. B. (2012). A resource perspective on the work–home interface: The work–home resources model. *American Psychologist, 67,* 545–556.

Wayne, J. H., Grzywacz, J. G., Carlson, D. S. & Kacmar, K. M. (2007). Work–family facilitation: A theoretical explanation and model of primary antecedents and consequences. *Human Resource Management Review, 17,* 63–76.

Witt, L. A. & Carlson, D. S. (2006). The work–family interface and job performance: Moderating effects of conscientiousness and perceived organizational support. *Journal of Occupational Health Psychology, 11,* 343–357.

Yang, N., Chen, C. C., Choi, J. & Zou, Y. (2000). Sources of work–family conflict: A Sino–U.S. comparison of the effects of work and family demands. *Academy of Management Journal, 43,* 113–123.