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Cross-Cultural Measurement Invariance Of Work/Family Conflict Scales Across English-Speaking Samples

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Cross-Cultural Measurement Invariance Of Work/Family Conflict Scales Across English-Speaking Samples

by

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Dedication

This work is dedicated to all of those who had faith in me when I did not have faith in myself. It is especially dedicated to the loving memory of my sister, who departed this world far too soon for me to share my joy with on a mortal basis. Elissa, I know you see me now, watch me live and thrive, and I know you will always be with me.

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Cross-Cultural Measurement Invariance of Work/Family Conflict Scales Across English-Speaking Samples

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ABSTRACT

The factor structure of the work/family conflict scale developed by Carlson, Kacmar, & Williams (2000) was analyzed for measurement invariance between a US and an Australian/New Zealand (ANZ) sample using a multisample confirmatory factor analysis procedure. Results indicated that factor pattern fit between the female samples on the common model was good-to-mediocre, and factor pattern fit between the male samples and the common model was mediocre-to-poor. Both samples exhibited significant changes in chi square when testing for the more restrictive factor loading equivalence. Partial measurement invariance revealed a better fit between the male samples when three of the items were unconstrained, and when eight items were unconstrained between the female samples. Finally, males and females in the ANZ sample exhibited factor pattern invariance, but required two items to be unconstrained before factor loading invariance was achieved. Mean differences on the six scales revealed higher levels of time-based work interference with family and family interference with work for males than for females in the ANZ sample.

Cross-Cultural Measurement Invariance of Work/Family Conflict Scales across English-Speaking Samples

Over the past 20 years a gradual shift in the makeup of the labor pool has resulted in a tremendous influx of women into the US workforce (Howard, 1995). Yet women have not only entered the workforce but have also rapidly moved into managerial and professional positions that have ever increasing role requirements, pulling from time and effort previously spent dealing with home and family matters. Because this shift has not been accompanied by any noticeable increase in government or private assistance in childcare, healthcare, or eldercare, beyond the Family and Medical Leave Act of 1993, the result has been a situation in which both men and women are left with mounting responsibilities within their work and family roles. Not surprisingly, these mounting responsibilities have led to a greater potential for role conflict.

In their seminal work on organizational stress, Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964) defined role conflict as the "simultaneous occurrence of two (or more) sets of pressures such that compliance with one would make more difficult compliance with the other" (in Greenhaus & Beutell, 1985, p. 77). These sets of pressures can originate both within and between roles, thereby setting up the possibility of multiple conflict scenarios from multiple sources. For instance, for the domains of work and family, role conflict may originate within the family itself (intrarole conflict, e.g. parent vs. spouse), within work itself (managerial obligation to the company vs. to subordinates), or between the domains (interrole conflict, e.g. work role vs. family role conflict). Yet the measurement of these forms of conflict has often been conducted with study-specific scales that were not developed using rigorous psychometric procedures. This is particularly true for work/family conflict, where, until recently, the lack of standardized measurement has presented both theoretical and practical problems for researchers. The purpose of this study was to validate the structure of a current work/family conflict scale across two English-speaking cultures, thereby furthering the standardization of work/family conflict measurement.

Work and Family

Research on the intersection between work and family roles has focused on the area of conflict, where role demands from each domain are considered to be mutually incompatible (Parasuraman & Greenhaus, 2002). This stems from a scarcity hypothesis, where an individual's resources (such as time) are fixed, and participating in multiple roles inevitably leads to conflict. Yet more recent research has investigated the idea that work and family roles may be mutually beneficial. This line of inquiry is better known as work/life balance, or work/life fit.

Work/life balance. Work/life balance, also known as work/life fit, has been defined as "satisfaction and good functioning at work and at home with a minimum of role conflict" (p. 349; Clark, 2001). This stems from role theory, which indicates that participation in multiple roles can enhance an individual's quality of life (Sieber, 1974; in Parasuraman & Greenhaus, 2002). Current research has found evidence that this type of role interaction does occur between the work and family domains. For instance, using daily repeated measures from diary entries, Doumos, Margolin, and John (2003) studied the spillover and crossover effects between health promoting behaviors and marital interaction. Their findings indicate that marital interactions affected both wives' and husbands' hours worked. The importance of work/life balance is also found in studies of telework. Specifically, when compared to office workers, Hill, Miller, and Colihan (1998) found that teleworking did not enhance the employee's perception of work/life balance. In fact, qualitative analysis seemed to indicate an equivocal reaction, where increased mobility was viewed as positive, but location in home was viewed as a breakdown in the boundary between the two domains.

Clark (2001) pointed out that much of the work/life balance literature has focused on individual facets of the construct, such as work outcomes, role outcomes, or role conflict and stress. She also argued that limiting study variables to conflict presupposes that balance is the absence of conflict, and instead recommends that research expand to include multiple aspects of the work/life balance construct when considering how it may be affected. In her own work, Clark has looked at the effects of workplace culture on five aspects of work/life balance: work satisfaction, home satisfaction, work functioning, home functioning, and role conflict. Her findings show the work culture dimension of operational flexibility (ability to alter one's schedule) was most often associated with work/family balance, specifically with work satisfaction and family well-being. In addition, supportive supervision was associated with increased employee citizenship. However, one interesting finding was that temporal flexibility was unassociated with any of the study's measures of work/life balance. Finally, none of the work culture measures were associated with home activity satisfaction or the amount of role conflict.

Overall, the emerging work/life balance literature indicates a construct that includes both work/family conflict and the extent to which spillover positively affects both the work and family domains. However, the exact nature of the construct has yet to be fully understood. Researchers continue to both qualitatively (Clark, 2001b; Voydanoff, 2002) and quantitatively (DeBord, Canu, & Kerpelman, 2000; Zimmerman, Haddock, Current, & Ziemba, 2003) search for a comprehensive theory that may or may not exist. However, it is not by accident that many cues in this line of inquiry have been taken from the extensive work/family conflict literature. As a result, this study focuses on the work/family conflict aspect of work and family research.

Work/family conflict. Greenhaus and Beutell (1985) defined work/family conflict as "a form of interrole conflict in which the role pressures from the work and family domains are mutually incompatible in some respect" (p. 77). According to their model, work/family conflict is both bi-directional and multi-dimensional. The bi-directionality comes from the concept that work can interfere with family, and that family can interfere with work. In addition, the multi-dimensional nature of work/family conflict occurs in each direction. Specifically, both family interference with work and work interference with family are composed of three dimensions: time-, strain-, and behavior-based conflict. Time-based work/family conflict arises when the time demands from one role make it physically impossible to meet the requirements of another role, and when preoccupation with one role's requirements occurs, even when physically involved in meeting the requirements of another role (Greenhaus & Beutell, 1985). Work-related sources of conflict include hours worked and commuted per week, amount and frequency of overtime, irregularity of shift work, and inflexibility in the work schedule. Family-related sources include number of children, younger children, and family size (including older relatives).

Next, strain-based work/family conflict is derived from role-produced strain, when strain from one role interferes with fulfilling responsibilities in another role. Work-related sources of strain-based conflict include work-role ambiguity, intrarole work-conflict, low levels of leader support, and high physical and psychological demands. Family-related sources include lack of spousal support, husband-wife dissimilarity in career orientation, husband-wife disagreement about family roles, and husband-wife dissimilarity in attitudes towards a wife's employment status.

Lastly, behavior-based work/family conflict occurs when behavior in one role may be incompatible with expectations for behavior in another role. Work-related antecedents include work ambiguity and work involvement, and family related antecedents include family-role ambiguity, intra-family role conflict, social support, and family role involvement (Carlson, Kacmar, & Williams, 2000).

In recent years, research on conflict between the different role domains of work and family has dramatically increased (Burke & Greenglass, 2001; Fu & Shaffer, 2001). Organizational outcomes such as job satisfaction, commitment, performance, turnover intentions, etc. have been extensively investigated. For instance, higher levels of work/family conflict are related to lower levels of job satisfaction, organizational commitment, job performance, higher levels of turnover intention, and burnout (Allen, Herst, Bruck, & Sutton, 2000; Aryee, 1992; Bacharach, Bamberger, & Conley, 1991; Kossek & Ozeki, 1998). Effects are not limited to the realm of work, as higher levels of work/family conflict are related to lower levels of life satisfaction, marital satisfaction, family satisfaction, and increased family distress (Allen et al. 2000; Frone, Yardley, & Markel, 1997; Kinnunen & Mauno, 1998). In addition, work/family conflict has been indirectly linked to child acting out and problems at school. Testing a model of father's work attitudes and interrole status, Stewart and Barling (1996) found that higher levels of work/family conflict are positively related to negative parenting practices (punishing behaviors and rejecting behaviors). These negative parenting practices were then found to directly relate to child behavior, specifically acting out and school competence. Work/family conflict is also related to overall physical health, blood pressure, and health complaints (Adams & Jex, 1999; Frone, Russell, & Barnes, 1996; Thomas & Ganster, 1995), not to mention general psychological strain, substance abuse, and depression (Beatty, 1996; Burke, 1988; Frone, Russell, & Cooper, 1993). In fact, Frone (2000) found that the probability of having an anxiety, mood, or substance abuse disorder was directly related to levels of both work interference with family and family interference with work. In addition, Frone found a Gender by work/family conflict interaction, where men with high levels of family interference with work had a higher probability of having an anxiety disorder than did women.

Researchers have also discovered a multitude of variables that directly and indirectly affect the previously mentioned outcomes as antecedents to work/family conflict. These include supervisor support/work climate (Allen, 2001; Thompson, Beauvais, & Lyness, 1999; Carlson & Perrewe, 1999; Kirchmeyer & Cohen, 1999; Carlson & Perrewe, 1999), dispositional variables such as Type A behavior and Negative Affectivity (Burke, 1988; Carlson, 1999; Stoeva, Chui, & Greenhaus, 2002), role conflict/overload (Frone, Yardley, & Markel, 1997; Carlson, 1999; Shamir, 1983;

Wallace, 1999;), and coping behaviors (Matsui, Ohsawa, & Onglatco, 1995; Kirchmeyer & Cohen, 1999; Stoeva, Chui, & Greenhaus, 2002). As can be seen, the impact of work/family conflict on an individual's life is vast. Clearly work/family conflict is deserving of the attention it has garnered.

In addition to antecedents, consequences, and covariates, the construct's influence has also been found to be similar across cultures. For example, using a Hong Kong sample, Aryee, Fields, and Luk (1999) replicated an explanatory model of work/family conflict previously validated by Frone, Russell, and Cooper (1992) on a US sample. Aryee et al. concluded that the reciprocal nature and asymmetrical boundary permeability of the two forms of work/family conflict were not culture specific. In another study, Matsui, Ohsawa, and Onglatco (1995) found that levels of work/family conflict were related to parental demands among Japanese wives, results that were also found in Aryee, Luk, Leung, and Lo's (1999) Hong Kong sample, and Frone, Yardley, and Markel's (1997) study using a US sample. Finally, Carlson (1999) found that negative affectivity was related to all three types of work/family conflict (time, strain, & behavior-based). Using a Hong Kong sample, Stoeva, Chui, and Greenhaus (2002) found, among other things, similar results as Carlson did with her US sample. As a result of these studies, it does appear that work/family conflict is not just a western phenomenon, but also an important stressor in the lives of people the world over.

Measuring Work/Family Conflict

Despite evidence of the widespread importance of work/family conflict, the research to date has some gaps and oversights. As previously stated, a lack of standardized measurement exists, which has resulted in theoretical (i.e., construct clarification) and practical (i.e., comparing results from multiple studies) problems. Even after the delineation of the different dimensions of work/family conflict by Greenhaus and Beutell (1985), nearly all of the literature has been built on measures that do not adequately sample the construct. For instance, Frone, Yardley, and Markel's (1997) model determined that each direction of work/family conflict was related to the other indirectly by way of domain overload and domain distress, as well as being related to performance within the opposite domain. Yet Frone et al.'s measure of work/family conflict consisted of two items for each direction of the construct, making generalizability of the results difficult. In fact, the vast majority of measures have either been self-developed (Frone, Russell, & Cooper, 1993 & 1994; Matsui, Ohsawa, & Onglatco, 1995; O'Driscoll, Ilgen, & Hildreth, 1992; Rice, Frone, & McFarlin, 1992), developed without using psychometrically rigorous procedures (Pleck, Stains, & Lang, 1980; Small & Riley, 1990), or failed to distinguish between either the bi-directionality of the construct (Cooke & Rousseau, 1984; Greenglass, Pantony, & Burke, 1988; Stephens & Sommer, 1996) or its multi-dimensional nature (Netemeyer, Boles, & McMurrian, 1996). To date, only one measure (Carlson, Kacmar, & Williams, 2000) has both addressed the need for rigorous test development and the multi-directional/dimensional nature of work/family conflict.

Table 1 presents a list of the primary measurement tools used in generalized work/family conflict research to date, starting with three initial studies conducted by Holahan and Gilbert (1979), Burke, Weir, and DuWors (1979), and Pleck, Stains, and Lang (1980). These early attempts at measuring the construct were loosely based on role theory, but generally were not written with an understanding of the bi-directional or multi-dimensional nature of work/family conflict. The scales used in these studies had additional difficulties, such as having not been developed using rigorous psychometric practices (Holahan & Gilbert), containing items that were not designed to be combined to measure a distinct construct (Pleck et al.), or mixing multiple constructs (such as satisfaction and role overload) with interrole conflict (Burke et al.). However, the research formed the foundation from which future measures of work/family conflict could be built. For instance, using the 1977 Quality of Employment Survey (Quinn & Staines, 1978), Pleck et al. determined that there were seven different types of work-family conflict. The authors further identified excessive work time, schedule conflicts, and fatigue/irritability as the three most prevalent. This information provided a basic understanding of the types of generalized conflict that can occur between work and family roles. Yet again, due to the lack of theory at the time, the scale was not constructed to measure the severity of occurrence for each of the types of conflict the author's identified. Issues such as this would need to be addressed before a measure could be considered to truly sample the construct. What follows is a detailed description of the development, contributions, and deficiencies of the scales used to measure work/family conflict.

Bohen and Viveros-Long (1981). The development of a tool addressing the aforementioned deficiencies was first conducted by Bohen and Viveros- Long in their seminal book, *Balancing Jobs and Family Life: Do Flexible Work Schedules Help?* In their work, the authors sought to address the effects of flextime on family stress, family work, and equity of spouse family roles. Of particular interest to the present study is their definition of family stress, which they stated was "tension or pressure arising at the points where people's work and family roles connect or overlap" (p. 100). To measure this they constructed two surveys, the Job-Family Role Strain scale, which centered on general worries about fulfilling both work and family roles, and the Job-Family Management scale, which measured the ease/difficulty of managing family activities. Subsequent work/family conflict research has extensively utilized the Job-Family Role Strain scale.

The Job-Family Role Strain scale was specifically built to tap stress related to "internalized values and emotions – such as self-doubt, worry, guilt, and pressure – but also feelings of contentment, fulfillment, self-respect, and balance in regard to job and family obligations" (p. 233). The authors based the item's content on role strain work done by Komarovsky (1977, in Bohen & Viveros-Long, 1981), who determined that there are six modes in which tension may occur (reproduced in Table 2). Bohen and Viveros-Long utilized five of the six modes as the basis for the content of the items in the Job-Family Role scale, excluding congruity between a person's personality and a particular social role due to limitations in the scope and design of their study.

Item generation for the Job-Family Role scale occurred in three stages: first by gathering and classifying statements relating to work/family strain from five independent studies and from interviews with a group of 10 families, followed by panel and expert review of the items generated by these statements, and finally through a pilot study where reliability was determined and feedback on the items solicited. In the first stage, statements from five independent studies were classified into the five Komarovsky modes of role strain used in the study. Next, individual and group conversations of varying length (10 minutes to one hour) were held with the fathers, mothers, and children of 10 different families. For fathers and mothers, these conversations centered on the role strain involved in being successful workers and parents, while for children they centered on discussing the kinds of strains they thought their parents felt. Statements from these conversations were then sorted into the five modes and combined with those extracted from the five independent studies. Items were then written based on this database.

In the second phase of item development, the previously written items were presented to two groups of six federal employees. Each group reviewed the item content and discussed "whether these statements reflected their own feelings and any different feelings that they had" (p. 236). They were then designated as part of the Role Strain or Management scale based on whether they concerned internalized values, or feelings about the logistics of work/life role management. Next, the items were presented to a third group of six federal employees. These employees were considered expert judges and consisted of a psychologist, a sociologist, and three federal personnel experts. The panel rated the items according to how well they tapped the content of the scale. Items that adequately passed this phase of content analysis were subsequently used in the pilot study.

In the final phase of item development, a pre-test was conducted by administering the preliminary scale to 50 federal employees. An alpha of .71 was computed, and positive relationships were found with whether or not a spouse worked (r=.17), having the main responsibility in home chores (r=.13), number of hours spent doing home chores (r=.18), percent of respondent time spent doing home chores (r=.23), having the main responsibility with the children (r=.17), percent of time spent with the children (r=.24), perception of work/family interference (r=.52), age (r=-.22), and finally number of hours working and commuting (r=.11). Additional comments led to the deletion of a number of items and the splitting of the scale into two distinct pieces, based on whether items were directed generally towards adults, and those items directed specifically to parents/dealing with children. The splitting of the items into two surveys was done to increase the range of populations that qualify to take the scale. After elimination of some items due to content validity questions, final alphas of the adult scale (.72) and the total scale (.71) were determined using a second sample (N=449). Internal consistency for the parenting items was not calculated. Lastly, a factor analysis using the second sample was conducted on both the adult and parenting versions of the scale, as well as the total scale. From these, a final 16-item scale was constructed consisting of ten generalized items geared towards adults, and 6 more specific items geared towards parents.

Bohen and Viveros-Long's (1981) Job-Family Role Strain scale was the first attempt to develop a measure of work and family interrole conflict that was not based on frequency counts and whose development employed rigorous psychometric techniques. Its influence has been widespread, both in its use as a measure of work/family conflict (Bedeian, Burke, & Moffitt, 1988; Duxbury, Higgins, & Lee, 1994; Higgins, Duxbury, & Irving, 1992), and as a basis from which future scales were developed (Carlson, Kacmar, & Williams, 2000). However, the scale is not without shortcomings. To begin, factor analysis by the authors revealed a four-factor structure that does not fit the five Komarovsky (1977, in Bohen & Viveros-Long, 1981) modes used in developing the items, or the bi-modal emphasis of adult vs. parent-oriented item content. In addition, the items tapped internalized feelings of guilt and worry (e.g., "I worry whether I should work less and spend more time with my children"), which may be due to actual negative spillover between the roles, or may result from personality-based issues, making it difficult to distinguish between the different constructs. Finally, the 16-item scale contains statements which tap generalized work/family conflict (“I have a good balance between my job and my family time”), role overload (“I feel I have more to do than I can comfortably handle”), family interference with work (“I worry that other people at work think my family/friends interfere with my job”), child interference with work (“I worry about how my kids are when I’m at work”), and work interference with nonwork (“My jobs keep me away from my family/friends too much”). This combination of various aspects of work/family conflict, as well as aspects of role overload, may result in both attenuation and difficulty in explaining the meaning of relationships with other constructs.

Kopelman, Greenhaus, and Connolly (1983). The development of a work/family interference measure whose content contained a cleaner interpretation of the construct was addressed by Kopelman, Greenhaus, & Connolly. The author's based their work on Kahn, Wolfe, Quinn, Snoek, and Rosenthal's (1964) dissemination of role theory, and more specifically, interrole conflict. Kahn et al. indicated that with interrole conflict, "the role pressures associated with membership in one organization are in conflict with pressures stemming from membership in other groups" (p. 20). They also indicated that, "Demands from role senders on the job for overtime or take-home work may conflict with pressures from one's wife (or husband) to give individual attention to family affairs during evening hours" (p. 20). According to Kopelman et al., previous studies had used a variety of interrole conflict measures, many of which were open-ended or single-item questions (Beutell & Greenhaus, 1982; Jones & Butler, 1980; in Kopelman et al.). This, they argued, indicated a need for an empirically valid measure, if only to promote consistency across organizational studies.

In this study, the authors developed measures of both work and family intrarole conflict, along with a scale for work interference with family. The items for interrole conflict were based on work done by Pleck, Stains, and Lang (1980). As previously stated, Pleck et al. determined that there were seven different types of work-family conflict. The authors further identified excessive work time, schedule conflicts, and fatigue/irritability as the three most prevalent. Kopelman et al. chose to collapse these three categories, classifying interrole conflict as arising from limited time resources (time-based), or excessive strains (strain-based) associated with either of the roles. Factor analysis indicated that items loaded cleanly on a single factor for two independent samples, with loadings ranging from .32 to .69 for sample #1 (alpha = .70), and .38 to .85 for sample #2 (alpha=.89).

Although the measure of interrole conflict developed by Kopelman et al. (1983) has been used extensively in the work/family conflict literature (Parasuraman, Greenhaus, & Granrose, 1992; Thomas & Ganster, 1995), problems with both its development and its conceptualization exist. To begin with, the author's admit that sample size (N=91) in the second of the two studies seriously compromised the generalizability of results. In fact, the author's caution against interpreting the factor structure from the second study. Given that nearly half of the items listed in the final scale were developed from the results of this second study, the final factor structure of the measure could be questioned. In addition, whereas Kopelman et al's scale does sample three forms of interrole conflict, i.e., work time, scheduling, and excessive fatigue, they nevertheless do not sample other forms such as schedule uncertainty, work travel, and vacation-related problems (Pleck et al., 1980). More importantly, the 8-item scale contains no facet scores, making it impossible to estimate the relative contribution of each type of interrole conflict (time- strain-, or behavior-based) to work interference with family.

Lastly and most importantly, Kopelman et al.'s scale only measures work interference with family, and not family interference with work. Burley (1989) addressed this deficiency by re-wording four of the scale items, reversing the direction of their focus, thus producing an ad hoc family interference with work scale (Table 3). Gutek, Searle, and Klepa (1991) tested this format using two independent samples. Findings indicated that internal consistency in both instances was at acceptable levels (alpha levels of .79 and .83) for the family interference with work scale. Factor analyses were also conducted using each sample, revealing a dual factor structure where items for work interference with family and family interference with work loaded cleanly on two separate factors. Finally, the two scales correlated r=.26 and r=.10 in each sample, revealing that although they were related, they also appeared to measure distinct aspects of the work/family conflict construct. However, although this information is promising, the validity of Burley's (1989) family interference with work scale has never been adequately tested and, because the items were worded to mirror those in the Kopelman et al (1983) scale, any deficiencies within that measure would likewise appear in this one.

Wiley (1987). The primary contribution by Wiley to the measurement of work/family conflict was to provide statistical evidence of the bi-directional nature of the construct. Instead of developing an entirely new scale, Wiley chose 22 of the 50 items used by Burke, Weir, and DuWors (1979). Items were chosen based on whether they tapped the extent to which work interfered with both family and personal roles. A subsequent factor analysis revealed four factors, including role overload, job/person conflict (measuring general work interference with non-work), job/family conflict (measuring work interference with family), and family/job conflict (measuring family interference with work). Intercorrelations between the three forms of conflict were relatively high, the largest between job/person and job/family conflict (r=.54), followed by job/person and family/job conflict (r=.48), and finally by job/family and family/job conflict (r=.40). This appears to indicate that the scales are measuring distinct forms of work/family conflict, yet there is also a high degree of overlap between them.

Subsequent analysis revealed significant relationships between all three forms of conflict and role overload (correlations ranging between .45 and .56); life satisfaction (correlations ranging between -.23 and -.28); job satisfaction (correlations ranging between -.12 and -.26); job involvement (correlations ranging between -.10 and .20); and organizational commitment (correlations ranging between -.10 and -.24). In addition, when regressing outcome variables onto all four independent variables, significant beta weights were found for job satisfaction (β=-.32) and organizational commitment (β=-.34) onto job/person conflict; for regressing job involvement (β=.35) and organizational commitment (β=.32) onto job/family conflict; and for regressing job involvement (β=-.24) onto family/job conflict.

These analyses provide preliminary evidence of the bi-directional nature of work/family conflict, as postulated by Greenhaus and Beutell (1985). However, the scales used in this study were not developed with the benefit of this theory. More importantly, the items taken from Burke et al. (1979) were not intended to be separated into different scales, and thus their content most likely did not adequately sample the construct. Finally, internal consistencies of the job/family, job/person, and family/job scales were not provided, and additional construct validity was not pursued in depth. Therefore, although the work done in this study provides valuable information regarding the structure of the work/family conflict construct, it also highlighted the need for the development of a measure that is both psychometrically sound and that is built under the umbrella of current theory.

Netemeyer, Boles, and McMurrian (1996). It would be another 9 years before Netemeyer, Boles, and McMurrian developed the first bi-directional measure of work/family conflict using rigorous psychometric procedures for both the work interference with family and family interference with work subscales. For their scale, a pool of 110 items was initially generated from previous published sources and reduced to 43 (22 work interference with family, and 21 family interference with work) based on ratings from a panel of four judges from other universities. An important aspect of these items is that they did not reflect behavior-based work/family conflict. Instead, the items reflected general demand, time, and strain-based, work interference with family and family interference with work. The author's used three independent, non-student samples to determine the factor structure and criterion-based validity of their scale. These included elementary and high school teachers and administrators (sample #1, n=182), small business owners (sample #2, n=162), and real estate sales people (sample #3, n=186). Within each sample, measure purification was conducted by way of an iterative confirmatory procedure using LISREL VII (Jöreskog & Sörbom, 1989; in Netemeyer et al.). Using a series of five heuristics (i.e. completely standardized factor loadings of greater-than .50, highly redundant in terms of wording with other items, etc), items in the first sample were reduced from 43 to 24 (13 work interference with family, 11 family interference with work). A modified set of heuristics (i.e., still exhibited correlated measurement errors, had completely standardized factor loadings greater-than .60, etc) were used to further reduce items from 24 to 13 (seven work interference with family, six family interference with work) in the second sample. Lastly, an additional three items were deleted in the third sample on the basis of author judgment. The final scale consists of five items measuring time and strain-based work interference with family, and five items measuring time and strain-based family interference with work. Internal consistency was high for both scales, ranging from .88 for work interference with family, to .89 for family interference with work.

In addition to measure purification, Netemeyer et al. (1996) used covariance structure modeling to compare a two-factor and single factor scale structure within each of the three samples. Results indicated that across all samples a two-factor model of work/family conflict fit the data, and the single factor model did not. Item loadings ranged from .60 to .89 on a priori factors, and internal consistency ranged from .82 to .90 across samples. In addition to the validation of the scales' structure, criterion-based validity was determined by way of comparisons with 17 additional variables. These included job/life/relationship satisfaction, role conflict/ambiguity, and physical symptomology. Predictions using both directions and differences between the construct of work/family conflict were confirmed.

The strength of the Netemeyer et al. (1996) scale lies in the psychometrically rigorous fashion in which it was developed. This was demonstrated in their use of expert judgment to reduce the item pool; employing three independent, non-student samples; and covariance structure modeling. However, the weakness associated with the measure include only partial adherence to current theory, and reliance on previously used measures for its own item pool. As previously mentioned, work/family conflict is both multi-directional and multi-dimensional (Greenhaus & Beutell, 1985). Whereas Netemeyer et al. concentrated on choosing items that reflected the multi-directional aspect of work/family conflict, they largely ignored the multi-dimensional nature of the construct. This is reflected in their choice to use a two-factor structure in their analysis, as well as the choice to omit behavior-based conflict from the item-pool. In addition, the authors' reliance on previously published scale items limited them to study-specific measures that even they admitted would often "reflect potential outcomes of the constructs rather than their content domain" (p. 400). In summary, Netemeyer et al. demonstrated that their scale was both structurally sound and criterion-valid, yet did not adequately sample the content domain.

Stephens and Sommer (1996). The Netemeyer et al. (1996) scale provided critical evidence that work/family conflict is bi-directional. However, it was Stephens and Sommer (1996) who first investigated the multi-dimensional aspect of the construct. Using similarly rigorous psychometric procedures as Netemeyer et al., the authors sought to measure the time-, strain-, and behavior-based nature of work interference with family. After developing a pool of 28 items from a review of the literature, a group of 47 subject matter experts (SMEs) were given definitions of the three types of conflict and asked to classify the statements accordingly. A final exploratory pool of 16 items remained after items that did not achieve at least 80% agreement among SMEs were eliminated.

The next step was to conduct an exploratory factor analysis on data from 300 employees of a large research hospital. Criteria were established for identifying factors and retention of items. For determining the number of factors, four criteria were used: Eigenvalues greater than 1, a scree plot test, a priori determination, and percentage of variance explained. Using these rules, a three-factor solution emerged. The first factor consisted of 8 items, 4 items each that were hypothesized to measure time- and strain-based conflict. Meanwhile, the second and third factors consisted of three items each, all hypothesized to tap behavior-based work interference with family. More specifically, the second factor contained positively worded items, while the third factor contained negatively worded items. For retaining items, two criteria were used: Item loadings must exceed .45, and item loadings must differ by at least .1 between cross-factor loadings. From this 2 items were eliminated, leaving a scale structure consisting of three factors and 14 items.

As a final step, the authors conducted a confirmatory factor analysis using responses from 273 employees gathered from a state government agency (n=145) and a scientific testing firm (n=128). Stephens and Sommer (1996) tested three models: A null model with a single latent variable, a two-factor solution as found in the exploratory factor analysis (with positively and negatively worded behavior-based items combined), and a three factor solution where time-, strain-, and behavior-based items were influenced by separate latent variables. Both the null model (GFI = .34; AGFI = .24) and the two-factor model (GFI = .92; AGFI = .88; NFI2 = .871) failed to display adequate fit to the data. However, the three-factor solution containing the a priori latent variables of time-, strain-, and behavior-based conflict was found to acceptably fit the data (GFI = .95; AGFI

= .93; NFI2 = .986). Since chi-square goodness-of-fit tests tend to be overly sensitive to sample size and small departures from multivariate normality (Bentler, 1990; in Stephens and Sommer, 1996), a chi-square to degrees-of-freedom ratio was calculated. According to Hanisch and Hulin (1991, in Stephens and Sommer), a ratio of less than 2.0 indicates a positive model fit. Stephens and Sommer found the ratio for the three-factor solution to be 1.35.

Although their exploratory factor analysis did not reveal the a priori factors of time-, strain-, and behavior-based conflict, the confirmatory factor analysis did corroborate the author's three-factor solution. This was the first time someone had attempted to confirm the multi-dimensional nature of Greenhaus and Beutell's (1985) theory. While not conclusive, the study does provide evidence that a multi-dimensional factor structure could exist, something no other study had done. Combined with the more conclusive evidence of bi-directionality in the construct (Netemeyer et al, 1996), the probability that measurement of work/family conflict should be done using a six-factor scale was high.

Carlson, Kacmar, and Williams (2000). The act of producing a scale that covered both the bi-directional and multi-dimensional nature of work/family conflict was realized in this recent study. Similar to Netemeyer et al. (1996) and Stephens and Sommer (1996), Carlson et al. first developed an item pool based on previously published measures. A total of 31 non-redundant items were generated from Bohen and Viveros-Long (1981); Burley (1989); Duxbury, Higgins, and Mills (1992); Frone, Russell, and Cooper (1992); Gutek, Searle, and Kleppa (1991); Koppelman et al. (1983); Pleck (1978); and Stephens and Sommer (1993). Items from other studies were excluded because they specifically addressed job demands or nonwork conflict, which the authors deemed beyond the scope of their study. Using content analysis guidelines provided by Schriesheim et al. (1993; in Carlson et al.) and a sample of 236 undergraduates enrolled in an upper level business course, the authors selected 20 items from the initial pool of 31. The remaining items were then administered as a survey of work/family conflict to a second sample of 390 employees of a state government agency. Exploratory factor analysis revealed that all items loaded on only one of three possible factors, yet did not provide a comprehensive representation of each of the six conflict dimensions. For example, none of the items represented behavior-based conflict, and only one represented the strain-based work interference with family dimension.

To increase the scale content validity, Carlson et al. developed an additional 34 items based on "review of the literature as well as on personal and anecdotal experience" (p. 257). All 54 items were then presented to a sample of 132 MBA students to categorize and rate. For an item to be retained it had to be categorized in the correct definition at least 70% of the time (using six different definitions, one for each dimension of work/family conflict), and have a mean score of 3.5 (again, 70%) for the rating-content adequacy testing. This process reduced the item count to 33, with an additional three items removed for parsimony. The remaining 30 items represented the five best items for each of the six scales.

Two additional studies were then conducted. In the first study, 228 graduates from an Executive MBA program were given the 30-item measure. A confirmatory factor analysis was then run to determine if a six-factor model fit the data, with each factor represented by five items in the scale. An additional 11 items were eliminated due to either factor loadings found to be less than .50, items being more strongly associated with any factor than the one for which it was intended, correlated measurement error, or wording redundancy. The process produced a final scale of 18 items, three items for each of the six dimensions of work/family conflict.

In the second and final study, the dimensionality, reliability, discriminant validity, factor structure, gender differences, and differential predictions of the new scale were investigated. A new, independent sample of 225 individuals who were employed full-time in various organizations was collected to help conduct these tests. Dimensionality was assessed by testing six, three, two and one factor models using confirmatory factor analysis, with items forced to load on specific factors and factors being allowed to correlate. Results indicated that the six-factor model had the best fit [χ^2 (120) = 237.40, p=.00; CFI=.95, RMSEA=.06], and all factor loadings were significant (ranging .69-.91). In addition, the internal consistency of each factor ranged between .78 and .87. Factors were found to correlate between .24 and .83, with only two correlations above .60, indicating discriminant validity among the six different factors.

The factor structure of the scale was then tested for invariance across samples. Both the current sample and the sample from the initial confirmatory factor analysis were used to compare four two-group models. Models varied according to whether factor loadings, factor correlations, and error variances were held constant or allowed to vary freely. Generalizability across samples was confirmed when two different data sets mapped well to the model (Carlson, Kacmar, & Williams, 2000). Specifically, the only instance where the factor structure did not hold across samples was the most constrained model. However, invariant error variances are considered the least important in testing factor structure invariance across groups (Marsh, 1995; Williams, Bozdogan, & Aiman-Smith, 1996; in Carlson, et al.), and because the fit indices indicated adequate fit across the most constrained model, evidence of measurement invariance across samples was considered to be sound. This further confirmed the six-factor structure of the model.

Similar procedures were used to determine if the six-factor model was invariant across males and females. For this analysis, the most recently collected sample was used. As with the factor structure analysis, four two-group models (males vs. females) were again compared by varying the degree of constraint on the factor loadings, correlations, and error variances. Unlike the overall factor structure, differences across gender were discovered when the factor correlations and error variances were held invariant. Further analysis revealed that the pattern of factor correlations was similar, even if the correlations themselves were different. For instance, the average factor correlations for males was .47, and .45 for females. In addition, "two-thirds of the individual differences were less than .20 and the largest difference between correlations was .37" (Carlson et al., 2000, p. 266). A set of t-tests were then conducted, revealing that females were found to experience significantly more conflict than men for all three forms of family interference with work, as well as for strain-based work interference with family. Carlson, et al. hypothesized that the "inconsistent findings in past research on gender differences…may be explained by the fact that females are more likely to experience more conflict than men on only some, not all, forms of conflict" (p. 267).

Finally, Carlson et al. (2000) used both work and family-oriented measures for the antecedents of role conflict, role ambiguity, social support, and role involvement with the outcomes of job satisfaction, family satisfaction, life satisfaction, and organizational commitment to test differential predictions of work/family conflict. Two path models were examined: In the first, all three forms of work interference with family conflict were compared with the four work related antecedents and the four outcome variables. In addition, direct paths from the antecedents to the outcomes were also examined. The second model consisted of the three forms of family interference with work, which were compared to the four family-related antecedents and four outcomes. Direct paths from the antecedents to the outcomes were also examined in this model. Significant path coefficients were used to determine relationships.

Each of the six dimensions was found to differentially relate to both antecedents (role ambiguity, role conflict, social support, and role involvement) and consequences (job/family/life satisfaction, and organizational commitment). For work interference with family, all four antecedents were related to strain-based conflict, work ambiguity and work involvement were related to behavior-based conflict, and only work involvement was related to time-based conflict. Meanwhile, strain and behavior-based conflict were negatively related to the outcomes of job and life satisfaction, and time-based conflict was not related to any of the outcome variables. For family interference with work, all four antecedents predicted behavior-based conflict, and only family-role conflict and social support predicted time and strain-based conflict. In addition, strain-based conflict predicted job, family, and life satisfaction (not predicted by any of the other family interference with work scales), whereas behavior-based conflict significantly predicted organizational commitment.

Overall, Carlson et al. (2000) demonstrated that six separate dimensions could represent the work/family conflict construct. The scale they developed to measure these shows discriminant and criterion-based validity, as well as a solid factor structure across two independent samples. In addition, the authors demonstrated that males and females are affected in different ways by experiencing work/family conflict. This finding may provide evidence as to why some authors find differential permeability between work interference with family and family interference with work.

Summary of work/family conflict measurement. Over the past 25 years, the assessment of work/family conflict has evolved from measures that treated the construct as a singular facet and often contained items that overlapped with other constructs (e.g., role ambiguity, job satisfaction) to scales that are able to differentiate between both the direction and the type of conflict being measured. Although all of these scales tap generalized feelings of conflict (as opposed to role-specific perceptions), research has nevertheless indicated they are different from one another. Scales that treat work/family conflict as a singular facet have different predictive capabilities than those that treat it as a multifaceted construct. As a result, continued research into both the theoretical underpinnings of work/family conflict, and the predictive capabilities of current measurement techniques, is warranted.

Testing Work/Family Conflict Measurement Equivalence Across Multiple Populations

Carlson et al. (2000) provided a major step forward in the measurement of work/family conflict. The authors were able both to sample the content domain appropriately and to provide evidence of a high degree of reliability and validity. They also provided the first measure of Greenhaus and Beutell's (1985) model of work/family conflict as a bi-directional, multi-dimensional construct that fit across several independent samples. In addition they found that each dimension expresses differential relationships with outcome variables. Given these findings, an appropriate next step in both the evolution of this measure and the evolution of the measurement of work/family conflict in general would be to examine its structure across a multitude of populations, particularly those from other nationalities and cultures.

Recall that individual studies have provided evidence of the cross-cultural nature of work/family conflict (Aryee, Fields, & Luk, 1999; Matsui, Ohsawa, & Onglatco, 1995). Although these studies tested the bi-directional nature of the construct, they did not include measures of its multi-dimensionality. To test whether the full six-factor structure of work/family conflict will hold outside of the US, a measure of the six subgroups first needed to be built. Carlson et al. provided such a scale, and its continued validation will lay the foundation from which the current model of work/family conflict can be tested. To that end, the purpose of this study was to further validate the Carlson et al. scale by testing for measurement invariance between a US and a foreign English-speaking sample. In this case, the foreign English-speaking sample was obtained from Australia and New Zealand.

Measure structure vs. stimulation. By using a foreign English-speaking sample, problems with language translation are minimized and the structure of the measure can better be tested. This is particularly helpful because vast differences exist between testing the cross-cultural viability of a measure (i.e., measurement invariance, also known as measurement equivalence) and developing cross-lingual versions of it. According to Hulin (1987), “the goal of … equivalence is to provide an equivalent structure to the material to achieve equivalent stimuli rather than equivalent structure as an end in itself” (p. 117). In other words, directly translating a measure often results in confusion due to differences in how the target language expresses the concepts elucidated in the original wording of the items. Although this may replicate the structure of the measure, it does not guarantee a replication of a given scale's ability to stimulate answers that provide information on the construct of interest, which is what Hulin referred to as "stimuli." Yet testing for "equivalent stimuli" before adequately testing the cross-cultural structure of a new measure may be putting the proverbial cart before the horse. Thus, you have what appears to be a catch-22: a test for equivalent structure may be hampered by a lack of equivalent stimulation, and testing for equivalent stimulation may be hindered by a lack of equivalent structure. The only apparent solution is to simultaneously test for stimuli and structure at multiple points in the measure development process, a procedure that dramatically increases time and cost requirements. Although this may be a scientifically desirable solution, it is often not practical.

A second solution would be to test measurement equivalence using samples with fewer cultural differences as a first step. By reducing cultural differences, the structure of a measure may be tested in non-US samples with fewer questions about equivalent stimulation of the construct. This could effectively remove the alternative hypothesis that equivalent stimulation was not adequately achieved, and thus the cross-cultural version of the measure is not valid, regardless of structural strength. Such a test could provide evidence of structural cross-cultural equivalence. Once this is established, equivalent stimulation could become the focus of further research.

Cultural similarities between the United States, Australia, and New Zealand. To void the alternative hypothesis that equivalent stimulation was not achieved, an English-speaking sample that is culturally similar to the US must be used. For the present study, a sample from Australia and New Zealand was used to determine whether the Carlson et al. (2000) scale's six-factor structure holds in a non-US sample. Similarities between Australia, New Zealand, and the United States have been well documented. For instance, Fallon (1996; in Fallon, 1997) successfully replicated the Frone et al. (1992) model of work/family conflict in an Australian sample, in which job/family involvement and job/family stressors influenced work/family conflict, which in turn affected job/family distress and individual levels of depression. Other studies have provided more generalized information. For instance, a Gallup pole (1976; in Ouweneel & Veenhoven, 1991) found that mean self-report levels of happiness were identical for Australian and US groups, as were the standard deviations in the samples.

Sagie and Schwartz (1994) used a measure of dispersion to determine similarity between cultures. In their study of grade school teachers in 36 nations, the authors calculated the level of variance in ratings of value importance to determine value consensus in a population. Specifically, the participants rated 56 single values according to their importance "as a guiding principle in my life" (p. 220). The ratings were then combined into ten broad values based on a typology by Schwartz (1992; in Sagie & Schwartz): benevolence, tradition, performance, security, power, achievement, hedonism, stimulation, self-direction, and universalism. Variances calculated on these broad value types were then averaged to determine a nation's overall level of value consensus, where lower variance meant higher levels of congruence. Interestingly, the value consensus ratings for Australia, New Zealand, and the United States fell within .14 of each other. In addition, participants from all three nations rated their country as high in socioeconomic modernization and democratization of the political system. These ratings indicate that they are similar not only in value consensus, but that they are dissimilar to nations with higher value consensus as well. Specifically, higher levels of socioeconomic modernization and political democratization are related to lower levels of value congruence. On the other hand, higher levels of modernization and lower levels of democratization (e.g., totalitarianism) lead to higher levels of value consensus. Thus, not only are Australia, New Zealand, and the United States similar to each other, they are also different than other nations in similar ways.

Finally, similarity between these three nations can also be found in the study of cultural dimensions. According to Hofstede (1997), dimensions of culture are aspects "that can be measured relative to other cultures" (p. 14). Drawing largely from his seminal work involving 50 nations and 3 world regions, Hofstede (1997) found many similarities between Australia, New Zealand, and the United States on his dimensions of power distance, individualism/collectivism, masculinity/femininity, uncertainty avoidance, and long-term orientation variables. For instance, Hofstede defined power distance as "the extent to which less powerful members of institutions and organizations within a country expect and accept that power is distributed unequally" (p. 28). In countries with a low level of power distance, supervisors have a "consultative" style of decision-making, where they speak with subordinates before reaching a decision. On the other hand, in countries where a high level of power distance exists, subordinates have a dependent relationship with their supervisors, where they are not consulted and instead are lead in an autocratic way. When comparing the nations of interest to this study, on a 100-point scale, all three scored in the lower 40th percentage on power distance and were within 18 points of each other.

Hofstede (1997) found similar results when comparing the three nations on levels of individualism/collectivism. Individualism "pertains to societies in which the ties between individuals are loose: everyone is expected to look after him or herself and his or her immediate family," and collectivism is considered the opposite of individualism and "pertains to societies in which people from birth onwards are integrated into strong, cohesive groups, which throughout people's lifetime continue to protect them in exchange for unquestioning loyalty" (p. 51). As with power distance, Australia, New Zealand, and the United States all scored extremely high on the Individualism Index (IDV), within 12 points of each other on the 100-point scale.

The similarities among these three nations are even more pronounced in the masculinity/femininity, uncertainty-avoidance, and long-range orientation dimensions. Hofstede (1997) defined masculine societies as places in which social gender roles are distinct (men are assertive, tough, and focused on the material aspects of living, while women are modest, tender, and concerned with the quality of life), and feminine societies as places in which gender roles overlap, e.g. men and women can be concerned with the quality of life. Meanwhile, Hofstede defined uncertainty avoidance as the extent to which the members of a culture feel threatened by uncertain or unknown situations, and long-range orientation as the extent to which a society promotes the values of persistence, thrift, ordering relationships by status and observing this order, and having a sense of shame. This is opposed to promoting short-term orientation values, which include personal steadiness, protecting your "face," respect for tradition, and reciprocation of greetings, favors, and gifts. For Australia, New Zealand, and the United States, scores on these three dimensions on a 100-point scale were within four, five, and two points, respectively. This, along with the very similar scores on power distance and individualism/collectivism, indicates that the three nations are essentially the same in their levels of these five dimensions.

One final similarity between these three countries is in their laws regarding family leave. In the US, the Family and Medical Leave Act of 1993 states that a person may take up to 12 weeks of unpaid leave for a newborn or newly adopted child. Individuals may then return to work to either their same job or a job of similar status and salary level. In addition, many companies offer paid leave of absences during this timeframe, with the number of businesses offering such benefits growing from year to year. On the other hand, Australian and New Zealand law indicates that a person may take parental leave for up to 52 weeks, also unpaid. However, unlike in the US, few if any private companies offer paid leave during this timeframe (S. Garvey, personal communication, January 22nd, 2003). Also unlike the US, Australian state governments often offer some kind of paid leave to their workers, and do provide a one-time maternity payment at the time of birth. Therefore, although the Australia/New Zealand time for unpaid leave is longer, its benefits are mitigated by a lack of compensation. For this reason it is likely that individuals on parental leave in Australia/New Zealand return to work within a similar time period as those on leave in the United States.

In summary, research indicates that the cultures of the United States, Australia, and New Zealand appear to promote similar value systems. This includes similar levels of value congruence, as well as levels of cultural dimensions, as defined by Hofstede (1997). In addition, between Australia and the United States, a model for explaining the antecedents and consequences of work/family conflict was found to replicate in both nations, a particularly relevant finding to the current study. Finally, the parental leave laws for all three nations are sufficiently similar to warrant the assumption that individuals return to work after approximately the same amount of time on leave. More to the point, the United States, Australia, and New Zealand all offer unpaid leave, and all have ever-increasing numbers of women in the workforce (Fallon, 1996), leading to greater numbers of dual-career couples, and the need for dual-earners in a given family. Because of these results, it appears that structural measurement invariance can be tested in the Carlson et al. (2000) measure of work/family conflict with a significantly reduced threat of non-equivalent stimulation as an alternative hypothesis.

C*ross-cultural gender issues in work/family conflict.* Although measurement invariance across cultures of the Carlson et al. (2000) scale would provide support for the usefulness of the tool as a measure of work/family conflict, its examination would be incomplete without some test of its ability to detect differences within cultures. One particularly salient test would be to determine whether men and women have similar reactions to work/family conflict. This is relevant since gender differences in work/family conflict have been the focus of a multitude of studies.

Gutek, Searle, and Klepa (1991) addressed the issue of gender by testing two separate models of work/family conflict. The authors looked at the rational model, where conflict is linearly related to the total amount of time spent in family and work, and the gender-role model, where gender role expectations are believed to affect reported levels of conflict. In other words, gender is hypothesized to either affect conflict directly, and/or to moderate the relations between the number of hours spent in a specific domain (work vs. family) and conflict. Therefore the hours an individual spends in their gendercongruent domain (e.g., more hours for men at their job and for women doing family-related work) will have less of an impact on conflict than hours spent in a non-congruent domain (e.g., men doing more family-related work).

Results indicated that both the rational and the gender role models explained the connection between hours in a domain and reported conflict, with more support for the rational perspective. For instance, in both studies there was a fairly large relationship between hours spent in a specific domain, and conflict arising from that same area (e.g., the more hours worked, the larger the reported levels of work interference with family). Nevertheless, women did report significantly stronger levels of work interference with family than men did, despite the fact that both groups, in both studies, reported similar amounts of time spent in paid labor. This is reflected in the significant variance explained in the gender-by-hours interaction term entered into the regression equation to predict work/family conflict. In other words, although the rational model received full support in their study, some of the variance was better explained by domain-specific gender expectations.

Further evidence of gender differences in reported work/family conflict can be found in Borovsky and Stepanski's (1999) meta-analytic review. The authors first gathered 15 studies containing data on six variables, including work role stressors, family role stressors, work/family conflict, job satisfaction, family satisfaction, and life satisfaction. These correlations were then meta-analytically combined producing two sets of 15 meta-analytic correlations; one set each for males and females. A series of Z-tests across gender revealed significant differences between all of the 15 correlations. Next, using a model presented by Bedeian, Burke, and Moffett (1988), the authors analyzed gender differences by comparing model fit between men and women on the six variables. This was done by creating a matrix out of each set of meta-analytic correlations, and subsequently analyzing them with structured equation modeling (SEM). More precisely, the two matrices were first compared with an unconstrained model, where male and female path coefficients were estimated separately. The matrices were then compared in a constrained model, where path coefficients were forced to equality for both genders. A significant chi-square difference between the two models indicated that the unconstrained model was a better fit to the data. In other words, it appears that gender does affect the relationships in the model.

The results found by Borovsky and Stepanski (1999) were not conclusive. Although a significant difference was found between the chi-squares, they also reported that the overall fit of the model to the entire dataset (that is, including both males and females) was moderate at best. This supports the findings of Gutek et al. (1991), in that gender as a moderator may explain additional variance, but not in all circumstances. In addition, Borovsky and Stepanski did not have enough studies to use a bi-directional measure of work/family conflict, let alone a measure that also tapped the multi-dimensional nature of the construct. This leaves the possibility that the findings were entirely due to one dimension or direction, as was found with Gutek et al. (1991).

However, additional support for gender differences does exist. Burley (1995) found that women exhibited greater levels of work interference with family than men. Meanwhile, Duxbury, Higgins, and Thomas (1996) found a significant main effect with gender on a generalized conflict scale, but failed to find any interactive effects with their primary variable: computer-support supplementary work at home.

Finally, this difficulty in determining the nature of gender differences in work/family conflict is also present in the results found by Duxbury and Higgins (1991). Using an expanded model originally conceptualized by Kopelman et al. (1983), the authors hypothesized that work/family expectations, work conflict, family conflict, and work/family involvement would all act as antecedents to work/family conflict. In turn, conflict would directly affect quality of work/family life, and through these, indirectly affect life satisfaction. From this model they hypothesized numerous gender differences, including: the relationship between work involvement and conflict will be larger for women than men; the relationship between family involvement and conflict will be higher for men than women; the relationship between work-expectations and conflict will be stronger for men than women; the relationship between family-expectations and conflict will be stronger for women than men; the relationship between work-conflict and work/family conflict will be stronger for men than women; the relationship between family-conflict and work/family conflict will be stronger for women than men.

The authors collected data on 240 individuals who were either married or had children living at home. They then used a partial least-squares analysis to determine gender differences between generalized work/family conflict and a number of different variables. Results indicated that higher levels of involvement in a non-gender sanctioned role (e.g., work involvement for women, family involvement for men) resulted in greater levels of work/family conflict. In addition, quality of a non-gender sanctioned role had a negative relationship with work/family conflict, such that men had lower quality of family life, and women lower quality of work life, when conflict was high. These results build on the gender model tested by Gutek et al. (1991). Yet as with that study, other findings in this study paint a more complicated picture of the relationship between gender and work/family conflict. For instance, a stronger relationship between work expectations and conflict was found for men than women, yet gender differences could not be tested on family expectations and conflict because no significant relationship between the variables was found for women. In addition, women had a stronger relationship between family conflict and work/family conflict than did men, but no gender differences were found when comparing the relationship between work conflict and work/family conflict. These results appear to conflict with those regarding work and family involvement, making it difficult to determine a clear picture of gender similarities and differences when inter-role conflict is measured.

Other studies also bear out the complicated picture of gender and work/family conflict. For instance, Frone, Russell, and Cooper (1992) developed a model of antecedents and consequences to work/family conflict that included variables similar to those studied by Borovsky and Stepanski (1999), including job/family distress, job/family involvement, work/family conflict, and depression (used as a measure of life satisfaction by Borovsky and Stepanski). Yet when comparing males and females in a multi-group analyses utilizing SEM, no gender differences were found, regardless of the fact that a bi-directional measure of conflict was included. Eagle, Miles, & Icenogle (1997) specifically tested for gender differences using three different bi-directional scales of work/family conflict, and also found no gender differences. In summary, many studies have found gender differences (Borovsky & Stepanski, 1999; Burley, 1995; Gutek et al., 1991) and many others have found no differences at all (Frone et al; Eagle et al). This leaves open the question of when, and under what circumstances, gender differences exist.

A clearer picture of gender differences in work/family conflict may become apparent with proper sampling of the construct, namely by measuring both its bi-directional and multi-dimensional nature. As previously stated, Carlson et al. (2000) provided a test of gender differences in their scale development. The authors found that females experienced greater levels of time-, strain-, and behavior-based family interference with work, as well as greater levels of strain-based work interference with family. In addition, the authors found that, although the factor loadings were similar between men and women, the factor correlations and error variances differed significantly. However, these findings do not address the possibility that there are cross-cultural dissimilarities in the relationship between gender and conflict, even if the different cultures are similar in levels of masculinity/femininity (Hofstede, 1997).

In summary, gender differences may also occur in non-US, English-speaking samples, yet this does not necessarily mean that the differences will be the same as those found in English-speaking samples in the United States. However, given that there are cultural similarities between the United States and the Australian/New Zealand sample to be used in this study (Hofstede, 1997), it is reasonable to predict that males and females have differential relationships in time-, strain-, and behavior-based family interference with work, and work interference with family.

Purpose of the Current Study

As previously stated, the purpose of this study was to validate further the Carlson et al. (2000) scale by testing for measurement invariance between a US and a foreign

English-speaking sample. In this case, the foreign sample consisted of a group of full-time employees in the Australian and New Zealand branches of an S&P 500 company. As noted earlier, the similarity between these English-speaking countries and the US is extensive enough to mitigate the alternative hypothesis of appropriate stimulation when testing for measurement invariance in attitudinal scales. However, in this instance directly testing one sample against the other may be presumptive. Carlson et al.'s results indicate that gender differences in factor correlations and error variances did occur in the same US sample to be used in this study. As a result, should any differences be found between the Australian/New Zealand group and its US counterpart, it would be impossible to determine whether they originated from dissimilarities in culture, or dissimilarities between men and women. Therefore, to determine whether measurement invariance exists between the US and Australian/New Zealand groups on the Carlson et al. work/family conflict scale, cross-cultural intra-gender comparisons were conducted. Specifically:

Hypothesis 1a:

An equivalent six-factor structure of Carlson et al.'s scale will exist for males in the English-speaking Australian/New Zealand sample and males in the English-speaking sample from the United States.

Hypotheseis 1b:

An equivalent six-factor structure of Carlson et al.'s scale will exist for females in the English-speaking Australian/New Zealand sample and females in the English-speaking sample from the United States.

Again, given the similarities between the cultures, it was also expected that dissimilarities between men and women would exist in the Australian/New Zealand sample itself. Specifically:

Hypotheseis 2:

Gender differences in work/family conflict will exst in the English-speaking Australian/New Zealand sample.

Although differences likely exist in how men and women experience work/family conflict in Australia and New Zealand, what those differences are is difficult to predict. In other words, while similarities with the United States across cultural dimensions may allow us to predict that gender differences exist at a macro level, the specific nature of those differences is not so easily determined without direct study. Because research using this population is not available on this topic, an exploratory investigation was addressed. Specifically:

Research Question 1:

If gender differences do exist in the English-speaking Australian/New Zealand sample, are those differences the same as the ones found by Carlson et al. in their sample from the United States?

As previously stated, the current study aimed to investigate these research questions using archival data gathered from the United States and Australia/New Zealand. Data gathered in the United States (the validation sample) consists of one sample used by Carlson et al. (2000) in their original validation study. Data gathered in Australia/New Zealand (the comparison sample) was part of a larger data set acquired during a local validation study by an S&P 500 company.

Method

Participants

Participants for this study consisted of two independent samples collected at an earlier date. One of the data sets was used by Carlson et al. (2000) in the original validation study. The second sample is a comparison sample consisting of archival data gathered during a local validation study in which employees within the Australian and New Zealand division of an S&P 500 company were invited to participate. Data were collected between July and August of 2001. The study used several measures, including the full Carlson et al. (2000) measure of WFC.

Validation sample. The second set of participants from the third study in the original Carlson et al. (2000) validation research was employed as the validation sample in this paper. Because the responses of these participants were not used for item analysis/elimination, or final scale structure development, they are essentially unbiased in representing the structure of the work/family conflict scale. The sample was gathered using a snowball strategy, where a group of individuals in a night class for working undergraduates were given the surveys and then asked to distribute them to 5 other working individuals. Instructions for taking the survey were as follows, “Please indicate the degree of your agreement with each of the following questions regarding your work and family life by circling the appropriate response, where one is strongly disagree and five is strong agree”. Finally, participants were employed in numerous organizations across a wide range of jobs.

The sample consists of 222 individuals, 83 males and 139 females. On average the males were 37.25 years old, had an average job tenure of 6.44 years, and on average had 1.3 children and .90 living with them. Roughly 3.6% were Asian, 12.0% African American, 1.2% Hispanic, 81.9% White, and 1.2% other. In addition, 16.9% were single, 72.3% were married, and 10.8% were divorced. For females, the average age was 35.42 years old, average job tenure 6.35 years, and on average 1.34 children and 1.05 living with them. Roughly 2.2% were Asian, 8.6% African American, 0% Hispanic, 87.8% White, and 1.4% other. In addition, 24.5% were single, 58.3% were married, 13.7% were divorced, and 2.9% were widowed.

Comparison sample. A total of 2,394 employees within the Australian and New Zealand division of an S&P 500 company were invited to participate in a local validation study. The company was engaged in recruitment and placement services, as well as consulting and marketing. Respondents included managers, secretaries, recruiters, and other individuals in white-collar jobs. Instructions for taking the survey were as follows, "The following questions will ask you about your attitudes and behavior at work and in your life in general. They are for research purposes only, so please answer them as honestly as possible. All answers will be kept anonymous, and your responses will not be made available to individuals in the company outside of the research group".

Of the 2,394, 579 took the Carlson et al. (2000) work/family conflict scale, resulting in a 24% response rate. An additional 187 responses were excluded due to incomplete answers, resulting in a total sample of 392 full-time employees. Within the usable sample, 287 (73.2%) were from Australia, and 249 (63.5%) were female. For Australian males (n=105), participants were on average 35.35 years old, had held at least 4 full-time positions in their lifetimes, held their current positions and been a part of their current organization for at least one year but less than three years, and 82% claimed that their current position was representative of their professional field. For New Zealand males (n=34), participants were on average 38.38 years old, had held close to 5 full-time positions in their lifetimes, held their current positions and been a part of their current organization for at least one year but less than three years, and 89% claimed that their current position was representative of their professional field.

For Australian females (n=173), participants were on average 29.50 years old, had held almost 4 full-time positions in their lifetimes, held their current positions and been a part of their current organization for at least one year but less than three years, and 72% claimed that their current position was representative of their professional field. For New Zealand females (n=34), participants were on average 29.92 years old, had held over 4 full-time positions in their lifetimes, held their current positions and been a part of their current organization for at least one year but less than three years, and 86% claimed that their current position was representative of their professional field.

Additional information about Australian demographics can be found at the Australian Bureau of Statistics (2001). Specifically, on average females give birth to 1.75 children, 41.2% of all families have children under the age of 15, median age of marriage for males is 28.5, and the median age of first marriage for females is 26.7. Of all couple-families, 78.3% of them have children under the age of 15, and 56.7% are dual-earner families. Similarly, Statistics New Zealand (http://www.stats.govt.nz/) reports that in 2001 women gave birth to 1.97 children on average. In addition, 36.1% of all families in the country have children under the age of 15, the median age at marriage for "bachelors" is 29.30 years, and the median age marriage for "spinsters" is 27.49.

Finally, of all couple-families, 91.10% of them have children under the age of 15, and 86.6% are full-time dual-earner couples.

Measures

Work/family conflict. As previously stated, work/family conflict was measured using Carlson et al.'s (2000) 18 item scale (Table 4). The scale consists of six subscales (3 items each), measuring time-, strain-, and behavior-based conflict for both work interference with family and family interference with work. An example of an item from the time-based family interference with work scale is, "I have to miss work activities due to the amount of time I must spend on family responsibilities." An example item from the time-based work interference with family scale is, "My work keeps me from my family activities more than I would like." Alpha reliability estimates for the validation study ranged from .68 (behavior-based work interference with family) to .83 (strain-based family interference with work), and from .78 (behavior-based work interference with family) to .92 (time-based work interference with family) for the comparison sample. For the validation sample, a 5-point Likert scale was used ranging from strongly disagree (1) to strongly agree (5), whereas the comparison sample was given a Likert scale ranging between strongly disagree (1) and strongly agree (6).

Procedure

Archival data for the validation sample were supplied by from Dr. Carlson, who provided an American sample originally used for item purification. Next, data from a local validation study conducted by an S&P 500 company on their Australian/New Zealand division were acquired. These data included responses to the full Carlson et al. (2000) work/family conflict scale, as well as several demographic items. Data collection occurred over a ten-week period between late June and early August of 2001, starting with an invitation to participate by the director of the Australia/New Zealand offices to some 2,394 full-time employees. Employees were given periodic reminders (every 2-3 weeks) of the option to participate and were asked to complete the study by a specific date.

As previously stated, both samples were measured on a strongly agree/strongly disagree Likert scale, with the validation sample scale ranging from 1 to 5, and the comparison sample scale ranging from 1 to 6. Due to the discrepancies between the answer format, all scores were analyzed using a completely standardized solution. According to Jöreskog and Sörbom (1996), a completely standardized solution is one in which both the latent and observed variables are standardized for analysis. In addition, the comparison scale contained a "Not applicable" choice. Individuals who chose this option for any of the questions were removed from the current study's sample due to the difficulty in determining the reasons for their choice. In other words, without a full understanding of the reasons for the choice, imputation of substitute scores would dramatically increase the probability of corrupting the comparison sample data set. Because power (sample size) did not appear to be an issue, exclusion was thought to be the most prudent decision. The final sample sizes are noted in the participants section.

Design and Analysis

Multi-sample confirmatory factor analysis (also known as a simultaneous factor analysis) was used to determine measurement invariance of the work/family conflict scale (Carlson et al., 2000) across the two independent samples. A diagram of the overall factor model is presented in Figure 1. Measurement invariance (also called measurement equivalence) was evaluated through a series of comparisons between the groups, and was based upon the fundamental covariance equation for confirmatory factor analysis, namely:

$$\Sigma = \Lambda\Phi\Lambda' + \Theta$$

Where Σ is the variance/covariance matrix of all the observed variables in the dataset, Λ is the matrix of item factor loadings, Φ is the variance/covariance matrix of the latent variables (factors), and Θ is the diagonal matrix of unique variances. This equation is the model describing observed item covariances as a function of common and unique factors (Vandenberg & Lance, 2000). The steps for testing measurement equivalence come from comparing the different matrices and their components delineated in the equation, increasing in specificity as needed. For this study, steps comparing the covariance matrices, factor structure, factor loadings, and error variances are planned to test for measurement equivalence between the US and Australia/New Zealand populations. The sequence consisted of two separate tests: (1) between males in the US and males in the Australia/New Zealand sample, and (2) females in the US and females in the Australia/New Zealand sample. Next, similar tests were conducted between males and females in the Australian/New Zealand group to examine Hypothesis 2. Finally, given structural similarities between gender groups in the Australian/New Zealand sample, t-tests were used to determine whether group differences existed in a pattern similar to that reported by Carlson et al. (2000).

Identification of the Factor Model

Identification of the statistical (in this case, factor) model in structural equation modeling involves determining whether there is a unique set of parameters associated with the data (Byrne, 1998). The first requirement for identification of the statistical model is to determine a basic model for testing. Carlson et al. (2000) provided this, fulfilling the initial step. A second requirement (linked to the first) is the need to determine the scale of every latent variable within the model. Because latent variables are unobserved, the scales may be estimated using the measurement model. This is often accomplished by fixing one manifest variable's factor loading parameter to a non-zero number, usually 1.0. This indicator variable then becomes a reference variable for the estimation of the associated latent variable's scale. Hence, in the Carlson et al. scale, each of the six latent variables would have one of their three item-loadings fixed to 1.0.

Although this is an accepted practice for single-sample confirmatory factor analysis, it provides unique obstacles in determining measurement invariance across multiple groups. By confining a specific factor loading to 1.0, the loadings of those variables are essentially set to be equivalent, even though they have yet to be tested for equivalence. In addition, the smaller the number of manifest variables for each latent variable, the larger the impact of this practice in determining invariance between groups. For instance, in the current study, using a reference variable for model identification would result in the assumption that 33% of the variables (six out of the 18 manifest variables, or one from each of the six latent variables) have invariant loadings across groups. Because they would be required for model identification, these six loadings could not be statistically tested for actual measurement invariance. Therefore, using a different approach that provides fewer restrictions on testing parameter measurement invariance would be beneficial.

A second approach to determining model identification is to directly standardize the latent variables. This procedure eliminates the need for reference variables, allowing all factor loadings to be freely estimated (Joreskog & Sorbom, 1993a, 1993b). Direct standardization of latent variables using single-sample confirmatory factor analysis is often accomplished by fixing the latent variable variances to some non-zero constant, usually 1.0 (Reise, Widaman, & Pugh, 1993), but preferably population variance values. Yet once more this provides challenges when testing for measurement invariance. For instance, if latent variable variances in both samples are fixed at 1.0, but at least one is significantly larger or smaller than 1.0, then discrepancies may arise. Therefore, to use standardization of latent variables in model identification, latent variable variances should be estimated. The best practice for estimating latent variables in multi-sample analysis is to equate them across groups and allow LISREL to determine the values accordingly (Jöreskog & Sörbom, 1996). Through estimation using equivalence across groups, LISREL is given a value, or "guidepost" from which it may estimate latent variable variances. This is useful when population values are not available.

Steps taken for statistical identification of the model are presented in Table 20.

Determining Measurement Invariance

According to Cheung and Rensvold (1999), steps for determining measurement invariance include:

1. $\Sigma^1 = \Sigma^2$. Testing invariance begins with a comparison of sample covariance matrices (Sörbom, 1976; cited in Jöreskog & Sörbom, 1996). If the null hypothesis is

not rejected, then invariance is said to exist. If the covariance matrices are equal, it follows that all of the matrices (factor loading, factor covariance, and uniqueness) must be equal across groups, and no further tests are needed. However, this is a very rigorous test (Cheung & Rensvold), and rejection of the null usually follows, prompting additional analysis.

2. $\Lambda^{1}_{form} = \Lambda^{2}_{form}$. Next, the fit of the theoretically derived model presented in Figure 1 is tested for invariance across groups. In this instance, factor loadings are not constrained to be equal across groups, only the pattern of manifest (item) and latent variable loadings. If invariance is confirmed, then the χ^2 statistic used in this unconstrained baseline model is used in subsequent tests (χ^2_{uncon}). If not, then further tests of invariance are not warranted since a common factor structure cannot be supported by the data. In the wake of such a finding, the only reasonable courses of action are single-sample confirmatory factor analysis and exploratory factor analysis. However, because the factor structures are known to differ (because of the results of step 2), no further tests of equivalence are warranted.

Determining manifest loading invariance. Manifest (item) loading invariance involves both full and partial invariance testing. Given factor pattern invariance, procedures for these and subsequent tests would include the following:

3. $\Lambda^{1}_{\chi} = \Lambda^{2}_{\chi}$. Manifest (item) loadings are held invariant and the difference between the χ^2_{uncon} and the subsequent χ^2 statistic is calculated. In the case of a significant difference, subsequent tests would not be warranted. However, a series of tests would be conducted to determine partial measurement invariance within the lambda matrix.

A nonsignificant difference between the unconstrained and fully constrained model would indicate measurement invariance. Subsequent tests would include:

4. $\Phi^1 = \Phi^2$. A test of factor variance/covariance invariance to provide the basis for testing equality of factor intercorrelations.

5. $\Theta^1 = \Theta^2$. Assuming factor variance/covariance similarity, invariance between unique variance matrices would indicate comparable reliability between the two samples.

Partial measurement invariance. If the same pattern of loadings across groups has been established, and the equality of the set loadings across groups has been rejected, partial measurement invariance can be investigated. Partial measurement invariance refers to examining which item loadings in a measure are invariant across multiple samples, and which are not. Although there is no generally accepted procedure for such an analysis, suggestions exist within the literature (Cheung & Rensvold, 1999; Vandenberg, 2000). For the present study, the following procedure was chosen:

1. One item at a time was held equivalent. All other items in the measure were not constrained to be equal across groups.
2. As with prior tests, differences between the χ^2_{uncon} and the present χ^2 were used to determine whether an item loading was equivalent across groups.
    a. For directly standardized latent variables, all three items were tested in this manner.
    b. For indirectly standardized latent variables using a reference variable, each item was alternately used both as a reference variable and a constrained variable, with the third variable set to vary freely. Results

determined which items were invariant, and which item was best used as the reference variable (Cheung & Rensvold, 1999).

Testing Model Fit

Because the χ^2 Likelihood Ratio Test is highly sensitive to both sample size and departures from multivariate normality (Byrne, 1998), three additional indices were also used to analyze model fit. These were the standardized root mean square residual (SRMR), the non-normed fit index (NNFI), and the root mean square error of approximation (RMSEA). The three were chosen for their ability to identify models with underparameterized factor covariances and factor loadings (e.g., when one or more parameters are fixed to zero when their population values are not zero; Hu & Bentler, 1998). In addition, the SRMR was chosen for its robust results when sample sizes are small (e.g., N<250). For SRMR and RMSEA, a value less than .05 is considered a good fit. In addition for RMSEA, a value between .05 and .08 is considered fair fit, and .08 to .10 moderate to poor fit. Finally, for NNFI, a value at or above .95 is considered good fit (Hu & Bentler).

Results

Data Preparation

Comparison sets. To test whether the ANZ and US samples had similar six-factor structures, the samples were split between, then compared within, gender: Males from the ANZ sample were compared to males from the US sample, and females from the ANZ sample were compared to females from the US sample. As previously stated, comparing the samples in this way ruled out gender as a reason for any differences found across cultures. Tests for measurement invariance were then duplicated across both sets within the ANZ sample. Specifically, to test Hypothesis 1a, tests for full and (when necessary) partial measurement invariance were applied to the US and ANZ male samples. To answer Hypothesis 1b, the same tests were then applied to the US and ANZ female samples. In addition, to address Hypothesis 2, tests for full and partial measurement invariance were also applied to the ANZ sample split by gender (males vs. females).

Imputation of missing values. For males in the US sample, 15 separate items were found to have missing data, spread across 13 different people. Missing data were subsequently imputed by predicting responses based on completed answers to same-scale items. First, regression weights and error terms were calculated using individuals with complete data sets. Since no scale contained more than one missing value for any given individual, each equation consisted of two predictors. Missing values were then replaced by finding predicted values for each missing value using the appropriate regression equation.

Descriptive statistics. Correlations and descriptive statistics for items and scales are presented in Tables 5 through 18. The largest number of significant inter-item correlations was found between males in the US (132 out of 162) followed by females in the US (112 out of 162), males in ANZ (112 out of 162), and females in ANZ, respectively (98 out of 162). However, item intercorrelations, means, and standard deviations appeared roughly the same across datasets. For scale scores, the number of significant intercorrelations was largest for the US females (15 out of 15), followed by ANZ males (13 out of 15), US males (12 out of 15), and ANZ females (10 out of 15). As with the items, the size of the intercorrelations, means, and standard deviations for the scales appeared similar across samples.

Determining Measurement Invariance

Comparing variance/covariance matrices. Significant χ^2 between the sets of males ($\chi^2(171)=282.03$, $p<.01$) and females ($\chi^2(171)=427.29$, $p<.01$), as well as mediocre-to-poor fit results (males: RMSEA=.062; SRMR=.10; NNFI=.92. Females: RMSEA=.08; SRMR=.12; NNFI=.90), indicate that the groups do not share common variance/covariance matrices (see Table 19). Nevertheless, as stated in the previous section, the comparison of covariance matrices is often considered an extremely rigorous test, because it is equivalent to holding factor pattern, factor loading, and uniqueness matrices constant across groups (Cheung & Rensvold, 1999). Additional analysis is therefore warranted, because less complete invariance is still possible.

Hypotheses 1a and 1b: Factor pattern invariance. Hypotheses 1a and 1b stated that an equivalent six-factor pattern would be found between both males and females in the US and ANZ samples. As an initial step, the first item in each factor was designated as a reference variable and it's loading constrained to 1.0. According to Jöreskog and Sörbom (1996), a reference variable for a latent variable is "an observed variable that represents the latent variable in the sense of being a valid and reliable measure of it. There can be only one reference variable for each latent variable" (p. 18). Because the scale of latent variables must be estimated from the observed variables, designating a reference variable by constraining its loading to a non-zero number provides the basis from which this may occur. Conventionally, researchers have constrained reference variables to 1.0 (Reise, Widaman, & Pugh, 1993), a practice that was followed in this study. Using such a procedure, statistical identification of the model was achieved for both males and females. Overall, model fit was good for females ($\chi^2(240)=464.76$,

$p<.01$; RMSEA=.066; SRMR=.049; NNFI=.94), and moderate-to-poor for males ($\chi^2(240)=445.30$, $p<.01$; RMSEA=.079; SRMR=.070; NNFI=.90). Results are therefore similar enough between the samples for both males and females to warrant further investigation of measurement invariance, supporting both hypotheses 1a and 1b. As previously stated, all subsequent tests of equivalence were conducted by examining the difference between the unconstrained factor pattern χ^2 (χ^2_{uncon}), and the more constrained model's χ^2 (χ^2_{con}).

Invariance of manifest variable factor loadings. Manifest variable factor loadings were tested for invariance by equating each sample's lambda matrix, thus holding the factor pattern and manifest variable loadings equal across groups. As with testing for factor pattern invariance, results indicated significant χ^2 for both males ($\chi^2(257)=475.67$, $p<.01$) and females ($\chi^2(255)=509.91$, $p<.01$), with mediocre-to-poor model fit for males (RMSEA=.081; SRMR=.14; NNFI=.84), and good-to-fair fit for females (RMSEA=.068; SRMR=.079; NNFI=.93). In addition, significant changes in χ^2 between the unconstrained and constrained model for both males ($\Delta\chi^2(17)=30.37$, $p<.05$) and females ($\Delta\chi^2(15)=45.15$, $p<.05$) indicated non-invariance of manifest variable factor loadings. The remaining fit indices also indicated a decrease in overall model fit, with increases in RMSEA (males: ΔRMSEA= +.002; females: ΔRMSEA= +.002) and SRMR (males: ΔSRMR= +.07; females: ΔSRMR= +.03), and decreases in NNFI (males: ΔNNFI= -.06; females: ΔNNFI= -.01), for both males and females. These results indicate that further invariance tests such as factor variance/covariance comparisons and unique variance comparisons, or scale mean comparisons across samples, would not be meaningful.

Statistical identification of the model. Because full measurement invariance was not found, results were analyzed for partial invariance across groups. However, before this could be undertaken, an alternative method for estimating the scale of latent variables, and subsequently achieving statistical identification of the model, was sought. Previous identification was achieved by fixing reference variable item loadings within each scale to 1.0. However, using this method precluded testing the equality of reference variable loadings across samples. To free these parameters for subsequent testing, latent variable scaling needed to be achieved by alternative means. One such way is to fix latent variable variances to some non-zero value. Jöreskog and Sörbom (1996) recommend using values that represent population variances, and common practice is to equate the variances to 1.0 (Reise, Widaman, & Pugh, 1993). However, because population information is not available, and actual factor variances can not be known, estimation of factor variances was considered the best possible practice in this situation. However, to free the references variables for parameter testing, estimate the factor variances, and identify the statistical model, some reference point is still needed for latent variable scaling. Fortunately, with multi-sample analysis, latent-variable scaling can be achieved by equating factor variances across samples. This avoids the difficulty of determining actual latent variable variances required when designating fixed values. In summary, given the lack of population information on the work/family conflict scales, equating factor variances across samples for latent scale estimation in lieu of using fixed values was considered more appropriate.

For males, using the unconstrained model where only factor patterns are designated as equal resulted in model identification and identical fit statistics as when reference variables were used. However, comparisons between the female sets resulted in non-positive definite covariance matrix errors in the estimated common model, and no results were provided by LISREL. This indicates that at least one of the latent variable scales could not be estimated by equating factor variance across groups. To determine which factor or factors were causing the non-positive definite covariance matrix error in the LISREL program, identification was reverted to using reference variables for each of the factors. Thereafter, an iterative approach to determining which factor variances could not be estimated by equating factor variances was undertaken. Descriptions of the steps taken during successive iterations are presented in Table 20 and elucidated below.

Using the original model that utilized reference variables to achieve statistical identification, changes were made one factor at a time. For each iteration, a single latent variable's variance was equated across groups, and the corresponding reference variable freed. Given model identification after such a modification, subsequent iterations would include the previous modification, and test of the next factor in like manner. For example, the original program was modified so that the reference variable for time-based work interference with family was freed, and the latent variable variances in each sample equated within the LISREL program. All other factor scales continued to be estimated using reference variables. When the program was executed, statistical identification of the model was again achieved, yet now the loadings for all three items for time-based work interference with family may be tested for measurement equivalence. For the second iteration of this process, the results of the first iteration are kept in place, and the procedure of freeing the reference variable and equating the latent variable variances for the next factor is repeated, and so forth until all relevant factors have been tested.

Through this process it was found that strain-based family interference with work required the use of a reference variable to determine latent variable scaling between the female samples, while all other factors could be scaled by equating the factor variances. Therefore, the variance for this factor was allowed to vary freely, and a reference variable re-assigned to be used in determining latent variable scaling. The remaining five factors were scaled by equating their respective factor variances. As a result, no errors were encountered, statistical identification of the model was achieved, and testing for partial measurement invariance resumed for both comparison sets.

Partial measurement invariance. Partial measurement invariance was determined on an item-by-item basis. In turn, each manifest variable loading was constrained to be equal across samples, while simultaneously the loadings of all other items in the measure were allowed to vary freely. For males, the resulting change in χ^2 and fit statistics were significant for items three ($\Delta\chi^2$=5.42, p<.05; ΔRMSEA= +.001, ΔSRMR= +.012, ΔNNFI= 0.00; "I have to miss family activities due to the amount of time I must spend on work responsibilities"), seven ($\Delta\chi^2$=6.04, p<.05; ΔRMSEA= +.002, ΔSRMR= +.007, ΔNNFI= 0.00 ; "when I get home from work I am often too frazzled to participate in family activities/responsibilities"), and eleven ($\Delta\chi^2$=5.06, p<.05; ΔRMSEA= +.001, ΔSRMR= +.021, ΔNNFI= 0.00 ; "because I am often stressed from family responsibilities, I have a hard time concentrating on my work"). Although the NNIF statistics indicated no change, the results were still poor. Combined with the significant $\Delta\chi^2$, large negative changes in SRMR, and small negative changes in RMSEA, it was determined that the model would fit the data better if these items were allowed to vary freely.

As a result, the final model consisted of equating factor patterns between the samples, as well as all manifest variable loadings with the exception of items three, seven, and eleven. Overall change in χ^2 for males was not significantly different from the unconstrained model ($\Delta\chi^2(15)=15.14$, $p>.05$), yet fit was again mediocre-to-poor (RMSEA=.078; SRMR=.11; NNFI=.91). However, fit indices do show a small improvement using partial measurement invariance when compared to full measurement invariance (ΔRMSEA= -.001, ΔSRMR=0.00, ΔNNFI= +.01). Fit statistics for each of the manifest variable loading tests between the male samples are presented in Table 21, with final lambda, phi, and error matrices, along with estimated modification indices for males, in Tables 23 through 25.

Modification indices provide the estimated change in χ^2 should the specific item invariance between samples be set to vary freely. For males, LISREL estimated that removing the equality constraints between samples for items 10, 12, and 15 would reduce the χ^2 by 10.42 (2.57, 4.87, and 2.98, respectively). All other modifications would result in χ^2 reductions of less than two. However, this reduction would not result in a non-significant statistic. Furthermore, the change in χ^2 between the unconditional and conditional model was already non-significant. Therefore, removal of any equality constraints wound neither improve measurement invariance nor model fit. As a result, all remaining equality constraints between the two male samples were left intact.

For females, the resulting change in χ^2 and fit statistics were significant for items one ($\Delta\chi^2$=5.35, $p<.05$; ΔRMSEA= 0.001, ΔSRMR= +.015, ΔNNFI= 0.00; "my work keeps me from my family activities more than I would like"), two ($\Delta\chi^2$=6.84, $p<.05$; ΔRMSEA= 0.001, ΔSRMR= +.018, ΔNNFI= -.01; "the time I must devote to my job keeps me from participating equally in household responsibilities and activities"), four ($\Delta\chi^2$=4.49, $p<.05$; ΔRMSEA= 0.00, ΔSRMR= +.010, ΔNNFI= 0.00; "the time I spend on family responsibilities often interferes with my work responsibilities"), seven ($\Delta\chi^2$=8.30, $p<.05$; ΔRMSEA= +.001, ΔSRMR= +.0031, ΔNNFI= -.01; "when I get home from work I am often too frazzled to participate in family activities/responsibilities "), eight ($\Delta\chi^2$=5.77, $p<.05$; ΔRMSEA= 0.001, ΔSRMR= +.023, ΔNNFI= -.01; "I am often so emotionally drained when I get home from work that it prevents me from contributing to my family"), 10 ($\Delta\chi^2$=3.95, $p<.05$; ΔRMSEA= 0.00, ΔSRMR= +.003, ΔNNFI= 0.00; "due to stress at home, I am often preoccupied with family matters at work"), 15 ($\Delta\chi^2$=5.88, $p<.05$; ΔRMSEA= 0.00, ΔSRMR= +.017, ΔNNFI= -.01; "the behaviors I perform that make me effective at work do not help me to be a better parent or spouse"), and 18 ($\Delta\chi^2$=4.99, $p<.05$; ΔRMSEA= 0.00, ΔSRMR= +.011, ΔNNFI= 0.00; "The problem-solving behaviors that work for me at home do not seem to be as useful at my work"). Although changes in SRMR were large, changes in RMSEA and NNFI were negligible. Combined with the significant $\Delta\chi^2$, it was determined that the model would better fit the data if these items were allowed to vary freely. However, since eight out of 18 of the items displayed differences in factor loadings, use of the measure for comparisons between cultures is not supported.

In addition, it was found that designating item eleven ("because I am often stressed from family responsibilities, I have a hard time concentrating on my work") as a reference variable for strain-based family interference with work resulted in better parameter invariance than using other items. This was determined using Cheung and Rensvold's (1999) triangle heuristic. According to the authors, certain items may work better as reference variables when testing for invariance in multiple groups. They proposed a system by which items in a factor were alternately used as the reference variable, set free to vary, or constrained to equality across groups. The pattern that provides the greatest amount of equality across groups is then used in identification of the model. Specifically, for strain-based family interference with work, using item 12 as the reference variable resulted in a significant $\Delta\chi^2$ for item 11, but not vice-versa, while item 10 had a significant $\Delta\chi^2$ regardless of which was used to scale the latent variable.

By adjusting for equality based on these findings, overall change in χ^2 was not significantly different from the unconstrained model ($\Delta\chi^2(9)=13.96$, $p>.05$), and a good-to-mediocre fit with the model was realized (RMSEA=.065; SRMR=.064; NNFI=.94). As with the males, fit indices for partial measurement invariance showed an improvement over the test for full measurement invariance ($\Delta\chi^2(10)=43.03$, $p<.05$; ΔRMSEA= -.003, ΔSRMR= -.056, ΔNNFI= +.01). However, since only 10 of the 18 items could be used in the adjusted scale, the viability of the measure as an indicator across cultures of work/family conflict is questionable. Fit statistics for each of the manifest variable loading tests are presented in Table 22, with final lambda, phi, and error matrices, along with estimated modification indices for females, in Tables 26 through 28.

Modification indices provide the estimated change in χ^2 should the specific item invariance between samples be set to vary freely. For females, LISREL estimated that removing the equality constraints between samples for item 13 would reduce the χ^2 by 4.11. All other modifications would result in χ^2 reductions of less than two. However, as with the males, this reduction would not result in a non-significant statistic. Furthermore, the change in χ^2 between the unconditional and modified conditional model was already non-significant. Therefore, removal of any equality constraints wound neither improve measurement invariance nor model fit. As a result, all equality constraints between the two female samples remained intact.

Exploratory factor analysis

Exploratory factor analysis was conducted to determine why model fit between US and ANZ males was mediocre-to-poor, but fit between the female samples was good-to-mediocre. Initially, principal axis factoring with a Promax rotation and a forced six-factor solution was used to determine if the sample factor patterns matched those espoused in theory. Factor patterns and loadings are presented in Tables 29 to 30 for males and 31 to 32 for females. Results indicated that a six-factor solution showing simple structure and conforming to theory could not be extracted from data from males in the US. For males in ANZ, all but three items loaded exclusively on their a priori factors. Specifically, items 13 and 15 double-loaded on their a priori behavior-based work interference with family factor, and a factor containing behavior-based family interference with work, while item 14 only loaded on the factor containing behavior-based family interference with work.

Results from the females in the ANZ sample also indicated that items from the behavior-based work/family conflict scales loaded on the same factor. However, unlike the males, only item 17 loaded on a separate, a priori factor, and item 13 double-loaded on the factor containing items from the strain-based family interference with work scale. For the US female data, a forced six-factor solution also provides evidence that the original theory may be viable. However, unlike the ANZ males, items for the strain and time-based family interference with work scales loaded on the same factor. Yet items 4 and 5 of the time-based family interference with work scale also loaded on a separate factor. All other items loaded on their a priori factors, with item 15 double-loading on the behavior-based family interference with work factor.

Given the difficulties in fitting the data to a six-factor model, a forced five-factor solution was also investigated. For ANZ males, a clear five-factor solution emerged, with no complex loadings, and items from the two behavior-based scales loading on a single factor. For US males, the results were not as clean. Again, the items from both behavior-based scales loaded on the same factor, as did item nine from the strain-based work interference with family scale. Item eight loaded on the strain-based family interference with work scale, and items four and 14 double-loaded on this same factor. Finally, a "garbage" factor appeared containing item seven, and double-loadings for items 13 and 16.

For the females, a five-factor solution fit the data well, albeit for different reasons. Like their male counterparts, the ANZ female's displayed a clean structure, with items from the two behavior-based scales loading on the same factor. The one exception was item 13, which loaded on both the behavior-based factor and the strain-based family interference with work factor. For US females, time and strain-based family interference with work scale items again loaded on the same factor. In addition, items 13 and 15 double-loaded on their a priori behavior-based work interference with family factor as well as a more general behavior-based factor with items from the behavior-based family interference with work scale.

When only a small number of items load on each dimension, and the communalities of the items are relatively low, results from exploratory factor and principal components analysis can differ widely (Floyd & Widamen, 1995). Therefore, principle components analysis with a promax rotation was also computed to help determine the extent to which the data sets do not fit the a priori work/family conflict theory. Component patterns and loadings are presented in Tables 33 to 34 for males and Tables 35 to 36 for females. Using a forced six-component solution with the males, both the order of component extraction and pattern of loadings are different for each sample. In the US group, a combined behavior-based dimension that included both work interference with family (items 13, 14, & 15) and family interference with work (items 16, 17, & 18) emerged. A similar finding occurred with males in the ANZ sample, with the exception of item 13, which loaded on a separate dimension. Also in the ANZ sample, the other two behavior-based work interference with family items (items 14 & 15) double-loaded on the dimension containing item 13. As with the exploratory factor analysis with the ANZ male group, the double-loading of these items presents two clear components for behavior-based work interference with family in the ANZ sample. It also provides evidence that the scales may be measuring similar, yet distinct, factors of work/family conflict. Lastly, it is a clear departure from the component structure of males in the US sample, at least in part accounting for the level of fit between the two groups.

Other differences between the US and ANZ male sample component structures are seen in the time-based family interference with work dimension (items 4, 5, & 6). For the US, item 6 of this component loads on its own dimension, while for the ANZ males, all three items load on the same component. In addition to this, several items in the US sample have double-loadings on unrelated components. For instance, items 8 (strain-based work interference with family) and 14 (behavior-based work interference with family) load on their designated dimensions and on the strain-based family interference with work dimension. In addition, item 13 loads on both its designated behavior-based work interference with family dimension, and the strain-based work interference with family dimension. Finally, using a forced five-component solution did not significantly change these findings.

In summary, exploratory component analysis revealed that data from males in the US sample appear well represented by a 5-component solution, and show a complex loading pattern with some items. In contrast, data from males in the ANZ sample were at least partially represented by the theorized 6-component solution, with some complex loadings between the highly correlated behavior-based work/family conflict scales. These dissimilarities appear large enough to affect the level of measurement invariance between the two samples.

Regardless of the dissimilarities between the two male samples, the patterns are still similar enough to provide evidence of fit with a common model. Specifically, 16 of the 18 items loaded on their theoretical a priori components. In addition, the majority of the complex items displayed lower or negative loadings on non-a priori dimensions, indicating that the majority of their variance was accounted for by the correct a priori components. For these reasons, the simultaneous confirmatory factor analysis provided mediocre levels of fit on at least some of the indicators. Given the small sample size of males in the US (N=83), and the previously mentioned imputation of some of the US samples' data, the level of fit found between the US and ANZ group may be viewed as appropriate.

For females, the differences in pattern loadings are not as complex as those with the males. To begin with, the US sample is of a considerably larger size (N=139), that allows for more diversity in answers. As a result, exploratory components analysis revealed a 6-factor structure much closer to the theoretical model than what was found in the US males. All items loaded on their a priori dimensions, and only two had double-loadings: item 15 loaded on both behavior-based factors, and item six loaded on both the behavior based and time-based family interference with work factors.

The structure of the ANZ female data was not as consistent with that of the original theory as the US female sample. To begin, like their male counterparts, items from both behavior-based scales loaded on the same component, with the exception of item 13, which loaded on an independent dimension. However, unlike the ANZ males, items 14 & 15 of the behavior-based work interference with family scale did not double-load on the same component as item 13. In other words, the female sample essentially contained only one component for behavior-based work interference with family. All other dimension patterns for the ANZ female sample were identical to those of the US sample. The only exception to this was item 4, which double-loaded on both time-based dimensions. In short, the similarities between the female samples are large enough to warrant a good-to-mediocre fit in measurement invariance, but the dissimilarities between them on the behavior-based component prohibits a better fit between the groups.

Summary and explanation of exploratory factor and components analysis. Put simply, sample characteristics may be attenuating fit between the groups in simultaneous confirmatory factor analysis. Most obvious of these characteristics is the small number of data points in the US male sample. It is likely that diversity of scores in larger samples would provide a better representation of the population and therefore a better fit with the theoretical model. More specifically, as sample size increases, not only is the population factor structure better revealed, but also smaller differences between the samples become significant.

For all groups, high correlations between the behavior-based factors resulted in exploratory findings where a five-factor solution fit the data ($\Phi_{(\text{US males})}$=.89; $\Phi_{(\text{ANZ males})}$=.84; $\Phi_{(\text{US females})}$=.79; $\Phi_{(\text{ANZ females})}$=.98). This indicates a high degree of similarity between the two behavior-based latent variables, and in how these scales are being answered. In addition, for US females, high correlations between the time and strain-based family interference with work factors (Φ=.85) reveal why items from those two scales loaded on the same dimensions. Nevertheless, there is enough similarity between the two sets of samples to warrant a study of measurement invariance. This is evidenced by the non-significant $\Delta\chi^2$ and positive changes in other fit statistics when testing for factor pattern invariance.

Hypothesis 2: Gender Differences in the Australian/New Zealand Sample.

Hypothesis 2 stated that differences would exist between males and females in the Australian/New Zealand sample on Carlson's work/family conflict scale. To determine the extent to which measurement noninvariance occurred, steps of the prior analyses were repeated on Australian/New Zealand males and females.

Comparing variance/covariance matrices. Significant χ^2 between males and females (χ^2(171)=322.74, p<.01) in Australia/New Zealand indicate that the groups may not share common variance/covariance matrices (see Table 37). However, good-to-mediocre fit results (RMSEA=.062; SRMR=.081; NNFI=.94) indicate that measurement invariance may still exist. Since the comparison of covariances is considered an extremely rigorous test, holding pattern and factor loadings constant across groups (Cheung & Rensvold, 1999), additional analysis is warranted.

Hypothesis 2: Factor Pattern Invariance. As with prior analyses, an initial step was to use the first item in each factor as a reference variable, constraining its loading to 1.0. Using this procedure, statistical identification of the model was achieved, with a significant χ^2 ((240)=497.98, p<.01), and mediocre fit statistics (RMSEA=.070; SRMR=.060; NNFI=.93). However, results are similar enough between the samples to warrant further investigation of measurement invariance. As with previous analyses, all future tests of equivalence will be conducted by examining the difference between this unconstrained factor pattern χ^2 (χ^2_{uncon}), and the more constrained model's χ^2 (χ^2_{con}).

Invariance of manifest variable factor loadings. Manifest variable factor loadings were tested for invariance by equating each sample's lambda matrix, thus holding the factor pattern and manifest variable loadings equivalent across groups. As with testing for factor pattern invariance, results indicated significant χ^2 between males and females ($\chi^2(258)=529.04$, $p<.01$), with mediocre-to-fair model fit (RMSEA=.071; SRMR=.083; NNFI=.93). In addition, significant changes in χ^2 between the unconstrained and constrained model ($\Delta\chi^2(18)=31.06$, $p<.05$) indicates non-invariance of manifest variable factor loadings, supporting Hypothesis 2. Both RMSEA and SRMR also indicate a decrease in overall model fit (ΔRMSEA= +.001; ΔSRMR= +.023), with no change in NNFI. These results indicate that further invariance tests such as factor variance/covariance comparisons and unique variance comparisons, or scale mean comparisons across samples, would not be meaningful without further modification.

Statistical identification of the model. Since full measurement invariance was not found, results were analyzed for partial invariance across groups. As with the prior analyses, estimating the scale of latent variables by equating factor variances was used in favor of reference variables. Subsequently, each respective reference variable for the factors was freed for parameter testing. The new pattern of constraints resulted in identification of the model (Table 37) and testing for partial measurement invariance resumed.

Partial measurement invariance. Partial measurement invariance was determined on an item-by-item basis. For each manifest variable, loadings were constrained to be equal across samples while all other items in the measure were allowed to vary freely. Resulting change in χ^2 and fit statistics were significant for items four ($\Delta\chi^2=4.28$, $p<.05$; ΔRMSEA= +.001, ΔSRMR= +.008, ΔNNFI= 0.00; "the time I spend on family responsibilities often interferes with my work responsibilities"), and eight ($\Delta\chi^2$=4.69, p<.05; ΔRMSEA= +.001, ΔSRMR= +.009, ΔNNFI= 0.00 ; "I am often so emotionally drained when I get home from work that it prevents me from contributing to my family"). Although the NNFI statistics indicated no change, the combined significant $\Delta\chi^2$, large changes in SRMR, and small changes in RMSEA, it was determined that the model would fit the data better if these items were allowed to vary freely.

As a result, the final model consisted of equating factor patterns between the samples, as well as all manifest variable loadings with the exception of items four and eight. Using these changes, overall $\Delta\chi^2$ between ANZ males and females was not significantly different from the unconstrained model ($\Delta\chi^2$(16)=22.23, p>.05), yet fit was again mediocre (RMSEA=.070; SRMR=.075; NNFI=.93). Fit statistics for each of the manifest variable loading tests between the male and female ANZ samples are presented in Table 38, with final lambda, phi, error matrices, and estimated modification indices, in Tables 39 through 41.

Modification indices provide the estimated change in χ^2 should the specific item invariance between samples be set to vary freely. It was estimated that removing the equality constraints between males and females for items 7,10, 11, and 12 would reduce the χ^2 by 18.23 (2.49, 10.03, 3.14, and 2.57, respectively). All other modifications would result in χ^2 reductions of less than two. However, this reduction would not result in a non-significant χ^2 statistic. Furthermore, the change in χ^2 between the unconditional and conditional model was already non-significant. Therefore, removal of any equality constraints wound neither improve measurement invariance nor model fit. As a result, all remaining equality constraints between the Australian/New Zealand male and female samples remained intact.

Research Question 1: Differences between Males and Females in the Australian/New Zealand Sample

Since non-invariance exists in items four and eight between Australian/New Zealand males and females, results of mean comparisons for the time-based family interference with work scale, and the strain-based work interference with family scale, are subject to debate. However, the other four scales indicate measurement invariance and therefore can be compared across groups without question. Results indicate that significant gender differences only exist for time-based work interference with family and family interference with work, where males reported higher levels of conflict than females. No differences across gender for strain or behavior-based family interference with work or work interference with family were found (Table 42). This is markedly different than the Carlson et al. (2000) findings, in which females indicated significantly higher mean scores on all three forms of family interference with work (time, strain, behavior), as well as strain-based work interference with family. In short, gender differences did exist between Australian/New Zealand males and females, supporting hypothesis 2. Yet these differences are not the same as those found in the United States by Carlson et al., and are dissimilar enough to warrant further investigation.

Discussion

The purpose of this study was to examine the level of measurement invariance in a scale of work/family conflict between samples from the United States and Australia/New Zealand. Samples from both cultures were also split into males and females to rule out gender as a possible alternative explanation to findings. As a result, a total of four datasets were analyzed: US males vs. ANZ males, and US females vs. ANZ females. In addition, gender differences were examined within the Australia/New Zealand sample to determine if males and females reported similar patterns of work/family conflict compared to their US counterparts. Measurement invariance was conducted on both sets of analyses through the use of simultaneous confirmatory factor analysis using the LISREL 8.3 statistical package. In addition, exploratory factor analysis was conducted on the four data sets to determine if discrepancies were the result of underlying differences in factor patterns that are not revealed in confirmatory factor analysis. Finally, mean differences between males and females within the ANZ sample were compared on scales where measurement invariance was determined.

Testing for Measurement Invariance

Hypotheses 1a and 1b. Hypotheses 1a and 1b stated that an equivalent six-factor structure of Carlson et al.'s (2000) work/family conflict scale would be found between males in the English-speaking Australian/New Zealand sample and males in the English-speaking sample from the United States, as well as between females in the US sample and females in the ANZ sample. One procedure for testing these hypotheses was to compare sample covariance matrices. When the matrices prove to be similar due to a good fit with the common model, then measurement invariance is said to exist and further tests are unwarranted. The findings indicated that a poor fit existed for both the male and female sets. Nevertheless, this test is considered very rigorous, and a poor fit with the common model does not necessarily mean that full measurement non-invariance exits.

Therefore, additional testing was done to determine if the findings of the initial invariance test were due to minor or major differences between the samples.

The next step was to constrain only the pattern of factor loadings to equality across groups, not the equality of each of the loadings. When constraining the pattern of factor loadings to be equal across groups, the common model fit between male groups was mediocre-to-poor, and the common model fit between female groups was good. This test was essential to determine if the samples could be compared further. Without at least a moderate fit with the hypothesized factor model, there would be no justification to continue comparisons using multiple samples. This is because the factor structure would be so different across groups that the numbers resulting from the scales would not be comparable.

Determining what is "enough" fit between each sample and the common model is not cut-and-dry. For instance, using only the χ^2 Likelihood Ratio Test nearly always results in a significant statistic, indicating that the model does not fit the data. Yet it is widely accepted that the χ^2 test is not robust against deviations in multivariate normality and deviations due to small sample sizes (n<250; Hu & Bentler, 1998). The three other fit indices used in this study were picked to complement the χ^2 for their abilities to identify models with underparameterized covariances and factor loadings (RMSEA, NNFI), as well as their robust results when sample sizes are small (SRMR). However these are imperfect in that they are descriptive statistics, providing good information only when a model either fits well or poorly, and only when they are similar in their assessments. Such was the case with the female data, where all three descriptive indices indicated good model fit, providing support for hypothesis 1b.

Decidedly different results were found in the male set, where the RMSEA and SRMR indicated mediocre fit, and the NNFI indicated poor fit (the χ^2, as always, was significant). This provided at least partial support for hypothesis 1a, and is a good example of the gray area in interpreting model fit, which occurs when some fit indices indicate a good fit and others indicate a poor fit. Determining whether the fit was "good enough" to continue comparisons between the male samples was based entirely on the relative distance between the findings and specified cutoff scores, as well as common practices in the literature. Using these guidelines, it was determined that the common model's fit with both male samples was good enough to warrant further investigation, even though the hypothesis was only considered to be partially supported.

Because this is the model to which all additional (constrained) models were compared, it is referred to as the unconstrained model.

Invariance of manifest variable factor loadings. Although hypotheses 1a and 1b were essentially supported, the findings do not complete the study's primary purpose of determining measurement invariance in the work/family conflict scales across both sets of samples. To do so requires additional testing, beginning with the manifest variable factor loadings. While continuing to hold the pattern of factor loadings invariant across groups, the values of item loadings were also held constant across groups and common model fit assessed. However, unlike the factor pattern test, results indicated that fit with the descriptive indices decreased when manifest variable loadings were held constant across groups, both for the males and females. In addition, the change in χ^2 between the unconstrained model and the pattern-and-loading constrained model was significant, providing further evidence that measurement non-invariance exists across culture for both males and females.

The next step was to determine to what extent measurement non-invariance existed between the samples in each set, also known as partial measurement invariance. Additional analyses revealed that specific manifest variable factor loadings between the male samples (items 3, 7, & 11) were causing the overall comparison of item factor loadings to fit the data poorly. By allowing these loadings to vary freely for each sample, instead of constraining them to be equal, descriptive fit statistics improved considerably, and the change in χ^2 was no longer significant. The situation was considerably more complicated between the female samples, where eight items (numbers 1, 2, 4, 7, 8, 10, 15, 18) displayed non-invariant factor loadings when constrained to be equal across samples. Again, when these are set to vary freely, descriptive fit indices improved considerably, and the change in χ^2 was no longer significant. Nevertheless, the high level of non-invariance between the males and female samples would make mean comparisons across cultures difficult to interpret, and therefore such comparisons were not computed.

To determine why measurement non-invariance occurred and why the male samples had a poorer fit with the common model than the female samples, exploratory factor and component analyses were computed on all four samples. Results revealed differences in underlying patterns within each sample. For instance, data from US males contained a considerable number of double-loadings and did not conform to the theoretical model (and the one proposed by Carlson et al., 2000), yet data from the ANZ males more readily adhered to a six-factor solution. However, the complex item loadings in the male ANZ sample make a five-factor solution plausible as well. This may explain the mixed findings of the fit indices, where some indicate mediocre fit, but others point to a poor fit between the two data sets. In addition, partial measurement invariance revealed only three items that could not be equated across groups. These similarities indicate that the dissimilarities between the samples may be due to sample-specific issues as opposed to problems within the theoretical factor structure of the measure. For instance, the size of the US male sample (n=83) may not be large enough to provide an adequate representation of how males in the US react to this measure. The cleaner solution for the US males found in the component analysis may indicate that a larger sample representing a diverse set of job-types would yield a factor pattern with greater similarity to the one displayed by males in the ANZ sample.

In contrast, US females appeared closer to the a priori 6-factor solution than their male counterparts, yet items from time and strain-based family interference with work double-loaded on a single factor. Meanwhile, the ANZ females' data appeared best represented by a 5-factor solution. Differences between the two female samples' results were also found with the behavior-based scale, where the work and family-based scale items loaded on separate components for US females, but only on one component for ANZ females. However, with the ANZ female sample, a single item from the behavior-based work interference with family scale loaded on its own component, indicating at least partial similarity in the behavior-based scales' factor structure between the two data sets. Nevertheless, it does appear that conceptually there are 6 factors, yet only five appear to be defensible empirically. In addition, unlike the male samples, the females largely displayed clean item loadings in each analysis. This, coupled with the double-loadings of time and strain-based family interference with work in the US sample, provides evidence for the good-to-mediocre model fit found between the two samples in the simultaneous confirmatory factor analyses. In addition, the differences in factor structures also provide evidence for why eight out of the 18 items were found to have non-invariant loadings across the samples. However, both samples were large enough (US=139; ANZ=249) to provide at least adequate representation of the population scores. This leads to the question of whether some other sample-related issue is causing such a marked departure from the general work/family conflict theory, as discussed below.

Overall, these issues may also be masking error in the scale's ability to measure the theoretical model. This question arises when looking at the factor analysis results from the two Australia/New Zealand samples, where size was not an issue. Both males and females had cleaner five-factor structures than six-factor structures. Although these structures have greater similarities than those found between males and females in the US sample, they are nevertheless a departure from the theoretical model. More importantly, problems arise across all the samples with the measurement of behavior-based work/family conflict. Specifically, although behavior-based conflict appears to exist, whether it can be parsed into work and family orientations are unclear. For instance, certain job-types such as litigator, police officer, and military personnel may require changes in behavior that are drastically different between the work and family domains. If individuals have trouble adjusting when moving between domains, then behavior-based conflict would be more prevalent and more readily measured by the Carlson et al. scale. Nevertheless, it is interesting that both the US and ANZ samples show conflicting results when I attempted to fit a bi-directional solution to this form of work/family conflict. This may indicate that the measure is not thoroughly sampling the six work/family conflict components, and therefore may need to be revised by increasing the specificity of the item wording.

An alternative sample-related explanation may be in the composition of the data sets. Whereas the US female sample is primarily made up of individuals in their late 30's, the Australian/New Zealand female sample consists of individuals in their early 30's. It may be that younger women have less experience dealing with work/family role overlap, be more likely to have younger children at home, and are more likely to be in an earlier career-building phase than older women. These issues may moderate the extent to which younger women are able to leave work-related behaviors "at the office." In contrast, older women will be more likely to have older, more self-sufficient children, not to mention be more experienced in dealing with work/family role overlap and be further along/secure in their career development. These differences may be important in a woman's ability to separate work-related versus family-related behavior. In short, older women may be better equipped both experientially and environmentally to separate work-related role behaviors from family-related role behaviors, hence the differences in the exploratory component analyses results from those found in exploratory factor analysis.

Gender Differences in the Australian/New Zealand Sample

Hypothesis 2 and research question 1. Hypothesis 2 postulated that gender differences in work/family conflict would exist in the Australian/New Zealand sample, and research question 1 was an exploratory analysis into the nature of those differences. However, before mean comparisons could commence, measurement invariance between males and females in the ANZ sample needed to be confirmed. As with hypotheses 1a and 1b, a covariance matrix comparison resulted in poor fit statistics and a significant χ^2. Additional testing revealed a good fit with the common model when the factor pattern was held invariant. However, a poor fit with the model occurred when the factor loadings were held invariant as well. Partial measurement invariance testing was then conducted, revealing significant changes in χ^2 and poorer model fit when the loadings for items four and eight were equated across genders. Subsequently, improved model fit and a non-significant change in χ^2 from the unconstrained model resulted when the loadings for these items were allowed to vary freely.

The high degree of measurement invariance between males and females in Australia/New Zealand (e.g., only two items had non-invariant factor loadings) allowed for mean comparisons between the two groups. Results indicated that differences do exist between males and females, providing support for hypothesis 2. However, these differences are not the same as the ones reported by Carlson et al. (2000) in their comparisons between males and females in a US sample. Specifically, significant gender differences only existed for time-based work interference with family and family interference with work, where males reported higher levels of conflict than females. No differences across gender for strain or behavior-based family interference with work or work interference with family were found. This is markedly different than the Carlson et al. (2000) findings, in which females indicated significantly higher mean scores on all three forms of family interference with work (time, strain, behavior), as well as strain-based work interference with family. The qualitative conclusion is that males and females in Australia/New Zealand view work/family conflict differently than their counterparts in the United States.

The reasons for this may again be rooted in the age differential between the samples. Yet the possibility that cultural differences exist cannot be ignored. It may be that men share a greater level of household responsibility in Australia/New Zealand than in the U.S. In addition, Australian law allows for up to one year of unpaid maternity leave, and may reflect a greater tolerance for pregnancy in working women than in the US. In short, men and women in Australia/New Zealand appear to be experiencing similar levels of work/family conflict across the majority of the scales in Carlson et al.'s (2000) measure. Further study is required to determine the exact nature and origin of these differences. However, differences may also be due to biases within the samples, which may cause errors in recovering the factor structure from the data.

Issues in Interpreting Study Results

Questions about the interpretation of study results arise from three distinct issues. First, the number of individuals in the US dataset may be too small to represent population parameters accurately, particularly in the case of the US males. As previously stated, factor analysis of samples these sizes are more easily affected by sample-specific characteristics and biases. Second, the low number of items per dimension increases the likelihood that errors will result when attempting to recover the theoretical model factor structure. For instance, Stephens (1996) indicates that any factor defined by only a few items is close to being variable specific. That is, it may be better to interpret it as individual variables than items grouped into a single dimension. Lastly, the possibility that cultural differences exist cannot be ruled out, and is confounded with the issues surrounding sample size and measure characteristics.

The twin issues of sample size and measure characteristics may be causing unstable factor pattern matrices and decreasing the likelihood of factor structure recovery, respectively. Of the four data sets, only US females and ANZ males produced reasonable six-factor solutions. Yet even in these samples one of the factors contained items with double-loadings, the magnitudes of which were smaller on their a priori factor than on their non-theoretical dimension. In other words, none of the four samples in this study showed the clean a priori structure on which the Carlson et al. (2000) scale was developed.

As previously stated the problems with factor structure recovery may also be due to cultural differences. For instance, Australian federal government policy provides some benefits that are not available in the US, such as a one-time maternity allowance. In addition, child care assistance and fee subsidies are available through the federal government, even though the benefit has been reduced over the past decade. Finally, all public sector employees enjoy varying degrees of paid maternity leave as mandated by each state, and extra tax rebates are available to single-income families (Buchanan & Thornthwaite, 2001). Although individually these benefits do not necessarily apply to this study's sample, collectively they indicate a potentially different national attitude towards childcare and working women. This attitude may be behind the differential responses to Carlson et al.'s (2000) work/family conflict scale.

By increasing the number of items per scale beyond the accepted minimum, better sampling of the construct occurs, and a greater amount of the variance is accounted for. Only additional research with a variety of US samples will determine whether the measure corresponds to its hypothesized factor structure in the US.

Summary of Results

It was thought that the factor structure of the Carlson et al. (2000) work/family conflict scale would be similar across U.S. and ANZ samples. Clearly, there was some similarity in results across cultures. However, the support was only marginal between males in the US and ANZ samples due to a mediocre-to-poor fit with the a priori 6-factor model. Further tests for measurement invariance revealed that neither the comparison between the two male samples nor the comparison between the two female samples resulted in full invariance. Specifically, both sets of comparisons showed poor fit when manifest variable loadings were held to equality across groups. Subsequent investigation revealed that the majority of item factor loadings in both sets could be held to equality, yet some could not. The non-invariant item loadings were thereafter allowed to load freely across the sets of comparisons, and fit with the common model in both the male and female comparisons were significantly improved. The resulting models for both groups are indicative of partial measurement invariance.

Exploratory factor analysis revealed that the difficulties encountered in determining measurement invariance might be due to problems with the underlying factor structure of the scale itself. Specifically, only males in Australia/New Zealand and females in the US came close to matching the underlying a priori 6-factor structure that Carlson et al.'s (2000) scale is based upon. Instead, all of the samples more closely matched a 5-factor structure. Equally important was the fact that sample characteristics may have played a part in exploratory factor analysis results, as well as subsequent invariance testing. To that end, the male US sample may have been underpowered due to its small size, and may not have adequately represented the diversity of scores for males in the United States. In addition, average age differences may have introduced moderators such as age of children at home, placement in career development cycle, and general experience in dealing with work/family role overlap. In short, sample characteristics may have played a part in determining the level of measurement invariance experienced between the two groups in each comparison set.

A final alternative explanation for the level of measurement invariance found may reside in the differences in culture between Australian/New Zealand and the United States. It is possible that men take a larger role in family responsibilities in Australia/New Zealand than men in the United States. Also, level of acceptance of pregnancy leave and its relative impact on a woman's career may be less favorable in the United States than in Australia/New Zealand. While these questions are beyond the scope of this study, they nevertheless are plausible explanations as to why differences in measurement invariance were found.

Finally, hypothesis 2 was supported by the significant mean differences found across work/family conflict scales between men and women in Australia/New Zealand. However, the nature of those differences is different from the gender differences reported in the United States. Specifically, Carlson et al. (2000) reported that females experienced higher levels on all scales associated with family interference with work, as well as strain-based work interference with family. In contrast, this study found that males experienced higher levels of work/family conflict, specifically within the time-based work interference with family and family interference with work scales. All other scale mean comparisons were not significant. These discrepancies in gender comparisons again point to the possibility that cultural differences between the United States and Australia/New Zealand exist in how the work and family role overlap is perceived.

Impact on Work/Family Conflict and Future Implications

As stated in the introduction, the field of work/family conflict has been hampered by a lack of viable measurement tools. The Carlson et al. (2000) scale was the first instrument that covered both the directionality and dimensionality of work/family conflict as theorized by Greenhaus and Beutel (1985). The current study sought to expand the construct validity of this scale by comparing the factor structure across two English-speaking cultures. However, results are mixed. The findings of this study indicate that further testing of the scale may be warranted. Specifically, larger samples than those employed here would help to rule out sample-specific biases as the cause for any cross-cultural differences uncovered. The issue can be readily addressed through the collection of additional data and may aid in the recovery of the theoretical model's factor structure. However, problems in the recovery of the theoretical model's factor structure may also be the result of too few items associated with each dimension. Since a factor composed of only a few items can be considered variable specific (Stephens, 1996), any additional items would add considerably to the amount of variance accounted for, as well as expand the ability of each scale to adequately sample the construct. Therefore, once sample-specific biases have been ruled out as the cause of factor structure difficulties, item generation and testing could then commence. Should the addition of variables fail to aid in factor pattern recovery the US, the theoretical model itself may also need to be questioned. However, should recovery succeed in the US and fail cross-culturally, the results could be due to cultural differences in how work/family conflict is perceived. At that point, construction of a culture-specific measure would be called for.

Current results also suggest that problems may exist in how individuals view and express behavior-based work/family conflict. Individuals may not have the self-awareness to determine whether their actions at work are any different than their actions at home. The manager who deals strictly but fairly with her subordinates may not fully recognize that this same behavior is seen as lacking compassion and empathy when applied to her children. Similarly, the successful salesman may find himself working to win arguments with his family when compromise would be the better tact. Simply put, the dynamics of family relations may require a modification of behaviors that apply well in the workplace. Awareness that one is not modifying these behaviors once one returns home may not be a generally understood phenomenon. This also works in reverse, where applying behaviors that work with ones family may be neither appreciated nor appropriate in the workplace. Alternatively, specific occupations (such as being a litigator or police officer) require behavior that it is markedly different from what is called for in the home environment. Future research may try increasing the participant's awareness of crossovers between work and family oriented behavior, as well as investigate the moderating properties of specific occupations on behavior-based conflict. Additional testing for behavioral awareness between roles may reveal that the structure of work/family conflict changes with experience and environment (level of advancement in career, age of children at home, etc). Otherwise the construct itself may need to be modified, and subsequent measures modified or developed anew, before an adequate study of how these roles collide can be undertaken.

Conclusions

Work/family research is a diverse field that includes such topics as work/family conflict and work/life balance. The ever-increasing incursion of work-related activities on what traditionally was time for the family, the need for dual-earner couples to support a household, and the increasing number of tasks required of a single employee, all point to the growing need to balance work and family activities. This balance is often difficult to achieve, resulting in conflicts between these two roles to an extent that has not been seen (in the US) since the height of World War II (Goodwin, 1994). The importance of discerning consequences of these difficulties on worker output, organizational adherence, organizational commitment, and employee health and welfare cannot be overly stressed. However, the best possible intentions and experiments in determining the root of these issues are only as good as the measurement tools on which they depend. The present study is an attempt to further the development of Carlson et al's (2000) work/family conflict measure. Results indicate that additional testing of both the theoretical structure of work/family conflict, as well as the measure used in this study, are necessary before firm conclusions can be drawn from cross-cultural comparisons. Without valid and reliable measurement there can be no valid and reliable answers. Developing this and other tools in conjunction with a more comprehensive theory of work and family will lay the foundation for future investigation, and hopefully help to clear the way for a better work/family environment.

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Table 1

Chronology of Primary Tools Used in Measuring Generalized Work/Family Conflict

Citation	Description
Holahan and Gilbert (1979)	Six dichotomous measures of specific interrole conflict: a) Worker vs. Spouse (3 items), b) Worker vs. Parent (4 items), c) Worker vs. Self (4 items), d) Spouse vs. Parent (3 items), e) Spouse vs. Self (4 items), and f) Parent vs. Self (3 items).
Burke, Weir, & DuWors (1979)	Wives indicated degree to which husbands jobs negatively impacted home and family life. Fifty items assessed 10 areas including requirement to relocate, personal relationship between husband and wife, etc.
Pleck, Staines, & Lang (1980)	Used Quality of Employment Survey (Quinn & Staines, 1977) data to determine frequency and type of work/family conflict encountered by various family structures (i.e., with children, employed wives, etc).
Bohen & Viveros-Long (1981)	Developed the Job-Family Role Strain scale, a 16-item measure that taps job/parent, job spouse, and generalized interrole conflict.
Kopelman, Greenhaus, & Connolly (1983)	Developed an 8-item measure of work interference with family interrole conflict based on types of work/family conflict reported by Pleck et al. (1980).
Wiley (1987)	Factor analyzed 22 items from the 50-item scale used by Burke et al. (1979). Found four distinct factors emerged: job/person-, job/family-, and family/job conflict, as well as role overload.
Burley (1989; presented in Gutek, Searle, & Klepa, 1991)	Reconfigured four of the Kopelman et al (1983) items to tap family interference with work, demonstrating that work/family conflict is bi-directional and the two directions are in fact distinct.
Stephens & Sommer (1996)	Developed the first work interference with family measure tapping generalized strain-, time-, and behavior-based conflict as delineated by Greenhaus & Beutel (1985).
Netemeyer, Boles, & McMurrian (1996)	Developed the first bi-directional generalized work/family conflict scale utilizing prior measurement items. Each scale consists of five items, and were shown to be distinct.
Carlson, Kacmar, & Williams (2000)	Developed first bi-direction, multi-dimensional scale of work/family conflict. The measure consists of six three-item subscales tapping both the directions (work interference with family and family interference with work) and the dimensions (time-, strain-, behavior-based) of conflict delineated by Greenhaus & Beutel (1985).

Table 2

Komarovsky's (1977) Six Modes of Role Tension.

Mode	Job-Family Example
Ambiguity about which norms regulate a certain situation.	The allocation of domestic tasks.
Lack of congruity between an individual's personality and a particular social role.*	When a housewife's need for achievement is frustrated by housewifery.
A socially structured insufficiency of resources for role fulfillment.	When a single parent cannot find suitable child care facilities.
Low reward for role conformity.	When a woman feels her home-based work carries less social esteem than employment.
Conflict between normative role phenomena.	If a father must be at work when other family members are available to be with him.
Overload of role obligations.	When an individual has too many statuses – such as parent, student, child, friend, spouse, worker, and community leader – to meet the demands of each status to the satisfaction of all the role partners and the satisfaction of self.

Note: Reproduced from Bohen & Viveros-Long, p. 231. *=not used in developing content of Job-Family Role Strain scale.

Table 3

Burley (1989) Work/Family Conflict Scale.*

Work Interference with Family	Family Interference with Work
1. After work, I come home too tired to do some of the things I'd like to do.	1. I'm often too tired at work because of the things I have to do at home.
2. On the job I have so much work to do that it takes away from my personal interests.	2. My personal demands are so great that it takes away from my work.
3. My family/friends dislike how often I am preoccupied with my work while I am at home.	3. My superiors and peers dislike how often I am preoccupied with my personal life while at work.
4. My work takes up time that I would like to spend with my family/friends.	4. My personal life takes up time that I would like to spend at work.

*=taken from Kopelman, Greenhaus, & Connolly (1983), and reported by Gutek, Searle, & Klepa (1991).

Table 4

Carlson et al. Work/Family Conflict Scale

Time-based work interference with family

1. My work keeps me from my family activities more than I would like.
2. The time I must devote to my job keeps me from participating equally in household responsibilities and activities.
3. I have to miss family activities due to the amount of time I must spend on work responsibilities.

Time-based family interference with work

4. The time I spend on family responsibilities often interferes with my work responsibilities.
5. The time I spend with my family often causes me not to spend time in activities at work that could be helpful to my career.
6. I have to miss work activities due to the amount of time I must spend on family responsibilities.

Strain-based work interference with family

7. When I get home from work I am often too frazzled to participate in family activities/responsibilities.
8. I am often so emotionally drained when I get home from work that it prevents me from contributing to my family.
9. Due to all the pressures at work, sometimes when I come home I am too stressed to do the things I enjoy.

Strain-based family interference with work

10. Due to stress at home, I am often preoccupied with family matters at work.
11. Because I am often stressed from family responsibilities, I have a hard time concentrating on my work.
12. Tension and anxiety from my family life often weakens my ability to do my job.

Behavior-based work interference with family

13. The problem-solving behaviors I use in my job are not effective in resolving problems at home.
14. Behavior that is effective and necessary for me at work would be counterproductive at home.
15. The behaviors I perform that make me effective at work do not help me to be a better parent or spouse.

Behavior-based family interference with work

16. The behaviors that work for me at home do not seem to be effective at work.
17. Behavior that is effective and necessary for me at home would be counterproductive at work.
18. The problem-solving behaviors that work for me at home do not seem to be as useful at my work.

Table 5

Item Intercorrelations for Males in the United States Sample

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Item 2	.780**									
Item 3	.653**	.679**								
Item 4	.193	.308**	.253*							
Item 5	.288*	.400**	.287**	.419						
Item 6	.267*	.416**	.337**	.428**	.726**					
Item 7	.374**	.357**	.364**	.237*	.302**	.278*				
Item 8	.403**	.325**	.314**	.266*	.306**	.330**	.488**			
Item 9	.402**	.300**	.357**	.225*	.332**	.329**	.464**	.726**		
Item 10	.218*	.200	.084	.376**	.248*	.262*	.380**	.560**	.394**	
Item 11	.175	.119	.103	.432**	.240*	.303**	.363**	.483**	.361**	.722**
Item 12	.210	.187	.129	.277*	.464**	.437**	.293**	.520**	.363**	.574**
Item 13	.112	.051	.028	.234*	.208	.261*	.309**	.416**	.480**	.441**
Item 14	.242*	.126	.076	.062	.258*	.128	.254*	.365**	.473**	.257*
Item 15	.342**	.198	.105	.182	.288**	.247*	.320**	.502**	.457**	.528**
Item 16	.191	.067	-.043	.080	.182	.235*	.139	.494**	.379**	.404**
Item 17	.155	.005	.064	.123	.131	.152	.174	.355**	.452**	.393**
Item 18	.242*	.133	.143	.241*	.200	.171	.113	.497**	.476**	.442**

Note: N=83; *=p<.05; **=p<.01

Table 5 (continued)

Item Intercorrelations for Males in the United States Sample (continued)

	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	Item 17
Item 12	.701**						
Item 13	.427**	.273*					
Item 14	.198	.129	.612**				
Item 15	.396**	.394**	.544**	.565**			
Item 16	.365**	.460**	.430**	.561**	.658**		
Item 17	.392**	.261*	.514**	.625**	.585**	.752**	
Item 18	.355**	.270*	.601**	.605**	.519**	.694**	.718**

Note: N=83; *=p<.05; **=p<.01

Table 6

Means, Standard Deviations, Reliabilities, and Intercorrelation of Scales for Males in the United States

	Mean	SD	WIF Time	FIW Time	WIF Strain	FIW Strain	WIF Behavior	FIW Behavior
WIF Time	2.90	1.14	.877					
FIW Time	1.77	0.81	.412**	.769				
WIF Strain	2.45	1.00	.472**	.417**	.791			
FIW Strain	1.72	0.71	.205	.459**	.559**	.849		
WIF Behavior	2.49	1.01	.191	.296**	.558**	.453**	.801	
FIW Behavior	2.36	1.04	.133	.225*	.451**	.471**	.741**	.885

Note: N=83; *=p<.05; **=p<.01; WIF = work interference with family; FIW = family interference with work; Diagonal contains reliabilities.

Table 7

Item Intercorrelations for Males in the Australia/New Zealand Sample

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Item 2	.772**									
Item 3	.753**	.742**								
Item 4	.150	.156	.310**							
Item 5	.068	.182*	.205*	.541**						
Item 6	.039	.113	.237**	.624**	.706**					
Item 7	.337**	.359**	.419**	.136	.143	.149				
Item 8	.232**	.222**	.270**	.075	.082	.072	.754**			
Item 9	.329**	.344**	.351**	.139	-.001	.050	.747**	.695**		
Item 10	-.048	-.073	-.059	.409**	.307**	.409**	.055	.147	.132	
Item 11	-.027	-.053	.038	.348**	.192*	.317**	.149	.139	.258**	.736**
Item 12	.054	.014	.104	.309**	.214*	.272**	.229**	.198*	.301**	.631**
Item 13	.206*	.205*	.286**	.089	.163*	.167*	.324**	.301**	.233**	.151
Item 14	.169	.102	.203*	.150	.258**	.199*	.243**	.299**	.171*	.214*
Item 15	.124	.141	.254**	.167*	.241**	.275**	.331**	.359**	.215*	.179*
Item 16	.138	.060	.158	.174*	.170*	.329**	.347**	.365**	.284**	.176*
Item 17	.174*	.041	.142	.167*	.256**	.271**	.331**	.314**	.266**	.140
Item 18	.189*	.211*	.270**	.175*	.191*	.278**	.357**	.319**	.328**	.185*

Note: N=143; *=p<.05; **=p<.01

Table 7 (continued)

Item Intercorrelations for Males in the Australia/New Zealand Sample (continued)

	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	Item 17
Item 12	.875**						
Item 13	.325**	.427**					
Item 14	.211*	.272**	.540**				
Item 15	.218**	.313**	.634**	.776**			
Item 16	.245**	.316**	.473**	.614**	.687**		
Item 17	.178*	.251**	.438**	.645**	.614**	.761**	
Item 18	.220**	.317**	.537**	.616**	.702**	.750**	.723**

Note: N=143; *=p<.05; **=p<.01

Table 8

Means, Standard Deviations, Reliabilities, and Intercorrelation of Scales for Males in Australia/New Zealand.

	Mean	SD	WIF Time	FIW Time	WIF Strain	FIW Strain	WIF Behavior	FIW Behavior
WIF Time	3.55	1.33	.903					
FIW Time	2.14	0.99	.204*	.831				
WIF Strain	3.10	1.20	.384**	.118	.891			
FIW Strain	1.64	0.80	-.006	.387**	.218**	.898		
WIF Behavior	2.66	1.07	.233**	.254**	.345**	.321**	.848	
FIW Behavior	2.54	1.04	.182*	.283**	.391**	.272**	.742**	.896

Note: N=143; *=p<.05; **=p<.01; WIF = work interference with family; FIW = family interference with work; Diagonal contains reliabilities.

Table 9

Item Means and Standard Deviations for Males in the United States and Australia/New Zealand Samples.

	US Males		ANZ Males	
	Mean	St. Dev.	Mean	St. Dev.
Item 1	3.31	1.33	3.76	1.47
Item 2	2.78	1.30	3.66	1.43
Item 3	2.61	1.18	3.22	1.46
Item 4	1.73	0.94	2.08	1.08
Item 5	1.88	1.05	2.31	1.25
Item 6	1.71	0.94	2.04	1.12
Item 7	2.40	1.19	3.22	1.31
Item 8	2.43	1.15	2.82	1.31
Item 9	2.51	1.22	3.25	1.36
Item 10	1.86	0.91	1.71	0.89
Item 11	1.64	0.73	1.62	0.85
Item 12	1.65	0.79	1.59	0.91
Item 13	2.41	1.18	2.58	1.18
Item 14	2.60	1.26	2.69	1.25
Item 15	2.46	1.15	2.73	1.22
Item 16	2.43	1.23	2.60	1.23
Item 17	2.32	1.10	2.55	1.15
Item 18	2.33	1.12	2.47	1.06

Note: US males: N=83; ANZ males: N=143. Likert for US Males 1 to 5, ANZ males 1 to 6.

Table 10

Item Intercorrelations for Females in the United States Sample

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Item 2	.603**									
Item 3	.693**	.699**								
Item 4	.115	.150	.082							
Item 5	.202*	.102	.190*	.623**						
Item 6	.144	.063	.195*	.568**	.615**					
Item 7	.271**	.395**	.516**	.194*	.305**	.343**				
Item 8	.372**	.516**	.537**	.254**	.269**	.310**	.706**			
Item 9	.304**	.455**	.543**	.157	.279**	.326**	.709**	.747**		
Item 10	.158	.055	.208*	.415**	.376**	.554**	.203*	.166*	.148	
Item 11	.169*	.171*	.240**	.584**	.485**	.649**	.337**	.345**	.379**	.645**
Item 12	.191*	.096	.251**	.617**	.568**	.635**	.242**	.306**	.293**	.648**
Item 13	.081	.161	.136	.169*	.136	.288**	.353**	.208*	.234**	.264**
Item 14	.225**	.265**	.244**	.226**	.218**	.345**	.287**	.284**	.332**	.246**
Item 15	.252**	.279**	.278**	.200*	.179*	.259**	.237**	.325**	.225**	.275**
Item 16	.303**	.304**	.332**	.097	.171*	.165*	.280**	.357**	.383**	.282**
Item 17	.285**	.300**	.332**	.106	.188*	.163	.205*	.334**	.363**	.305**
Item 18	.120	.227**	.155	.209*	.113	.192*	.208*	.279**	.220**	.309**

Note: N=139; *=p<.05; **=p<.01

Table 10 (continued)

Item Intercorrelations for Females in the United States Sample (continued)

	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	Item 17
Item 12	.848**						
Item 13	.333**	.249**					
Item 14	.321**	.274**	.571**				
Item 15	.270**	.248**	.470**	.503**			
Item 16	.266**	.258**	.447**	.438**	.598**		
Item 17	.336**	.304**	.512**	.502**	.499**	.780**	
Item 18	.335**	.302**	.380**	.243**	.411**	.540**	.496**

Note: N=139; *=p<.05; **=p<.01

Table 11

Means, Standard Deviations, Reliabilities, and Intercorrelation of Scales for Females in the United States

	Mean	SD	WIF Time	FIW Time	WIF Strain	FIW Strain	WIF Behavior	FIW Behavior
WIF Time	2.84	1.08	.855					
FIW Time	2.00	0.90	.184*	.819				
WIF Strain	2.82	1.12	.544**	.351**	.886			
FIW Strain	1.92	0.83	.214*	.698**	.328**	.878		
WIF Behavior	2.62	0.95	.293**	.316**	.371**	.373**	.760	
FIW Behavior	2.67	0.95	.346**	.212*	.378**	.389**	.635**	.821

Note: N=139; *=p<.05; **=p<.01; WIF = work interference with family; FIW = family interference with work; Diagonal contains reliabilities.

Table 12

Item Intercorrelations for Females in the Australia/New Zealand Sample

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Item 2	.741**									
Item 3	.762**	.729**								
Item 4	.247**	.212**	.293**							
Item 5	.187**	.046	.234**	.454**						
Item 6	.101	.014	.161*	.460**	.791**					
Item 7	.484**	.627**	.561**	.098	.109	-.008				
Item 8	.471**	.629**	.544**	.046	.086	.049	.865**			
Item 9	.485**	.543**	.523**	.176**	.074	-.009	.728**	.731**		
Item 10	.077	.088	.119	.122*	.190**	.246**	.115	.125*	.135**	
Item 11	.032	.071	.073	.148*	.214*	.233*	.093	.096	.108	.798**
Item 12	.038	.035	.083	.128*	.149*	.258**	.024	.021	.059	.747**
Item 13	.139*	.112	.157*	.060	.087	.098	.172**	.177**	.212**	.422**
Item 14	.093	.109	.163*	.038	.093	.067	.198**	.217**	.237**	.227**
Item 15	.252**	.228**	.296**	.090	.085	.053	.286**	.314**	.308**	.210**
Item 16	.187**	.212**	.256**	.097	.047	.075	.258**	.298**	.294**	.183**
Item 17	.128*	.125*	.196**	.017	.033	.024	.244**	.256**	.234**	.183**
Item 18	.140*	.150*	.201**	.069	.077	.083	.259**	.309**	.305**	.205**

Note: N=249; *=p<.05; **=p<.01

Table 12 (continued)

Item Intercorrelations for Females in the Australia/New Zealand Sample (continued)

	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	Item 17
Item 12	.790**						
Item 13	.391**	.402**					
Item 14	.260**	.179**	.387**				
Item 15	.227**	.167**	.437**	.652**			
Item 16	.249**	.199**	.402**	.598**	.775**		
Item 17	.223**	.170**	.339**	.702**	.644**	.688**	
Item 18	.246**	.177**	.469**	.589**	.688**	.720**	.703**

Note: N=249; *=p<.05; **=p<.01

Table 13

Means, Standard Deviations, Reliabilities, and Intercorrelation of Scales for Females in Australia/New Zealand

	Mean	SD	WIF Time	FIW Time	WIF Strain	FIW Strain	WIF Behavior	FIW Behavior
WIF Time	2.90	1.29	.896					
FIW Time	1.94	0.91	.212**	.800				
WIF Strain	3.12	1.33	.644**	.089	.912			
FIW Strain	1.60	0.77	.082	.240**	.103	.912		
WIF Behavior	2.52	1.02	.234**	.109	.316**	.365**	.745	
FIW Behavior	2.59	1.04	.216**	.075	.330**	.246**	.797**	.875

Note: N=249; *=p<.05; **=p<.01; WIF = work interference with family; FIW = family interference with work; Diagonal contains reliabilities.

Table 14

Item Means and Standard Deviations for Females in the United States and Australia/New Zealand Samples

	US Females		ANZ Females	
	Mean	Std. Dev.	Mean	Std. Dev.
Item 1	3.16	1.27	3.13	1.45
Item 2	2.71	1.22	2.92	1.48
Item 3	2.64	1.19	2.63	1.34
Item 4	1.96	0.99	1.84	1.02
Item 5	2.11	1.12	2.06	1.15
Item 6	1.95	1.04	1.91	1.04
Item 7	2.74	1.22	3.04	1.44
Item 8	2.84	1.24	3.03	1.46
Item 9	2.89	1.27	3.29	1.45
Item 10	2.08	0.99	1.68	0.89
Item 11	1.88	0.91	1.57	0.81
Item 12	1.81	0.88	1.55	0.81
Item 13	2.73	1.19	2.31	1.22
Item 14	2.52	1.13	2.55	1.22
Item 15	2.59	1.17	2.69	1.32
Item 16	2.68	1.13	2.58	1.17
Item 17	2.63	1.09	2.67	1.22
Item 18	2.70	1.12	2.51	1.09

Note: US females: N=139; ANZ females: N=249. Likert for US females 1 to 5, ANZ females 1 to 6.

Table 15

Item Intercorrelations Between Males in the United States and Australia/New Zealand

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Item 2	.776**									
Item 3	.729**	.736**								
Item 4	.184**	.241**	.317**							
Item 5	.158*	.286**	.257**	.519**						
Item 6	.129*	.238**	.287**	.576**	.719**					
Item 7	.374**	.415**	.438**	.208**	.233**	.222**				
Item 8	.302**	.284**	.304**	.155*	.171**	.167*	.677**			
Item 9	.376**	.383**	.387**	.202**	.142*	.168*	.683**	.711**		
Item 10	.032	-.002	-.029	.377**	.267**	.342**	.136*	.272**	.193**	
Item 11	.033	-.003	.052	.366**	.200**	.308**	.202**	.238**	.276**	.727**
Item 12	.097	.056	.102	.290**	.278**	.313**	.228**	.288**	.300**	.610**
Item 13	.182**	.165*	.213**	.147*	.186**	.205**	.324**	.344**	.324**	.252**
Item 14	.197**	.114	.165*	.124	.258**	.178**	.245**	.321**	.272**	.227**
Item 15	.209**	.184**	.225**	.186**	.269**	.278**	.343**	.414**	.311**	.292**
Item 16	.164*	.079	.105	.151**	.182**	.303**	.282**	.412**	.321**	.254**
Item 17	.180**	.056	.135*	.166*	.229**	.243**	.294**	.337**	.341**	.222**
Item 18	.214**	.194**	.234**	.204**	.201**	.247**	.276**	.384**	.382**	.277**

Note: N=226; *=p<.05; **=p<.01

Table 15 (continued)

Item Intercorrelations Between Males in the United States and Australia/New Zealand (continued)

	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	Item 17
Item 12	.823**						
Item 13	.356**	.371**					
Item 14	.205**	.222**	.567**				
Item 15	.271**	.333**	.605**	.700**			
Item 16	.282**	.360**	.460**	.595**	.678**		
Item 17	.244**	.249**	.469**	.638**	.608**	.759**	
Item 18	.263**	.296**	.563**	.612**	.636**	.730**	.722**

Note: N=226; *=p<.05; **=p<.01

Table 16

Means, Standard Deviations, and Intercorrelation of Scales for Males in the United States and Australia/New Zealand

	Mean	SD	WIF Time	FIW Time	WIF Strain	FIW Strain	WIF Behavior	FIW Behavior
WIF Time	3.31	1.30	--					
FIW Time	2.01	0.95	.297**	--				
WIF Strain	2.86	1.17	.447**	.242**	--			
FIW Strain	1.67	0.77	.045	.391**	.294**	--		
WIF Behavior	2.60	1.05	.232**	.276**	.416**	.359**	--	
FIW Behavior	2.47	1.04	.180**	.274**	.415**	.333**	.743**	--

Note: N=226; *=p<.05; **=p<.01; WIF = work interference with family; FIW = family interference with work.

Table 17

Item Intercorrelations Between Females in the United States and Australia/New Zealand

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Item 2	.698**									
Item 3	.741**	.718**								
Item 4	.205**	.188**	.224**							
Item 5	.192**	.062	.220**	.513**						
Item 6	.115*	.028	.172**	.498**	.729**					
Item 7	.418**	.565**	.544**	.121*	.167**	.101*				
Item 8	.440**	.599**	.540**	.107*	.142**	.131**	.820**			
Item 9	.425**	.521**	.523**	.160**	.136**	.096	.726**	.736**		
Item 10	.104*	.060	.147**	.237**	.258**	.358**	.118*	.122*	.106*	
Item 11	.080	.090	.130**	.316**	.314**	.389**	.154**	.167**	.173**	.745**
Item 12	.091	.044	.140**	.312**	.304**	.398**	.080	.106*	.116*	.715**
Item 13	.120*	.113*	.149**	.106*	.106*	.165**	.206**	.173**	.190**	.383**
Item 14	.134**	.156**	.189**	.099*	.135**	.161**	.225**	.237**	.265**	.226**
Item 15	.251**	.245**	.290**	.123*	.115*	.120*	.274**	.318**	.285**	.219**
Item 16	.224**	.236**	.280**	.099*	.090	.107**	.259**	.313**	.313**	.223**
Item 17	.175**	.177**	.238*	.045	.083	.070	.233**	.279**	.273**	.217**
Item 18	.134**	.167**	.185**	.123*	.091	.124**	.231**	.291**	.261**	.255**

Note: N=388; *=p<.01; **=p<.01

Table 17 (continued)

Item Intercorrelations Between Females in the United States and Australia/New Zealand (continued)

	Item 11	Item 12	Item 13	Item 14	Item 15	Item 16	Item 17
Item 12	.818**						
Item 13	.386**	.361**					
Item 14	.275**	.208**	.440**				
Item 15	.231**	.186**	.434**	.605**			
Item 16	.257**	.224**	.418**	.544**	.715**		
Item 17	.255**	.211**	.387**	.639**	.600**	.716**	
Item 18	.289**	.233**	.442**	.466**	.588**	.656**	.628**

Note: N=388; *=p<.05; **=p<.01

Table 18

Means, Standard Deviations, and Intercorrelation of Scales for Females in the United States and Australia/New Zealand

	Mean	SD	WIF Time	FIW Time	WIF Strain	FIW Strain	WIF Behavior	FIW Behavior
WIF Time	2.87	1.22	--					
FIW Time	1.96	0.90	.202**	--				
WIF Strain	3.01	1.27	.615**	.166**	--			
FIW Strain	1.71	0.81	.118*	.409**	.151**	--		
WIF Behavior	2.55	1.00	.250**	.181**	.325**	.369**	--	
FIW Behavior	2.62	1.01	.254**	.122*	.337**	.297**	.745**	--

Note: N=388; *=p<.05; **=p<.01; WIF = work interference with family; FIW = family interference with work.

Table 19

Level of Overall Fit Across Multiple Models of Invariance

	χ^2	$\Delta\chi^2$	RMSEA	SRMR	NNFI
Males					
Variance/Covariance Invariance	282.03	n/a	.062	.100	.92
Factor Pattern Invariance (χ^2_{uncon})	445.30	n/a	.079	.070	.90
Factor Pattern and Loading Invariance	475.67	30.37*	.081	.140	.84
Partial Measurement Invariance	460.44	15.14	.078	.100	.91
Females					
Variance/Covariance Invariance	427.29	n/a	.080	.120	.90
Factor Pattern Invariance (χ^2_{uncon})	464.76	n/a	.066	.049	.94
Factor Pattern and Loading Invariance	516.33	51.57*	.068	.12	.93
Partial Measurement Invariance	473.30	8.54	.065	.064	.94

Note: *=p<.05; RMSEA=Root Mean Square Error of Approximation; SRMR=Standardized Root Mean Square Residual; NNFI=Non-Normed Fit Index.

Table 20

Steps in Statistical Identification of the Model for Males and Females

Step	Identification?	WIF Time	FIW Time	WIF Strain	FIW Strain	WIF Behavior	FIW Behavior
Males							
1	Yes	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
2	Yes	Var.	Ref.	Ref.	Ref.	Ref.	Ref.
3	Yes	Var.	Var.	Ref.	Ref.	Ref.	Ref.
4	Yes	Var.	Var.	Var.	Ref.	Ref.	Ref.
5	Yes	Var.	Var.	Var.	Var.	Ref.	Ref.
6	Yes	Var.	Var.	Var.	Var.	Var.	Ref.
7	Yes	Var.	Var.	Var.	Var.	Var.	Var.
Females							
1	Yes	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
2	Yes	Var.	Ref.	Ref.	Ref.	Ref.	Ref.
3	Yes	Var.	Var.	Ref.	Ref.	Ref.	Ref.
4	Yes	Var.	Var.	Var.	Ref.	Ref.	Ref.
5	No	Var.	Var.	Var.	Var.	Ref.	Ref.
6	Yes	Var.	Var.	Var.	Ref.	Var.	Ref.
7	Yes	Var.	Var.	Var.	Ref.	Var.	Var.

Note: WIF=Work Interference with family; FIW=Family interference with work; Ref.=Reference variable used in latent variable scaling; Var.=start value used in direct latent variable scaling.

Table 21

Partial Measurement Invariance Fit Statistics for Males.

	χ^2	$\Delta\chi^2$	RMSEA	ΔRMSEA	SRMR	ΔSRMR	NNFI	ΔNNFI
(χ^2_{uncon})	445.30	n/a	.079	n/a	.070	n/a	0.90	n/a
Item 1	446.05	0.75	.079	0.000	.070	0.000	.90	0.00
Item 2	445.52	0.22	.079	0.000	.070	0.000	.90	0.00
Item 3	450.72	5.42*	.080	+.001	.082	+.012	.90	0.00
Item 4	448.90	3.60	.080	+.001	.073	+.003	.90	0.00
Item 5	445.60	0.30	.079	0.000	.070	0.000	.90	0.00
Item 6	447.99	2.69	.079	0.000	.074	0.004	.90	0.00
Item 7	451.34	6.04*	.081	+.002	.077	+.007	.90	0.00
Item 8	445.64	0.34	.079	0.000	.070	0.000	.90	0.00
Item 9	445.39	0.09	.079	0.000	.070	0.000	.90	0.00
Item 10	445.74	0.44	.079	0.000	.074	+.004	.90	0.00
Item 11	450.36	5.06*	.080	+.001	.091	+.021	.90	0.00
Item 12	448.74	3.44	.079	0.00	.082	+.012	.90	0.00
Item 13	445.44	0.14	.079	0.00	.072	+.002	.90	0.00
Item 14	445.55	0.25	.079	0.00	.071	+.001	.90	0.00
Item 15	448.11	2.81	.079	0.00	.083	+.013	.90	0.00
Item 16	445.37	0.07	.079	0.00	.070	0.000	.90	0.00
Item 17	445.30	0.00	.079	0.00	.070	0.000	.90	0.00
Item 18	445.30	0.00	.079	0.00	.071	+.001	.90	0.00

Note: *=p<.05; RMSEA=Root Mean Square Error of Approximation;
SRMR=Standardized Root Mean Square Residual; NNFI=Non-Normed Fit Index.

Table 22

Partial Measurement Invariance Fit Statistics for Females

	χ^2	$\Delta\chi^2$	RMSEA	ΔRMSEA	SRMR	ΔSRMR	NNFI	ΔNNFI
(χ^2_{uncon})	464.76	n/a	.066	n/a	.049	n/a	.94	n/a
Item 1	470.11	5.35*	.067	+0.001	.064	+.015	.94	0.00
Item 2	471.60	6.84*	.067	+0.001	.067	+.018	.93	-0.01
Item 3	465.11	0.35	.066	0.000	.050	+.001	.94	0.00
Item 4	469.25	4.49*	.066	0.000	.059	+.010	.94	0.00
Item 5	467.41	2.65	.066	0.000	.057	+.008	.94	0.00
Item 6	465.43	0.67	.066	0.000	.051	+.002	.94	0.00
Item 7	473.06	8.30*	.067	+0.001	.080	+.031	.93	-0.01
Item 8	470.53	5.77*	.067	+0.001	.072	+.023	.93	-0.01
Item 9	464.95	0.19	.066	0.000	.050	+.001	.94	0.00
Item 10	468.71	3.95*	.066	0.000	.052	+.003	.94	0.00
Item 11	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Item 12	465.23	0.47	.066	0.000	.049	0.000	.94	0.00
Item 13	467.62	2.86	.066	0.000	.056	+.007	.94	0.00
Item 14	465.49	0.73	.066	0.000	.050	+.001	.94	0.00
Item 15	470.64	5.88*	.066	0.000	.065	+.017	.93	-0.01
Item 16	464.77	0.01	.066	0.000	.049	0.000	.94	0.00
Item 17	464.88	0.08	.066	0.000	.049	0.000	.94	0.00
Item 18	469.75	4.99*	.066	0.000	.060	+.011	.94	0.00

Note: *=p<.05; All $\Delta\chi^2$ based on 1 degree of freedom; RMSEA=Root Mean Square Error of Approximation; SRMR=Standardized Root Mean Square Residual; NNFI=Non-Normed Fit Index.

Table 23

Within-Group Completely Standardized Manifest Variable Loadings and Modification Indices for Males

	US	ANZ	MI	US	ANZ	MI	US	ANZ	MI
Item 1	0.88	0.86	0.32						
Item 2	0.91	0.87	0.03						
Item 3	0.78	0.86	n/a						
Item 4				0.65	0.66	1.78			
Item 5				0.85	0.77	0.24			
Item 6				0.89	0.89	0.98			
Item 7							0.61	0.90	n/a
Item 8							0.89	0.83	0.03
Item 9							0.85	0.83	0.25

Note: US=United States; ANZ=Australia/New Zealand; MI=Modification Index.

Table 23 (continued)

Within-Group Completely Standardized Manifest Variable Loadings and Modification Indices for Males (continued)

	US	ANZ	MI	US	ANZ	MI	US	ANZ	MI
Item 10	0.76	0.76	3.66						
Item 11	0.89	0.99	n/a						
Item 12	0.85	0.87	4.86						
Item 13				0.70	0.69	0.81			
Item 14				0.78	0.83	0.00			
Item 15				0.83	0.91	2.76			
Item 16							0.86	0.88	0.01
Item 17							0.87	0.85	0.09
Item 18							0.82	0.86	0.19

Note: US=United States; ANZ=Australia/New Zealand; MI=Modification Index.

Table 24

Within-Group Completely Standardized Phi Solution for Males

	US	ANZ	US	ANZ	US	ANZ	US	ANZ	US	ANZ
WIF Time	1.00	1.00								
FIW Time	0.54	0.19	1.00	1.00						
WIF Strain	0.55	0.43	0.54	0.13	1.00	1.00				
FIW Strain	0.30	-0.02	0.56	0.34	0.69	0.20	1.00	1.00		
WIF Behavior	0.32	0.22	0.43	0.30	0.73	0.38	0.58	0.27	1.00	1.00
FIW Behavior	0.20	0.19	0.32	0.33	0.61	0.43	0.56	0.25	0.89	0.84

Note: WIF=Work Interference with Family; FIW=Family Interference with Work; US=United States; ANZ=Australia/New Zealand.

Table 25

Within-Group Completely Standardized Theta-Delta Error Terms for Males

	US	ANZ
Item 1	0.23	0.26
Item 2	0.17	0.24
Item 3	0.39	0.26
Item 4	0.58	0.57
Item 5	0.29	0.40
Item 6	0.20	0.21
Item 7	0.63	0.19
Item 8	0.21	0.31
Item 9	0.28	0.32
Item 10	0.42	0.43
Item 11	0.21	0.02
Item 12	0.28	0.24
Item 13	0.51	0.52
Item 14	0.38	0.30
Item 15	0.31	0.18
Item 16	0.26	0.22
Item 17	0.24	0.28
Item 18	0.33	0.26

Note: US=United States; ANZ=Australia/New Zealand.

Table 26

Within-Group Completely Standardized Manifest Variable Loadings and Modification Indices for Females

	US	ANZ	MI	US	ANZ	MI	US	ANZ	MI
Item 1	0.75	0.85	n/a						
Item 2	0.78	0.86	n/a						
Item 3	0.93	0.86	0.20						
Item 4				0.77	0.51	n/a			
Item 5				0.78	0.86	1.69			
Item 6				0.84	0.90	0.07			
Item 7							0.82	0.93	n/a
Item 8							0.87	0.93	n/a
Item 9							0.87	0.79	0.04

Note: US=United States; ANZ=Australia/New Zealand; MI=Modification Index.

Table 26 (continued)

Within-Group Completely Standardized Manifest Variable Loadings and Modification Indices for Females (continued)

	US	ANZ	MI	US	ANZ	MI	US	ANZ	MI
Item 10	0.72	0.87	n/a						
Item 11	0.92	0.92	0.46						
Item 12	0.93	0.86	0.79						
Item 13				0.63	0.57	4.11			
Item 14				0.76	0.74	1.24			
Item 15				0.73	0.86	n/a			
Item 16							0.89	0.86	0.00
Item 17							0.89	0.81	0.12
Item 18							0.59	0.84	n/a

Note: US=United States; ANZ=Australia/New Zealand; MI=Modification Index.

Table 27

Within-Group Completely Standardized Phi Solution for Females

	US	ANZ	US	ANZ	US	ANZ	US	ANZ	US	ANZ
WIF Time	1.00	1.00								
FIW Time	0.24	0.16	1.00	1.00						
WIF Strain	0.67	0.70	0.44	0.06	1.00	1.00				
FIW Strain	0.29	0.09	0.85	0.27	0.42	0.10	1.00	1.00		
WIF Behavior	0.38	0.30	0.44	0.10	0.47	0.36	0.46	0.35	1.00	1.00
FIW Behavior	0.43	0.25	0.24	0.08	0.45	0.35	0.39	0.28	0.79	0.98

Note: WIF=Work Interference with Family; FIW=Family Interference with Work; US=United States; ANZ=Australia/New Zealand.

Table 28

Within-Group Completely Standardized Theta-Delta Error Terms for Females

	US	ANZ
Item 1	0.44	0.28
Item 2	0.40	0.26
Item 3	0.13	0.25
Item 4	0.41	0.74
Item 5	0.39	0.27
Item 6	0.29	0.18
Item 7	0.32	0.14
Item 8	0.24	0.14
Item 9	0.24	0.38
Item 10	0.48	0.24
Item 11	0.15	0.16
Item 12	0.14	0.26
Item 13	0.60	0.68
Item 14	0.43	0.45
Item 15	0.47	0.26
Item 16	0.21	0.25
Item 17	0.21	0.35
Item 18	0.65	0.30

Note: US=United States; ANZ=Australia/New Zealand.

Table 29

Exploratory Analysis Loadings and Patterns in a Forced 6-Factor Solution for Australia/New Zealand Males

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Item 18	.829					
Item 17	.875					
Item 16	.878					
Item 15	.805					.432
Item 14	.770					
Item 13	.523					.359
Item 12		.870				
Item 11		1.018				
Item 10		.665				
Item 9				.811		
Item 8				.879		
Item 7				.887		
Item 6					.873	
Item 5					.812	
Item 4					.648	
Item 3			.816			
Item 2			.854			
Item 1			.921			

Note: ANZ = Australian/New Zealand; all loadings less than .300 suppressed.

Table 30

Exploratory Analysis Loadings and Patterns in a Forced 5-Factor Solution between US and Australia/New Zealand Males

	1		2		3		4		5	
Item	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ
Item 18	.809	.813								
Item 17	.861	.803								
Item 16	.859	.815							-.504	
Item 15	.617	.879								
Item 14	.931	.835	-.324							
Item 13	.645	.599							.353	
Item 12			.775			.874				
Item 11			.967			1.013				
Item 10			.808			.662				
Item 9	.417							.834		
Item 8			.439					.844		
Item 7								.876	.324	
Item 6							.801			.893
Item 5							.884			.776
Item 4			.308				.331			.660
Item 3				.837	.763					
Item 2				.873	.865					
Item 1				.874	.939					

Note: ANZ = Australian/New Zealand; all loadings less than .300 suppressed.

Table 31

Exploratory Analysis Loadings and Patterns in a Forced 6-Factor Solution between US and Australia/New Zealand Females

	1		2		3		4		5		6	
Item	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ
Item 18		.822	.554									
Item 17		.683	.757									.568
Item 16		.873	.991									
Item 15		.901	.412						.350			
Item 14		.687							.664			
Item 13		.436		.328					.758			
Item 12	.926			.885								
Item 11	.922			.896								
Item 10	.735			.881								
Item 9					.877	.666						
Item 8					.785	.966						
Item 7					.844	.917						
Item 6	.588									.896		
Item 5	.342									.900	.678	
Item 4	.541									.475	.384	
Item 3							.818	.809				
Item 2							.693	.748				
Item 1							.888	.916				

Note: ANZ = Australian/New Zealand; all loadings less than .300 suppressed.

Table 32

Exploratory Analysis Loadings and Patterns in a Forced 5-Factor Solution between US and Australia/New Zealand Females

	1		2		3		4		5	
Item	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ
Item 18		.828	.629							
Item 17		.843	.801							
Item 16		.856	.852							
Item 15		.846	.437						.354	
Item 14		.767							.646	
Item 13		.382	.340	.349					.540	
Item 12	.909			.886						
Item 11	.804			.891						
Item 10	.665			.882						
Item 9					.874	.659				
Item 8					.779	.965				
Item 7					.851	.920				
Item 6	.762									.897
Item 5	.674									.900
Item 4	.757									.474
Item 3							.771	.797		
Item 2							.681	.745		
Item 1							.902	.914		

Note: ANZ = Australian/New Zealand; all loadings less than .300 suppressed.

Table 33

Principal Components Analysis Loadings and Patterns in a Forced 6-Component Solution between US and Australia/New Zealand Males

	1		2		3		4		5		6	
Item	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ
Item 18	.929	.858										
Item 17	.930	.965										
Item 16	.623	.943										
Item 15	.848	.548										.496
Item 14	.855	.594	-.361									.420
Item 13	.583								.377			.796
Item 12			.836			.904						
Item 11			.866			.967						
Item 10			.773			.791						
Item 9								.848	.641			
Item 8			.396					.944	.893			
Item 7								.904	.505			
Item 6							.861			.873		
Item 5							.913			.938		
Item 4										.718	.826	
Item 3				.852	.833							
Item 2				.898	.876							
Item 1				.956	.909							

Note: ANZ = Australian/New Zealand; all loadings less than .300 suppressed.

Table 34

Principal Components Analysis Loadings and Patterns in a Forced 5-Component Solution between US and Australia/New Zealand Males

Item	1		2		3		4		5	
	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ
Item 18	.867	.835								
Item 17	.910	.841								
Item 16	.913	.839							-.336	
Item 15	.654	.892								
Item 14	.836	.876	-.361							
Item 13	.507	.663			-.321				.492	
Item 12			.818			.915				
Item 11			.871			.967				
Item 10			.778			.777				
Item 9								.882	.584	
Item 8			.390					.913	.416	
Item 7								.881	.835	
Item 6							.869			.876
Item 5							.892			.871
Item 4							.558			.763
Item 3				.869	.805					
Item 2				.912	.860					
Item 1				.918	.914					

Note: ANZ = Australian/New Zealand; all loadings less than .300 suppressed.

Table 35

Principal Components Analysis Loadings and Patterns in a Forced 6-Component Solution between US and Australia/New Zealand Females

	1		2		3		4		5		6	
Item	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ
Item 18	.950	.774										
Item 17	.654	.950										
Item 16	.769	.868										
Item 15	.427	.821	.473									
Item 14		.860	.920									
Item 13			.811									.952
Item 12					.754	.914						
Item 11					.780	.933						
Item 10					.978	.898						
Item 9				.786			.894					
Item 8				.938			.819					
Item 7				.915			.925					
Item 6	.473								.407	.925		
Item 5									.870	.939		
Item 4								.402	.885	.618		
Item 3								.820			.813	
Item 2								.788			.753	
Item 1								.929			.986	

Note: ANZ = Australian/New Zealand sample; all loadings less than .3 suppressed.

Table 36

Principal Components Analysis Loadings and Patterns in a Forced 5-Component Solution between US and Australia/New Zealand Females

	1		2		3		4		5	
Item	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ	USA	ANZ
Item 18		.857					.894			
Item 17		.882					.650		.315	
Item 16		.878					.705			
Item 15		.867							.567	
Item 14		.827							.902	
Item 13		.411		.443					.768	
Item 12	.872			.930						
Item 11	.791			.910						
Item 10	.715			.921			.337			
Item 9			.880			.783				
Item 8			.809			.937				
Item 7			.909			.914				
Item 6	.795									.921
Item 5	.763									.934
Item 4	.833							.400		.621
Item 3					.790			.819		
Item 2					.773			.785		
Item 1					.984			.933		

Note: ANZ = Australian/New Zealand sample; all loadings less than .3 suppressed.

Table 37

Comparison of Overall Fit Across Multiple Models for Measurement Invariance between Australian/New Zealand Males and Females

	χ^2	$\Delta\chi^2$	RMSEA	SRMR	NNFI
Males					
Variance/Covariance Invariance	322.74	n/a	.062	.081	.94
Factor Pattern Invariance (χ^2_{uncon})	497.98	n/a	.070	.060	.93
Factor Pattern and Loading Invariance	529.04	31.06*	.071	.083	.93
Partial Measurement Invariance	519.71	22.23	.070	.075	.93

Note: *=p<.05; RMSEA=Root Mean Square Error of Approximation; SRMR=Standardized Root Mean Square Residual; NNFI=Non-Normed Fit Index.

Table 38

Partial Measurement Invariance Fit Statistics between ANZ Males and Females

	χ^2	$\Delta\chi^2$	RMSEA	ΔRMSEA	SRMR	ΔSRMR	NNFI	ΔNNFI
(χ^2_{uncon})	497.98	n/a	.070	n/a	.060	n/a	.93	n/a
Item 1	498.11	0.13	.070	0.000	.060	0.000	.93	0.00
Item 2	498.02	0.04	.070	0.000	.059	-.001	.93	0.00
Item 3	498.65	0.67	.070	0.000	.062	+.002	.93	0.00
Item 4	502.26	4.28*	.071	+.001	.068	+.008	.93	0.00
Item 5	498.11	0.13	.070	0.000	.059	-.001	.93	0.00
Item 6	498.49	0.51	.070	0.000	.061	+.001	.93	0.00
Item 7	499.57	2.09	.070	0.000	.062	+.002	.93	0.00
Item 8	502.67	4.69*	.071	+.001	.069	+.009	.93	0.00
Item 9	497.98	1.00	.070	0.000	.059	-.001	.93	0.00
Item 10	500.03	2.05	.070	0.000	.059	-.001	.93	0.00
Item 11	500.24	2.16	.070	0.000	.067	+.007	.93	0.00
Item 12	500.34	2.26	.070	0.000	.069	+.009	.93	0.00
Item 13	500.03	2.05	.070	0.000	.067	+.007	.93	0.00
Item 14	499.41	1.43	.070	0.000	.065	+.005	.93	0.00
Item 15	497.98	0.00	.070	0.000	.059	-.001	.93	0.00
Item 16	498.48	0.50	.070	0.000	.063	+.003	.93	0.00
Item 17	498.02	0.04	.070	0.000	.059	-.001	.93	0.00
Item 18	497.98	0.00	.070	0.000	.060	0.000	.93	0.00

Note: *=p<.05; RMSEA=Root Mean Square Error of Approximation; SRMR=Standardized Root Mean Square Residual; NNFI=Non-Normed Fit Index.

Table 39

Within-Group Completely Standardized Manifest Variable Loadings and Modification Indices for ANZ Males and Females

	Males	Females	MI	Males	Females	MI	Males	Females	MI
Item 1	0.86	0.86	0.08						
Item 2	0.88	0.86	0.42						
Item 3	0.84	0.88	0.99						
Item 4				0.70	0.52	n/a			
Item 5				0.79	0.87	0.45			
Item 6				0.88	0.91	0.58			
Item 7							0.92	0.92	2.49
Item 8							0.84	0.93	n/a
Item 9							0.83	0.79	0.35

Note: MI=Modification Index.

Table 39 (continued)

Within-Group Completely Standardized Manifest Variable Loadings and Modification Indices for ANZ Males and Females (continued)

	Males	Females	MI	Males	Females	MI	Males	Females	MI
Item 10	0.78	0.85	10.03						
Item 11	0.97	0.94	3.14						
Item 12	0.87	0.87	2.57						
Item 13				0.63	0.56	1.87			
Item 14				0.81	0.77	1.50			
Item 15				0.93	0.86	0.86			
Item 16							0.87	0.87	0.68
Item 17							0.85	0.81	0.52
Item 18							0.86	0.84	0.12

Note: MI=Modification Index.

Table 40

Within-Group Completely Standardized Phi Solution for ANZ Males and Females

	M	F	M	F	M	F	M	F	M	F
WIF Time	1.00	1.00								
FIW Time	0.20	0.18	1.00	1.00						
WIF Strain	0.44	0.69	0.14	0.07	1.00	1.00				
FIW Strain	0.01	0.09	0.36	0.29	0.21	0.11	1.00	1.00		
WIF Beh.	0.22	0.30	0.30	0.12	0.38	0.36	0.27	0.36	1.00	1.00
FIW Beh.	0.20	0.25	0.33	0.09	0.44	0.36	0.26	0.30	0.83	0.98

Note: WIF=Work Interference with Family; FIW=Family Interference with Work; Beh.=Behavior

Table 41

Within-Group Completely Standardized Theta-Delta Error Terms for ANZ Males and Females

	Males	Females
Item 1	0.25	0.27
Item 2	0.23	0.27
Item 3	0.29	0.23
Item 4	0.51	0.73
Item 5	0.38	0.25
Item 6	0.22	0.16
Item 7	0.15	0.15
Item 8	0.30	0.14
Item 9	0.31	0.37
Item 10	0.39	0.28
Item 11	0.05	0.13
Item 12	0.24	0.24
Item 13	0.61	0.68
Item 14	0.34	0.40
Item 15	0.13	0.27
Item 16	0.24	0.24
Item 17	0.28	0.34
Item 18	0.25	0.30

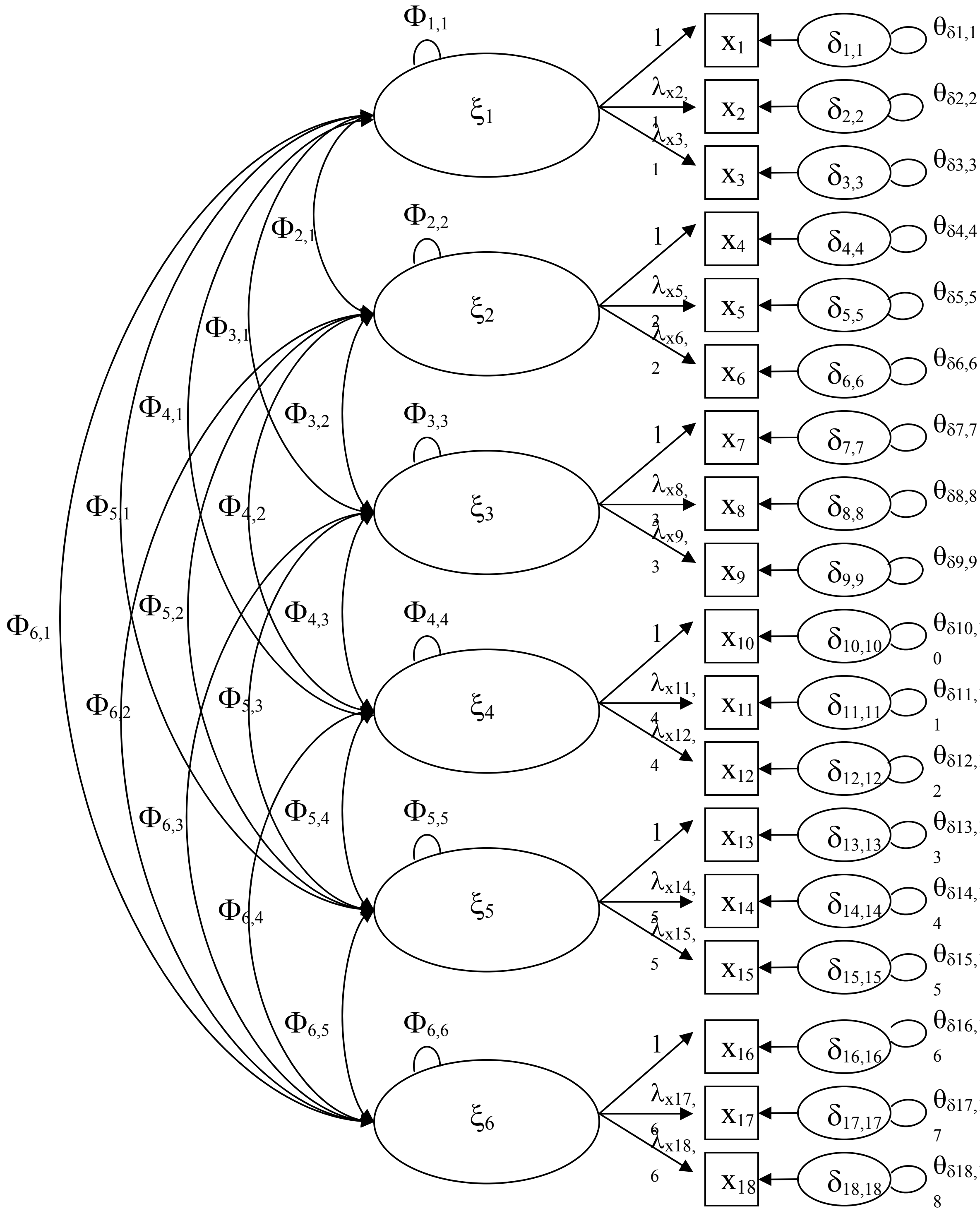
Table 42

Mean Group Comparisons Between Australian/New Zealand Males and Females

	Gender	N	Mean	SD	t	df
WIF Time	Males	143	3.54779	1.33122	4.717**	289.110
	Females	249	2.89558	1.29369		
FIW Time[a]	Males	143	2.14452	0.99337	2.054*	274.49
	Females	249	1.93708	0.90699		
WIF Strain[a]	Males	143	3.09557	1.20421	-0.200	321.05
	Females	249	3.12182	1.33262		
FIW Strain	Males	143	1.64103	0.80402	0.513	286.082
	Females	249	1.59839	0.77151		
WIF Behavior	Males	143	2.66434	1.06700	1.328	284.946
	Females	249	2.51807	1.01898		
FIW Behavior	Males	143	2.54079	1.04425	-0.441	294.651
	Females	249	2.58902	1.03835		

Note: *=p<.05; **p<j.01 WIF=work interference with family; FIW=family interference with work;
[a] scales not invariant across gender.

Figure 1. Carlson et al. (2000) model of work/family conflict.



Φ1,1
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Φ3,3
Φ4,4
Φ5,5
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λx3,1
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δ1,1
δ2,2
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θδ12,12
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θδ14,14
θδ15,15
θδ16,16
θδ17,17
θδ18,18

About the Author

David Herst began his career in psychology as a Licensed Psychiatric Technician, graduating as valedictorian of his 1992 class from Mt. San Antonio Community College. He then received a Bachelor's of Science degree from the University of Wyoming in 1995, and his Master's Degree in Industrial/Organizational Psychology in 2001 from the University of South Florida on route to his Ph.D.

While in the Ph.D. program at the University of South Florida, Mr. Herst taught extensively in the undergraduate program in the psychology department. He has presented at numerous conferences, including the Society for Industrial/Organizational Psychology, Academy of Management, and American Psychological Association. He is a published author, and has repeatedly served as a reviewer for the Southern Management Association's annual conference.