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Reconsidering work time: a multivariate longitudinal within-couple analysis

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Dual-earner couples now work significantly more hours than in the past, but few couple-level studies examine whether work hours are linked to mental health and quality-of-life outcomes. In 2001, Jacobs and Gerson proposed that combined spouse work hours would better predict outcomes than would spouses' individual work hours. Longitudinal data from a random sample of 211 dual-earner couples with children partially support this hypothesis. Our findings suggest that future research on dual-earner couples' work hours should be couple-level and longitudinal, estimate both linear and non-linear relationships, and include multiple positive and negative outcomes as well as subjective indicators of the meaning of work hours.

Keywords: work hours; dual-earner couples; quality of life; within-couple analysis

La cantidad de horas trabajadas por parejas donde ambos integrantes aportan ganancias es cnsiderablemente mayor ahora que en el pasado, pero pocos estudios a nivel de pareja indagan en la posible relación entre horas trabajas y salud mental o calidad de vida. Jacobs y Gerson (2001) argumentaron que la totalidad de las horas trabajadas en esas parejas sería mejor indicador de resultados que las horas trabajadas por cada integrante de la pareja. Los datos longitudinales de una muestra aleatoria de 211 parejas con dos sueldos y con hijos ratifican parcialmente esta hipótesis. Nuestras conclusiones sugieren que toda investigación futura sobre horas de trabajo de parejas con dos sueldos debe ser longitudinal, llevarse a cabo a nivel de pareja, tener en cuenta parentescos lineares y no lineares, y abarcar consecuencias positivas y negativas, a la par que indicadores sujetivos del significado de las horas trabajadas.

Palabras claves: horas trabajadas; parejas con dos sueldos; calidad de vida; análisis a nivel de pareja

The heavy focus in the work–family literature on time demands as a major source of stress dates back to the 1970s. As Kanter noted at that time: 'The amount of time demanded by occupations and the timing of occupational events are among the most obvious and important ways occupational life affects family life' (1977, p. 31). Much has changed in the past 30 years, but paid work time – variously conceptualized – has remained a key variable in work–family studies. Among the most remarkable

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changes is the dramatic increase in the number of dual-earner couples. Currently, 78% of married workers are in two-earner couples, compared to 66% in 1977 (Bond, Thompson, Galinsky, & Prottas, 2003). This increase has reinvigorated claims that time spent at work is eroding time for family life and has spawned a new vocabulary reflecting heightened concern about time pressures, including the 'time bind' (Hochschild, 1997), the 'time squeeze' (Blanton, 2003), the 'second shift' (Hochschild, 1989), and the 'time famine' (Orr, 2004). These claims typically imply that reactions to long work hours differ by gender (e.g., Hochschild, 1997).

In spite of these claims, few studies examine the linkage between time spent at work by spouses in dual-earner couples and mental health and quality-of-life outcomes, both positive and negative. Indeed, the well-studied concept of 'linked lives' (e.g., Chesley & Moen, 2006; Elder, George, & Shanahan, 1996) suggests that change in one spouse's work hours is likely to have effects on both spouses. However, most systematic studies in this research area continue to take the individual employee, not the couple, as the unit of analysis (see Galambos & Walters, 1992; Moen, 2003; Voydanoff, 2004a for exceptions), potentially underestimating the effect of work hours within couples. Moreover, many studies of two-earner couples have relied on data from only one spouse (e.g., Stolzenberg, 2001). In addition, most of the studies in this area have been cross-sectional and the results inconsistent (cf., House, Strecher, Metzner, & Robbins, 1986; Sparks, Cooper, Fried, & Shirom, 1997; Voydanoff, 2004b). Although the data for this analysis were collected between 1989 and 1992, to the best of our knowledge, this is the only extant data-set with three-wave longitudinal data from both members of each marital dyad on change over time in work hours and in several mental health and quality-of-life outcomes (i.e., work–family conflict, psychological distress, and marital-role quality).

Jacobs and Gerson (2001) proposed that total family work hours, or the combined work hours of both spouses, would be a stronger predictor of negative outcomes, especially among parents, than the work hours of the individual spouses. Total family work hours is a concept with considerable face validity; as Jacobs and Gerson (2001) note, 'married individuals have less time to spend at home, because they devote more joint time to work' (p. 50). The present study is the first to examine the Jacobs and Gerson hypothesis with a suitable longitudinal couple data-set and a set of advanced data analytical tools. In this paper, we examine and expand upon the Jacobs and Gerson hypothesis using data from a longitudinal study involving three waves of data collection over two years drawn from a Boston-area random sample of 211 full-time employed dual-earner couples with children.

Literature review

The problem with work time

Despite considerable concern about the time pressures on employees, empirical evidence calls into question whether US employees are, in fact, working longer average weekday hours, as well as whether long work hours per se are, in fact, related to negative outcomes. If long work hours are a risk factor, it would be important for employees, researchers, and corporate policy makers to know which employees are especially vulnerable to changes in work hours.

Detailed analyses by Jacobs and Gerson (2004) show that the length of the average work week has been remarkably stable between 1960 and 2000. American men work an average of 42–43 hours per week, whereas American women work an average of 35–36 hours per week. Variance in work hours, however, has increased over this period, especially for women. There has also been an increase in women's annual work hours, reflecting a movement toward full-year work. Thus, the increase in women's work hours is due primarily to their working more weeks per year, not more hours per week. Largely due to these changes in women's labor force pattern, there has been an increase in dual-earner couples and an increase in their combined weekly work hours (i.e., total family work hours). In the present analysis, we focus on weekly work hours data.

In the view of Jacobs and Gerson (2001), the time crunch is likely to be due to total family work hours, which increased among dual-earner parents from 81 to 91 hours per week between 1977 and 2002 (Bond et al., 2003). Jacobs and Gerson (2001) speculate as to the likely consequences of this increase in total family work hours: 'It is not the amount of working time but rather the loss of someone to take care of domestic needs' (p. 46) that is associated with work–family conflict. More recently, Voydanoff (2004b) argued that long work hours reduce the resources that couples have for managing home demands, with likely negative effects on marital quality that vary with gender. Specifically, for fathers, but not mothers, activities with spouse decreased as work hours increased until a minimum level was reached.

Thus, we assess work–family conflict and marital-role quality as outcomes, and, following the suggestion of Frone, Russell, and Cooper (1992) to assess multiple outcomes, we include an additional measure, psychological distress. Modeling multiple outcomes is desirable because work hours might be related to different outcomes in different ways, as predicted, for example, by the dual-process model linking job demands to work–family conflict and facilitation (Voydanoff, 2004a). To illustrate, long work hours may contribute to work–family conflict and marital problems (e.g., Frone, Yardley, & Markel, 1997; Major, Klein, & Ehrhart, 2002; Noor, 2003), whereas autonomy and learning opportunities on the job, which may be associated with long work hours (Voydanoff, 2004a), may be linked to work–family facilitation (Demerouti & Geurts, 2004). Long work hours may also be associated with higher income and benefits, with possible positive effects on marital-role quality. By including a range of theoretically relevant outcomes, positive as well as negative, we can better assess the relationships linking work hours to outcomes.

The hypothesis that total family work hours will lead to increased distress and lower quality of life is also consistent with the conservation of resources model (Hobfoll, 1989), which suggests that individuals seek to acquire and maintain resources. Stress is a reaction to threatened loss of resources, actual loss of resources, or lack of an expected gain in resources (Grandey & Cropanzano, 1999). Resources include energies such as time, money, and knowledge that allow one to acquire other resources. Loss of one resource, time, as reflected in higher total family work hours, may be linked to the experience of distress.

Conceptualizing work hours within couples

Previous research on the relationship between individual work hours and outcomes has yielded inconsistent results: some studies report positive associations, some

negative associations, and others, no significant relationship (Barnett, 1998, 2006). For example, long work hours have been associated with high work–family conflict (Grzywacz & Marks, 2000) as well as with good physical health (Bird & Fremont, 1991). In contrast, there was no significant relationship between long work hours and intention to turnover or life satisfaction (Barnett & Gareis, 2000a,b). However, the notion of linked lives suggests that within-couple analyses might yield more informative results than analyses focusing solely on the individual worker (Chesley & Moen, 2006).

As early as 1984, Nock and Kingston made a persuasive case for taking the couple as the unit of analysis in conceptualizing work schedules in dual-earner couples. They proposed a concept called the 'family work day', which captures both the total commitment of hours by the couple and the scheduling of those hours in terms of overlap between spouses' work hours. Surprisingly, even 20 years later, their call has gone largely unheeded. Jacobs and Gerson (2001) are an exception; their conceptualization of total family work hours is consistent with the first part of the Nock and Kingston (1984) family work day. There is as yet no general consensus, however, on the best strategy for conceptualizing work time as a couple-level variable.

Crossover effects

Several studies of dual-earner couples estimate the effects of each spouse's work hours on that spouse's own outcomes, and, in some cases, also assess within-couple crossover effects of one spouse's work hours on the other spouse's outcomes (e.g., Brines, 1994; Galambos & Walters, 1992; Stolzenberg, 2001; Westman, Hamilton, Vinokur, & Roziner, 2004). For example, Crouter, Head, McHale, and Tucker (2004) found that fathers' work hours predicted mothers' subsequent depressive symptoms. In contrast, Galambos and Walters (1992) found that husbands' depression and anxiety was predicted by their wives' long work hours as well as by their own, with no parallel crossover effect among wives. Similarly, Brines (1994) and Stolzenberg (2001) also found negative effects on husbands of wives' long work hours. Other studies have found that long work hours by wives are unrelated to or actually have positive effects on husbands' outcomes. For example, Hyde, DeLamater, and Hewitt (1998) found that wives' work hours were unrelated to husbands' sexual satisfaction.

Multiple outcomes

Previous research suggests that the inclusion of multiple outcomes in a within-couple context may improve the precision of results. For example, in a prior analysis using the present longitudinal data-set of dual-earner couples, the more time a husband spent in childcare relative to his wife, the lower was his distress (Ozer, Barnett, Brennan, & Sperling, 1998). The relationship was more complicated among wives. Husbands' increased childcare was related simultaneously to wives' increased distress (as she spent correspondingly less time in childcare) and increased marital-role quality (which was linked to decreased distress in wives). These effects counter-balanced each other such that there was no net significant effect of husbands' relative time in childcare on wives' distress.

Overall, these findings underscore the complexity of 'real' life that is obscured when crossover effects are not taken into account and when outcomes are studied one at a time. There is every reason to expect that the results will also be complex in the present within-couple longitudinal analysis, which links objective aspects of work hours to three outcomes for husbands and for wives and estimates crossover effects between spouses.

Total family work hours

The Jacobs and Gerson (2001) hypothesis focuses not on the work time of the individual members of a marital dyad, but on their combined work time and its correlates. Individual work hours and total family work hours, however, do not exhaust all of the possible conceptualizations of work hours within couples. To adequately assess the unique predictive power of total family work hours, one must assess the effects of a more complete set of other conceptualizations of couple work time, including the difference in work hours between the spouses.

Within-couple difference in work hours

Within a couple, spouses are likely to differ in the average number of hours they work per week. Moreover, the direction of the difference may vary. In some couples, the husband may work more hours than the wife; in others, the opposite may be the case. The within-couple difference in work hours may be at least in part a proxy for the amount of time each spouse is at home while the other spouse is at work, similar to Nock and Kingston's 'overlap' component of the family work day (1984).

Longitudinal analyses

Over time, for each conceptualization of work hours, there is a time-varying component and a stable component, both of which we take into account in our analyses. The stable component represents hours averaged over the three time points, whereas the time-varying component represents differences from the average as observed in each wave of data collection.

Linear versus non-linear effects

Most previous studies have focused on linear effects of work hours on outcomes, although there is some indication (e.g., Johnson, 2004; Weston, Gray, Qu, & Stanton, 2004) that these relationships may be non-linear, at least with respect to some outcomes. For example, it may be that the processes linking work hours to outcomes differ for employees who work more compared to fewer than the average number of hours per week. Longitudinal analyses that estimate both linear and non-linear relationships between work hours and outcomes may be needed, given that increases or decreases in work hours over time may have different effects for workers depending on where in the continuum their work hours lie (Voydanoff, 2004b).

In the most relevant previous study, Voydanoff (2004b) estimated the relationship between paid work hours and three indicators of marital quality with cross-sectional data from a nationally representative sample of dual-earner couples with at least one

child 10–17 years of age. She found no linear effects of paid work hours on any indicator of marital quality for husbands or wives. However, for husbands, the non-linear effect of paid work hours was related positively to one indicator of marital quality – activities with spouse. According to Voydanoff, 'activities with spouse decrease as work hours increase until a minimum level is reached' (p. 320). This interpretation, which suggests a change-over-time analysis requiring longitudinal data, unfortunately could not be tested with her cross-sectional data. Moreover, although the data were collected from couples, the analyses were conducted separately for the husbands and wives, thereby losing the richness of the couple data. Finally, the analyses did not include any measure of response bias, even though previous research indicates that employees tend to over- and under-represent their work hours, especially on self-report measures (Perry-Jenkins, 2005).

In the present paper, we extend the Voydanoff (2004b) analysis by utilizing longitudinal data, employing a within-couple data analysis strategy, including an established measure of response bias (i.e., trait negative affectivity), and including, in addition to marital-role quality, work–family conflict and psychological distress as outcomes. We include these additional outcomes not because there is a body of directly relevant prior literature, but rather to more fully investigate the linkages between change over time in work hours and a number of seemingly pertinent outcomes in a within-couple framework.

Gender

Although Jacobs and Gerson (2001) do not discuss gender differences per se, several studies suggest that, on average, wives' work hours compared to their husbands' are shorter and more reactive to external, including family, demands (Barnett & Rivers, 1996; Glass & Estes, 1997; Lyness & Judiesch, 2001; Maume, 2006; Voydanoff, 2004b). Moreover, other researchers (e.g., Voydanoff, 2004b) report gender differences in the linkages between work hours and particular outcomes. Our models estimate separate coefficients for men and women and test directly for gender differences. Since men in dual-earner couples tend to work longer hours than women, many family responsibilities may fall to the women. This imbalance may have negative effects on wives' outcomes. To the extent that the difference in work hours increasingly favors men over time, women's outcomes may be more negatively affected than men's. Alternatively, other studies suggest that when a woman's work hours are long or increase over time, her husband is deprived of some of the supports that she provides and that he depends upon (Brines, 1994; Galambos & Walters, 1992; Stolzenberg, 2001). Accordingly, increases over time in her work hours, or in the difference favoring wives, may have more serious negative effects on the husband's outcomes than on the wife's.

Thus, the present study differs in several respects from previous studies: (1) it is a three-wave longitudinal analysis of data from both spouses in a random sample of dual-earner couples with children using advanced tools for longitudinal analysis of couple data; (2) it systematically tests various conceptualizations of work time within couples, including total family work hours and spousal differences, as well as non-linear conceptions of work time; (3) it utilizes a methodology that permits analysis of within-couple data, including within-couple crossover effects; (4) it includes both negative and positive outcomes; and (5) it permits an explicit test of the effects of

gender. Additionally, we improve previously validated outcome measures by giving more weight in the analysis to items indicating more severe symptoms (Cheong & Raudenbush, 2000).

Covariates

Following Jacobs and Gerson (2001), we include education and number of children as covariates. Highly educated workers tend to work longer hours than less educated ones (Bluestone & Rose, 1998), and the growth in working time between 1970 and 1997 has been concentrated among the most highly educated couples (Jacobs & Gerson, 2001).

Jacobs and Gerson (2001) also found that dual-earner couples' work hours are linked to the number of children they have, with couples who have more children working somewhat fewer hours. This is primarily due to the mothers in those families working fewer hours; in contrast, husbands with more children show slight increases in work hours. Child age was not linked to work–family conflict, which appeared to be related to the mere presence of children. As Jacobs and Gerson note, 'the nature of parental stresses may change as children age, but they do not necessarily diminish, as many parents of teenagers will attest' (2001, p. 92). More recently, Reynolds (2005) found that among employed men and women, having a preschool or a young school-age child was unrelated to work-to-family conflict, family-to-work conflict, or work hours preference. Preliminary analyses with the present data-set indicate that child age is inconsistently related to outcomes. Therefore, we include number but not age of children as a covariate.

Going beyond Jacobs and Gerson, we include household income, parent age, and negative affectivity as covariates. Stolzenberg (2001) argues that only when household income is controlled can one estimate the link between nonpecuniary aspects of work hours – for example, the diversion to the labor market of a spouse's time and effort from self and family care – and outcomes. Parent age serves as a proxy for marriage length and age of children, which have effects on marital-role quality. Negative affectivity is a mood-dispositional trait to experience the world negatively. A considerable literature suggests that including negative affectivity as a covariate reduces spurious correlations between predictors and outcomes, especially when both are assessed by self-report as in the present analysis (Brennan & Barnett, 1998).

In sum, using data from a longitudinal study of a Boston-area random sample of 211 full-time employed dual-earner couples with children and constructing multivariate models, we estimate the relationships between three different conceptualizations of family work hours – hours worked by each spouse, total family work hours, and the difference between the two spouses' work hours – and three simultaneous outcomes for each spouse: work–family conflict, marital-role quality, and psychological distress (i.e., a total of six outcomes for each couple). We estimate these effects both cross-sectionally and longitudinally, within and across spouses, both linearly and quadratically, and we examine whether the effects differ for men and women. Because prior studies have not conceptualized work hours as a couple-level variable, nor have they estimated non-linear as well as linear effects, these analyses are largely exploratory in nature. We intend our methods and results primarily to guide future research rather than to support or fail to support existing research and theory.

1. Within couples, (a) each spouse's average work hours, (b) average total family work hours, and (c) average difference between the two spouses' work hours will be related to mental health and quality-of-life outcomes (i.e., work–family conflict, psychological distress, and marital-role quality) for both spouses.
2. Within couples, (a) change in each spouse's work hours, (b) change in total family work hours, and (c) change in the difference between the two spouses' work hours will be related to change in outcomes for both spouses.

We also test for gender differences in the magnitude of the associations between work hours and outcomes.

Method

Sample

Data for the original longitudinal study involving three waves of data collection over two years came from a random sample of dual-earner couples in two Boston suburbs (National Institute of Mental Health, MH #43222). During Wave 1, both spouses in all couples were employed full time and the men were 25–40 years of age. The participation rate among eligible couples who could be contacted was 68%, and the attrition rate across the three waves of data collection was 8%. We employed a variety of techniques to increase response rate and to keep participants engaged with the study over the three data collections. These techniques included placing notices in local newspapers about the forthcoming study, arranging interviews for the researchers on local cable television stations about the nature of the study, asking local institutions (e.g., churches, synagogues, schools) to alert congregants and parents about the study, and sending annual newsletters to participants describing the progress of the study and sharing basic descriptive results. Data were collected between fall 1989 and spring 1992.

The original sample of 300 couples was stratified such that 60%, or 180 couples, had children at Wave 1. For the present analyses, we analyzed data from the 211 couples ($N = 422$ individuals) who were parents or became parents over the course of the two years. On average, the men in this subsample were 35.73 years old (SD = 4.10) and the women were 34.91 years old (SD = 4.65); the couples had been married for an average of 9.49 years (SD = 5.15) at Wave 1. There was a wide range of occupations in the sample, from clerical workers to executives. Educational attainment averaged 16 years of schooling (i.e., a bachelor's degree) for both men (Mean = 16.35, SD = 2.38) and women (Mean = 16.11, SD = 2.12). The median annual household income was $77,250 at Wave 1 (SD = $39,201). Averaging across the two years of data collection, couples had 1.53 children (SD = 0.74); 72.0% had at least one preschooler, 48.6% had at least one school-aged child, and 28.7% had at least one teenager (percentages do not total 100% because some parents had children in more than one of the three age categories).

Procedure

Each spouse participated in three private face-to-face 90-minute quantitative interviews at intervals of about one year (12–15 months). Before each interview,

participants also completed a mailed survey to be returned to the interviewer. The interview and survey covered many aspects of participants' lives, including work arrangements, social-role quality (as spouse, employee, and parent), and quality of life. Each couple was paid $25 for participating in each wave.

Measures

Individual work hours were assessed by asking each spouse to estimate how many hours, on average, they work each week, including all jobs. These figures were used to compute *total family work hours*, or the sum of both spouses' work hours, and the *difference between the two spouses' work hours*. As explained below, because we employ a multivariate outcomes model with separate sets of outcomes for husbands and wives (Barnett, Marshall, Raudenbush, & Brennan, 1993), the difference scores are inversely related so that they have the same interpretation for both men and women. Regardless of gender, a positive value means working more hours than one's spouse. Further, because the outcomes are gender-specific, there is no problem with redundancy or multicollinearity occasioned by including terms for both the husband and the wife, even though the only thing that distinguishes them is the sign.

Work–family conflict was assessed using eight spillover stress and strain items selected from Wortman, Biernat, and Lang (1991). Respondents rated four items about work interfering with family and four items about family interfering with work on a scale from 1 (*not at all true*) to 4 (*very true*). Internal consistency in the present sample is good, with Cronbach's alphas at each wave ranging from 0.73 to 0.77.

Psychological distress was assessed by asking participants to indicate on a scale from 0 (*not at all*) to 4 (*extremely*) how often in the past week they were bothered by each of 10 symptoms of anxiety and 14 symptoms of depression (Derogatis, 1975). When anxiety and depression scores were combined to create a measure of psychological distress (Barnett et al., 1993) it demonstrated excellent internal consistency in the present sample, with Cronbach's alphas at each wave ranging from 0.90 to 0.93.

Marital-role quality was measured using a 15-item brief form (Hyde & Plant, 1996) of the Marital-Role Quality scale (Barnett et al., 1993), on which participants used a scale from 1 (*not at all*) to 4 (*considerably*) to rate the extent to which each item was rewarding or of concern. Internal consistency is excellent in the present sample, with Cronbach's alphas at each wave ranging from 0.91 to 0.94.

Covariates were assessed as follows: participants indicated their highest level of *education* on a scale ranging from 1 (*didn't finish high school*) to 6 (*advanced graduate degree: MD, DSW, PhD, etc.*) at Wave 1. *Number of children* and *respondent age* are self-explanatory. *Household income per capita* was calculated by averaging each spouse's report of household income and then dividing by the number of people in the household. The distribution of this variable is skewed, so we used the natural log of per capita income in the analyses. *Negative affectivity* was assessed with the 10-item Trait Anxiety Scale (Spielberger, 1983), on which respondents used a scale from 1 (*almost never*) to 4 (*almost always*) to indicate how characteristic the traits were of them. The scale was administered at Wave 1 and Wave 2; participants' average score was entered as a covariate. The test–retest correlation in the present sample was 0.77 over a one-year period. Internal

consistency is very good in the present sample, with Cronbach's alphas at each wave ranging from 0.80 to 0.86.

Analytic overview

To address the challenge of analyzing data where outcomes are known to be correlated within couples (e.g., psychological distress), Barnett et al. (1993) used hierarchical linear modeling (HLM), a technique originally developed to analyze data from individuals in social groupings such as classrooms. Barnett, Raudenbush, Brennan, Pleck, and Marshall (1995) and Raudenbush, Brennan, and Barnett (1995) expanded the HLM approach to include growth (or growth curve) modeling to analyze data gathered over three time points. The use of HLM is an appropriate and flexible approach for handling such data. Because the model proposed by Raudenbush et al. (1995) incorporates a measurement model with an error term, it is possible to estimate a quadratic growth curve for the relationship between time-varying predictors and the outcome variables using just three data points, not four as would be required if the error term needed to be estimated separately. Thus, typical quadratic associations can be estimated. However, because these curves will span all three time points in the study, they should not be extrapolated beyond the range of three points. These associations may be thought of as typical deflections from a linear association (even if the linear term is 0; i.e., flat) or as 'temporal instability' associated with change in a time-varying predictor (Raudenbush et al., 1995).

One important aspect of the flexibility of the HLM growth modeling approach is that it is able to retain data even when there are missing observations for a given respondent or couple. Thus, we can retain data from couples who were lost to follow-up before Wave 3, but, more importantly for the purposes of this study, we were able to utilize data from couples who became parents during the study, increasing the usable sample from the 180 couples who had children at Wave 1 to 211 couples, the number who were parents by Wave 3.

We expand upon the multivariate outcome approach to growth modeling couple data developed by Raudenbush et al. (1995) by further refining the measurement model intrinsic to both the cross-sectional (Barnett et al., 1993) and longitudinal frameworks (Raudenbush et al., 1995) and by expanding the number of outcomes modeled simultaneously. Because the model already employed multivariate outcomes (i.e., separate measures of distress for each couple member), it was easily expanded to model more than one outcome for each couple member. The first example of multiple outcomes per spouse was devised by Ozer et al. (1998), in which, as described above, both marital-role quality and psychological distress were modeled as outcomes for each of the two members of a couple, a feature that is retained and expanded in the present analyses. We also enhanced the measurement model beyond the original parallel subscales (Barnett et al., 1993; Raudenbush et al., 1995; Raudenbush, Rowan, & Kang, 1991); recent work (Cheong & Raudenbush, 2000; Maier, 2001; Pastor, 2003) has shown that HLM can accommodate an embedded item-response measurement model as a feature of the analysis. In this instance, a simpler linear weighting model is employed (Raudenbush et al., 1991).

Item-response, or Rasch (1980), models were originally employed in the analysis of testing, wherein an item's 'difficulty' is estimated. These methods are easily

translated to psychological measurement, though for scales such as psychological distress, 'severity' is a more sensible label than 'difficulty' (Bingenheimer, Raudenbush, Leventhal, & Brooks-Gunn, 2005). The use of an item-response model within the hierarchical linear model allows for an empirical weighting scheme in which scale items are ranked and weighted by their severity. Thus, 'spells of terror or panic' is given more weight as a measure of psychological distress than 'feeling low in energy or slowed down'. In our model, because the individual items are rating scales, not test items scored only as correct or incorrect, we do not employ a logistic model as in a true Rasch model. The assumptions for using a linear model with rating-scale items are the same as those for creating a scale by summing items, with the only difference being the application of empirical weights (Raudenbush et al., 1991; Wright, 1982).

Although we add a new layer of sophistication by using all original scale items to create self-weighting outcome scales while adjusting for measurement error, the overall structure of the model is not changed from the example offered by Raudenbush et al. (1995), in which just two parallel subscales were used to create the measurement model. Just as in that well-known example, all time-varying predictors and covariates were incorporated in level one of these two-level models, while the stable predictors make up level two of the model. In the present analysis, we model simultaneously three outcomes for each couple member: work–family conflict, psychological distress, and marital-role quality. Thus, the statistical model features a total of six outcomes for each couple (see Ozer et al., 1998 for a similar analysis). We estimated six hierarchical linear models. The first was the measurement model, in which we created the three self-weighted scales at level one by modeling $k - 1$ items (where k represents the number of scale items) for each scale plus one dummy variable for each scale (Cheong & Raudenbush, 2000). Next we modeled a null growth model that contained an intercept and a linear and a quadratic growth parameter for each of the three outcomes for each spouse at level one of the model; no predictors were included at level two (Raudenbush et al., 1995). The next model was a control model that included the time-varying covariates (number of children and logged household income per capita) at level one and stable covariates (education, age at Wave 1, negative affectivity, and average logged household income per capita) at level two. The control model was used as a baseline to test whether each of the explanatory models provided incrementally better fit once the influence of the covariates had been accounted for.

We estimated explanatory models employing two fundamentally different conceptualizations of work hours. Specifically, in the first model we included individual work hours for the husband and for the wife; to that model we then estimated another model adding crossover effects, by which we mean direct effects of one spouse's work hours on the other spouse's outcomes. In the other explanatory model, we included total family work hours (Jacobs & Gerson, 2001) and the difference between the hours worked by the two spouses. For each model, analogous work hours variables were divided into a stable component, which represented work hours averaged over the three time points, and a time-varying component, which represented differences from the average as observed in each wave. For each explanatory model, a deviance test (Raudenbush & Bryk, 2002; Raudenbush, Bryk, Cheong, & Congdon, 2004) was used to examine whether each nested model incrementally improved the fit over the control model. For the individual hours plus

crossover effects model, the deviance test was used to examine whether it improved the fit compared with the individual hours model that did not include crossover. Because the total family work hours and individual work hours models are not nested, they are not compared one to another.

Because the total amount of time devoted to work might have differing effects depending on the gender of the spouse, we tested for gender differences, relying on multivariate general linear hypothesis testing (Raudenbush & Bryk, 2002; Raudenbush et al., 2004).

Interpretive overview

Before discussing the results, we present some possible interpretive scenarios to facilitate understanding. We do this because this is the first analysis to estimate both quadratic and crossover effects in the relationships linking multiple conceptualizations of couple work hours to multiple outcomes, and the results are likely to be complex.

Considering first the quadratic analyses, it is possible that the curvilinear relationships between stable work hours and outcomes or between changes in work hours and changes in outcomes – best viewed as characteristic deflections or temporal instability (Raudenbush et al., 1995) – will vary for employees who work more or fewer hours on average than their peers. Following are several possible scenarios that might account for such results. Although we cannot test these alternative explanations, we offer them in the spirit of suggesting possible directions for future research.

Work hours preference

Previous research suggests that employees differ in the extent to which their work schedules are a good 'fit' to their and their families' needs (Barnett, Gareis, & Brennan, 1999; Gareis, Barnett, & Brennan, 2003) and that employees are motivated to maximize work schedule fit (Moen & Wethington, 1992; Reynolds & Aletraris, 2006). Because work schedule fit has been shown to mediate relationships between work hours and outcomes (Barnett et al., 1999), we speculate that a process of schedule fit maximization is occurring if, among those employees who work longer hours than average, increases in work hours are associated with increases in marital-role quality, while at the same time, for those who work fewer hours than average, decreases in work hours are also associated with increases in marital-role quality. That is, both groups of employees may be optimizing family preferences for particular work schedules, and both groups are experiencing the improvements in quality of life that accompany enhanced work schedule fit (Barnett et al., 1999). The situation above would yield a U-shaped relationship between change in work hours and change in marital-role quality (a positive outcome). With a negative outcome, fit maximization would result in an inverted U-shaped relationship, such that longer-hours employees who further increase their work hours experience less distress, whereas shorter-hours employees who further reduce their work hours also experience less distress.

Reverse causality

It is also plausible that employees who are experiencing high marital-role quality are better able to increase their work hours. In contrast, employees who are experiencing low marital-role quality may be motivated to further decrease their work hours. Reverse causality explanations would also result in U-shaped relationships when the outcome is positive and in inverted U-shaped relationships when the outcome is negative.

Increased work-related benefits

If work hours were associated with such job-related perquisites as better pay, benefits, and advancement opportunities for all workers, there would be a linear relationship linking long work hours, as well as increases in work hours, to more positive outcomes. Some previous studies have linked long work hours to positive outcomes (see Barnett, 1998, 2006), suggesting that increased job-related benefits might be associated with decreased distress and increased marital-role quality. On the other hand, if short-hours workers were not eligible for such increased perquisites when they increased their work hours – for example, if the short-hours workers have dead-end, entry-level jobs that offer no benefits – the relationship between work hours and benefits would be non-linear.

Finally, crossover effects present additional interpretive challenges because, as with the quadratic effects, the mechanism of the effect may be ambiguous. Several previous studies suggest that the work schedule of one spouse affects the mental health and quality-of-life outcomes of the other spouse (e.g., Gareis et al., 2003). For example, if husbands' increased work hours are associated with decreases in their wives' distress, it may be that the husband's improved mood at home has a positive effect on his wife's distress. Alternatively, reverse causality explanations are also possible; for example, that the lower the wife's distress, the more able the husband is to work longer hours.

Many of these scenarios have no precedents in either the theoretical or the empirical literature. For now we intend them as a jumping off point for other researchers both in planning their studies and in analyzing and interpreting their data. Our results raise new questions that researchers should consider beyond the mere objective measurement of work hours and the tracking of changes in work hours over time.

Results and discussion

Descriptive findings

Across the three waves of data collection, the men averaged 47.67 work hours per week (SD = 9.65), ranging up to 78 hours per week, whereas the women averaged 37.04 work hours per week (SD = 9.53), ranging up to 69.67 hours per week. Almost one-fifth (18.0%) of the participants had a second job at Wave 1. In most (78.2%) of the couples, the husband averaged more work hours than the wife across the three waves of data collection. In the rest of the couples, the wife averaged more hours than the husband (18.5%) or the spouses averaged the same number of hours (3.3%).

There was considerable variation in work hours over the study period. Although both spouses were employed full time at Wave 1, about one-third of the wives had either left the labor force (9.1%) or cut back to part time (23.1%) at Wave 2; these figures were 7.1 and 28.3%, respectively, at Wave 3. Their husbands were far less likely to leave the labor force (2.4% at Wave 2 and 3.1% at Wave 3) or to cut back to part time (2.4% at Wave 2 and 3.0% at Wave 3). This variability can also be expressed as the percentage of the sample who increased or decreased their work hours by five or more hours per week: among wives, this figure was 47.1% at Wave 2 and 58.9% at Wave 3. Among the husbands, this figure was 53.4% at both Wave 2 and Wave 3.

With respect to the covariates, there were median increases of $5500 in household income between Waves 1 and 2 and $2000 between Waves 2 and 3. This relatively small median change in income between waves of data collection does not reflect the fact that the majority of families – 77.7% between Waves 1 and 2 and 77.4% between Waves 2 and 3 – experienced an upward or downward change of greater than $10,000 in annual household income.

Model estimation

Our first model comparison was between the control variables model and the null growth model, each containing our three outcome variables for each of the spouses. The deviance test indicated that the control variables improved model fit substantially ($\chi^2 = 433.045$, $df = 48$, $p < 0.0005$). The individual hours plus crossover model improved fit both as compared with the control model ($\chi^2 = 164.218$, $df = 48$, $p < 0.0005$) and as compared with the individual hours model without crossover ($\chi^2 = 77.603$, $df = 24$, $p < 0.0005$). Similarly, the model containing total family work hours plus difference in spouses' hours also fit the data significantly better than the control model ($\chi^2 = 114.660$, $df = 48$, $p < 0.0005$).

HLM results

Tables 1 through 3 show the unstandardized regression coefficients for wives and for husbands in each of the two explanatory models, with the stable coefficients in the top half of each table and the time-varying coefficients in the bottom half. (The significant findings are summarized in Table 4.) Although each table shows the findings for only one of the three outcomes we examined, as discussed above, each of the two explanatory models estimated all three outcomes. That is, the results for each outcome are net of the effect of the other two outcomes. In all tables, only the work hours variables are shown; the covariates have been omitted for the sake of brevity and clarity (results for covariates are available from the authors upon request). It is important to recall that we controlled for household income in all analyses, allowing us to focus on the nonpecuniary aspects of total family work hours (Stolzenberg, 2001). Because of the number and complexity of the findings, we offer some interpretation as part of our presentation of the results wherever feasible.

In general, across the three outcomes, there were few results for either the stable or the time-varying aspect of total family work hours, or for the stable aspects of the individual work hours variables. In contrast, there were several findings for the time-varying work hours variables.

Table 1. Regression coefficients estimation for work–family conflict.

	Model 1: Individual work hours		Model 2: Difference in work hours	
Work–family conflict	Wives	Husbands	Wives	Husbands
Stable predictors (level two)				
Intercept	1.34304	1.09845	1.36539	1.11928
Total family work hours	–	–	0.00140	0.00594**
Total family work hours squared	–	–	0.00048***	−0.00003
Husband's work hours	−0.00095	0.00914***	–	–
Husband's work hours squared	0.00010	−0.00004	–	–
Wife's work hours	0.00384	0.00319	–	–
Wife's work hours squared	0.00074**	−0.00002	–	–
Difference in work hours	–	–	0.00168	0.00327†
Difference in work hours squared	–	–	−0.00009	−0.00001
Time-varying predictors (level one)				
Total family work hours	–	–	0.00144	0.00306*
Total family work hours squared	–	–	0.00010	−0.00010
Husband's work hours	−0.00097	0.00309	–	–
Husband's work hours squared	0.00013	0.00010	–	–
Wife's work hours	0.00373*	0.00284†	–	–
Wife's work hours squared	0.00024	0.00007	–	–
Difference in work hours	–	–	0.00220*	0.00045
Difference in work hours squared	–	–	0.00010	0.00015†

Note: $N = 211$ couples.
***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, †$p < 0.10$.

Work–family conflict

For the stable predictors, there are two major findings. First, there is a linear relationship between husbands' longer work hours and husband's reports of higher work–family conflict (Table 1, Model 1). Although total family work hours shows up as a significant predictor of husbands' work–family conflict in Model 2, the Model 1 finding suggests that this effect may be driven by husbands' individual work hours.

For the wives, the quadratic term linking work hours to work–family conflict is significant, indicating that this relationship is best viewed as non-linear. As shown in Figure 1, the relationship is U-shaped. That is, for women who work more hours than average, longer hours are linked to greater work–family conflict, as is true for their husbands. In contrast, for women who work fewer hours than average, shorter hours are linked to greater work–family conflict. There is a significant gender difference in the association between individual work hours and work–family conflict ($\chi^2 = 10.55$, $p = 0.005$). Thus, the differences in the relationship between work hours and work–family conflict for husbands vs. wives is unlikely to be a chance finding. Although the quadratic total family work hours term shows up as a significant predictor of wives' work–family conflict in Model 2, the Model 1 finding suggests that this effect may be driven by wives' squared individual work hours.

The finding of a positive relationship between longer work hours and greater work–family conflict among the men and among the long-hours wives confirms the cross-sectional results of previous studies. The finding among the short-hours wives

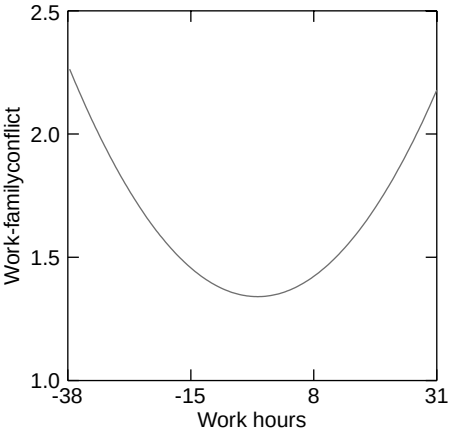

Figure 1. Stable effect of wife's work hours on wife's work–family conflict.

that shorter hours are linked to greater work–family conflict may reflect reverse causality. That is, women who experience greater work–family conflict may cope by reducing their work hours (Reynolds, 2005).

The results are different for the time-varying predictors. For wives, but not husbands, increases in work hours are related linearly to increased work–family conflict, in an effect paralleling the stable effect of hours on conflict for husbands (see Table 1, Model 1). There is no significant gender difference, however, in the association between changes in work hours and changes in work–family conflict ($\chi^2 = 0.46$, $p > 0.500$). Although change over time in the difference in work hours shows up as a significant positive predictor of wives' work–family conflict in Model 2, the Model 1 finding suggests that this effect may be driven by changes in wives' individual work hours.

In contrast, for the husbands, increases in total family work hours are linearly associated with increases in their ratings of work–family conflict (see Table 1, Model 2). Again, however, there is no significant gender difference in the association between changes in total family work hours and changes in work–family conflict ($\chi^2 = 4.38$, $p = 0.110$).

Psychological distress

None of the stable work hours variables is significantly linked to psychological distress (see Table 2). For the time-varying predictors, there are significant non-linear relationships between changes in husbands' work hours and changes in both husbands' and wives' psychological distress (see Table 2, Model 1). As shown in Figure 2, the relationship between changes in husbands' work hours and changes in their distress is shaped like an inverted U. Among men who work more hours than average, increases in work hours are linked to decreases in distress. In contrast, for men who work fewer hours than average, it is decreases in work hours that are linked to decreases in distress.

As discussed above in the 'Interpretive Overview', it may be that men who work long hours and then further increase their hours may derive additional work-related

Table 2. Regression coefficients estimation for psychological distress.

	Model 1: Individual work hours		Model 2: Difference in work hours	
Psychological distress	Wives	Husbands	Wives	Husbands
Stable predictors (level two)				
Intercept	0.08190	0.09806	0.12541	0.12598
Total family work hours	–	–	0.00089	−0.00087
Total family work hours squared	–	–	0.00012	0.00002
Husband's work hours	0.00123	−0.00054	–	–
Husband's work hours squared	0.00011	0.00001	–	–
Wife's work hours	0.00113	0.00044	–	–
Wife's work hours squared	0.00010	−0.00008	–	–
Difference in work hours	–	–	−0.00161	0.00054
Difference in work hours squared	–	–	−0.00004	−0.00008
Time-varying predictors (level one)				
Total family work hours	–	–	0.00070	0.00102
Total family work hours squared	–	–	0.00001	−0.00003
Husband's work hours	−0.00003	−0.00128	–	–
Husband's work hours squared	−0.00032***	−0.00020**	–	–
Wife's work hours	0.00205*	0.00381***	–	–
Wife's work hours squared	0.00022**	0.00020**	–	–
Difference in work hours	–	–	0.00010	−0.00177 **
Difference in work hours squared	–	–	−0.00004	0.00005

Note: $N = 211$ couples.
***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, †$p < 0.10$.

benefits (e.g., advancement opportunities) that operate to reduce their distress. Alternatively, the findings may reflect reverse causality such that low-distress men are able to increase their already long work hours. In contrast, men who work fewer hours than average and then further decrease their work hours may do so for reasons

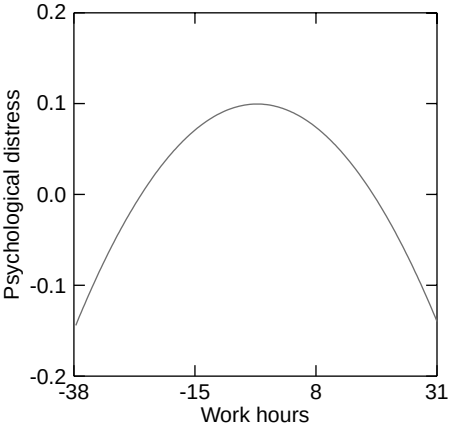

Figure 2. Time-varying effect of changes in husband's work hours on changes in husband's psychological distress.

such as boredom on the job; the reduced exposure to unpleasant aspects of the job may be associated with reduced psychological distress. Or it may be that both men who work fewer hours and men who work more hours than average, by changing their work hours even further in the same direction, are maximizing work schedule fit.

There is also a crossover relationship between changes in husbands' work hours and changes in their wives' distress (see Table 2, Model 1). The shape of this relationship is an inverted U similar to that in Figure 2. That is, for men who work more hours than average, increases in work hours are linked to decreases in their wives' distress, whereas for men who work fewer hours than average, it is decreases in work hours that are associated with decreases in their wives' distress. Again, two different processes may be operating. Among longer-hours men, as work hours increase, so might work-related perquisites that may reduce their wives' distress, whereas among shorter-hours men, increased work hours may not have the same benefits because of the nature of their jobs.

A reverse causality explanation is also possible: the lower the wives' distress, the more able the husbands may be to work longer hours. This crossover effect may also operate through the individual effect for husbands of changes in hours on changes in distress. As reported above, short-hours men who further reduce their work hours report decreased distress, which may directly or indirectly affect their wives' distress. Wives may enjoy having their husbands home more and therefore be less distressed, or husbands' lowered distress may affect their mood at home, with positive consequences for wives' levels of distress.

There are also significant non-linear relationships between changes in wives' work hours and changes in both wives' and husbands' psychological distress (see Table 2, Model 1). For wives, there is a U-shaped relationship between changes in work hours and changes in their distress: for women who work more hours than average, increases in work hours are linked to increases in distress, whereas for women who work fewer hours than average, it is decreases in work hours that are linked to increases in distress. The finding that women who increased their already long work hours reported higher distress may reflect increased fatigue, or inadequate time for sleep, leisure, or family activities. Among women who were working fewer than the average number of hours, decreases in work hours were associated with increases in distress. Reverse causality may explain this finding. As these women feel better (i.e., they report decreasing distress) they increase their work hours. Alternatively, as their distress increases, their work hours decrease.

There is also a crossover effect of changes in wives' work hours on changes in husbands' psychological distress that is shaped like an inverted mirror image of a J, as shown in Figure 3. That is, for women who work fewer hours than average, increases in work hours are linked to increases in husbands' distress, whereas for women who work more hours than average, it is decreases in work hours that are linked (weakly) to increases in husbands' distress. This relationship is similar in shape to those between changes in husbands' work hours and changes in both husbands' and wives' distress described above. Thus, the possible explanations for those effects (e.g., maximization of work schedule fit) seem plausible here as well.

Not surprisingly, the gender differences in the association between changes in work hours and changes in one's own psychological distress ($\chi^2 = 20.62$, $p < 0.0005$) and between changes in work hours and changes in spouse's psychological distress

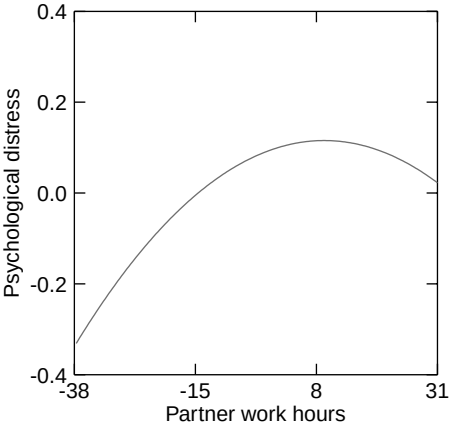

Figure 3. Time-varying effect of changes in wife's work hours on changes in husband's psychological distress.

($\chi^2 = 31.81$, $p < 0.0005$) were significant. Finally, although changes in the difference between husband's and wife's hours shows up as a significant predictor of his psychological distress in Model 2, the Model 1 finding suggests that this effect may be driven by changes in the wife's individual work hours. Thus, the effect of wives' hours on both spouses' distress is essentially the opposite of the effect of husbands' hours on both spouses' distress.

Marital-role quality

For the stable predictors, as with psychological distress, none of the work hours variables is significantly associated with this outcome (see Table 3). For husbands, changes in work hours have a significant non-linear relationship with changes in marital-role quality. As shown in Figure 4, this relationship is shaped roughly like a mirror-image J. For men who work fewer hours than average, decreases in work hours are linked to increases in marital-role quality. As suggested by their already fewer than average work hours, these men may be less personally invested in their work and perhaps more invested in their family lives. Thus, decreases in their work hours would give them more time to spend with their wives and families. In contrast, for men who work more hours than average, increases in work hours are linked (weakly) to increases in marital-role quality. A reverse causality explanation is plausible: as husbands' marital-role quality improves, they are better able to increase their work hours. It is also possible that the marital-role quality of both groups of husbands improves as both maximize their (different) strategies for balancing work and family. In other words, as their work schedule fit improves, so does their marital-role quality.

For the wives, changes in work hours have a significant non-linear relationship with changes in marital-role quality, in an effect similar to the relationship just described for the husbands (see Figure 5). That is, for women who work fewer hours than average, decreases in work hours are linked to increases in marital-role quality. In contrast, for women who work more hours than average, increases in work hours are linked (weakly) to increases in marital-role quality. In sum, these

Table 3. Regression coefficients estimation for marital-role quality.

	Model 1: Individual work hours		Model 2: Difference in work hours	
Marital-role quality	Wives	Husbands	Wives	Husbands
Stable predictors (level two)				
Intercept	3.21632	2.95946	3.22757	2.94447
Total family work hours	–	–	−0.00069	0.00186
Total family work hours squared	–	–	−0.00013	−0.00019
Husband's work hours	−0.00205	0.00187	–	–
Husband's work hours squared	−0.00033†	−0.00019	–	–
Wife's work hours	−0.00084	0.00082	–	–
Wife's work hours squared	−0.00021	−0.00021	–	–
Difference in work hours	–	–	−0.00037	−0.00029
Difference in work hours squared	–	–	−0.00017	−0.00004
Time-varying predictors (level one)				
Total family work hours	–	–	−0.00155†	0.00122
Total family work hours squared	–	–	−0.00001	0.00016**
Husband's work hours	−0.00276*	−0.00173	–	–
Husband's work hours squared	−0.00015	0.00023*	–	–
Wife's work hours	−0.00025	0.00290**	–	–
Wife's work hours squared	0.00017*	−0.00004	–	–
Difference in work hours	–	–	0.00051	−0.00290 ***
Difference in work hours squared	–	–	0.00007	−0.00003

Note: $N = 211$ couples.
***$p < 0.001$, **$p < 0.01$, *$p < 0.05$, †$p < 0.10$.

findings support Voydanoff's results (2004b) that there is a non-linear (but not a linear) relationship between men's work hours and their marital-role quality. However, we also found a similar non-linear effect for wives that Voydanoff did not find.

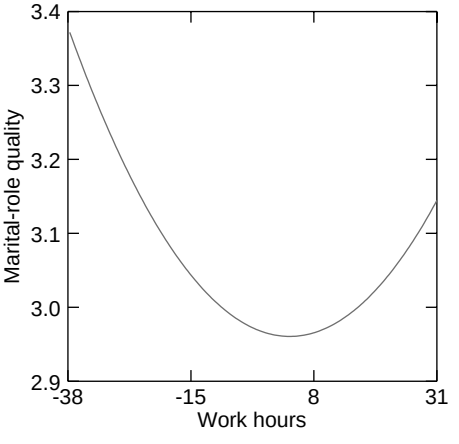

Figure 4. Time-varying effect of changes in husband's work hours on changes in husband's marital-role quality.

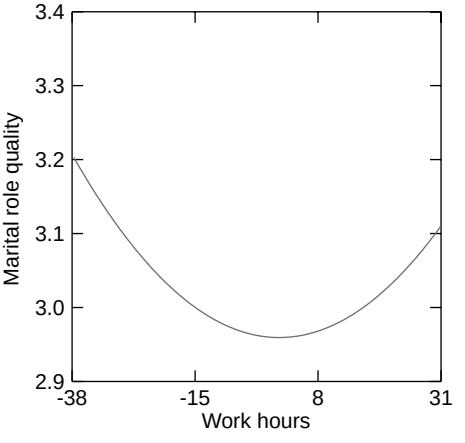

Figure 5. Time-varying effect of changes in wife's work hours on changes in wife's marital-role quality.

As expected, there is no significant gender difference in the association between changes in individual work hours and changes in one's own marital-role quality ($\chi^2 = 1.77$, $p > 0.500$). Although the quadratic change in total family work hours term shows up as a significant predictor of changes in his marital-role quality in Model 2, the Model 1 finding suggests that this effect may be driven by changes in his squared individual work hours.

There is also a linear crossover relationship from husbands to wives: as husbands' work hours increase, their wives' marital-role quality decreases (see Table 3, Model 1). Speculatively, as husbands' work hours increase, they are less available for shared activities and have less time for childcare and household tasks, all of which might take a toll on wives' evaluation of the marriage (Ozer et al., 1998).

Finally, there is a linear crossover effect from wives to husbands in the opposite direction: As wives' work hours increase, their husbands' marital-role quality increases (see Table 3, Model 1). Perhaps husbands benefit from the increased perquisites that come with wives' additional work hours. Alternatively, in a reverse causality process, as husbands' marital-role quality improves, wives may be able to work longer hours.

Given that these crossover effects operate in opposite directions, it is not surprising that there is a significant gender difference in the association between changes in individual work hours and changes in one's spouse's marital-role quality ($\chi^2 = 12.38$, $p = 0.003$). Although the difference in husbands' and wives' work hours shows up as a significant predictor of husbands' marital-role quality in Model 2, the Model 1 finding suggests that this effect may be driven by changes in her individual work hours.

Overview

As mentioned above, Table 4 displays a summary of all significant findings. For each, we indicate in the table the direction of the effect. To summarize the stable findings, for all husbands, regardless of whether they work more or fewer hours than average,

Table 4. Summary of findings.

	Wives' outcomes	Husbands' outcomes
Stable effects		
Individual effects	+ Her hours squared, her work–family conflict	+ His work hours, his work–family conflict
Time-varying effects		
Individual effects	+ Her work hours, her work–family conflict	
	+ Her hours squared, her marital-role quality	+ His hours squared, his marital-role quality
	+ Her work hours, her distress	− His hours squared, his distress
	+ Her hours squared, her distress	
Crossover effects	− His work hours, her marital-role quality	+ Her work hours, his marital-role quality
	− His hours squared, her distress	+ Her work hours, his distress
		+ Her hours squared, his distress
TFWH effects		+ Total family work hours, his work–family conflict

Note: $N = 211$ couples. The symbols + and − indicate the direction of the effect.

and for wives who work more hours than average, longer hours are associated with greater perceptions of work–family conflict, whereas for wives who work fewer hours than average, it is shorter hours that are associated with greater perceptions of work–family conflict.

To summarize the time-varying findings, for husbands who work more than the average number of hours, increases in his work hours are associated with positive outcomes for him (decreased distress and slightly increased marital-role quality) and mixed outcomes for his wife (decreased distress, but also decreased marital-role quality). For wives who work more than the average number of hours, increases in her work hours are associated with mixed outcomes for her (increased work–family conflict and distress, but also slightly increased marital-role quality) and positive outcomes for her husband (slightly decreased distress and increased marital-role quality).

In contrast, for husbands who work fewer than the average number of hours, increases in his work hours are associated with negative outcomes for both him and his wife (increased distress and decreased marital-role quality for both spouses). For wives who work fewer than the average number of hours, increases in her work hours are associated with mixed effects for her (increased work–family conflict and decreased marital-role quality, but also decreased distress) and mixed outcomes for her husband (increased distress, but also increased marital-role quality).

Finally, there is a significant linear relationship between increases in total family work hours and increases in the husband's perceptions of work–family conflict.

Conclusions

The major findings of this analysis of longitudinal data from a Boston-area random sample of 211 dual-earner couples with children are both substantive and

methodological. One major substantive finding is that both cross-sectionally and longitudinally, total family work hours is only associated with one of the three outcomes, work–family conflict, and only in the time-varying analysis. In addition, the effect was found for husbands and not for wives, but because there is no significant gender difference for this effect, we cannot say definitively that there is no effect of total family work hours on wives' work–family conflict. Thus, we find only partial support for the Jacobs and Gerson (2001) hypothesis as originally formulated, given that there were 12 possible effects of total family work hours (i.e., both stable and time-varying effects of total family work hours on his and her scores on three outcomes).

The paucity of findings for the stable aspects of individual and total family work hours suggests that couples adjust to the stable aspects of work hours, with few significant effects on either partner's outcomes. In contrast, change over time in work hours, especially at the individual level, appears to require adjustments that are associated with outcomes for both partners, although the pattern of effects varies by the gender of the spouse.

Moreover, in most cases, it appears that the processes linking work hours to outcomes differ depending on whether spouses work more or fewer than the average number of hours. It may also be that two (or more) processes are operating simultaneously. One such mechanism is fit maximization; another is reverse causality. Consider the results for psychological distress. Men who are already working more hours than average who then further increase their work hours may be doing so to further maximize their, and perhaps their family's, preferences, resulting in increased positive outcomes. The same fit-maximization process may account for the finding that among men who are already working fewer hours than average who then further decrease their work hours, psychological distress also decreases. Another, perhaps simultaneous, mechanism is reverse causality, whereby changes in an outcome drive changes in work hours. So, for example, as women who are already working long hours experience fewer symptoms of psychological distress, they may increase their work hours.

Fit-maximization and reverse causality processes may also explain some of the crossover results. For example, wives report a decrease in distress if their husbands who already work long hours further increase their work hours. (Recall that increases in work hours are also associated with decreases in distress among husbands who work longer than average hours.) Thus, as husbands' distress decreases, so too do wives'. It appears as if, at least with respect to some outcomes, both partners in couples in which the husbands work longer than average hours benefit from his (or perhaps their) work-schedule fit maximization. Alternatively, the lower a wife's distress, the more likely a husband who already works long hours is able to increase his work hours. These speculations lend support to the dual-process model (Voydanoff, 2004a).

The results of this analysis lend support for a weaker version of the Jacobs and Gerson (2001) hypothesis in that they demonstrate that both spouses' work hours must be taken into account to understand the effects of work hours on mental health and quality-of-life outcomes. The hope that a focus on total family work hours (in contrast to individual work hours) would clarify the inconsistency in previous studies relating work hours to such outcomes has only been partially realized.

In addition to the substantive findings, several important methodological advances should inform future theory and research. First, the prevalent strategy of relying on cross-sectional data and estimating simple linear effects is likely to miss a major part of the story. Most of the findings of this analysis emerged from the fact that we conducted time-varying analyses, analyzed crossover effects, and included quadratic terms. Moreover, the results differed depending on which outcome was studied. Thus we strongly suggest that future studies: (1) take the couple, not the individual, as the unit of analysis; (2) include multiple outcomes; (3) collect longitudinal data; (4) estimate crossover effects, both cross-sectionally and longitudinally; and (5) estimate non-linear as well as linear effects.

Future research needs to attend to the subjective meanings of work hours as well as to the absolute number of work hours (Barnett, 1998, 2006). For example, although many long-hours workers prefer to work fewer hours (Bond, Galinsky, & Swanberg, 1998), many do not. As discussed above, in one study of dual-earner couples, work schedule fit (i.e., the degree to which one's own and one's spouse's work schedules meet one's own and one's spouse's needs) mediated the relationship between work hours and burnout (Barnett et al., 1999). Only when long work hours were coupled with poor work schedule fit was burnout high.

Relatedly, future research should also consider the reasons employees work the hours they do (Weston et al., 2004). Some employees involuntarily work shorter hours because they cannot find full-time work, whereas others may voluntarily work shorter hours. (See Reynolds & Aletraris, 2006 for a discussion of change over time in work hours preferences.) Similarly, some employees work long hours because they are afraid of the consequences of not doing so; other employees may prefer to work long hours in order to keep from going into debt. In recent reviews, Barnett (1998, 2006) concludes that the subjective meaning of work hours is potentially a more powerful predictor than are objective aspects of work hours. Future research into the linkages between work hours and outcomes needs to attend more closely to these various subjective meanings.

Although we found no significant effects of the within-couple difference in work hours, we believe it is premature to conclude that this conceptualization is of no interest. One useful direction for future research might be to focus on the second component of the Nock and Kingston (1984) family work day, which is the degree of overlap in spouses' work schedules. Nock and Kingston propose a measure of the number of hours each day that at least one spouse is at work along with a complementary measure of 'off-scheduling', or the number of hours each day that only one spouse is at work. While our notion of the difference between spouses' work hours may be indirectly related to such off-scheduling, it would be useful to calculate these measures more directly in future research.

Finally, these results call into question the conservation of resources model (Hobfoll, 1989). We see little evidence that the loss of resources (i.e., time), whether assessed as individual time or as total family work hours, is linearly related to psychological distress. Rather, these relationships are complex and non-linear. For example, as discussed above, it is only among wives working more than the average that increases in work hours are associated with increases in distress. Among wives working fewer hours than the average, decreases in work hours are associated with increases in distress.

This study has several limitations. The major limitation is that the sample is primarily white, well-educated, middle-class, and drawn from one region of the US. Moreover, all of the participants were employed full time at the initial data collection. Although it would be preferable to have a more heterogenous sample including a range of part-time workers, it is important to note that many participants increased or decreased their work hours over the two-year data collection period. It would also have been desirable to include workers who vary even more widely in socioeconomic status and occupational prestige. It remains for future research to determine whether our findings would generalize to a broader sample. Also, our data were limited to average weekly hours; future research needs to test the Jacobs and Gerson (2001) hypothesis with annual work hours as well. Further, it would be useful to examine other aspects of work time, including commuting time, 'on-call' time at home, and the ability of each partner to flex his or her work hours to meet family needs.

Moreover, we were unable to estimate the effects of the distribution of work hours over the 24-hour day on outcomes. Yet other studies suggest that the distribution of work hours may be a more critical predictor of negative outcomes than is the absolute number of hours worked (Barnett, 1998, 2006; Presser, 2004). For example, among shift workers, night, evening, and rotating shifts are far more disruptive of family outcomes than is the day shift (Presser, 2000). As we move toward a 24/7 economy, increasing numbers of workers will be employed on nonstandard schedules, both voluntarily and involuntarily. The focus on the distribution of work hours within couples draws attention to the issue raised earlier; that is, the degree of overlap or nonoverlap in spouses' work schedules.

Finally, the data were collected between 1989 and 1992, a time of economic recession, including high unemployment, in the USA as well as in the rest of the world. Now that the models for doing longitudinal couple-level analyses with multiple outcomes have been developed, it is up to future researchers to apply these methods to more current data.

These limitations notwithstanding, the study has several strengths, especially the availability of three waves of longitudinal data from both spouses in a random sample of dual-earner couples with children. Moreover, our analysis strategy fully exploited the richness of our couple data and permitted estimation and testing of crossover and gender effects. We were also able to incorporate into our analysis several different conceptualizations of work time within couples, particularly changes over time, thereby allowing us to better isolate the separate effects of total family work hours.

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