Bolger, N., & Laurenceau, J.-P. (2013). Intensive Longitudinal Methods: An Introduction to Diary and Experience Sampling Research. New York: Guilford.

In summary, the major hypothesis to be tested is whether the number of daily stressors at work predicts degree of end-of-the-day relationship dissatisfaction for both husbands and wives.

METHOD

Design

Couples were recruited using advertisements in local newspapers. Each partner completed an initial set of background questionnaires and then completed two online daily diaries for each of 21 consecutive days. The first diary was completed within an hour of the end of the workday and assessed experiences in the workplace, including the number of work stressors experienced that day. The second diary was completed later that day, within an hour of going to bed, and assessed feelings of dissatisfaction and tension in the relationship with the partner.

Sample

The sample consisted of male and female partners from 100 dual-career married or cohabiting heterosexual couples from a metropolitan city who volunteered to participate in a study of "work and family experiences." Male partners were, on average, 30.9 years old (SD = 5.1) and female partners were, on average, 29.4 years old (SD = 4.7). Sample composition: 54.2% were European American, 28.3% were Hispanic American, 9% were African American, 5.4% were listed in other categories (e.g., Caribbean descent), and 2.1% were Asian American and Pacific Islanders. Couples were cohabiting for an average of 5.2 years (SD = 4.4). The median number of children in the home was two.

Measures

Relationship dissatisfaction. Feelings of dissatisfaction and tension in the relationship were measured at the end of each day using five of the highest loading items from a well-established measure of marital tension (Kurdek, 1994). Raw scores for each item were combined to form a composite and rescaled to a 0–10 scale, such that 0 was the lowest possible score (no tension) and 10 was the highest possible score (extreme tension). Summary statistics for dissatisfaction averaged over persons and time were M = 5.08, SD = 1.35, range = 0–10 for male partners, and M = 4.64, SD = 1.40, range = 0–10 for female partners.

Work stressors. Participants were asked the following as part of the end-of-workday diary: "Take a moment to think about the stressful events that you experienced at work today. Please check all on the following list that apply." Examples included "transportation problem," "demand from coworker," "demand from supervisor," and "missed a deadline." Summary statistics for number of work stressors aggregated over persons and time were M = 3.01, SD = 1.03, and range = 0–7 for male partners, and M = 2.97, SD = 1.03, range = 0–6 for female partners.

RESULTS

Data Structure and Preliminary Analyses

The analysis dataset consisted of 100 (couples) × 2 (persons) × 21 (days) = 4,200 observations. Scatterplots of the daily relationship dissatisfaction and work stressors did not reveal any outliers, and there were no visually apparent time trends. Scatterplots for each partner within each couple are available upon request from the authors.

Statistical Model

Before presenting the central aspects of the model, it is useful to first note any scaling of variables that affects interpretation of results. A crucial feature of our analyses is that we created within- and between-subjects versions of the work stressors variable, separately for male and female partners. Although there were no obvious time trends in the data, elapsed time in days was also included as a control. Its original scale was 0 to 20, but to aid interpretation of the intercept in the model, it was centered on the middle of the time span, that is, day 10.5, and then divided by 7 so that one unit on the time variable corresponded to a week.

We analyzed these data using a multilevel model for dyadic diary data that treats the three levels of distinguishable dyadic diary data (days nested within persons nested within couples) as two levels of random variation. The lower level represents variability due to within-person repeated measures for male partners and female partners, and the upper level represents between-couples variability across male partners and across female partners (see Laurenceau & Bolger, 2005, and Raudenbush et al., 1995, for more details).

In this model, we specified a within-couple process of reactivity in end-of-the-day relationship dissatisfaction to daily work stressors that was hypothesized to be significant, on average, for both male and female partners. Figure 1 shows thin fitted regression lines for male partners and female partners together with thick fitted lines for the average male and female partner. Visual inspection of the thick lines suggests that our prediction was borne out: The slope of the lines representing the link between number of work stressors and end-of-the-day relationship dissatisfaction are positive for both male and female partners.

For a statistical test of the hypothesis, we refer to the upper panel of

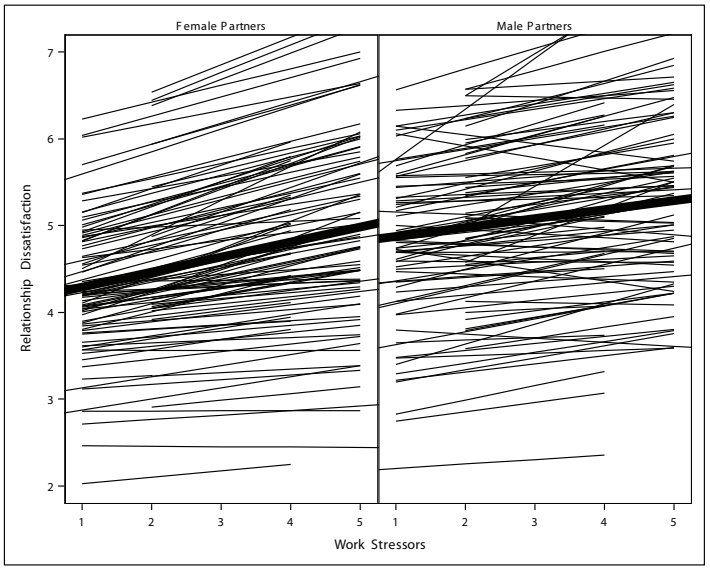

Figure 1. Spaghetti plots of average (thick) and subject-specific (thin) regression lines for evening relationship dissatisfaction as a function of work stressors for female (left) and male (right) partners.

Table 1, which shows the fixed or average effects for the model. On days with a typical number of work stressors, on average, male and female partners reported relationship dissatisfaction levels of approximately 5.1 and 4.6 units, respectively; that is, at the middle of the 0–10 scale. For every one additional work stressor experienced, female partners were, on average, 0.11 units higher in relationship dissatisfaction (CI_{95} = 0.06, 0.16; all subsequent *CI*s are 95%); male partners were, on average, 0.16 units higher on relationship dissatisfaction (*CI* = 0.11, 0.21).

The lower panel of Table 1 presents random effects, that is, estimates of between-couples variability around the average or fixed effects. Random effects are reported as within- and between-couples

Table 1. Parameter Estimates for Dyadic Multilevel Model of Evening Relationship Dissatisfaction as a Function of Number of Work Stressors for Male and Female Dyad Partners

					CI_{95}	
Fixed effects (intercepts, slopes)	Estimate	(*SE*)	t^a	p^b	Lower	Upper
M_Intercept	5.09	(0.10)	48.98	<.001	4.88	5.29
F_Intercept	4.65	(0.10)	46.98	<.001	4.45	4.84
M_Work stressor Slope	0.11	(0.03)	4.27	<.001	0.06	0.16
F_Work stressor Slope	0.16	(0.03)	6.37	<.001	0.11	0.21
M_Time Slope	0.01	(0.02)	0.51	.61	–0.03	0.06
F_Time Slope	–0.02	(0.03)	–0.97	.33	–0.08	0.03
Mean M_Work Stressor Slope	–0.14	(0.44)	–0.33	.75	–1.01	0.73
Mean F_Work Stressor Slope	0.62	(0.43)	1.45	.15	–0.23	1.47
					$CI_{95}{}^c$	
Random effects ([co-]variances)	Estimate	(*SE*)	*z*	p^b	Lower	Upper
Level-2 (between-couples)[d]						
M_Intercept	1.03	(0.15)	6.76	<.001	0.79	1.41
F_Intercept	0.92	(0.14)	6.66	<.001	0.70	1.27
M_Work Stressor Slope	0.028	(0.009)	3.10	.001	0.02	0.06
F_Work Stressor Slope	0.016	(0.009)	1.79	.04	0.01	0.07
M-F Intercept covariance	0.26	(0.11)	2.39	.02	0.05	0.47
M-F Slope covariance	0.011	(0.007)	1.57	.12	-0.003	0.024
Level-1 (within-couples)						
M_Residual	0.761	(0.025)	30.81	<.001	0.72	0.81
F_Residual	1.00	(0.03)	30.81	<.001	0.94	1.06
M–F Residual covariance	0.064	(0.020)	3.21	.001	0.02	0.10
Autocorrelation	0.010	(0.017)	0.60	.55	-0.02	0.04

Note: $N = 100$ couples, 21 days. M, male partner; F, female partner.

[a]Degrees of freedom are 98 for tests of intercepts and mean work stressors and 99 for work stressors and time slopes.

[b]All *p*-values are two-tailed except in the case of variances, where one-tailed *p*-values are used (because variances are constrained to be non-negative).

[c]Confidence intervals for variances were computed using the Satterthwaite method (see Littell, Milliken, Stroup, Wolfinger, & Schabenberger, 2006).

[d]Covariances among male and female partner intercepts and slopes were estimated but, for the sake of brevity, are not shown.

variances and covariances. The intercept and work stressor slope coefficients show substantial and statistically significant variability across

both male and female partners. Expressed in standard deviation units, the variation for work stressor reactivity is $\sqrt{.028} = 0.17$ units and $\sqrt{0.016} = 0.13$, for male and female partners, respectively. To get a better sense of these differences in work stressor reactivity, it is useful to examine ± *SD* around the average reactivity coefficients for males and females. In the present sample, approximately 95% of male partners' reactivity coefficients fall between –0.23 and 0.45 (0.11 ± 0.34). For female partners, approximately 95% of their reactivity coefficients fall between –0.10 and 0.42 (0.16 ± 0.26) units.

Also in the lower panel of Table 1 are covariances showing the dyad-level interdependence of male and female partners. These are (i) the covariance between male partner and female partner intercepts and (ii) the covariance between male partner and female partner slopes. Figure 2 represents these as 95% confidence ellipses for their respective bivariate normal distributions. Both covariances are positive, indicating that male partners with above-average relationship dissatisfaction tended to be paired with similarly above-average female partners;

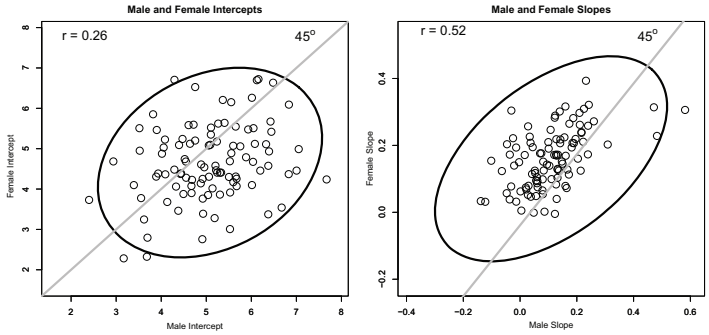

Figure 2. Dyad-level interdependence of male and female partners: Ninety-five percent confidence ellipses for bivariate normal distribution of male and female intercepts (left) and slopes (right). Small circles are empirical Bayes predictions from the dyadic longitudinal model.

and male partners with above-average tendencies to show increases in relationship dissatisfaction following stressful work days tended to be paired with similarly above-average female partners. The parameter labeled M–F residual covariance in Table 1 reflects the within-day association between male and female relationship dissatisfaction residuals on a given day. This association can come about through experiences during the day that both partners may share and lead to unusually high- or low-relationship dissatisfaction in both partners. Finally, we note that there is no evidence of autocorrelation in the level-1 (within-person) residuals.

8.5 CHAPTER SUMMARY

Dyadic relationships play a central role in daily life. In this chapter, we discussed intensive longitudinal studies of dyads, highlighting the opportunities and challenges of modeling dyadic interdependence at multiple levels and focusing on distinguishable dyads (e.g., wife-husband). The data example in this chapter was one where the within-subject processes for each partner within a couple (i.e., linking changes in daily work stressors to changes in dissatisfaction) were analyzed in parallel, allowing for correlated residuals between partners at the within-couple level and correlations between partner random effects at the between-couple level. Although not demonstrated, the model we proposed can also be extended to contain within-couple partner effects (Kenny et al., 2006) by including, for example, the male partner's daily work stressors as an additional cause of the female partner's relationship dissatisfaction.

8.6 RECOMMENDED READINGS

Gable, S. L., Reis, H. T., & Downey, G. (2003). He said, she said: A quasi-signal detection analysis of daily interactions between close relationship partners. *Psychological Science, 14*, 100–105.