

Unraveling the Relationship of Distress Levels Within Couples: Common Stressors, Empathic Reactions, or Crossover via Social Interaction?

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Using structural equation modeling analyses we examined the correlation in levels of depression symptoms within couples to determine whether the underlying mechanism is due to common stressors, empathic reactions, or crossover via social interaction. The analyses were based on two waves of data collection from a sample of 354 male Vietnam veterans, Era veterans (veterans who served elsewhere during the period of the Vietnam War), and nonveterans and from their wives or committed partners. The results demonstrated that the correlation in depression symptoms within couples is due primarily to common stressors and crossover via negative social interaction. Common stressful life events increase depression in both spouses, and this in turn increases social undermining, which further increases depression.

KEY WORDS: crossover; stress transmission; stress; job loss; unemployment.

INTRODUCTION

Since the early 1970s, there has been a growing recognition that work and family roles are intertwined. Kanter (1977) has argued that work and family domains cannot be considered as separate independent entities. Studying the relationship between work and nonwork, Wilensky (1960) has depicted two models: the spillover model which suggests that experiences characterizing work will be positively related to nonwork experiences and the compensatory model which suggests that there is a negative relationship between work and nonwork experiences. Rousseau (1978) concluded that the spillover model has received support in diverse occupations. In her

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study she found a positive relationship between work and nonwork experiences, supporting the spillover model. According to the spillover model, reactions to working conditions are transferred to the family domain. Thus, impaired well-being resulting from work stress may be reflected in decrements in family functioning. Research has continued to demonstrate the spillover effects of work to the family environment and from the family to the work environment.

Though much of the stress literature focuses on the coping processes and the reactions of individuals to the work and nonwork stressors that they encounter (French, Caplan, & Harrison, 1982; Westman & Shirom, 1995), relatively little attention has been paid to the process that operates when a stressor or psychological strain experienced by one person affects the level of strain of significant others. The process that begins with elevated stress or strain in one person and results in an increase in stress or strain of a partner is referred to in the literature as crossover (Bolger, DeLongis, Kessler, & Wethington, 1989b) or transmission (Jones & Fletcher, 1993; Rook, Dooley & Catalano, 1991). Bolger et al. (1989b), for example, found that stress experienced by the individual at the workplace leads to stress being experienced by the spouse at home. Similarly, Jones and Fletcher, (1993) and Rook et al. (1991) demonstrated that a person's job stress affects the psychological strain of the spouse.

Review of the crossover/transmission literature shows that investigators have emphasized different aspects of the phenomenon; some have focused on the crossover of *stress* from the individual to the spouse (Bolger et al., 1989b), others have examined the process whereby *job stress* of the individual affects the *strain* of the spouse (Burke, Weir, & Dowors, 1980; Jackson & Maslach, 1982; Jones & Fletcher, 1993; Mitchell, Cronkite, & Moos, 1983; Rook et al. 1991), or how psychological *strain* of one partner affects the *strain* of the other (Mitchell et al., 1983; Westman & Etzion, 1995). Though several studies that sought a direct crossover effect provided supportive evidence, others did not (Bolger, DeLongis, Kessler, & Schilling, 1989a).

Several investigators have provided possible explanations for the crossover process. Jones and Fletcher (1993) found that agreement concerning partners' stress was a mediator in the transmission process. Riley and Eckenrode (1986) found no support for either of the two possible explanations they examined: anxiety and guilt of the partner at being unable to meet the demands for support of the individual in crisis; and, conversely, diminishing of social support available to the individual, due to the partner being in crisis. Westman and Etzion (1995) suggested two possible explanations for their findings of a crossover effect: the spouse's burnout becomes a source of ongoing stress to the individual and adds to his/her burnout; and

a third variable such as life stress and/or social undermining affects the burnout of both partners.

Unfortunately, nearly all of the transmission/crossover studies used cross-sectional designs and consequently confounded at least three different interpretations of the mechanisms that produce their results. These results are fundamentally based on the associations between levels of stress or distress of the partners, which (1) may be the outcome of a common stressor affecting the strain of both partners, (2) may indicate a direct transfer of stress or strain from one partner to the other, or (3) may indicate an active process of crossover through the behavioral interaction between the partners. A systematic theoretical and empirical approach that distinguishes among these possible explanations is notably absent from the literature. The crucial issues in developing a theory of stress crossover between persons are detecting the main underlying mechanism and finding an appropriate methodological approach to examine and test possible mechanisms. We propose to elaborate on the three explanations noted above and show how they may account, by themselves or in any combination, for the findings concerning crossover effects.

The basis for the *first* proposed explanation is that the phenomenon is a spurious crossover effect; what appears to be a crossover effect is no more than the result of common stressors in a shared social environment increasing the strain in both partners. Indeed, nearly all the reported crossover studies relied on cross-sectional correlational designs, and did not control for possible common stressors.

One possible common stressor that affects both partners is stressful life events. In discussing their findings concerning crossover, Burke et al. (1980), as well as Westman and Etzion (1995) suggested that the crossover effect might be the result of common stressors. Similarly, Jones and Fletcher (1993) suggest that major family strains are likely to moderate the relationship between one partner's stress and the other's strain. In sum, the process detected by researchers as crossover of stress from one person to another might be a spurious relationship stemming from the fact that life stress affects both spouses. Unfortunately, most crossover studies focus on job stress and do not include stressful life events as possible common stressors that might affect both spouses. A near exception is Rook et al. (1991), who used life events as their measure of stress. However, in their research, the wives were asked to indicate whether their husbands had experienced some form of stressful job events. The reliability of such a measure of life events is questionable.

By contrast, the *second* explanation is that a *direct* transmission of strain occurs from one partner to the other. The basis for this explanation is the fact that crossover effects appear between closely related partners

who identify with and care for each other and share a great part of their lives together. According to this explanation, the strain of one partner produces in the other a sympathetic reaction which increases the level of distress in the latter. Riley and Eckenrode (1986) also suggested that the effect of the undesirable events one experiences on the significant other's distress may be the result of empathy.

Finally, the *third* explanation views the phenomenon as an *indirect*, relatively active one, which is *mediated* by the interaction process between the partners. According to this explanation, an increase in the stress, and consequently the strain, of one partner is likely to trigger or exacerbate a negative, perhaps conflictual, interaction style with the other partner, who experiences it as additional stress that further increases strain. This explanation is supported by empirical findings from two lines of research.

First, the literature documents that frustration is often an outcome of stressful conditions that trigger aggressive action (Berkowitz, 1989). Second, the literature on family processes also reports that stressed couples exhibit high levels of negative conflictual interactions (Schaefer, Coyne, & Lazarus, 1981). Furthermore, Bolger et al. (1989b) have shown that interpersonal conflicts are the most upsetting of daily stressors. Jones and Fletcher (1993) too suggested that transmission of stress is likely to be mediated by the daily interactions between partners as reflected in their mood states and communication. In conclusion, the literature supporting this explanation implies the need to focus on the communication pattern of the couple, in terms of the kind of interactions that are likely to enhance the partners' experience of stress or strain.

Social undermining, defined as behaviors directed toward the target person and displaying negative affect and negative evaluation of the person, is a possible relevant interactional variable that has been shown to increase the stress and strain of life partners (Abbey, Abramis, & Caplan, 1985; Kahn, Coyne, & Margolin, 1985; Paykel et al., 1969; Vinokur & van Ryn, 1993). These behaviors may turn out to be the mediating mechanisms of the crossover of stress or strain from one spouse to the other. Studies have also shown that social undermining increases depression (Coyne & Downey, 1991; Krause, Liang, & Yatomi, 1989; Rook, 1984, Russell & Cutrona, 1991). For example, Paykel et al. (1969) found that increased arguing with their husbands (undermining) was the single most frequent life change reported by depressed women a few months before the onset of depression. In a longitudinal study of recently unemployed respondents, Vinokur and van Ryn (1993) found that change in social undermining produced a change for the worse in mental health. On the other hand, some researchers suggest that depression precedes conflicting marital interactions (Nelson & Beach, 1990; Schmaling & Jacobson, 1990).

The purpose of the present investigation is to extend the previous work on the subject by examining the three proposed explanations of crossover. In order to accomplish this, it is important to measure and control for common stressors and for negative interaction patterns known to exacerbate strain. Thus, our study (a) explores the process of crossover in a longitudinal design that controls for baseline levels, (b) incorporates measures of life events that represent common stressors, (c) incorporates measures of social undermining that represent the critical interaction mechanism, (d) controls for locus of control as a personality construct that has been shown to be an important determinant of depression (Cvetanovski & Jex, 1994; Williams & Alliger, 1994), and, finally, (e) utilizes measures collected from both spouses.

The hypotheses of our study are stated as follows and specified by the numbered paths in the model presented in Fig. 1.

1. Stressful life events increase the depression symptoms of the focal respondent and the partner (paths 1a and 1b, respectively). Furthermore, because a number of the life events reported by each partner are shared (e.g., illness, problems with children, financial events) there is a significant correlation between the measure of stressful life events of the focal respondent and the partner (path 1c).
2. Depression produced by individual and common life events (hypothesis 1), and by low level of locus of control (see hypothesis 5), increases the process of social undermining between the partners. This effect of depression on undermining is displayed in our model by the depression of the partner causing an increase in undermining behavior toward the focal respondent (path 2).
3. In turn, the undermining behavior of the wife increases depression in the husband (path 3). Paths 2 and 3 constitute the chain of mediating events that represent the active crossover process due to the interaction between the partners. (A corresponding process from the husband toward his wife is assumed by the theory but not shown in the model because of the absence of data to examine this complementary direction.)
4. The stress of the life events reported by the partners increases social undermining, as represented by paths 4a and 4b in Fig. 1.
5. There is a *bi-directional direct transfer* of depression between husband and wife (the partners) shown in the model by paths 5a and 5b.
6. Internal locus of control orientation is a relatively permanent personality stress-resistance characteristic that predicts low levels of depression (Lefcourt, 1982). The effects of locus of control on depression are represented in Fig. 1 by paths 6a and 6b.

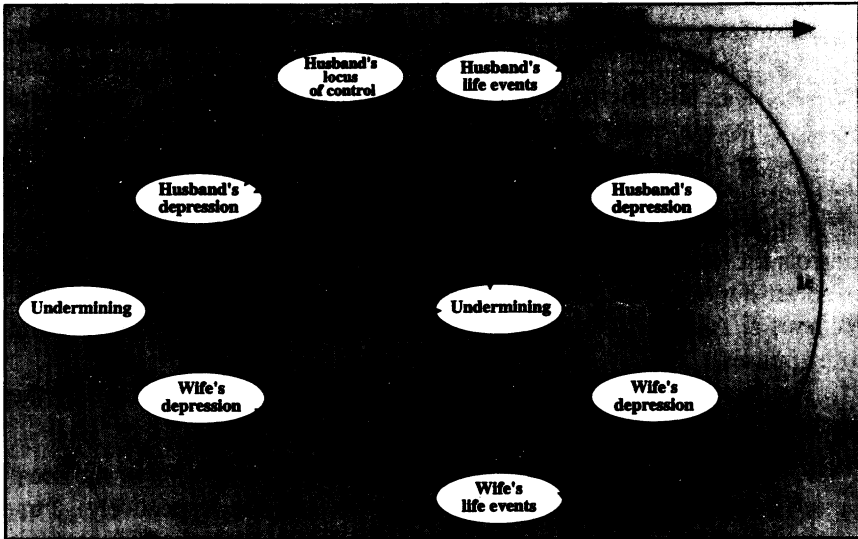


Fig. 1. Model of crossover of depression within couples. Two hypothesized determinants of the correlation of depression within couples are indicated by (1) the influence of common stressful life events, paths 1a and 1b, and (2) direct transmission (crossover), paths 5a and 5b, and (3) mediating interactional mechanisms, paths 2 and 3. Paths 6a and 6b are hypothesized to result in inverse relationship or influence and are indicated by a minus sign. All other paths are hypothesized to result in direct relationship or influence on the respective constructs.

In the current investigation, we test the above hypotheses using structural equation modeling analyses of data from a panel study of 354 couples. About a third of the male respondents had lost their jobs during the previous 6 months and about one-third were still unemployed when the data were collected. Since job loss and unemployment are known to be major stressful life events (Conger, Lorenz, Edler, Simons, & Xiaoja, 1993), our sample provided an adequate variation with respect to the effects of background stressors. Furthermore, this sample is suitable for examining crossover processes longitudinally, as a large number of respondents experienced high levels of stress and strain while others recovered over time through successful coping via reemployment.

METHOD

Subjects and Procedures

The study is based on secondary analysis of data collected for a study on stress, work, and unemployment among Vietnam veterans and nonvet-

erans (for a complete report, see Vinokur, Caplan, & Williams, 1987). The analyses reported for this study are based on a subsample of 354 male respondents who were married (89%) or cohabiting in a romantic relationship (11%) and of their wives or partners. The original study was based on a stratified sample of Vietnam veterans, and nonveteran male respondents (referred to as the focal respondents). Their female spouses or girlfriends are referred to as the partners or significant others. About half of the male respondents in this sample were unemployed at the first data collection and the rest were fully employed. The demographic characteristics of the unemployed respondents were virtually the same as those of the employed respondents who served as a control group. The focal respondents ranged in age from 25 to 41 ($M = 32.3$; $SD = 4.09$), and their education level ranged from 6 to 17 grades ($M = 13$; $SD = 1.89$). The significant others ranged in age from 19 to 46 ($M = 30.8$; $SD = 5.29$) and their education level ranged from 8 to 17 grades ($M = 12.7$; $SD = 1.77$).

The original study included three waves of data collection, but only the last two waves (i.e., Wave 2 and Wave 3 of the original study) were utilized in the current investigation, because they included all of the variables required for our analyses. Wave 2 and Wave 3 of the original study are thus henceforth referred to as Time 1 and Time 2.

Data from focal respondents were collected through personal interviews, with response rates ranging from 95% to 96% across the two data collection waves (Times 1 and 2). The data from the significant others were collected through self-administered questionnaires, with response rates exceeding 93% across the two data collection waves.

Measures

Depression. The index of depression was based largely on subscales from the Hopkins Symptoms Checklist (Derogatis et al., 1974). The questions in these scales required the respondent to “. . . tell how often you have experienced each of the following in the last two weeks.” The respondent related to seven symptoms such as “feeling sad” and rated their frequency on a 5-point scale of 1 = “not at all” to 5 = “very often.” The Cronbach α coefficients obtained were .86 and .87, respectively, for Time 1 and 2. The same index was constructed for the significant others in relation to *their* depression. The α coefficients were .87 and .88 at Time 1 and Time 2, respectively.

Undesirable Life Events. These consisted of an expanded version of the Holmes and Rahe (1967) Schedule of Recent Events (over the past 12 months). The questionnaire was filled out by all of the respondents 2 weeks prior to the administration at Time 2. Each respondent checked the events

of the preceding 12 months, as pleasant or unpleasant, and then rated the degree of stress produced by each event. Based on the findings of Vinokur and Caplan (1987), the Undesirable Life Events measure was the sum of the stress ratings of the unpleasant events that were checked. This sum was used as a single indicator of the latent factor in the structural modeling. The Mean Undesirable Life Events score for focal respondents was 24.32 (SD = 18.93) and for significant others 21.00 (SD = 16.40). We related only to undesirable events because of the evidence that they produce stronger effects on mental health (Taylor, 1991; Vinokur & Selzer, 1975). As the assessment of life events was performed about 2 weeks prior to the assessment of depression the possibility of response contamination between life events and depression was minimized.

Perceived Social Undermining (focal respondent). This measure was based on a 3-item index that assessed undermining behaviors of partners. The items represent actions that directly undermine and diminish the sense of self-worth. The respondents were asked to indicate the amount of undermining behaviors directed at them by their partners: they were asked to indicate on 5-point scales, each ranging from "not at all" (1) to "a great deal" (5), how much the partner "acted in an unpleasant or angry manner towards you," "made your life difficult," and "showed dislike." The coefficients of this were .77 and .78 at Time 1 and Time 2, respectively.

Engaging in Social Undermining (significant other/partner). The questionnaire was the same as that of the focal respondent, except that the questions related to engaging in social undermining, e.g., "How much did you act in an unpleasant or angry manner toward him?" The α coefficients of this measure were .67 and .73 at Time 1 and Time 2, respectively.

For the purpose of the structural analysis, the latent variable of social undermining was indicated by a pair of measures, one from the focal respondent (i.e., being undermined) and one from the spouse (i.e., engaging in undermining).

Locus of Control. Measured by ten items of a modified version of Rotter's (1966) questionnaire. These items were designed to capture personal orientations, e.g., "In my case, getting what I want has little or nothing to do with luck." The respondents had to indicate the degree of agreement or disagreement on a response scale of 1–5. The α coefficients were .67, and .72, respectively. Locus of control was measured only at Waves 1 and 2 of the original study (the latter is Time 1 of the current study). Locus of control is conceived of as an enduring personality variable. Indeed, as shown in Table 1, the means and standard deviations of the locus of control measure were identical at Time 1 and Time 2; we therefore used the Time 1 and 2 measures as indicators of the locus of control latent factor in the structural modeling analysis.

RESULTS

Crossover Effects Based on Cross-Sectional Analyses

A matrix of the intercorrelations among the model's indicators and their standard deviations and alpha coefficients is presented in Table I.

Most investigators have based their conclusions of a crossover effect on zero-order correlations between spouses' stress and strain and/or between the individual's stress and his/her spouse's strain. Corroborating these findings, the results in Table I show positive correlations between husband's and wife's life events (.35, $p < .01$) and between husband's and wife's depression at Time 1 and at Time 2 (.17, $p < .05$; .32, $p < .01$), respectively. Positive correlations were also found between husband's undesirable life events and wife's depression at Times 1 and 2 (.12, $p < .05$; .17, $p < .01$) and between wife's undesirable life events and husband's depression at Times 1 and 2 (.13, $p < .05$; .26, $p < .01$). All these findings indicate some kind of a crossover effect of stressors and strains of both spouses. However, bearing in mind that such correlations may be spurious, we used the structural modeling technique to investigate the crossover effect and its underlying mechanisms.

Overview of the Analytical Model and Analyses

The principal analyses consisted of confirmatory latent-variable structural modeling using the EQS program (Bentler, 1989) to test the model presented in Fig. 1. The structural modeling technique provides simultaneous estimation of the hypothesized regressions, using the estimated covariance matrix generated based on the observed covariance matrix of the measured variables. The estimated matrix is also used for evaluating the goodness-of-fit between the data and the model. In reporting the results of the structural equation modeling, we follow the guidelines suggested by Raykov, Tomer, and Nesselroade (1991). Four goodness-of-fit measures are reported: Normed Fit Index (NFI), Non-Normed Fit Index (NNFI), Comparative Fit Index (CFI), and Root Mean Squared Residual (RMR) measure. NFI, NNFI, and CFI that exceed .90, and RMR that is below .05 are indicative of acceptable model fit. In all instances, other goodness-of-fit measures that were examined in our analyses, such as LISREL's GFI and AGFI and Bollen's (1990) IFI indices, provided compatible results (for a detailed discussion of fit indices see Bentler, 1990; Bollen, 1990). The results of all of the analyses whether performed on listwise or pairwise covariance matrices, were virtually the same. We therefore present the results from the pairwise matrices, which generated slightly better goodness-of-fit indices and are based on a larger portion of the original sample.

Table I. Intercorrelations Among Research Variables ($N = 251-354$)^a

Variables	1	2	3	4	5	6	7	8	9	10	11	M	SD	N of items	α
FR LE												0a	1b	46	b
SO LE	.35**											0a	1b	46	b
FR DEP 1	.49**	.13*										1.94	.69	7	.86
SO DEP 1	.12*	.29**	.17*									2.16	.77	7	.87
FR UN 1	.18**	.11*	.32**	.24*								1.78	.66	3	.77
SO UN 1	.00	.15*	.14*	.43**	.37**							1.94	.58	3	.67
FR IE 1	-.11*	-.04	-.22*	-.11*	-.11*	.03						3.42	.50	10	.67
FR IE 2	-.13*	-.06	-.29**	-.18*	-.13*	-.04	.68**					3.43	.51	10	.72
FR DEP 2	.50**	.26**	.62**	.15*	.25**	.16*	-.24**	-.26**				1.91	.71	7	.87
SO DEP 2	.17*	.39**	.24*	.59**	.22**	.33**	-.08	-.14*	.32**			2.12	.76	7	.88
FR UN 2	.18*	.17*	.29**	.19*	.57**	.33**	-.07	-.05	.34**	.32**		1.79	.68	3	.78
SO UN 2	.14*	.23**	.21*	.26**	.24*	.57**	.00	-.06	.23**	.44**	.36**	1.90	.64	3	.73

^aa and b: standardized Z scores were used in the analyses.

^bThe life event construct is multidimensional and is used here as an independent variable. Consequently, coefficient alpha is not a relevant psychometric property for the current analysis.

* $p < .05$.

** $p < .01$.

A series of structural-equation analyses was conducted to examine the effects of various stressors on the transmission of depression symptoms from one spouse to the other. The analyses were based on a set of hypotheses that were incorporated into a model that included a longitudinal design with the Time 1 and Time 2 waves of data collection. The basic features of this model are those portrayed in Fig. 1. As already noted, Time 2 data include a measure of stressful life events over the preceding 12-month period. Because this period included a span of four months prior to Time 1 data collection, the life event measure was relevant to both time periods and was modeled as a predictor of depression at both Time 1 and Time 2. The model also included an estimate of the correlation between focal respondent's and spouse's measure of stressful life events and their effects on social undermining at Time 2 only, after earlier analyses showed no effects on Time 1 undermining.

Similarly, focal respondent's internal control orientation was also hypothesized to be relevant to both data collection periods and modeled as a predictor of focal respondent's depression (this measure was not available for the spouses). Spouse's depression was also modeled as a predictor of the social undermining experienced by the focal respondent.

Finally, to represent the longitudinal aspects of the model, the analyses also included (a) estimates of the covariances between the measurement errors of the respective factors across the two time periods, (b) the constraints that set the factor loading at Time 1 and Time 2 to be equal, and (c) the stabilities estimates, that is, the effects of Time 1 depression and social undermining constructs on their respective levels at Time 2.

The measurement model showed a good fit to the data with χ^2 (133, $N = 330$) = 190.4, $p < .05$, and with NFI = .96; NNFI = .97; CFI = .99; GFI = .93; AGFI = .88; and RMR = .025.

The analytic strategy focuses on the examination of the effect of two types of stressors—stressful life events and social undermining—on changes in crossover effects in successive analyses in which the effects of one or both types of stressors are controlled for and then removed. The first type of stressor, stressful life events, represents contextual stressors, such as financial difficulties, which are shared by both partners. The second type of stressor, social undermining, represents a stressor that is endogenous to the interaction pattern of the couple and may have been triggered, at least in part, by the contextual stressors. Thus, each of the successive models drops the effects of these two kinds of stressors to determine whether the observed *direct* initial crossover effect is increased. Finally, because of its restricted nature, it was not possible to use the model to examine the simultaneous (recursive) crossover effects between the spouses. Thus, separate series of analyses were conducted to first examine the modeling

of crossover of depression from the spouse to the focal respondent and then to examine the modeling of crossover of depression from the focal respondent to his spouse.

Crossover of Depression from Spouse to Focal Respondent

Figure 2 presents the results of the initial model of depression crossover from spouse to focal respondent. The results provide acceptable goodness-of-fit measures, with $\chi^2(85, N = 330) = 144 (p < .001)$, and with NFI = .95, NNFI = .97, CFI = .98, and RMR = .03. The solid lines represent statistically significant paths at $p < .05$. Dotted broken lines represent paths that are not statistically significant. Numbers in small circles represent residual variance.

As predicted, At Time 1 and Time 2, undesirable life events increased depression symptoms of the focal respondent ($\beta = .50, .25$, respectively) and of his spouse ($\beta = .31, .25$, respectively). In addition, undesirable life events predicted increased social undermining ($\beta = .14$) for the focal respondent only. Presumably, the increase in stress enhanced the perception

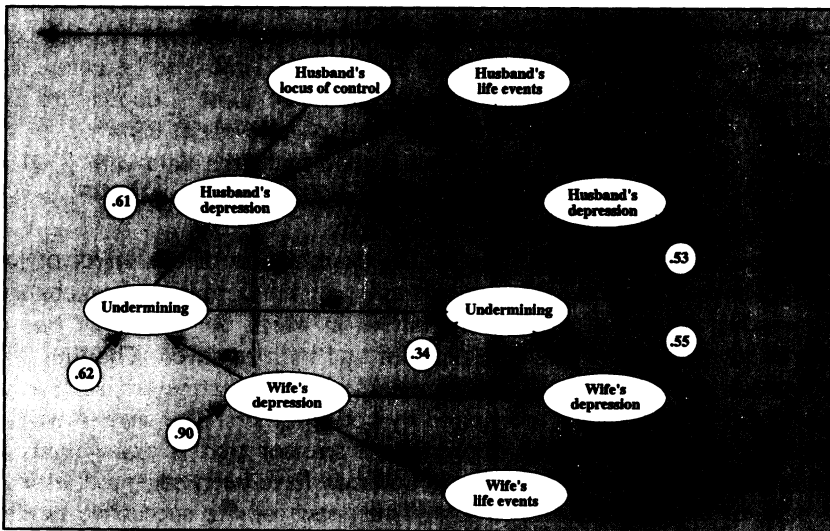


Fig. 2. Structural equation model of depression crossover from spouses to their focal respondents. $\chi^2(85, N = 330) = 144 (p < .001)$, and with NFI = .95, NNFI = .97, CFI = .98, and RMR = .03. Solid lines represent statistically significant paths at $p < .05$. Dotted broken lines represent paths which are statistically not significant. Numbers in small circles represent residual variance.

of various acts of the spouse as socially undermining acts. Finally, the reported undesirable life events of the focal respondent are correlated with the reported undesirable life events of his spouse ($r = .36$), indicating the existence of common stressors.

The results also show that the depression of the spouse is a strong predictor of social undermining as reported by both partners ($\beta = .62$ and $.46$, for Times 1 and 2, respectively). In turn, social undermining appears as a significant predictor of depression at Time 1 ($\beta = .31$), but fails to reach statistical significance at Time 2 ($\beta = .10$).

Most importantly, and as predicted, the β coefficients of the paths from the spouse's to the focal respondent's depression at Times 1 and 2, which provide the main indications of a direct crossover effect, are not statistically significant (respectively, $-.09$ and $.12$). The absence of statistically significant crossover paths in this model is hypothesized to be due to the effects of life events, and particularly to social undermining as the mechanisms that mediate the transmission of distress. Thus, when the effects of stressful life events on depression were removed and replaced with a correlation between the life events factor and the residual of the depression factor, these coefficients of the paths from wife's depression to husband's depression at Time 1 and Time 2 hardly increased at all. These path coefficients were, $-.07$ and $.14$ (n.s.) for Times 1 and 2, respectively. When only the effects of undermining on depression were removed and replaced with a correlation between the residuals of the depression and the undermining factors, the crossover coefficients of the paths from wife's depression to husband's depression increased at Times 1 and 2, to $.10$ (n.s.) and $.19$ ($p < .01$), respectively. However, when the effects of both life events and social undermining were removed and replaced by the respective correlations between the factors, the crossover path coefficients at Times 1 and 2 increased to $.14$ ($p < .01$) and $.21$ ($p < .001$), respectively. In conclusion, when the effects of life events and social undermining are modeled, there is no evidence of a direct crossover effect from the wife's depression to that of her husband. In turn, when the effects of stressful life events and social undermining are removed, the results produce a statistically significant path of direct crossover. This pattern of results strongly suggests that the apparent direct crossover is a spurious finding arising from incomplete specification of the effects of life events and social undermining.

Our next analysis focused on whether the *difference* between the direct crossover path coefficients in the models with and without the effects of life events and social undermining was statistically significant, that is, whether the crossover paths in the original model (Fig. 2) changed significantly after replacing the effects of the life events and social undermining with covariations. For this analysis, we fixed the paths in the original model

to their values in the latter model. The results of the model with the fixed effects were $\chi^2 (87, N = 330) = 152$, $\chi^2 (p < .01)$ being of greater statistical significance than in the original one, $\chi^2 (85, N = 330) = 144$. Using the same procedure, we tested whether the original model was significantly different from the model in which only the effect of social undermining was removed. The model with the fixed effects was only marginally worse than the original one (difference in $\chi^2 (df = 2) = 5.02$; $p < .10$).

Crossover Effects of Depression from Focal Respondent to Spouse

Figure 3 presents the results of the initial model of depression crossover from focal respondent to spouse. The results provide acceptable goodness-of-fit measures, with $\chi^2 (85, N = 330) = 136$ ($p < .001$), and with NFI = .95, NNFI = .97, CFI = .98, and RMR = .03. As can readily be seen, the β coefficients of the paths from focal respondent to spouse at Times 1 and 2 are .06 (n.s.) and .16 ($p < .01$), respectively, indicating a direct crossover effect of depression from focal respondent to their spouse at Time 2.

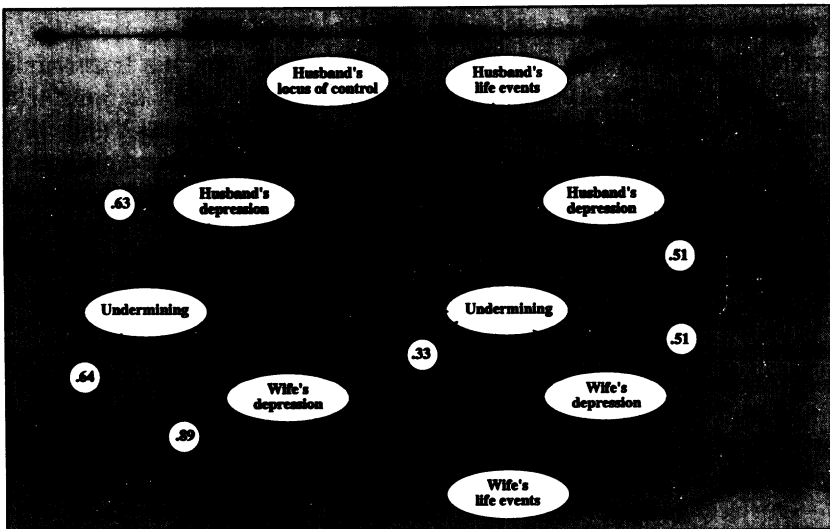


Fig. 3. Structural equation model of depression crossover from focal respondents to their spouses. $\chi^2 (85, N = 330) = 136$ ($p < .001$), and with NFI = .95, NNFI = .97, CFI = .98, and RMR = .03. Solid lines represent statistically significant paths at $p < .05$. Dotted broken lines represent paths which are statistically not significant. Numbers in small circles represent residual variance.

Next we reanalyzed the data for a revised model that removed the effects of the spouse's stressful life events on her depression by replacing the path from life events to depression with a correlation between the wife's life events and the residual of wife's depression. The results of this analysis produced exactly the same measures of goodness-of-fit as the earlier one. The only difference in the results was the increase in the β coefficients of the paths from focal respondent's to spouse's depression at Times 1 and 2, to .16 ($p < .05$) and .20 ($p < .001$), respectively. As a measure of perceived undermining was not available for the spouses, we could not remove its effects on depression as we did in the focal respondent model. We cannot, therefore rule out the possibility that undermining mediated the process of crossover from the focal respondents to their spouses.

DISCUSSION

The Mediating Mechanisms of the Crossover Process

The goal of this study was to examine and unravel three mechanisms proposed to account for the often cited correlations between partners' stress or strain levels and which have been viewed as evidence of crossover effects. Our results replicated commonly reported findings of significant correlations between levels of stress (i.e., life events), levels of strain (i.e., depression), and levels of stress in one partner and strain in the other, and vice versa. Most importantly, using structural modeling analyses, we proceeded to examine the plausibility of each of the mechanisms hypothesized to contribute to these correlations. These analyses control for relative unreliability of the measures, for Time 1 baseline levels, and for personality disposition affecting strain (i.e., locus of control).

In our initial structural model the effects of common stressors and social undermining on depression were modeled and thus controlled for. As expected, the resulting paths of influence indicating direct crossover of depression from one spouse to the other were small (.16, $p < .05$, from husband to wife, and .12 (n.s), from wife to husband) in comparison to the zero-order correlation of .32 between the levels of depression of the two. When we removed the effects of the common stressors and social undermining, the direct effect of depression from one spouse to the other increased significantly, to .21 for crossover from the husband to his wife, and .20 for crossover from the wife to her husband. Thus, the relatively weak coefficients of the paths of direct crossover of depression from one spouse to the other when stressful life events and social undermining are modeled and controlled, coupled with the significant increase in the size of these paths when the effects of life events and undermining are removed,

provide substantial evidence of life events and social undermining playing a significant role as mechanisms accounting for the crossover effects as hypothesized. At the same time, and when all other factors are controlled for, it appears that there is a small significant path from husband's depression to wife's, which suggests a certain degree of direct crossover of distress not mediated by the other mechanisms that are included in our analyses. The absence of a similar significant path from wife's depression to husband's raises the possibility of a gender difference: wives may be more sensitive and empathic to the emotional states of their husbands than are husbands to their wives. They may consequently be more likely to also share, empathize with, and be influenced by the emotional states of their husbands. However, the above conclusion should be considered with great caution because our model of crossover from husband to wife did not include social undermining behavior of the husband. Thus, the overall evidence suggests that crossover of depression is a two-way phenomenon: from husbands to wives and from wives to husbands as hypothesized. This contradicts the findings of several studies that detected crossover effects predominantly from men to women (e.g., Jones & Fletcher, 1993) and supports the findings of Westman and Etzion (1995), who found crossover effects from men to women as well as from women to men.

The Effects of Stressful Life Events on Depression and on Social Undermining

Our findings also demonstrated the adverse effects of stressful life events on the depression of both the focal respondents and their spouses, thus corroborating previous results concerning effects of critical life events on depression (Cronkite & Moos, 1984; Kessler, 1982; Pearlin, Lieberman, Menaghan, & Mullan, 1981). The adverse impact of stressful life events on the interaction pattern of the couple in terms of social undermining behavior was found only for the focal respondents but not for the spouses. A possible explanation for this lack of symmetry is that the focal respondents experienced the stressful life events of job loss and unemployment, which made them more sensitive to the social undermining behaviors of their wives.

Other Determinants of Husband's Depression: Locus of Control, Wife's Depression, and Social Undermining

The inclusion of internal locus of control in the model as an attribute of personal coping resource produced results in the hypothesized direction. That is, internal locus of control was found to reduce depression at both Time 1 and 2. These results support previous research showing that internal

locus of control is beneficial to one's psychological well-being and is negatively related to depression (Cvetanovski & Jex, 1994; Husaini & Von Frank, 1985).

Our results also replicated the findings of Conger et al. (1993) and those of Vinokur, Price, and Caplan (1995) concerning the effect of partners' depression on negative interaction. We found that spouses' depression at both Time 1 and Time 2 increased their undermining behaviors toward their husbands, which, in turn, increased the husbands' depressive symptoms. These results are also consistent with those of other investigators, such as MacEwen, Barling, and Kelloway (1992), who found in a longitudinal study that depression predicted angry marital behavior, and more generally with findings showing that frustration and distress trigger negative interactions (e.g., Berkowitz, 1989; Kahn et al., 1985).

The finding concerning the central role of social undermining should be noted in relationship to the literature on the importance of social support in the crossover process. Several studies that have regarded the partner's depression as a source of ongoing stress have suggested that spouses are influenced by each other's distress, not only directly, but also indirectly, via the partner's reduced supportive potential (Riley & Eckenrode, 1986). In the same vein, Jones and Fletcher (1993) suggested that a lack of perceived support may lead to a greater tendency to transmit occupational stress to the partners. Though they pointed to social support as the mediating mechanism in the crossover process, they did not consider the possible role of social undermining. Several studies have demonstrated that the negative or conflictual social behaviors in general and social undermining in particular must be distinguished from low levels of social support (Abbey et al., 1985; Rook, 1984; Ruehlman & Wolchik, 1988; Vinokur & van Ryn, 1993). Furthermore, these studies demonstrate that the adverse effects of social undermining or negative support on mental health are stronger than the ameliorating effects of social support.

In sum, we found that the evidence supports the three processes we outlined earlier. As noted, we found a *direct crossover* effect of depression. In addition, social undermining appeared as a strong mediating factor in the crossover effect indicating an *indirect effect* of crossover of depression. Finally, as hypothesized, life events representing *common stressors* were found to adversely affect the depression of both partners, which increased social undermining and further increased depression.

Limitations of the Study and Implication for Future Research

Despite the study's reliance on a longitudinal design and a structural model that incorporates major relevant factors, the strength and scope of

its findings are limited in two ways. First, the data did not include the complementary measures of the social undermining that is initiated by the husband toward his wife and her perception of this undermining. The absence of this measure precludes a comprehensive examination of a fully symmetrical model and the opportunity to detect gender differences. Second, providing a structural estimation solution for a bi-directional path requires several independent determinants for each depression construct. Unfortunately, the lack of a measure of wife's locus of control and possibly other measures of coping resources that affect depression precluded a test of a simultaneous bi-directional depression crossover between the spouses. To address the limitations of the secondary analyses in the present investigation, future studies will be designed with a greater array of measures collected from both spouses.

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