

Before They Said “I Do”: Discriminating Among Marital Outcomes Over 13 Years

One hundred couples were followed for 13 years from the premarital period well through the primary risk period for divorce. Results of discriminant analysis indicated that couples who remain satisfied, become distressed, and divorce can be reliably classified on the basis of premarital data. Further, both previously identified demographic risk factors and couple interaction variables contributed to classification accuracy, suggesting that both types of variables play important roles in relationship outcomes. The method employed here addresses weakness in previous studies by: (a) following couples for an extended period after marriage, (b) using multiple validated self-report and observational measures, and (c) making predictions simultaneously for divorced, distressed, and satisfied couples.

Although considerable research has been conducted on the prediction of either marital distress or divorce, these empirical efforts have suffered from several limitations. Specifically, studies that employ in-depth process variables (such as the observation of couples' communication) have followed couples for relatively short periods

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of time and/or had relatively few participants. Conversely, studies that employ long-term assessment and large samples have typically relied on demographic information and/or self-reports, often from only one partner. In addition, the majority of studies have focused on the prediction of marital satisfaction, distress, or divorce, but few investigations have examined these three outcomes simultaneously. Each of these three outcomes merits attention in its own right and, interestingly, may be best understood in consideration with the others (Gottman, 1993; Karney & Bradbury, 1995; Rogge & Bradbury, 1999). The current study addresses such concerns and attempts to extend this line of research.

The present sample was collected as part of a larger project designed both to identify risk factors for marital distress and divorce and to test the possibilities for preventing marital breakdown (Markman & Floyd, 1980; Markman, Floyd, Stanley, & Lewis, 1986). The core of this approach was that deficits in communication skills, particularly around emotional or conflicted themes, have an increasingly debilitating effect on couples. Thus, factors related to how well or poorly couples communicated and handled conflict were expected to contribute to the development of positive and negative outcomes in marriage. The present study was designed, in part, to test this theory by following couples from before marriage to well into (or through) their marriages.

The theory that communication deficits (and strengths) play an important role in couple

outcomes has received extensive support in longitudinal studies. Often mislabeled as "prediction studies," such studies have reliably classified couples using variables measured earlier in marital histories, especially variables related to couple interaction (e.g., Gottman, Coan, Carrere, & Swanson, 1998; Markman & Hahlweg, 1993).

A UNIQUE OPPORTUNITY IN A LONG-TERM DATA SET

The Denver Family Development Project began in 1980 with a sample of 135 couples planning marriage or formally engaged. This sample provided a rare opportunity to assess risk factors for long-term marital outcomes:

1. One hundred couples married and contributed data at multiple time points.
2. Measurement included both observations of couple interactions and self-report ratings of many theoretically important variables, albeit measures chosen from those available and considered relevant in 1980.
3. Outcomes are assessed for 13 years, an unusually long period in this type of study.
4. The sample has a very low attrition rate.

If beginning such a study today, a researcher would include measures and procedures not contemplated in 1980. Although the current study employed longitudinal data collection and observation of interpersonal processes as recommended by Bradbury, Fincham, and Beach (2000) in their review of research on the determinants of marital satisfaction, the roles of a number of variables now understood to be important in the prediction of satisfaction—such as partner attributions, social support, and domestic violence—had not yet been recognized in 1980.

Nevertheless, the present sample provided a strong opportunity to test the degree to which the kinds of high classification rates that have been reported in the marital literature with regard to marital stability versus divorce (e.g., Gottman et al., 1998) could be replicated over a longer period of time from only premarital variables.

No other published study of marital outcomes has this combination of important strengths. That is, although useful in identifying correlates of marital outcomes, most previous classification studies have had one or more significant weaknesses. Such studies have typically covered much shorter time spans (3 to 5 years or less; Buehlman, Gottman, &

Katz, 1992; Fowers, Montel, & Olson, 1996; Markman, 1979; Rogge & Bradbury, 1999); relied solely on self-report data (Fowers & Olson, 1989; Hill & Peplau, 1998; Kurdek, 1993; Williams & Jurich, 1995); used extreme groups created either by sample statistics or by therapist or clergy nomination, thus omitting many couples with more moderate levels of satisfaction (Fowers & Olson, 1986; Gottman et al., 1998; Heyman & Smith Slep, 2001; Holman, Larson, & Harmer, 1994); defined marital instability by partners' thoughts about marital trouble or divorce rather than by actual separation or divorce (Fowers & Olson, 1989; Holman et al.); created marital satisfaction groups by median or triad splits within the sample rather than employing accepted cut points on established measures (Fowers & Olson, 1986; Larsen & Olson, 1989); used multiple dichotomous equations to predict stability and satisfaction independent of each other (Gottman et al.; Heyman & Smith Slep; Holman et al.; Larsen & Olson); or had relatively small cell sizes for one or more stability or satisfaction groups (Buehlman et al., 1992; Holman et al.).

In the current study, discriminant function analysis was used to predict marital stability and satisfaction from observational and self-report data in a sample of 100 couples followed for 13 years. The statistical technique chosen provides information not only on the accuracy of classification into groups but also on the relation between the variables and the equations used to discriminate between the groups.

This study began in a period in which observational coding of couple interactions was only beginning to grow in use. The present sample and its cross-sectional counterparts (e.g., Birchler, Clopton, & Adams, 1984; Margolin & Wampold, 1981) included procedures in which couples' interactions were videotaped and coded by trained observers. Research by Markman (1981) showed that communication dynamics were an excellent predictor of longitudinal outcomes. That research led to the present sample and inclusion of methods based on newly burgeoning sophistication in the measurement of couple interaction (Notarius & Markman, 1981; Weiss & Summers, 1983). Reflecting the historical context, the majority of measures included in the current study assessed the ability of couples to handle conflict and its attendant negative emotions—such as measures of problem solving, emotional expression, and communication skills—that had been supported in previous research (Markman & Hahlweg, 1993).

We predicted that couple outcomes (divorce, happily married, married but distressed) could be discriminated by variables assessed before the couples married. Further, we specifically predicted that higher levels of conflict management skills would be associated with better relationship outcomes. In addition, we included measures of problem intensity and relationship satisfaction both to control for initial levels of functioning and to examine the extent to which couples' own perceptions of conflict and levels of overall happiness predicted future outcomes. Finally, we included measures of static risk factors identified by research as key factors in marriage. Specifically, we predicted that less religiousness (e.g., Mahoney et al., 1999), younger age at marriage (e.g., Booth & Edwards, 1985), and greater focus on strict reciprocity in relationships (e.g., Murstein & MacDonald, 1983) would be associated with lower satisfaction and greater instability over time.

Our goal was, in part, to obtain the greatest differentiation possible with these key variables for the three major outcome categories of divorced, distressed, and satisfied couples. Using data from a longitudinal study, we predicted that these premarital variables would reliably differentiate couples on future marital quality (e.g., distress vs. nondistress) and marital stability (e.g., divorce vs. remaining married).

METHOD

Participants

Couples were selected from the Denver Family Development Project, a longitudinal intervention study of 135 couples planning a first marriage. Recruited through community-wide advertising, couples were followed at approximately yearly intervals for a total of 10 assessment points. Couples were paid for their participation throughout the study (starting at \$25 per research session in the first years of the project and gradually rising to \$50).

Nearly 26% ($n=35$) of the couples in the study ended their relationships before marriage. These couples were excluded and only data from the 100 couples who married were included in the present analyses. At the first assessment, the average age of women was 24 years ($SD=3.9$ years, range = 17 to 35 years), 25 years for men ($SD=3.9$ years, range = 16 to 35 years). Individuals averaged 15.3 years of education ($SD=1.5$

years, range = 9 to 19 years), and the median personal income fell in the \$10,000 to \$14,999 range. Couples were predominantly (95%) European American, with the remaining 5% African American, Latino/Latina, or Other. Partners had known each other for 34.5 months ($SD=30.3$ months, range = 3 months to 15½ years). As expected for a premarital sample (Markman & Hahlweg, 1993), couples were quite happy in their relationships, with a mean modified Marital Adjustment Test (Locke & Wallace, 1959; Markman, 1981) score of 124.44 ($SD=12.86$). Most couples (78%) were sexually active, with 43% living together. All were planning marriage, and 71% were formally engaged.

Couples were categorized based on marital status and satisfaction over time. Twenty couples formed the divorce group. The remaining 80 couples were placed in either the married but distressed group or the happily married group, depending on their marital satisfaction over time. Couples were defined as married but distressed if either (a) both partners were distressed for at least two assessment points, or (b) at least one partner was distressed for three or more assessment points. Of the current sample, 22 couples met one or both criteria. Couples were defined as happily married if either (a) both partners' MAT scores remained above 100 for the duration of their participation in the study, or (b) one or both partners were distressed at one assessment point, followed by both partners scoring in the satisfied range. Forty-one couples (41%) remained continuously satisfied throughout the study. An additional 17 couples (17%) were distressed at one time point and then recovered. In 4 of these couples, wives were distressed at one period; in 12, husbands were distressed; and in 1, both partners were distressed. These recovered couples did not reliably differ from continuously satisfied couples. Thus, 58 couples (58%) were considered happily married, 22 couples (22%) were married but distressed, and 20 couples (20%) divorced.

Shorter term research has defined couples as distressed if they scored below 100 on the MAT at a single time point (e.g., Rogge & Bradbury, 1999). The duration and timing of the current study rendered the use of such criteria less than optimal for two reasons. First, marital satisfaction is not a static construct, but would be expected to fluctuate over the course of 13 years (Clements, Cordova, Markman, & Laurenceau, 1997). Couples who are distressed at one isolated point

and then return to the satisfied range are conceptually more similar to couples who remain satisfied than they are to couples who are consistently distressed. The latter, more stable pattern of distress is argued to have more pervasive and negative effects for the couple. Such a distinction between couples who were consistently distressed and couples who experienced transitory distress is in alignment with recent recommendations made by Beach and Fincham (2003). They argued that successfully differentiating between transient marital distress as seen in community samples (which may be likely to remit without intervention) and stable marital disorder as seen in clinical samples (which has been shown to worsen without treatment) would constitute an important conceptual advance for the field of marital work.

Arguing for the importance of stability might seem to suggest that distress should have been defined as scoring below 100 at all time points. Because the study began at the premarital period when couples typically are at their most satisfied (Markman & Hahlweg, 1993), such a criterion would have been unworkable. Thus, the current definition of distress required couples to be distressed over time, but to remain married throughout the study.

Procedure

The design and procedures of the larger study are available elsewhere (Markman, Floyd, Stanley, & Storaasli, 1988; Markman, Renick, Floyd, Stanley, & Clements, 1993), and only the tasks and measures of interest to the current study are described. Couples were initially matched and randomly assigned to intervention or control groups. Couples assigned to the intervention group ($n = 65$) were invited to participate in the Premarital Relationship Enhancement Program as it existed at that time (PREP; Markman et al., 1986). Only 29 couples completed the intervention, with the remaining 36 couples declining to participate. Couples assigned to the control group ($n = 35$) were not informed of the intervention program. General intervention results have been presented elsewhere (e.g., Markman et al., 1988; Markman et al., 1993), and the intervention is only briefly examined here.

Each laboratory assessment began with a brief opening interview, followed by the completion of several self-report questionnaires and discussions of two of the couple's top relationship problem areas. A second set of self-report questionnaires

was then completed, followed by a brief closing interview. Couples who were unwilling or unable to visit the laboratory at regularly scheduled follow-up assessment points provided self-report information by mail. All couples who had not previously divorced were contacted at the time of the last assessment point, and information about marital status was obtained.

Communication Box. The Communication Box procedure was developed to obtain an insider's perspective of the effect of each partner's communication (Markman & Floyd, 1980). During relationship problem discussions, partners rated the effect of their partners' communication by pressing one of five buttons with labels from *super negative* to *super positive*.

Couples Interaction Scoring System. The Couples Interaction Scoring System is a micro-analytic behavioral observation coding system (Gottman, 1979; Markman et al., 1992; Notarius & Markman, 1981; Notarius, Markman, & Gottman, 1983). The version of the Couples Interaction Scoring System used in the current study contains 36 verbal or content codes and 3 nonverbal or affect codes used to code each unit of interaction, defined as a grammatical clause. Each unit received both a verbal code for the speaker and two nonverbal codes, one each for the speaker and the listener. Cohen's kappas averaged .91 for content codes and .72 for affect codes.

Following C. I. Notarius (personal communication, June 1993), Couples Interaction Scoring System content and affect codes were combined to form four summary codes: problem-solving facilitation, problem-solving inhibition, emotional validation, and emotional invalidation. Two of these codes, problem-solving facilitation and emotional invalidation, were selected for inclusion in the current study as representative of key positive and negative aspects of communication. Problem-solving facilitation is the percentage of time that individuals engaged in behaviors thought to lead to constructive problem solutions, such as discussing the problem with positive affect, making plans, and summarizing one's own position. Emotional invalidation is the percentage of time individuals spent insulting or acting in otherwise unsupportive ways toward the partner, such as making negative comments about the relationship or the partner, sarcastically commenting on the partner's position, or engaging in "mind-reading" with negative affect.

Exchange-Orientation Scale. The Exchange-Orientation Scale is a 19-item questionnaire assessing the degree to which individuals expect behavioral reciprocity in their relationships (Murstein, Cerreto, & MacDonald, 1977; Murstein & MacDonald, 1983). The measure has acceptable reliability in the current sample ($\alpha = .68$ for husbands and $\alpha = .67$ for wives), and previous research has found an exchange orientation toward marriage to be associated with lower marital satisfaction (Murstein et al.; Murstein & MacDonald).

Marital Adjustment Test (MAT). The MAT (Locke & Wallace, 1959) is a widely used index of marital satisfaction and has been shown to discriminate between distressed and nondistressed couples (Gottman, Markman, & Notarius, 1977). This 15-item self-report measure assesses several aspects of marital functioning, including happiness, disagreements, shared confidences, and potential regrets in marrying. The MAT was revised to read appropriately for premarital couples (Premarital Adjustment Test; Markman, 1981). Across all time points, the measure demonstrated adequate reliability ($\alpha = .70$ for husbands and $.69$ for wives).

Personal history form. At each assessment point, participants provided basic demographic information on such topics as marital status, age, and religion. Individuals indicated their religiosity using a 5-point scale ranging from *not at all religious* to *very religious*. The stability of this assessment of religiosity is good, with test-retest correlations over 3, 4, and 5 years of $.78$, $.78$, and $.73$ for husbands and $.76$, $.82$, and $.70$ for wives.

Relationship Problem Inventory. The Relationship Problem Inventory (Knox, 1970) requires each partner to rate the perceived intensity of each of 10 commonly experienced problem areas in marriage (e.g., sex, money, communication). The Relationship Problem Inventory has demonstrated adequate levels of reliability (Gottman et al., 1977). In the current sample, the Relationship Problem Inventory 6-week test-retest correlation coefficients were $.69$ for husbands and $.55$ for wives.

RESULTS

Discriminant function analysis was used to examine the hypothesis that divorced, distressed, and happily married couples could be correctly

classified based on their premarital data. The 16 variables used in the discriminant function were husband and wife scores for each of the following eight measures: premarital satisfaction (premarital MAT), religiousness, age, problem intensity mean (Relationship Problem Inventory), exchange orientation, problem-solving facilitation (Couples Interaction Scoring System), emotional invalidation (Couples Interaction Scoring System), and Communication Box ratings. The correlations across husbands' and wives' predictor variables are presented in Table 1. The means, standard deviations, and zero order correlations within spouses are provided in Table 2.

A small number of couples ($n = 12$) did not have complete premarital data. Most of these couples were missing data for only one of the premarital variables. For some variables (e.g., age), it was possible to obtain this missing data from information provided at subsequent follow-ups. For the majority of variables, however, direct substitution was not possible. Rather than delete these couples from the analyses, within-group substitution was used. Because some of the variables were slightly skewed, median substitution was used to provide conservative estimates of central tendency (Tabachnick & Fidell, 1996). The analysis was completed with and without substitution and the pattern of results was essentially identical, so results using substitution are presented.

The analysis was first computed using all 16 variables, and then the model was trimmed by dropping from analysis variables not contributing to the solution. This trimming of the full model, with its resulting increase in the ratio of participants to variables, was conducted to guard against artificially increasing classification accuracy by capitalizing on trivial differences between a large number of variables (see Rogge & Bradbury, 1999, for a discussion).

Additionally, because the N was insufficient to split the sample to allow for true cross-validation, jackknife classification using the leave-one-out procedure was used to provide more realistic estimates of predictors and to reduce bias (Tabachnick & Fidell, 1996). This procedure, which redeveloped the analysis 100 times, each time leaving out one couple, was used to provide an estimate of the stability of the obtained discriminant functions.

Finally, obtained classification rates were compared with those that would be obtained by chance using two different approaches. First, a

Table 1. Across Spouse Zero Order Correlations Between Predictor Variables

Husbands	Wives							
	1	2	3	4	5	6	7	8
1. Age	.75***	.14	-.17	.01	-.12	.18	-.17	.09
2. Religiousness	-.07	.48***	-.03	.08	-.08	.03	-.02	-.03
3. Satisfaction	-.05	-.04	.51***	-.28**	.39***	.11	-.20*	.04
4. Problem mean	-.04	.11	-.30**	.28**	-.31**	-.22*	.30**	-.10
5. Exchange orientation	.05	-.16	.15	-.19	.31**	.21*	-.37***	.09
6. Problem facilitation	.06	.15	.04	-.11	.26**	.31**	-.47***	.09
7. Emotional invalidation	-.08	-.05	-.17	.05	-.35***	-.37***	.59***	-.15
8. C-Box rating	.11	.11	.14	-.20	.09	.16	-.24*	.62***

Note: $N = 100$ couples.

* $p < .05$. ** $p < .01$. *** $p < .001$.

chi-square analysis using the marginals of the classification table was used to compare the obtained distribution of cases with that expected purely by chance. The second method was to determine whether the obtained classification accuracy exceeded that obtained if all cases were assumed to fall in the largest group (i.e., the happily married group).

A discriminant function analysis attempting to discriminate between three groups (in this case, happily married, married but distressed, and divorced couples) uses two separate equations. The first equation separates the largest group from the remaining two (in this case, distinguishing couples who remain happily married from those who do not), and the second function separ-

ates the two smaller groups (in this case, the couples who divorced and those who remained unhappily married).

The resulting discriminant function was significant, with a canonical correlation of .52, $\lambda = .74$, $\chi^2(15, N = 100) = 27.61$, $p = .02$. Following Dalglish (1994), only structure coefficients are reported in Table 3 because the focus of the current study is substantive interpretation of the discriminant functions. Structure coefficients in discriminant analysis are roughly analogous to factor loadings in factor analysis in that they represent the correlations between the variables and the discriminant function. Examination of the structure coefficients revealed that premarital relationship satisfaction,

Table 2. Within-Spouse Intercorrelations, Means, and Standard Deviations for Predictor Variables

									Wife	
	1	2	3	4	5	6	7	8	<i>M</i>	<i>SD</i>
1. Age	—	.15	-.20*	-.10	-.10	.17	-.19	.01	23.77	3.93
2. Religiousness	.04	—	-.11	.01	-.10	-.08	.12	.23*	3.24	1.18
3. Satisfaction	-.13	-.11	—	-.34**	.40***	-.02	-.10	.06	124.98	14.18
4. Problem mean	.02	-.01	-.50***	—	-.21*	-.02	.06	-.05	17.68	10.73
5. Exchange orientation	-.05	-.16	.46***	-.47***	—	.23*	-.33**	-.01	68.10	8.44
6. Problem facilitation	.01	.15	.24*	-.23*	.21*	—	-.77***	.17	67.96	8.71
7. Emotional invalidation	-.06	.01	-.30**	.31**	-.28**	-.78***	—	-.17	5.13	3.33
8. C-Box rating	.05	-.07	.21*	-.35***	.21*	.10	-.23*	—	3.90	0.70
Husband <i>M</i>	24.55	2.97	123.91	19.97	67.86	68.09	5.26	3.87	—	—
Husband <i>SD</i>	3.88	1.28	15.43	11.46	7.60	9.99	3.37	0.66	—	—

Note: $N = 100$ couples. Coefficients printed above the diagonal are for wives; coefficients below the diagonal are for husbands.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3. Structure Coefficients for Full and Trimmed Models for Classification of Divorced, Married but Distressed, and Happily Married Couples

Step	Premarital Satisfaction		Religiousness		Problem Intensity		Problem Facilitation		Emotional Invalidation		Social Exchange		Age		C-Box Ratings	
	H	W	H	W	H	W	H	W	H	W	H	W	H	W	H	W
	Full															
F1	-.43	-.32	.17	.29	.55	.10	-.28	-.25	.39	.43	-.22	-.13	.04	-.19	-.32	-.23
F2	.42	.62	-.05	-.21	-.01	-.07	.18	-.04	-.19	.12	.12	.35	-.29	-.45	-.28	-.17
Trimmed (Step 9)																
F1	.72	.79			-.40				-.50	-.29				-.20	.06	
F2	-.15	.13			.59				.28	.56				-.56	-.56	

Note: F1 = Function 1. F2 = Function 2. H = Husband. W = Wife. N = 100 couples.

husbands' rated problem intensities, and husbands' emotional invalidation were all highly correlated with the equation separating those who remained happily married from the other two groups. Husbands' ratings of their wives' communication and of problem intensities, as well as wives' emotional invalidation and age, were highly correlated with the equation differentiating those who divorced from those who remained married.

As shown in Table 4, the discriminant function analysis using the full model correctly classified 77% of the sample. The proportion of couples

correctly classified by the discriminant function was significantly greater than that obtained by chance alone, $\chi^2(4, N = 100) = 67.87, p < .001$. Using the jackknife procedure, the classification rate remained above chance at 62% correct, $\chi^2(4, N = 100) = 21.54, p < .001$. Finally, the trimmed model, in which all variables that did not improve prediction were removed, was significant, canonical correlation of .46, $\lambda = .79, \chi^2(6, N = 100) = 22.26, p = .001$, and correctly classified 72% of the sample, also significantly greater than chance prediction, $\chi^2(4, N = 100) = 47.93, p < .001$. Additionally, all obtained classification

Table 4. Accuracy and n for Predicted Divorced, Married but Distressed, and Nondistressed Groups

Predicted Group	Actual Group			Sens.	Spec.	PPV	NPV
	1	2	3				
Initial Analysis							
1. Divorced	12	2	3	.60	.94	.71	.90
2. Married but distressed	1	12	2	.55	.96	.80	.88
3. Happily married	7	8	53	.91	.64	.78	.84
Jackknifed Analysis							
1. Divorced	9	2	7	.45	.89	.50	.87
2. Married but distressed	2	9	7	.41	.88	.50	.84
3. Happily married	9	11	44	.76	.52	.69	.61
Trimmed Model							
1. Divorced	8	1	2	.40	.96	.73	.87
2. Married but distressed	1	11	3	.50	.95	.73	.87
3. Happily married	11	10	53	.91	.50	.72	.81

Note: Sens. = Sensitivity (proportion of a given group correctly assigned to that group). Spec. = Specificity (proportion of those not in a given group correctly excluded). PPV = Positive Predictive Value (proportion correctly classified into a given group). NPV = Negative Predictive Value (proportion correctly not classified into a given group). N = 100 couples.

accuracies exceed the 58% accuracy that would have been obtained using base rates (i.e., predicting that each couple would fall into the largest category, happily married).

Sensitivity, specificity, positive predictive values, and negative predictive values are also presented in Table 4. Sensitivity was greatest in identifying happily married couples. That is, across original, jackknifed, and trimmed models, the discriminant function correctly identified happily married couples 86% of the time, as compared with 48% for divorced couples and 49% for distressed couples. Particularly in the jackknifed and trimmed models, divorced and distressed couples were relatively likely to be misclassified as happily married.

Specificity, the percentage of individuals correctly identified as not belonging to a particular group, was higher in the divorced (93%) and

distressed (93%) groups as compared with the happily married group (55%). That is, individuals who were not classified in the happily married group were nearly as likely to be happily married as they were to be distressed or divorced.

Positive predictive value refers to the likelihood of actually being part of a given group, given the prediction of belonging to that group. Positive predictive values were moderately high and roughly equivalent for all groups: 65% for divorced, 68% for distressed, and 73% for happily married couples.

Negative predictive value refers to the likelihood of not belonging to a given group, given the prediction of not being in that group. Negative predictive values were high across the groups: 88% for divorced, 86% for distressed, and 75% for happily married couples.

Table 5. Differences Between Divorced, Married but Distressed, and Happily Married Groups on Predictor Variables

Variable	Divorced (n = 20)		Distressed (n = 22)		Happily Married (n = 58)		η_p^2	F (2, 97)	p
	M	SD	M	SD	M	SD			
Premarital satisfaction									
Husbands	118.20 _a	20.05	116.07 _a	11.31	128.84 _b	13.15	.15	8.21	.001
Wives	122.97	10.80	115.19 _a	13.76	129.38 _b	13.51	.17	9.69	.0001
Religiousness									
Husbands	2.70	1.34	2.86	.99	3.10	1.36	.02	0.83	.44
Wives	2.90	1.12	2.91	1.11	3.48	1.19	.06	3.03	.05
Problem intensity									
Husbands	27.95 _a	17.30	21.14	8.07	16.78 _b	8.42	.15	8.27	.0005
Wives	18.82	9.00	18.74	11.31	16.89	11.14	.01	0.37	.69
Problem facilitation									
Husbands	65.18	11.11	65.69	11.33	70.00	8.71	.06	2.63	.08
Wives	64.83	8.57	67.96	6.46	69.04	9.34	.04	1.76	.18
Emotional invalidation									
Husbands	6.71 _a	3.97	6.17	3.35	4.42 _b	2.93	.09	4.77	.01
Wives	7.18 _a	4.09	4.97	2.37	4.48 _b	3.14	.10	5.36	.006
Social exchange									
Husbands	66.00	8.41	66.59	7.27	68.98	7.35	.33	1.56	.22
Wives	67.90	8.69	64.73	7.44	69.45	8.48	.05	2.58	.08
Age									
Husbands	24.25	4.96	25.82	3.42	24.17	3.57	.03	1.53	.22
Wives	22.00 _a	3.48	25.55 _b	4.11	23.71	3.78	.09	4.58	.01
Rating of communication									
Husbands	3.51 _a	.77	4.03 _b	.64	3.94 _b	.60	.08	4.15	.02
Wives	3.62	.59	4.00	.72	3.95	.71	.04	2.02	.14

Note: Means with different subscripts differ significantly at $p < .05$ in the Scheffé comparison.

To further clarify the relations between the predictor variables and couple outcomes, we conducted a posthoc mixed model multivariate analysis of variance (MANOVA) with group as the between-subjects factor and gender of partner as the within-subjects factor. As shown in Table 5, the three groups were significantly different on a number of premarital variables, Pillai's Trace = .63, $F(32, 166) = 2.38$, $p < .001$. Posthoc comparisons used the Scheffé procedure for comparisons of multiple means with α set at .05. Both women and men who later divorced engaged in significantly more emotionally invalidating behaviors than did women and men who remained happily married. Women who divorced were significantly younger than were women who remained married but distressed. Men who remained happily married reported higher premarital satisfaction than did men who either divorced or remained married but distressed. In contrast, women who remained happily married reported higher premarital satisfaction than did women who remained married but distressed, but neither stable group differed on premarital satisfaction from women who divorced. Men who remained happily married reported less intense premarital problems than did men who divorced. Finally, men who divorced rated their partners' communication as less positive than did either group of men who remained married.

Alternative Models

Although the variables included in the study were chosen based on theory, we examined the possibility that two other types of variables might account for the results: intervention status and demographic variables.

Because the original study was designed as an intervention study, the ability to collapse across groups rested on the assumption that the intervention did not influence the outcome, either directly, by lessening the probability of a particular outcome in the intervention group, or indirectly, by contributing to differential prediction models across the groups. That is, in order to collapse across groups, the intervention group must not differ from the other groups in rates of outcomes, and the prediction model must be the same for couples who received the intervention and those who did not.

These assumptions were tested in two ways. First, a second set of discriminant analyses was performed separately by group to determine

whether intervention influenced prediction. Values obtained for canonical correlation coefficients, Wilks's Lambdas, and classification accuracy within group were very similar to those obtained using the entire sample. Second, logistic regressions using intervention status and the set of 16 predictor variables were performed. In no case did intervention status predict these very long-term outcomes.

A second alternative model that was investigated was the possibility that divorced, married but distressed, and happily married couples differed on other demographic factors such as premarital income, premarital sexual activity, cohabitation status, educational level, length of time the partners had known each other, and length of dating relationship. This possibility was examined, and the groups did not differ on these demographic variables.

DISCUSSION

This study supports the hypothesis that the seeds of marital distress and divorce are sown for many couples before they say "I do." Although specific outcomes are clearly not predictable for any one couple (see Heyman & Smith Slep, 2001), these findings extend the literature on classification of marital outcomes by demonstrating that premarital variables can be used to discriminate among outcomes over a decade later. Further, the current study extends the literature by examining multiple outcomes (happily married, married but distressed, and divorced) simultaneously and by including all available couples rather than selecting couples at the extremes of the satisfaction distribution.

In these comparisons, premarital interaction and conflict data played a key role in differentiating marital outcomes. The findings lend further empirical support to the literature suggesting that interaction patterns play a central role in the development of marital distress (e.g., Gottman et al., 1998; Markman & Hahlweg, 1993; Matthews, Wickrama, & Conger, 1996; Rogge & Bradbury, 1999). The model that this research was founded on in the early 1980s can be summarized with the metaphor of erosion as a description of one of the common pathways to marital distress (Clements et al., 1997; Markman, Stanley, & Blumberg, 2001). In this model, negative premarital and early marital interactions (emotional invalidation being a key example) prime a marriage for the erosion of positivity

over time. Negative interaction, especially that not driven by a desire for constructive change, can cumulate to violate key expectations about marriage partners as close friends (Markman et al., 2001) or as sources of support (Coyne & DeLongis, 1986; Cutrona, 1996). For example, as a result of emotional invalidation suffered during conflict, a spouse might shift from an original positive or neutral goal to either defending the self or blaming the other. Such shifts have been theorized to account for the pervasive negative effects of conflict (Fincham & Beach, 1999).

Other findings here are consistent with the broader research literature. For example, the distressed group was characterized by lower premarital happiness. Because they had not divorced (at least as yet), these couples may have been prepared to accept marriages with lower levels of satisfaction based on their premarital experiences. Additionally, higher wives' religiousness was associated with greater likelihood of future marital happiness, consistent with various studies showing religious involvement to be protective for many couples (e.g., Call & Heaton, 1997; Mahoney et al., 1999; Stanley & Markman, 1992).

The finding that those marrying at younger ages are at greatest risk for divorce parallels previous research (e.g., Booth & Edwards, 1985; Martin & Bumpass, 1989). It may be that the immaturity and impulsivity that accompany youth translate into greater risk for divorce but not necessarily marital distress. On one hand, there is nothing obvious about marrying young that predisposes one to long-term marital unhappiness. People grow older, and most leave behind the risks attendant to youth. On the other hand, marrying young aligns the potent combination of the impulsiveness of youth and unsettled personality with the otherwise high-risk early years of marriage, making divorce particularly probable.

An alternative explanation is that younger women may view their prospects for remarriage more positively than do older women (Glenn, 2002). The youngest women may perceive more and better alternatives to their current relationships than do somewhat older women. Such an explanation would be consistent with the understanding of both alternative monitoring (e.g., Stanley & Markman, 1992) and exchange theory (e.g., Johnson, 1982; Rusbult, 1983). In other words, the youngest women have an awareness of better—or at least more—options for remarrying. In contrast, there is no particular reason to

believe that men see their options as declining with age, and male age was unrelated to divorce here.

Although not a significant predictor in isolation, exchange orientation was associated with poorer marital outcomes in ways that are consistent with commitment theory. Specifically, exchange orientation is antithetical to a healthy couple identity that can override "me versus you" thinking and score keeping (e.g., Levinger, 1965; Stanley & Markman, 1992).

Limitations

The duration of the project must be considered both a strength and a limitation. The project followed couples from the premarital stage through 10 assessment points in 13 years. Although this longitudinal design was critical for an in-depth assessment of marital satisfaction and stability over time, ongoing participation in marital research can contribute to marital quality (Bradbury, 1994; Rubin & Mitchell, 1976), thus limiting generalization. In addition, the research project included an intervention component. Surprisingly, the models of prediction, levels of satisfaction, and rates of divorce did not differ for the intervention, control, and decline groups 13 years after marriage. Two possibilities likely account for these findings. First, the effects of the short-term intervention, though potent in the early years of marriage (Markman et al., 1988; Markman et al., 1993), have weakened over time. Second, selective attrition makes interpretations of long-term outcomes problematic (Stanley & Markman, 1998). That is, nearly one quarter of couples not assigned to the intervention condition broke up before marriage, whereas less than 10% of intervention couples did. Given that couples were matched on premarital functioning before assignment to condition, one of the effects of the intervention may have been to help couples with weaker relationships negotiate premarital relationship difficulties. In contrast, premarital difficulties may have posed a bigger obstacle to couples in the control and decline conditions, and many of those weaker relationships dissolved before marriage. Thus, the possibility that the intervention affected the results in untested ways cannot be completely dismissed.

Additional limitations of the current study are sample size and homogeneity. Although the sample size is quite large for a project of this duration and depth of measurement, it is insufficient for the most

rigorous cross-validation, which requires splitting the sample and replicating the findings in each half. As Heyman and Smith Slep (2001) demonstrated, true cross-validation produces greatly reduced estimates of prediction accuracy. To guard against inflated estimates of classification accuracy, we both provided jackknifed classification rates and included couples representing the range of relationship satisfaction rather than limiting the analyses to extreme groups (see Rogge & Bradbury, 1999, for a discussion of this issue). Further limiting generalizability beyond the current sample is its homogeneity because the sample is predominantly middle class and European American.

All studies have limitations based on measurement decisions and methods. The relative degree to which key variables discriminate between outcomes is dependent in part on how well those variables are measured. The variables available for analysis in this older data set were limited to those available and supported in the literature circa 1980. Fincham and Beach (1999) have argued convincingly for more theory development in the study of marital conflict. In particular, they hypothesize ways in which a number of important variables (e.g., cognitions about individual goals during interaction, attachment history, commitment dynamics) may affect the way in which observed patterns of conflict influence marital outcomes. In the present study, these kinds of moderating or mediating variables were not studied because their importance had not yet been recognized in 1980, and thus such measures were not yet widely available.

Finally, the selection of variables in the final model was empirically driven rather than theoretically narrowed. That is, although the initial set of variables was based on theoretical considerations, model trimming was determined statistically. With such an approach, the possibility of capitalization on idiosyncratic features of the current data exists. For this reason, the final models should be interpreted cautiously in the absence of replication (for a discussion, see Stanley, Bradbury, & Markman, 2000).

Potential Implications for Prevention

Stanley (2001) has argued that preventive interventions should target dynamic rather than static risk factors, thus focusing effort where there is reason to believe that change is possible. The distinction between dynamic and static is more directly applicable to prevention than the com-

mon distinction between proximal and distal, for it matters little what variables are more proximal if they are not changeable. For instance, young age at marriage is a relatively static but also proximal risk factor. Although age does change over time, age cannot be targeted to lower the risks for a specific couple in the immediate present.

Here, accurate classification of outcomes was obtained by variables that are arguably dynamic: emotional invalidation, experienced problem intensity, and insider ratings of communication. Such findings are consistent with growth curve analysis work by Karney and Bradbury (1997), who demonstrated that couple interaction data are not only predictive of outcomes but are also more associated with change over time than are static dimensions such as neuroticism. Hence, evidence attests to the importance of dynamic factors in predicting marital quality over time.

Of course, age and religiousness, variables that are relatively more static, also added to the accuracy of classification. Other relatively static variables such as income, cohabitation, and education did not add to discrimination of outcomes, though it should be noted that samples with more variance on such dimensions could better test hypotheses about them.

The finding that potentially changeable variables are strongly associated with marital outcomes is a hopeful one. Specifically, there is evidence that patterns of interaction between partners are responsive to interventions (e.g., Hahlweg & Markman, 1988; Halford, Sanders, & Behrens, 1993; Markman et al., 1988; Sayers, Baucom, Sher, Weiss, & Heyman, 1991). Such findings should bolster efforts to develop preventive interventions targeted toward known, replicated risk factors as recommended for both general psychological distress (Coie et al., 1993) and for marital distress in particular (Halford, Markman, Kline, & Stanley, 2003). Though much is left to be discovered about which couples will respond best to what strategies, the current investigation adds to a growing body of research that holds promise in helping to frame the best targets for achieving the goals of prevention.

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