Relationship Risks in Context: A Cumulative Risk Approach to Understanding Relationship Satisfaction

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Abstract

Risks associated with less satisfying intimate relationships often co-occur within individuals, raising questions about approaches that consider only their independent impact. Utilizing the cumulative risk model, which acknowledges the natural covariation of risk factors, this study examined individuals in intimate relationships using the Florida Family Formation Survey ($n = 2,876$) and a replication sample ($n = 1,048$). Analyses confirmed that not only was relationship satisfaction lower among those with more risks, but the cumulative risk score was predictive above and beyond the individual risk factors. Furthermore, experiencing multiple risks exacerbated the negative associations between individual risks and relationship satisfaction, suggesting that the operation of a risk factor in a relationship is moderated by the presence or absence of other risks.

Keywords

marriage and close relationships; relationship processes; satisfaction; social context

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Individuals who are satisfied with their intimate relationships live longer (House, Landis, & Umberson, 1988), are physically healthier (Kiecolt-Glaser & Newton, 2001), and are better parents (Grych & Fincham, 1990) than people who are less satisfied with their relationships. Accordingly, it is not surprising that satisfaction in a relationship is one of the best predictors of general life satisfaction that has been measured, better than financial security, job satisfaction, or physical health (Glenn & Weaver, 1981). The promise of satisfying relationships has long been known to researchers, but in the last decade the benefits of satisfying intimate relationships have also been recognized by policymakers. In 2006, for example, the federal government allocated $750 million over 5 years toward the Healthy Marriage Initiative, explicitly aimed at promoting marriages that are not only enduring but fulfilling as well (Roberts, 2005).

If policy efforts to promote satisfying relationships are to succeed, they must target the individuals most likely to benefit from extra support. To this end, researchers have sought to identify risk factors for experiencing distress in relationships, where risk factors are defined as individual or environmental hazards that increase individuals' vulnerability to experiencing negative outcomes (e.g., Werner & Smith, 1982). This research has been largely successful,

identifying numerous variables that have been reliably associated with more or less satisfying intimate relationships. Within longitudinal research on marriage, one review identified over 200 risk factors that account for changes in marital satisfaction (Karney & Bradbury, 1995).

Although such research has offered important insights into the antecedents and correlates of relationship distress, to date most research has examined variables associated with risk independently from one another. Even studies that assess multiple risk factors at once generally examine the independent associations between each variable and relationship satisfaction, for example, through multiple regression. Yet most people do not experience risk factors independently. Multiple risk factors tend to covary within individuals (e.g., Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001), and so may interact, such that the effects of any single risk factor on relationship outcomes may depend on the other risk factors that an individual faces.

The premise of the current study is that a complete understanding of how any specific risk factor affects intimate relationships requires analyses that account for the cumulative impact of the other risk factors that characterize individuals. Building upon this premise, the goal of the research described here was to evaluate whether an index of cumulative risk may account for relationship outcomes over and above the contributions of individual risk factors and whether the associations between any single risk factor and relationship satisfaction are moderated by the accumulation of other risk factors. Toward this end, the remainder of this introduction is organized into three sections. The first offers a brief review of variables that have been identified as risk factors for negative relationship outcomes. The second section describes an approach to addressing the natural covariation of risk factors within individuals. The final section provides an overview of the current study, which applies a cumulative risk model to data from two independent samples of individuals surveyed about their current relationships.

Risk Factors in Intimate Relationships

With respect to understanding intimate relationships, a risk factor is any variable thought to increase the likelihood that the relationship will experience difficulties. To date, research has identified hundreds of unique variables that meet this definition. To make sense of this literature, we draw from ecological systems theory (Bronfenbrenner, 1979), which suggests that to understand relationship outcomes, we should move beyond focusing exclusively on couple behavioral processes to identifying the multiple settings and systems through which risk factors can arise. Karney and Bradbury (1995) have adopted this approach with the Vulnerability-Stress-Adaptation model, describing three settings that capture most variables that have been identified as relationship risk factors, starting from the individual level and working outward to the external circumstances within which the relationships occur.

Individual Characteristics

Each partner in an intimate relationship can be described by a set of relatively stable traits, previous experiences, and demographic factors. Some of the earliest empirical studies of relationships (e.g., Burgess & Cottrell, 1939) were aimed at identifying those individual characteristics that predict more or less positive relationship outcomes. Over the intervening years, a few individual characteristics in particular have been consistently found to predict negative relationship outcomes. For example, partners' specific experiences prior to entering their relationships, particularly problems with substance and alcohol abuse (Booth & Johnson, 1988) and a history of depression (Gotlib, Lewinsohn, & Seeley, 1998), reliably predict dissatisfaction. Satisfaction in marriage has also been associated with key demographic factors, such as educational attainment (e.g., Bahr & Galligan, 1984). Taken together, these results suggest that when individuals are vulnerable, their relationships are likely to be at risk as well.

Qualities of the Relationship

Some sources of vulnerability in relationships emerge not from the partners as individuals but from their interactions as a couple. Independent of the characteristics of the individuals, the way partners interact with each other is also associated with their relationship satisfaction. Couples whose interactions are characterized by physical violence are at greatly elevated risk of experiencing relationship distress, relative to couples who avoid violence (Rogge & Bradbury, 1999). This points to a set of risky relationship behaviors associated with negative relationship outcomes, just as risky health behaviors are associated with negative health outcomes.

External Circumstances

The way intimate relationships develop is also likely to be affected by the social, historical, and physical circumstances within which they occur. To the extent that maintaining satisfaction in a relationship takes effort, relationships are more likely to be satisfying in contexts that support those efforts and more likely to be challenging in contexts that constrain them. Thus, for example, partners in low-income neighborhoods tend to rate their relationships as less satisfying than partners in high-income neighborhoods (Cutrona et al., 2003). Couples who experience higher levels of stressful life events report lower satisfaction than couples who experience fewer stressful events (Karney, Story, & Bradbury, 2005). Finally, couples who experience a lack of support from their friends and family have more negative relationship outcomes than couples with strong, supportive social networks (Booth & Johnson, 1988). These studies indicate that some sources of risk in relationships lie entirely outside the couple, in the environments that facilitate or impede successful relationship maintenance.

Risks in Context: The Natural Covariation of Risk Factors

Grouping sources of risk into these broad themes is not to imply that different classes of risk factors are independent. On the contrary, risk factors are likely to covary both within and across domains (Karney & Bradbury, 1995). The challenge for those trying to make sense of the existing literature is acknowledging the fact that individuals who are at risk on one dimension tend to be at risk on multiple dimensions (Conger et al., 1990). Understanding risk as people experience it therefore requires researchers to address the simultaneous effects of multiple risk factors at once and the possibility that risk factors may interact to affect relationship satisfaction.

Estimating and Analyzing Cumulative Risk

One obstacle to addressing interactions among multiple variables through multiple regression is that, as the number of potential risk factors grows, the number of possible interaction terms quickly becomes unwieldy. To overcome this obstacle, research in a number of domains, from child development (Rutter, 1979) to epidemiology (Dawber, 1980), has begun applying the *cumulative risk model*. Cumulative risk models proceed from the assumption of equifinality, that is, the idea that disparate causal and developmental paths can lead to similar outcomes. In relationships, equifinality suggests that individuals with very different risk factors or profiles may nevertheless experience similar relationship outcomes. From this perspective, the number of risk factors that characterize an individual may account for relationship satisfaction more efficiently than the presence or absence of specific risk factors. Risk is described as cumulative in that those with more risk factors are more likely to experience negative outcomes than those with fewer risk factors. A cumulative risk analysis proceeds by assessing a defined set of risk factors, dichotomizing risk on each indicator (i.e., *present* = 1, *absent* = 0), and computing a continuous index that summarizes the total sources of risk affecting an individual.

As with any approach that involves categorizing continuous data, the cumulative risk approach results in lost information on variability within each risk factor. Yet this approach also offers advantages over other multivariate approaches to understanding risk. For example, the cumulative risk model is able to capture the natural covariation of risk factors within individuals. Because the variable of interest is the total number of risk factors, as opposed to the individual risk factors themselves, the approach does not require that variables that may, in fact, overlap substantially be treated as independent. Further, cumulative risk models offer an efficient way of examining moderation effects with multiple risk variables. Given that the effects of a particular risk factor on an outcome are likely to depend on the presence or absence of other risk factors (Appleyard, Egelund, van Dulmen, & Sroufe, 2005), the cumulative risk index can be used to determine if and how an individual′s experience of multiple risks moderates the association between a particular risk factor and relationship satisfaction (Gutman, Sameroff, & Cole, 2003).

How Might Risk Factors Interact?

Multiple risk factors may combine to account for relationship outcomes in several ways. Most regression analyses assume an *additive model* (see Figure 1 a), in which risk factors combine linearly to account for variance in outcomes (e.g., Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987). Risks are assumed to operate independently, whereby the effect of any risk factor on an outcome is unaffected by the presence or absence of other risk factors. The additive model thus predicts a linear relationship between risk and relationship satisfaction, such that satisfaction should be lower for individuals characterized by a higher number of risk factors.

Despite the prevalence of simple linear models in most research on intimate relationships, there are good reasons to expect that the combined effects of multiple risk factors should be interactive rather than additive (e.g., Rutter, 1979). Indeed, classic theories of marriage, such as Hill's (1949) Crisis Theory, explicitly predict that the effects of some risk factors (e.g., life stress) should interact with qualities of the spouses (e.g., coping resources) to account for family outcomes. Underlying this theory is the assumption that the operation of any particular risk factor in a relationship depends on the other risk factors that characterize the couple.

The nature of this interaction could take different forms. Prior models that acknowledge interactions have assumed an *exacerbation model* (see Figure 1b), wherein the already negative association between an individual risk factor and relationship satisfaction is made worse by the simultaneous presence of other risks. Rutter (1979), for example, found that, for children with four or more risk factors (e.g., maternal psychiatric disorder, severe marital discord), each stressor potentiated the others, such that the combined effect of multiple risk factors on children's mental health was significantly worse than a mere summation of their independent effects. A similar model may hold true within relationships, where experiencing financial strain, for example, may be a risk factor for relationship distress as may the presence of physical aggression, but the combination of both risk factors may have a more pronounced negative association with relationship satisfaction than the sum of the two independent effects.

Although the exacerbation model fits some existing results, it is not the only possible description of how multiple risk factors may interact. An alternative description is the *saturation model* (see Figure 1c), wherein additional risk factors have less impact on relationships as the accumulated number of risks that characterize the individual grows larger. For example, Sameroff (1998) found that the negative effects of multiple risk factors on children's mental health tapered off for children with five or more risk factors. Beyond this threshold, the individual impact of each risk factor diminished, such that the negative effect of, for example, parental mental illness was weaker for children with five other risks than it was for children with only one or two additional risk factors. Were such an effect to hold true within relationships, the incremental effects of a risk factor like having a substance abuse

problem would be weaker for individuals with multiple other risk factors than for individuals with no other risk factors.

Evaluating the additive, exacerbation, and saturation models would have concrete implications for polces to promote intimate relationships. Support for the simple additive model would suggest that the effectiveness of interventions targeting specific individual risk factors should be unaffected by the other risk factors that individuals experience. In contrast, support for the exacerbation model would suggest that interventions to strengthen relationships will be more effective to the extent that they acknowledge and target multiple risk factors simultaneously, as the presence of multiple risk factors may complicate the treatment of any specific risk factors. Support for a saturation model would suggest that interventions targeting specific risk factors may be more effective for individuals at moderate risk, for whom the alleviation of a particular risk factor may have a big impact, than for individuals at greater risk, for whom the alleviation of a single risk factor may not be associated with a great improvement in the relationship overall.

Overview of the Current Study

In light of prior theories that have acknowledged the natural covariation of risk factors within individuals, we examined how multiple sources of risk combine to influence relationship outcomes. To accomplish this, we applied a cumulative risk model toward data from the Florida Family Formation survey (Karney, Garvan, & Thomas, 2003), a project that interviewed a stratified random sample of Florida residents as well as randomly selected respondents from three other states about their relationship experiences and a wide range of potential risk factors. Analyses were designed to address several questions relevant for understanding variance in relationship satisfaction.

First, we addressed the association between the number of risk factors an individual reported and their relationship satisfaction, predicting that satisfaction should be lower among those who experience greater risk. The survey contains extensive demographic data, offering an opportunity to examine whether this association varies for different populations and across different types of relationships, as research has suggested several variables that may moderate the effects of *all* risk factors on relationship satisfaction. For example, research on the effects of individual risk factors on men's and women's relationship satisfaction have found evidence to suggest that men and women may be differentially affected by the experience of risk (Conger et al., 1990). Research suggests we might also find differences in the effect of risk on relationship satisfaction on the basis of an individuals' age (Schmitt & Kliegel, 2006), ethnicity (Bramlett & Mosher, 2002), relationship status (Brown & Booth, 1996), relationship duration (Parke, 1998), and parental status (Crohan, 1996). Second, we examined whether an index of cumulative risk accounted for significant variance in relationship satisfaction even after the individual risk factors were taken into account. Finally, we examined interactions between the cumulative risk index and each of the components of the index. We predicted that these interactions would support an exacerbation model, whereby the association between relationship satisfaction and any particular source of risk would be magnified by the accumulation of other risks.

Method

Sampling

Individuals in this study were recruited as part of the Florida Family Formation Survey. The design of the survey included stratified random sampling of the state of Florida, with oversamples of Blacks, Hispanics, and low-income residents (i.e., household income of less than $25,000 per year). These data were weighted using the product of expansion weights and

a poststratification adjustment and analyzed using the survey analysis module in Stata (StataCorp, 2005) to ensure that the results were representative of the state of Florida. We also collected data via random-digit dialing in three states with populations comparable to Florida's in terms of density and diversity: California, Texas, and New York. Given the differences in the sampling strategies, responses from the two samples are discussed separately throughout this article, although participants in both samples responded to the same interview instrument.

The response rate, defined as the number of completed interviews divided by the number of eligible households, was 22% for Florida and 19% for the comparison states. The cooperation rate, defined as the number of completed interviews divided by the number of households successfully contacted, was 34% for Florida and 26% for the comparison states, which are typical of larger telephone surveys (Johnson, Cho, Campbell, & Holbrook, 2006).

Procedures

Participants were surveyed via telephone interviews about their experiences, beliefs, and attitudes regarding intimate relationships. The complete interview contained roughly 200 questions, although no participant received the entire set of questions, as many items were administered only to specific groups (i.e., parents, unmarried individuals). The average length of an interview was 27 min. Individuals were not compensated for their participation.

Participants

To be eligible for the survey, participants needed to be above 18 years of age, fluent in either English or Spanish, and participating in the interview from their place of residence.

Florida—Complete telephone interviews were conducted with 4,008 residents of Florida. The current study examines data from the 2,893 individuals who reported either being married or currently in a romantic relationship (71.1% of the larger Florida sample). Approximately 1% ($n = 17$) of the sample had one or more nonresponses to the items comprising the cumulative risk scale, and they were dropped from the analyses. Of the remaining 2,876 individuals, 74.0% of the participants were married, 6.6% were currently engaged, 8.0% were cohabiting, and 11.4% were dating. Across all kinds of relationships, 54.4% of the sample was female, 13.1% of the participants were Black and 17.1% were Hispanic, and the mean age was 45.14 ($SD = 15.16$; 18 – 91). The mean household income was \$64,492 ($SD = $51,447$; national mean household income = \$60,466 in 2004 dollars; U.S. Census Bureau, 2004), and 31.9% of the sample had a college education. Individuals had been in their current relationships an average of 16.9 years ($SD = 14.9$ years).

Comparison states—Complete telephone interviews were conducted with 500 residents of California, 502 residents of Texas, and 502 residents of New York, for a total comparison sample of 1,504 participants. The current study uses data only from the 1,054 participants who reported being either married or currently in a romantic relationship in California, Texas, and New York (70.1% of larger sample). Although New York had a lower percentage of Hispanics than California or Texas (14.0% vs. 29.3% in California and 29.8% in Texas), the comparisons states did not differ from one another on any of the other relevant variables and thus were considered as a single comparison sample in the analyses. Approximately 1% ($n = 6$) of the sample had one or more nonresponses to the items comprising the cumulative risk scale, and they were dropped from the analyses. This remaining sample of 1,048 individuals currently in relationships did not differ significantly from the Florida sample in terms of relationship type (72.0% married, 6.1% currently engaged, 6.5% cohabiting, and 15.5% dating) or mean romantic relationship duration (16.0 years, $SD = 14.2$ years). Across all kinds of relationships, 52.2% of the sample was female, 10.3% of the sample was Black and 24.1% was Hispanic, and the mean age was 43.72 ($SD = 14.97$; 18 – 93). The mean household income in the

comparison states was $72,965 (*SD* = $56,019), and 39.6% of the individuals in this sample had a college education.

Measures

The analyses described here address a set of seven individual, contextual, and relationship risk factors that have been identified by prior research as having a potentially negative impact on relationship satisfaction. How individuals were classified as high versus low risk and the percentage of the high-risk groups are described below. Table 1 presents descriptive statistics for individuals in romantic relationships on these variables in both samples.

Individual Characteristics

Education. Individuals reported their educational attainment on a 7-point scale, ranging from 1 = *less than high school graduate* to 7 = *postgraduate work or degree*. Individuals with less than a high school education were considered high risk and comprised 8.4% of the Florida sample and 10.0% of the comparison sample.

Mental health. Mental health was measured using six items assessing the frequency of nonspecific psychological distress in the past month (e.g., feelings of nervousness; Kessler, Mickelson, & Williams, 1999). Items were rated on a 5-point scale ranging from 1 = *all of the time* to 5 = *none of the time*. Individuals in the lowest 25th percentile were classified as high risk.

Substance abuse. Respondents indicated on a 4-item scale whether they had difficulty with substance use in the past 12 months (e.g., "Have you ever felt that you ought to cut down on your drinking or drug use?"). Individuals who reported abusing any alcohol or drugs were considered high risk (12.8% of the Florida sample and 16.9% of the comparison sample).

Relationship Characteristics

Domestic violence. Respondents indicated on a 3-point scale ranging from 1 = *never or almost never* to 3 = *frequently* whether their partner had ever hit or slapped them when angry. Individuals who reported any incidents of domestic violence above never or almost never were categorized as high risk (about 2.5% in Florida and 3.1% in the comparison sample).

External Circumstances

Financial strain. Financial strain was rated on a 4-point scale that assessed whether individuals had difficulty making ends meet after paying household bills at the end of the month, ranging from 1 = *more than enough money left over* to 4 = *not enough to make ends meet*. Individuals who stated that they did not have enough money to make ends meet were classified as high risk and comprised 7.8% of the Florida sample and 7.8% of the comparison sample.

Difficult events. Individuals indicated on the 10-item Difficult Life Circumstances scale (Booth, Mitchell, Barnard, & Spiker, 1989) whether they had experienced specific, concrete events such as deaths in the family or serious health problems in the past year. Individuals in the top 25th percentile were considered high risk.

Social support. Social support was assessed using four items from the Fragile Families Study (Furstenberg & Hughes, 1995). Individuals indicated whether they could count on someone for support in four hypothetical situations (e.g., if individual became ill). Individuals in the lowest 25th percentile were classified as high risk.

Cumulative Risk Score

To create a cumulative risk score, we dichotomized the seven risk factors, with all variables coded either as 0 (*risk absent*) or 1 (*risk present*). We then summed the number of risk factors present for each participant, resulting in a risk score with a possible range of 0 to 7. In the Florida sample, 47.6% of the sample had no risk factors, 28.7% had 1, 14.3% had 2, 6.0% had 3, 2.7% had 4, 0.4% had 5, and 0.2% had 6. In the comparison sample, 46.3% of the sample had no risk factors, 28.2% had 1, 14.6% had 2, 7.0% had 3, 2.9% had 4, 1.0% had 5, and 0.1% had 6.

Relationship Satisfaction

Respondents reported on their subjective evaluations of their relationship using 12 items that assessed intimacy, commitment, and overall satisfaction. Intimacy was assessed with four items that included questions asking respondents to rate how much their partner supported them and understood their hurts and joys. Commitment was assessed with three items that asked respondents how committed they were to their relationship (adapted from Stanley & Markman, 1992) and three items that asked respondents how frequently they had considered ending their relationship (adapted from the Marital Instability Index; Booth, Johnson, & Edwards, 1983). Satisfaction was measured with two items taken directly from the General Social Survey (Davis, Smith, & Marsden, 2006) that asked respondents to evaluate how satisfied they were with the relationship. All items were coded so that higher scores reflected greater intimacy, commitment, and satisfaction. All 12 items were standardized and summed together, and this sum was divided by the possible total score and multiplied by 100 to create a composite index of relationship satisfaction that ranged from 0 to 100. Coefficient alpha for the combined index was high ($\alpha = .88$ in both samples).

Results

Descriptive Statistics and Preliminary Analyses

To confirm that the Florida sample and the comparison sample were indeed comparable, independent samples *t* tests were run for each risk variable. Average levels of these variables did not differ significantly between the two samples. To verify that our cutoffs for high and low risk classifications on each variable were appropriate, we compared the relationship satisfaction of the high- and low-risk groups on each of the seven risk factors. For every variable, the relationship satisfaction of the high-risk group was significantly lower than that of the low-risk group. In both samples, most variables had 5- to 10-point differences in relationship satisfaction between the high- and low-risk groups, or about one third to two thirds of a standard deviation (p values ranged from $p < .001$ to $p = .06$; Cohen's *d* values ranged from .07 to .16). We also found no evidence in follow-up analyses that setting the thresholds for the continuous risk factors to be either more conservative (e.g., bottom 10% for social support coded as risky) or more liberal (e.g., bottom on third for social support coded as risky) revealed a different pattern of results than the ones reported here, providing further support for our current classification of these risk factors.

Correlations among all the risk variables were estimated in both samples. Of the 21 possible pairwise correlations among the risk factors, 19 were statistically significant in the Florida sample, and 20 were statistically significant in the comparison sample. In the Florida sample, the magnitude of the correlations ranged from .01 to .32 (mean $r = .15$). In the comparison sample, the magnitude of the correlations ranged from .06 to .36 (mean $r = .17$). This highlights the interdependence among sources of risk in relationships and calls into question approaches that do not consider how risk factors operate in the context of one another.

To address our first aim, we conducted correlations to assess the association between the number of risk factors individuals experienced and their relationship satisfaction. In both samples, the cumulative risk score was significantly associated with relationship satisfaction (in Florida, $r = -.36$, $p < .001$; comparison states, $r = -.39$, $p < .001$). As predicted, satisfaction was significantly lower among those who experienced greater risk. Moderation analyses revealed that the strength of this association did not differ significantly across gender (Florida, $p = .23$; comparison states, $p = .91$), age (Florida, $p = .08$; comparison states, $p = .30$), ethnicity (Florida, $p = .39$; comparison states, $p = .43$), marital status (Florida, $p = .10$; comparison states, $p = .94$), or parental status (Florida, $p = .51$; comparison states, $p = .47$).

Risks in Context: The Unique Effects of Experiencing Multiple Risks on Relationship Satisfaction

To examine how much unique and total variance in relationship satisfaction could be accounted for by the seven categorical risk factors as well as how much additional variance could be explained by including the cumulative risk score, we conducted nested regressions (see Table 2). All analyses reported here were also run controlling for relationship duration, but including this control did not significantly alter the pattern of results. As shown in Table 2 (Model 1), the seven individual risk factors together explained a significant amount of variance in relationship satisfaction in both samples: in Florida, $F(7, 2870) = 91.59$, $p < .001$, final $R^2 = .18$; in comparison states, $F(7, 1044) = 29.17$, $p < .001$, final $R^2 = .16$. Poor mental health, financial strain, difficult events, lack of social support, and the presence of domestic violence were each independently associated with lower relationship satisfaction in both samples. Substance abuse also accounted for lower relationship satisfaction in the Florida sample.

Model 2 in Table 2 presents results from analyses that included all risk variables in the previous model plus the cumulative risk score. To note, variance inflation factors were well within acceptable limits in Model 2 (i.e., <2.5 for all variables), addressing concerns about multicollinearity as an issue in this analysis. The addition of the cumulative risk score resulted in a significant change in explained variance. Further, only education, mental health, and domestic violence remained significantly associated with relationship satisfaction in both samples. Substance abuse and difficult events continued to account for lower relationship satisfaction in the Florida sample. This indicates that even after controlling for the individual risk factors, the cumulative risk score accounted for significant variance in relationship satisfaction in both samples, such that the accumulation of more risk factors was associated with lower satisfaction.

Risks in Context: How Do Risk Factors Interact?

The unique predictive power of the cumulative risk score suggests that the experience of multiple risks may not be additive, as the cumulative risk score remained significant even after controlling for the independent effects of the risk factors. The next set of analyses addressed this possibility directly by evaluating whether the number of risks an individual experiences moderates the association between individual risk factors and relationship satisfaction.

We entered each of the risk factors into separate multivariate hierarchical regression models, following procedures described by Aiken and West (1991). In each model, the individual risk factor was entered first, followed by the cumulative risk score, and then the product of the risk factor and the risk score. Variables were centered before being entered into the regression. A nonsignificant interactive term would provide support for the additive model, as it would suggest that the number of risks present does not moderate the association between that risk factor and relationship satisfaction. The impact of a risk factor would remain the same regardless of whether it was the only risk factor or one of several. On the other hand, a significant and negative interactive term would provide evidence for the exacerbation model,

such that for that particular risk factor, the presence of other risks magnifies the association between that risk factor and relationship satisfaction. Here, the impact of a risk factor would be more negative if it was one of several as opposed to the only one. Finally, a significant and positive interactive term would provide support for a saturation model, whereby as the number of risk factors increases, the negative effects of each individual risk factor decline, such that a risk factor would have a less negative impact if it was one of several risk factors experienced as opposed to the only one.

Table 3 presents the interaction terms from each of the regression equations. The Florida sample provides evidence that cumulative risk moderates the effects of six of the seven risk factors: mental health, substance abuse, financial strain, difficult events, social support, and domestic violence. In the smaller comparison sample, we find evidence that cumulative risk moderates the effects of education and substance abuse. In all cases, the interactive term is negative, supporting our hypothesis that the accumulation of multiple risk factors exacerbates the associations between individual risk factors and relationship satisfaction.

Discussion

It is no great challenge to identify variables associated with relationship satisfaction. Indeed, prior research has named hundreds of distinct variables as risk factors for relationship distress (Karney & Bradbury, 1995). The challenge for those trying to make sense of the existing literature is that individuals who are at risk on one dimension tend to be at risk on multiple dimensions. Therefore, understanding risk as people experience it requires researchers to acknowledge the simultaneous effects of multiple diverse risk factors within multiple settings at once (Bronfenbrenner, 1979). To do this, the present study applied a cumulative risk approach to data from two independent samples of individuals in romantic relationships. In support of the central assumptions of this approach, the accumulation of risk factors was associated with significantly lower relationship satisfaction in both samples. These associations were not significantly moderated by gender, race or ethnicity, age, relationship status, relationship duration, or parental status. Moreover, nested regressions indicated that the experience of multiple risks was not additive, as the cumulative risk score was predictive above and beyond the individual risk factors. We found that the number of risks an individual experienced in fact moderated the effects of the individual risk factors, such that the negative associations between the individual risk factors and relationship satisfaction were exacerbated by the presence of other risks.

These findings have important implications for theory, methods, and policy. With respect to theory, the unique predictive power of the cumulative risk score suggests that the effect of the whole may not only be greater than the sum of its parts, it may be entirely independent of its complements. In other words, the fact that an individual bears a heavy burden may be just as determinant of their outcomes as the nature of the specific risk factors that comprise the burden. These findings mirror recent advances in neurobiology and stress on understanding the effects of allostatic load, a measure of the cumulative physiological toll exacted on the body through attempts to deal with stressors (Stewart, 2006). Researchers have found that the chronic demands on the body caused by trying to mobilize one's resources to deal with problems is highly predictive of health and well-being across the life span, regardless of the source of those demands (Evans, 2003). For the purposes of understanding the effects of multiple risk factors on relationship outcomes, this suggests that the wear and tear on an individual and his or her relationship that occurs as a result of accumulating multiple risk factors may in itself be a risk factor for relationship distress that merits further attention from relationship researchers.

With respect to methods, support for the exacerbation model suggests that not only do risk factors from multiple settings interact to predict outcomes, as posited in ecological systems

theory (Bronfenbrenner, 1979), but understanding the effects of any specific risk factor on relationship satisfaction therefore requires assessing that risk factor in the context of the other risks that individuals may experience. Because risk factors do not operate independently, research that studies the effects of specific risk factors independently may provide incomplete or even misleading results. Even specific risk factors that may not explain unique variance in a multivariate approach can negatively impact satisfaction as one of several risk factors accumulated by the individual. For example, risk factors identified in the literature and our preliminary analyses as being significant correlates of relationship satisfaction (e.g., education) were rendered nonsignificant when the simultaneous contributions of other risk factors were controlled. Yet the fact that specific risk factors did not have an independent association with satisfaction does not preclude them from combining with other risk factors both within and across domains to account for relationship outcomes. A comprehensive understanding of risk in relationships requires acknowledging and directly measuring individuals' broad experience.

With respect to policy, these findings suggest that no single approach toward strengthening relationships is likely to be effective for all distressed individuals, because equally distressed individuals are likely to experience different combinations of risk factors. Policies aimed at promoting relationship satisfaction may be most effective to the extent that they are tailored to individuals at specific levels of risk. This calibrated approach has been successfully used in prevention programs for a range of public health concerns, including cardiovascular disease and smoking (Pearson et al., 2002). In these cases, different programs were successfully aimed at individuals according to their differing levels of risk, such that low-risk individuals received different interventions than high-risk individuals. Relationship education programs aimed at improving relationships might consider a similar approach. More vulnerable individuals may benefit more from comprehensive strategies and policies aimed at simultaneously reducing the total number of risk factors to which the individuals are exposed, as each risk factor may complicate the treatment of other risk factors. Individuals characterized by fewer risk factors, on the other hand, may benefit from relationship education programs that target specific risk factors directly. This perspective suggests that assessing an individual's level of risk may be a crucial first step before determining an appropriate relationship-focused program.

Strengths and Limitations of the Study

Our confidence in the results of this study is enhanced by a number of strengths in its methodology and design. First, the pattern of results described here replicated within two large, independent, randomly selected, representative samples, rather than the convenience samples that characterize most prior research in this area. Second, the assessments included a broad range of potential risk factors from each of the major domains examined in the prior literature on risk in relationships. Prior research, even studies that have drawn from other surveys like the National Longitudinal Survey of Youth or the National Survey of Families and Households, has been able to address only a limited set of indicators at once. Third, the samples examined here contained enough diversity to allow analyses confirming that the overall pattern of results held true within several specific subgroups (i.e., gender, racial or ethnic groups), enhancing our confidence that this pattern of results was not dependent on the idiosyncrasies of a single sample or subgroup.

Notwithstanding these strengths, the limitations of this study suggest that these results should be interpreted cautiously. First, all of the data reported here were collected at a single assessment. Recognizing the limits of correlational data, we have made every effort to avoid making causal statements in describing the results. Although it is likely that the experience of multiple sources of risk gives rise to less satisfying intimate relationships (especially for risk factors that represent stable individual characteristics like education), these data cannot rule out the possibility that lower relationship satisfaction increases the likelihood of experiencing

risk. Mental health problems, for example, have been shown to be both a precursor and a symptom of relationship problems (e.g., Fincham, Beach, Harold, & Osborne, 1997). To begin to illuminate the causal implications of cumulative risk, longitudinal research would be a valuable next step and would offer the added benefit of a broader range of relevant relationship outcomes, including change in relationship satisfaction over time and whether or not a relationship remains intact.

A second limitation is the exclusive reliance on self-report data from only one member of the dyad. Because the data were provided by the individual, we were unable to rule out potential third variables that might account for associations between the cumulative risk index and relationship satisfaction. For example, it may be that individuals high in negative affectivity are more likely to report the presence of specific risk factors (e.g., less support) as well as to report being less happy with their relationships. These concerns are partially mitigated by the fact that some of the risk variables examined here (e.g., education) are less likely to be influenced by self-report biases or an unwillingness on the part of the participants to discuss sensitive issues over the phone. Further, although the somewhat low response rates of our telephone survey are worth noting, Groves (2006) maintains that there is little empirical support for the notion that low response rate surveys automatically produce estimates with high nonresponse bias. Finally, our reliance on only one partner's risk factors and perception of the relationship limited our ability to understand cross-partner influence. For example, the extent to which risk factors potentiate each other may depend on the shared resources of the couple, whereby high-risk individuals with high-risk partners may experience greater exacerbation effects than high-risk individuals who are the only member of the dyad at an elevated risk. Accordingly, future research should draw whenever possible upon objective measures of risk from both individuals within the relationship.

A third limitation of the current study, and one that remains a challenge for all research applying cumulative risk models (Appleyard et al., 2005), was the dichotomization of the indicators of risk. Although many decisions regarding cutoffs were relatively straightforward, such as reporting any domestic violence, some decisions involved the use of quartile splits, which were, by definition, sample dependent. In these cases, the current analyses adopted relatively conservative standards for determining the presence or absence of specific risk factors that were in line with previous risk research (Gutman et al., 2003; Sameroff, 1998). Further, we found no evidence in that setting different thresholds for the risk factors provided a different picture of the associations between risk and relationship satisfaction than the ones reported here.

Conclusion

Historically, most research on risk in intimate relationships has assumed that there is a linear relationship between predictors and outcomes. What this perspective overlooks, however, is that the context in which the risk factors are experienced can alter how these risk factors affect relationship quality, such that the operation of a particular risk factor in a relationship is likely dependent on the presence or absence of other risk factors. The present study suggests that to have a complete understanding of how risk factors contribute to relationship outcomes, researchers must capture the context in which they are experienced.

Acknowledgments

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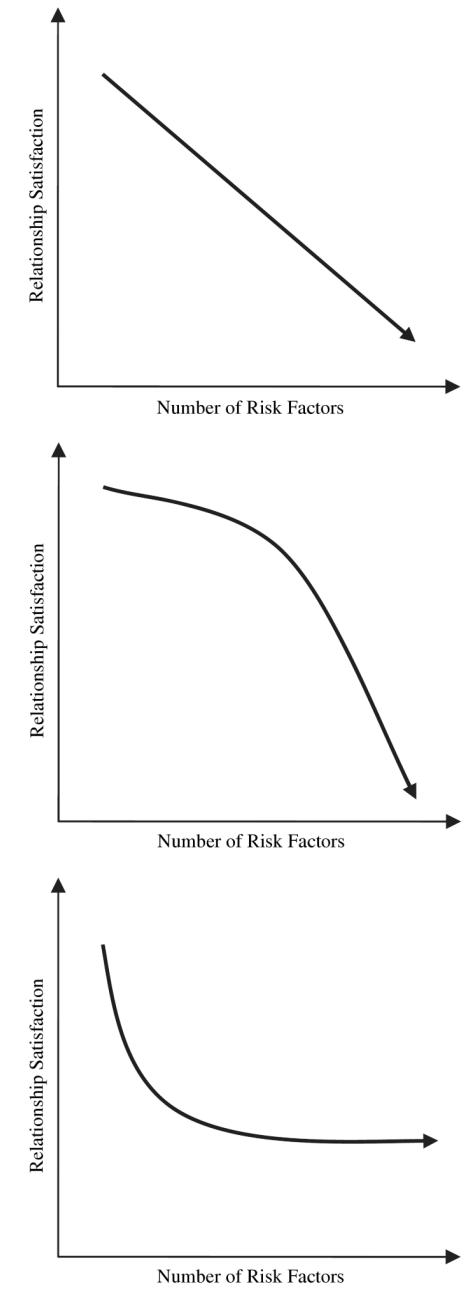
Figure 1.
(a) Additive Model of Cumulative Risk. (b) Exacerbation Model of Cumulative Risk. (c) Saturation Model of Cumulative Risk.

Table 1

Relationship Satisfaction and Risk Factors: Descriptive Statistics (N = 2,852 for Florida, 1,054 for Other States)

Variables	Florida				Other States			
	M	SD	Range	α	M	SD	Range	α
Education	3.99	1.93	1 – 7		4.26	2.02	1 – 7	
Mental health	26.24	4.00	6 – 30	.74	26.10	3.91	9 – 30	.81
Substance abuse	0.33	0.81	0 – 4	.69	0.41	0.89	0 – 4	.77
Financial strain	2.16	0.9	1 – 4		2.17	0.89	1 – 4	
Difficult events	1.58	1.50	0 – 9		1.62	1.5	0 – 8	
Social support	3.04	1.11	0 – 4		3.10	1.05	0 – 4	
Domestic violence	1.03	0.17	1 – 3		1.04	0.24	1 – 3	
Cumulative risk score	0.90	1.10	0 – 6		0.95	1.15	0 – 6	
Relationship satisfaction	84.08	13.63	25.42 – 100.0	.88	82.89	14.01	33.0 – 100.0	.88

Note: The means are weighted for the Florida sample but not for the comparison sample.

Table 2

Summary of Nested Regression Analysis for Risk Factors Predicting Relationship Satisfaction

Variable	Model 1 (Florida)			Model 2 (Florida)			Model 1 (Other States)			Model 2 (Other States)		
	B	SE B	β	B	SE B	β	B	SE B	β	B	SE(B)	β
Education	−1.34	.84	−.03	−3.65	1.12	−.08**	.06	1.39	.00	−3.59	1.83	−.08*
Mental health	−9.31	.55	−.30**	−6.89	.90	−.22**	−7.22	.95	−.23**	−3.52	1.57	−.11*
Substance abuse	.00	.00	−.06**	.00	.00	−.05**	.00	.00	.05	.00	.00	.03
Financial strain	−3.44	.88	−.07**	−1.15	1.15	−.02	−6.09	1.55	−.12**	−2.37	1.99	−.05
Difficult events	−5.72	.73	−.14**	−3.22	1.08	−.08**	−6.93	1.30	−.16**	−3.10	1.84	−.07
Social support	−1.52	.59	−.05**	.75	.94	.02	−2.87	1.09	−.08**	.54	1.58	.01
Domestic violence	−12.29	1.53	−.14**	−9.76	1.73	−.11**	−10.38	2.74	−.11**	−6.44	3.03	−.07*
Risk score				−2.27	.73	−.19**				−3.45	1.17	−.27**
R^2		.18			.19			.16			.17	
F for change in R^2	91.59**			9.58**			29.17**			8.73**		

Note: The data are weighted for the Florida sample but not for the comparison sample.

* $P \leq .05$,

** $p \leq .01$.

Table 3

Summary of the Moderating Effects of the Cumulative Risk Score on the Associations Between Individual Risk Factors and Relationship Satisfaction

Variable	Florida			Other States		
	B	SE B	β	B	SE B	β
Education × Risk score	.27	.24	.02	−1.01	.40	−.08[*]
Mental health × Risk score	−.40	.20	−.04[*]	−.23	.37	−.03
Substance abuse × Risk score	−.32	.42	−.09[**]	−.83	.41	−.09[*]
Financial strain × Risk score	−.58	.22	−.06[**]	.30	.39	.03
Difficult events × Risk score	−.38	.20	−.04[*]	−.20	.36	−.02
Social support × Risk score	−.47	.22	−.05[*]	−.23	.37	−.02
Domestic violence × Risk score	−.43	.17	−.07[**]	−.44	.34	−.07

Notes: The data are weighted for the Florida sample but not for the comparison sample. The above variables were run separately according to Aiken and West's (1991) guidelines for examining moderation. Each equation included the centered risk variable, the centered cumulative risk score, and the interaction term, with only the results from the interaction term reported here.

[*]
$p \leq .05$,

[**]
$p \leq .01$.