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# SELF-EXPANSION AS A MEDIATOR OF RELATIONSHIP IMPROVEMENTS IN A MINDFULNESS INTERVENTION

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*In a recent randomized controlled trial, couples participating in a mindfulness-based relationship enhancement program demonstrated significant improvements in relationship satisfaction and relationship distress (Carson, Carson, Gil, & Baucom, 2004). Here we report on a multiple mediation analysis of these couples' improvements. Potential mediators included measures of couples' engagement in exciting self-expanding activities, couples' ability to accept one another's difficult characteristics, and individual partners' ability to relax. Results indicate that to a large extent, the mindfulness-related relationship improvements can be attributed to partners' sense that they were participating in exciting self-expanding activities together during the course of the intervention. The implications of these findings for future mindfulness research are discussed.*

Research into mindfulness training—that is, the practice of focusing on the reality of the present moment, accepting and opening to it, without becoming engaged in elaborative thoughts or emotional reactions to situations (Kabat-Zinn, 1990)—has greatly expanded over the past several years. Mindfulness meditation interventions have now been shown to be efficacious in assisting individuals to cope more effectively with illness and stress in a variety of nonclinical (e.g., Shapiro, Schwartz, & Bonner, 1998) and clinical populations (depression, Teasdale et al., 2000; cancer, Speca, Carlson, Goodey, & Angen, 2000; psoriasis, Kabat-Zinn et al., 1998).

More recently, interest has grown in studying mindfulness within the context of couples' relationships (Christensen, Sevier, Simpson, & Gattis, 2004; Fruzzetti & Iverson, 2004; Rathus, Cavuoto, & Passarelli, 2006). We recently published a report on the first known test of a mindfulness program provided to couples (Carson et al., 2004). This program was specifically designed to enrich the relationships of relatively happy, nondistressed couples. The 8-week intervention was directly modeled after Kabat-Zinn's mindfulness program (for a complete description, see Kabat-Zinn, 1990; Kabat-Zinn & Santorelli, 1999), but included modifications to meet needs specific to working with nondistressed couples to enhance their relationships. Principal adaptations included (a) greater emphasis on loving-kindness meditations (Carson et al., 2005), with a particular focus on one's partner; (b) incorporation of partner versions of yoga posture exercises, in which partners physically supported and facilitated one another in the performance of therapeutic, often pleasurable postures; (c) mindful touch exercises, with each partner paying close attention to the giving and receiving of a gentle back rub, followed by dyadic discussion of the implications of this for sensual intimacy (i.e., sensate focus, Spence, 1997); (d) a dyadic eye-gazing exercise (adapted from Levine & Levine, 1995), with partners acknowledging and welcoming the deep-down goodness in one another; (e) application of mindfulness to relationship difficulties; and (f) the context for practicing various mindfulness skills, both in-session and at home, was tailored to bring couples' relationships into focus (e.g., partners were

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encouraged to be more aware during *shared* pleasant activities, unpleasant activities, and stressful interactions, and to discuss and keep daily records about new understandings arising from such interactions). In addition, group discussion and didactic components provided opportunities to consider the impact of these exercises on relationship functioning. For a more detailed description, see Carson, Carson, Gil, and Baucom (2006).

Results from this randomized, wait-list controlled trial suggested that the intervention was efficacious in favorably impacting the principal outcomes of the trial, that is, couples' levels of relationship satisfaction and relationship distress. Several other aspects of couples' relationships also improved during the intervention (see Carson et al., 2004).

Results from this trial also provided empirical support for some hypotheses explaining the effectiveness of a mindful approach to enhancing relational functioning (Carson et al., 2004). First, we proposed that participation in the intervention would be associated with increased participation in exciting, self-expanding activities (Aron & Aron, 1997; Aron, Norman, Aron, McKenna, & Heyman, 2000). The practice of mindfulness is often experienced as a self-broadening activity, leading to attitudinal transformations such as a greater sense of trust, love for others, and connectedness with a greater *whole* (Astin, 1997; Carson et al., 2004; Kabat-Zinn, 1993; Shapiro et al., 1998). Such changes correspond to Aron and Aron's self-expansion model of close relationships. This model proposes that expansion of "self" is a fundamental human motivation, and that close relationships tend to grow stronger through mutual engagement in exciting, self-expanding activities, including those leading to "the discovery of linkages, wisdom, their position in the universe" (Aron & Aron, 1997, p. 252). These are precisely the types of experiences that mindfulness meditators often report. Hence, our trial included a process of change measure that assessed couples' participation in activities they considered "exciting," and this measure showed strong intervention-related increases.[1]

Secondly, we proposed that acceptance of one's partner would increase among couples during the intervention. Mindfulness training places a fundamental emphasis on the acceptance of one's experiences without judgment (Hayes, Follett, & Linehan, 2004; Kabat-Zinn, 1990; Segal, Williams, & Teasdale, 2002). Notably, theorists in the area of enhancement of healthy relationships endorse the importance of acceptance (Wenzel & Harvey, 2001), as do numerous marital therapy researchers (e.g., Christensen & Jacobson, 2000). Therefore a process measure of acceptance of partner was also included in the trial; results indicated significant increases in partner acceptance.

A third process that we proposed would change during the intervention was relaxation. While mindfulness training does not explicitly aim at inducing relaxation, elicitation of the relaxation response is often described as an important potential consequence of mindfulness practice (e.g., Baer, 2003; Kabat-Zinn, 1990). Psychophysiologically, the relaxation response results in changes which are the opposite of stress-induced hyperarousal (Benson, Beary, & Carol, 1974). Researchers have suggested that engaging in psychophysiologically soothing techniques is likely to translate into taking a calmer approach to shared difficulties and challenges (Gottman, 1993). Accordingly, a process measure of relaxation was included, which indicated significant individual increases in relaxation during the trial.

Given that all three proposed processes of change—couples' joint participation in exciting self-expanding activities, partners' ability to accept one another, and individual relaxation—significantly increased during couples-based mindfulness training, the question remained as to the relative importance of each process. Several recent reviewers of the mindfulness literature (e.g., Baer, 2003; Grossman, Niemann, Schmidt, & Walach, 2004) have emphasized the need to investigate the mechanisms responsible for treatment-related changes. The purpose of the present investigation was to conduct mediational analyses to determine which process of change could best

[1]For parsimony's sake we did not report on changes in the exciting activities variable in our outcomes paper (Carson et al. 2004), but did report this elsewhere (see Carson 2002, p.118).

account for the significant improvements seen in couples' levels of relationship satisfaction and relationship distress.

## METHOD

*Participants*

The participants were 44 men and 44 women (22 each in the intervention and wait-list conditions) partnered in nondistressed heterosexual relationships. Couples were primarily employees and their partners at a major hospital who were recruited via advertisements placed in employee newsletters and gathering places. To qualify for the investigation, a couple had to be married or cohabitating for at least 12 months, surpass relationship distress and psychological distress cutoff criteria (*T*-score of 58 on the Global Distress Scale, Snyder, 1997; *T*-score of 65 on the General Severity Index of the Brief Symptom Inventory, Derogatis & Melisaratos, 1983), and could not be practicing meditation or yoga posture exercises on a regular basis. The mean age of the participating women was 37 years ($SD$ = 10.9, range 23–69) and of the men was 39 years ($SD$ = 12.4, range 24–69). Both the women and men were mostly very well educated (82% of women and 63% of men had done graduate-level studies), most had at least one child, and the majority were Caucasian (only one female participant was African American). Thirty-seven couples were married, and seven were cohabitating. The mean duration of their relationships was 11 years.

*Measures*

Measures were administered before and after the intervention. The scope of instruments described in this report is limited to the two principal outcomes of the study (relationship satisfaction, relationship distress) and the three expected processes of change which were to be tested as mediators (joint participation in exciting activities, acceptance of partner, individual relaxation).

*Quality of marriage index (QMI)*. The QMI (Norton, 1983) utilizes 6 Likert-type items to assess global relationship satisfaction (e.g., "We have a good relationship"). This measure has demonstrated high internal consistency (alpha coefficient for both women and men = 0.97) and excellent convergent and discriminant validity (Heyman, Sayers, & Bellack, 1994). Internal consistency in the current study was also very high for women ($\alpha$ = 0.95) and good for men ($\alpha$ = 0.86). The QMI has been found to correlate highly ($r$ = 0.85 for women, 0.87 for men) with the 32-item Dyadic Adjustment Scale (DAS; Spanier, 1976), which is the most commonly used measure of marital functioning. The QMI was chosen for this study because it has been deemed equivalent to the DAS for many purposes (Heyman et al., 1994), yet is shorter, simpler, and much quicker to complete.

*Global distress scale (GDS) from the marital satisfaction inventory-revised (MSI-R)*. The GDS (Snyder, 1997) is a widely used scale of relationship distress in couples comprised of 22 true-false items. Responses are summarized into normalized *T*-scores in which higher scores reflect greater discontent with the relationship. Snyder (1997) has reported high internal consistency for the GDS ($\alpha$ for both women and men = 0.91), and provided data supporting its criterion, discriminant, and construct validity. Internal reliability in the current study was adequate ($\alpha$ for women = 0.75, for men = 0.76). Analyses have validated use of the GDS with nonclinical samples (Snyder, 1997).

*Exciting activities index (EAI)*. The EAI was devised for this study as an index of couples' joint participation in activities they considered exciting. The EAI consists of two items ("How exciting are the things you have been doing together with your partner in the past 2 months?"; "Considering the last 2 months, please rate the degree to which you and your partner have participated together in activities which you find interesting and stimulating") with responses indicated by marking 100-mm visual analogue scales. A visual analogue scale (VAS) consists of a horizontal line (typically 100-mm long), with anchors to the left and right of the line

(e.g., ''Not at all,'' ''Extremely'') to indicate that higher amounts are reflected by marking the line further to the right. VAS measures, often in single-item formats, are extensively used in clinical settings to measure subjective phenomena, and have been shown to be valid, reliable, rapid, and sensitive in measuring variables such as global affect (e.g., Cella & Perry, 1986). The EAI had sufficient internal consistency in the present study (0.85 for both women and men).

*Acceptance of partner index (API).* The API was devised for this study as an index of perceived ability to accept difficult characteristics in the partner or relationship. The API consists of two items (''Considering characteristics of your partner, or your relationship, which you find difficult to deal with, over the last 2 months how easy has it been for you to stop struggling and just allow such things to be?''; ''In most intimate relationships, people find there are certain things about their partner or their relationship which they wish were different, but are difficult to change. How would you rate your ability, over the last 2 months, to accept and let be things that are difficult to change in your partner or relationship?''), with responses indicated by marking 100-mm VAS scales. The API had acceptable alpha coefficients in the present sample (for women 0.81, for men 0.87).

*Individual relaxation index (IRI).* The IRI, also devised for this study, assessed each individual's perception of his or her ability to relax. This was measured by two items (''Over the past 2 months, how easy has it been for you to wind down and relax at the end of the day?''; ''On average over the last 2 months, please indicate how difficult it has been for you to let go of feelings of tension and stress when the day is over'') marked on 100-mm VAS scales. The IRI had reasonable internal consistency in the present sample (for women 0.81, for men 0.76).

*General Procedures*

For a full description of the study procedures, including assessment methods, the content of the intervention, and treatment integrity procedures, please see our recently published paper (Carson et al., 2004).

## RESULTS

*Multiple Mediation Analysis Procedures*

A multiple mediation analysis procedure was used to determine whether significant improvements in relationship distress and relationship satisfaction were mediated by changes in the three proposed mediating factors (Preacher & Hayes, 2004, 2006). Advantages of performing multiple mediation rather than separate univariate mediation tests include (a) the ability to test that an overall mediation effect exists prior to examining specific effects of proposed mediators (analogous to conducting an initial overall multivariate test in standard regression); (b) the ability to determine the unique mediating effect that specific variables have within a single model, controlling for the presence of other mediators as well as covariates (in the present study, we were able to control for the potentially crucial effect of gender); and (c) greater precision and parsimonimity in model specification, which enhances statistical power and decreases the probability of Type I errors (Preacher and Hayes, 2006).

The advanced analytical procedure employed in this study also overcomes notable deficiencies of other common methods of mediation analysis. These include problems with Baron and Kenny's (1986) widely used approach (e.g., failure to provide a specific statistical test for the indirect effect that an independent variable has on a dependent variable via a proposed mediator; problems with omitted variables that may bias parameter estimates), and Sobel's (1982) test (e.g., unwarranted multivariate normality assumption—especially relevant in small samples—and greater probability of Type I errors) (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2004; Shrout & Bolger, 2002). Other advantages—shared with structural equation modeling methods for mediation testing—include greater flexibility in model specification and estimation options. Finally, the

procedure used in this study is very accessible, as it is easily implemented and compatible with common software packages (we used SPSS).

The procedure used herein relies on a resampling method known as bootstrapping. Bootstrapping is a nonparametric approach to effect-size estimation and hypothesis testing that is increasingly recommended for many types of analyses, including mediation (e.g., MacKinnon et al., 2004; Shrout & Bolger, 2002). Rather than impose questionable distributional assumptions, bootstrapping generates an empirical approximation of the sampling distribution of a statistic by repeated random resampling from the available data, and uses this distribution to calculate *p*-values and construct confidence intervals (5,000 resamples were taken for these analyses). Moreover, this procedure supplies superior confidence intervals (CIs) that are bias corrected and accelerated (see Preacher and Hayes, 2006, for details). Note, however, that to maintain congruence with results of more familiar analyses, our description of findings below include data showing that all models conform with Baron and Kenny's criteria, and also include results based on Sobel's test.

All mediation analyses utilized residualized posttest scores (adjusted for pretest scores using a linear regression procedure). For all analyses, individuals rather than couples were used as the unit of analysis to avoid problems associated with averaged couples scores (i.e., averaging two partners with highly discrepant scores can result in the same average as two partners with very similar scores). Gender was controlled in most analyses (coded as male = 1, female = 0), but in no case did gender approach significance. Because supplemental models performed to invoke Sobel's test could not accommodate a control variable, gender was not included in these models, but in each such case gender had previously been shown to be nonsignificant.

*Mediation of Relationship Satisfaction and Relationship Distress*

Table 1 displays the test results for relationship satisfaction, which are further illustrated in Figure 1. Results suggest that improvements in relationship satisfaction were significantly and substantially mediated only by the exciting activities variable. As shown, the effect on relationship satisfaction attributed to treatment condition was reduced from 3.04 (see Total Effect of Treatment in Table 1) to 1.59 (see Remaining Direct Effect in Table 1) by the set of three mediator variables (exciting activities, acceptance of partner, and individual relaxation). However, it was exciting activities that accounted for nearly all these mediational effects, that is, 1.40 of the total of 1.45 (see Indirect Effects of Treatment in Table 1; confidence intervals were $CI_{.99}$: 0.35, 3.07 and $CI_{.99}$: 0.49, 3.05, respectively). Both bootstrap results and Sobel's test showed exciting activities to be significant beyond the $p = .01$ level (note that whenever zero is not contained within the bootstrap confidence intervals, we can conclude that the effect is indeed significantly different from zero). Because the residual direct effect of treatment condition remains significant in the model (see Remaining Direct Effect of Treatment in Table 1), according to Baron and Kenny's procedures these results demonstrate partial rather than complete mediation by the exciting activities variable.

Table 2 displays the test results for relationship distress, which are further illustrated in Figure 2. Similar to results for relationship satisfaction, exciting activities was the only significant mediator of treatment-related improvements in relationship distress. In this case, the effect attributed to treatment condition was reduced from −2.04 (see Total Effect of Treatment in Table 2) to −0.70 (see Remaining Direct Effect in Table 2) by the mediator variables, with exciting activities accounting for most of the indirect effects of treatment condition, −1.23 of the total of −1.34 (see Indirect Effects of Treatment; confidence intervals were $CI_{.99}$: −3.19, −0.16 and $CI_{.99}$: −3.09, −0.24, respectively). Bootstrap results for exciting activities were significant at the $p = .01$ level, and Sobel's test indicated significance at slightly above $p = .01$. Because the residual direct effect of treatment condition was no longer significant when competing for variance with exciting activities in the mediation model (see Remaining Direct Effect of Treatment in Table 2), these results indicate a case of complete mediation according to Baron and Kenny's procedures.

Table 1
*Multiple Mediation Estimates for Relationship Satisfaction, Controlling for Gender*

| Variable | *b* | *t* | *p* |
|---|---|---|---|
| Treatment condition to mediators | | | |
| Exciting activities | 16.19 | 4.51 | < .0001 |
| Acceptance of partner | 10.64 | 3.22 | .0018 |
| Individual relaxation | 13.13 | 2.99 | .0037 |
| Direct effects of mediators on relationship satisfaction | | | |
| Exciting activities | 0.09 | 3.35 | .0012 |
| Acceptance of partner | 0.01 | 0.19 | .8498 |
| Individual relaxation | −0.00 | −0.04 | .9712 |
| Total effect of treatment condition on relationship satisfaction | | | |
| Treatment condition | 3.04 | 4.26 | .0001 |
| Remaining direct effect of treatment condition on relationship satisfaction | | | |
| Treatment condition | 1.59 | 2.18 | .0319 |
| Partial effect of gender on relationship satisfaction | | | |
| Gender | −0.41 | −0.63 | .5306 |

| | *b* | $CI_{lower}$ | $CI_{upper}$ | *p* |
|---|---|---|---|---|
| Indirect effects of treatment condition on relationship satisfaction via mediators (bootstrap results) | | | | |
| Total indirect effects | 1.45 | 0.49 | 3.05 | .01 |
| Exciting activities | 1.40 | 0.35 | 3.07 | .01 |
| Acceptance of partner | 0.06 | −0.78 | 1.17 | n.s. |
| Individual relaxation | −0.01 | −0.83 | 0.78 | n.s. |

| | *b* | *Z* | *p* |
|---|---|---|---|
| Indirect effects of treatment condition on relationship satisfaction via mediators (Sobel's test results) | | | |
| Total indirect effects | 1.44 | 3.18 | .0014 |
| Exciting activities | 1.40 | 2.75 | .0059 |
| Acceptance of partner | 0.08 | 0.25 | .8024 |
| Individual relaxation | −0.03 | 0.78 | .8871 |

*Notes*. Confidence intervals are bias controlled and accelerated; bootstrap resamples = 5000; gender not controlled in Sobel's test; $N = 86$ for all tests.

## DISCUSSION

Of the three potential mediating factors for relationship quality improvements—couples' joint participation in exciting self-expanding activities, partners' ability to accept one another's difficult characteristics, and individuals' ability to relax—only the exciting activities variable demonstrated a significant and substantial effect. These results suggest that to a large extent, the relationship improvements produced by the mindfulness intervention can be attributed to partners' sense that they were participating in exciting activities together during the course of the program.

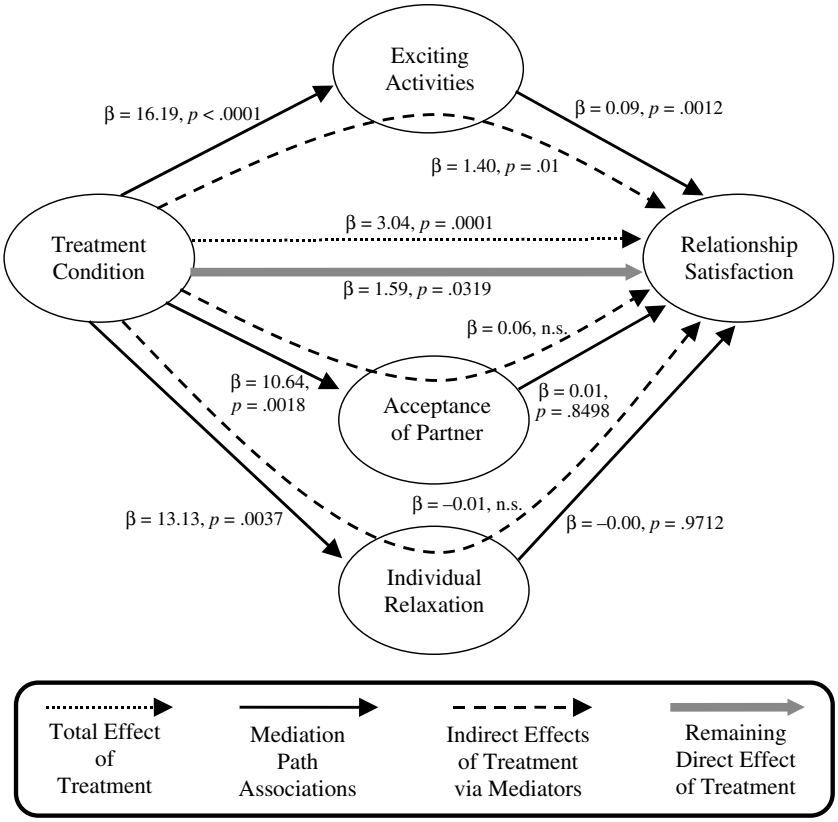


*Figure 1.* Multiple mediation bootstrap analysis of relationships between treatment condition and relationship satisfaction as mediated by exciting activities, acceptance of partner, and individual relaxation.

This finding confirms this study's hypothesis that partners would experience the couples-based mindfulness intervention as exciting and hence as self-expanding as described by Aron and Aron (1997). According to Aron and Aron's model, changes in relationship satisfaction over time are linked to experiences of self-expansion in the context of the relationship. Such self-expanding experiences are distinguished in terms of two key dimensions, novelty and arousal, which in ordinary language are subsumed by the single term "exciting" (Aron et al., 2000). Aron and Aron's studies have shown that activities which couples describe as exciting tend to either be novel (characterized by newness, such as attending musical concerts or studying nature) and/or arousing (characterized by high levels of physical activity, such as dancing or hiking). The Arons' correlational and experimental studies (e.g., Aron et al., 2000; Reissman, Aron, & Bergen, 1993) demonstrate that exciting activities are positively correlated with and prospectively predictive of marital satisfaction.

Several lines of evidence suggested that exciting self-expanding activities would plausibly be advanced through couples-based mindfulness training. First, as proposed by Aron and Aron (1997), for many people, self-expanding experiences include those characterized by fresh discovery of a deeply meaningful sense of connectedness to a greater whole, or greater wisdom, deeper insight, or expanded spirituality. These experiences are commonly reported by individuals practicing meditation (Astin, 1997; Carson et al., 2004; Kabat-Zinn, 1993; Shapiro et al., 1998; Smith, Amutio, Anderson, & Aria, 1996). Studies of meditators have

Table 2
*Multiple Mediation Estimates for Relationship Distress, Controlling for Gender*

| Variable | *b* | *t* | *p* |
|---|---|---|---|
| Treatment condition to mediators | | | |
| Exciting activities | 16.30 | 4.64 | < .0001 |
| Acceptance of partner | 10.36 | 3.19 | .0020 |
| Individual relaxation | 12.79 | 2.95 | .0040 |
| Direct effects of mediators on relationship distress | | | |
| Exciting activities | −0.08 | −2.66 | .0095 |
| Acceptance of partner | −0.02 | −0.68 | .4875 |
| Individual relaxation | 0.00 | 0.45 | .6546 |
| Total effect of treatment condition on relationship distress | | | |
| Treatment condition | −2.04 | −2.69 | .0085 |
| Remaining direct effect of treatment condition on relationship distress | | | |
| Treatment condition | −0.70 | −0.88 | .3827 |
| Partial effect of gender on relationship distress | | | |
| Gender | 0.40 | 0.55 | .5825 |

| | *b* | $CI_{lower}$ | $CI_{upper}$ | *p* |
|---|---|---|---|---|
| Indirect effects of treatment condition on relationship distress via mediators (bootstrap results) | | | | |
| Total indirect effects | −1.34 | −3.09 | −0.24 | .01 |
| Exciting activities | −1.23 | −3.18 | −0.16 | .01 |
| Acceptance of partner | −0.22 | −1.39 | 1.00 | n.s. |
| Individual relaxation | 0.12 | −0.48 | 0.91 | n.s. |

| | *b* | *Z* | *p* |
|---|---|---|---|
| Indirect effects of treatment condition on relationship distress via mediators (Sobel's test results) | | | |
| Total indirect effects | −1.33 | −2.87 | .0041 |
| Exciting activities | −1.23 | −2.37 | .0180 |
| Acceptance of partner | −0.24 | −0.74 | .4590 |
| Individual relaxation | 0.14 | 0.57 | .5716 |

*Notes*. Confidence intervals are bias controlled and accelerated; bootstrap resamples = 5000; gender not controlled in Sobel's test; $N = 88$ for all tests.

also found that subjective reports of mental calm and clarity often correlate with indicators of *increased* physiological alertness (Shapiro & Walsh, 1984). The mindfulness approach to meditation, in particular, emphasizes that in the process of paying attention to present-moment happenings, practitioners continually discover new and interesting aspects of their experience (i.e., features which are novel and arousing). Although time spent in meditation is typically not interactive, much of the process and content of the meditative experience is part of a common domain. As such, resulting insights, feelings, and behavioral changes are eminently shareable with others. Thus, it is reasonable to expect that partners' joint

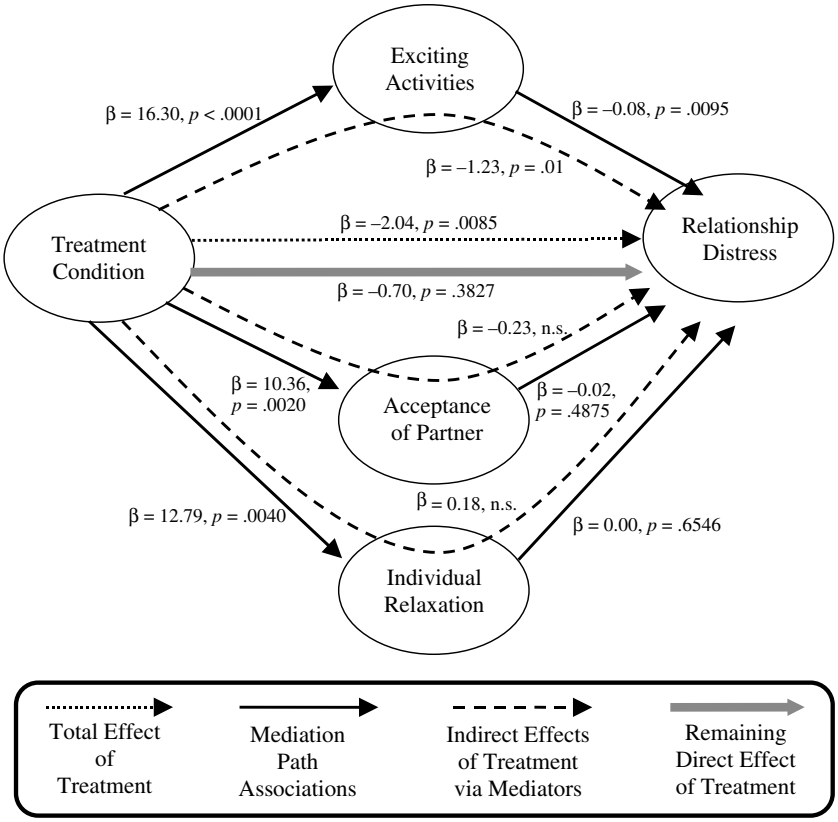


*Figure 2.* Multiple mediation bootstrap analysis of relationships between treatment condition and relationship distress as mediated by exciting activities, acceptance of partner, and individual relaxation.

participation in meditation could enhance their relationship in a manner consistent with the Arons' self-expansion model.

Secondly, yoga posture exercises performed in a mindful manner were a principal component of our couples program. Yoga posture exercises bend and stretch the body in unusual ways, and thus are intensely stimulating (though ultimately relaxing), and hence fit with the arousing dimension of self-expanding activities. Moreover, the incorporation of the "partner" approach to yoga postures involved partners suddenly finding themselves in physical contact while in novel, often pleasurable positions (frequently accompanied by sounds of laughter and spontaneous expressions of pleasure), thus fitting with the novel dimension of self-expanding activities.

Lastly, innovative, relationship-focused adaptations of the mindfulness intervention invited partners to experience one another in new ways. Among the adaptations that conceivably could have had exciting, self-expansion effects were partner-focused loving-kindness meditations, mindful touch exercises, and mutual eye-gazing exercises.

A limitation of the present findings is that couples in this study did not directly rate the mindfulness program in terms of its "exciting" quality. However, the only known factor that could account for differential changes in couples' ratings of exciting activities was whether they were assigned to the intervention versus control condition. Anecdotal evidence for couples' experience of the program as exciting was abundant, with partners frequently making remarks such as "we have so much fun driving home after the mindfulness classes because we're talking

about all the things we're discovering." Nonetheless, future studies should directly measure the degree to which participants explicitly rate the couples' mindfulness program as exciting. It would also be important to obtain such ratings for specific components of the program, such as the formal mindfulness practices (e.g., sitting meditation, yoga postures) and features such as mindful touch exercises and partner-focused loving-kindness meditation. Another limitation of this study lies in the measures used as potential mediators. We were unable to locate existing appropriate, validated measures of exciting activities/self-expansion, acceptance of partner, individual relaxation, or moment-to-moment awareness itself. Brief measures of three of these factors were therefore devised as an initial step toward investigating processes of change in couples-based mindfulness training. We also considered devising a similar measure of moment-to-moment awareness, but concluded that a brief measure of whether individuals were aware of their ongoing momentary experiences would be very difficult to formulate. Since that time, however, validated measures of mindful awareness have become available (e.g., Brown & Ryan, 2003). Future mediational investigations should utilize the best measurement instruments available. Finally, additional limitations to this study arise from this study's sample, which was relatively small and, as in most couples research, was almost entirely white, well educated, middle class, and entirely heterosexual. We cannot know, therefore, whether similar findings would be demonstrated in more diverse populations.

Readers may find it surprising that exciting, self-expanding activities surpassed acceptance and relaxation as the principal mediator of mindfulness-related improvements in couples' relationships. It is important to point out that our findings do not mean that acceptance and relaxation may not also serve as mediators, but rather that their mediated effects appear to be relatively weak compared to (or may actually be subsumed by) the exciting activities process. In general, the specific indirect effects of mediators are attenuated to the extent that the mediators are correlated (Preacher and Hayes, 2006). In post hoc tests we performed, we confirmed that our three proposed mediators were significantly intercorrelated, and found that in simple univariate mediation models (in which the proposed mediators did not have to compete with one another for variance), acceptance of partner demonstrated significant levels of mediation for relationship satisfaction and relationship distress—though substantially less so than did exciting activities. Also, individual relaxation demonstrated trends approaching significance for mediating these outcomes.

It is possible that changes in acceptance and relaxation contributed in important ways to couples' sense of being engaged in an exciting, self-expanding learning process, and that the mediating effects of acceptance and relaxation (and their measured variances) were subsumed by the effect of exciting activities. Whatever the case, it is apparent that more research into the self-expansion effects of couples-based mindfulness training is needed. For such purposes, daily data records and multilevel model analyses hold promise for teasing out the nature of any interacting relationships between these and other mediating processes in producing mindfulness outcomes (Gil et al., 2004). Mediational studies are also needed for mindfulness-based programs delivered to groups of individuals (e.g., mindfulness-based stress reduction, mindfulness-based cognitive therapy). Along with the potential role of self-expansion on an *individual* basis, such analyses should include acceptance, relaxation, moment-to-moment awareness, and other processes which experts (e.g., Kabat-Zinn, 1990) deem to be crucial to the effective practice of mindfulness.

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