

# Marital Interactions in Predicting Treatment Outcome in Panic Disorder with Agoraphobia

Ghassan El-Baalbaki, Claude Bélanger, Michel Perreault, Steffany J. Fredman, Donald H. Baucom

**Abstract**—This study had two goals. First, it investigated marital interaction variables as predictors of treatment outcome in panic disorder with agoraphobia (PDA) in sixty-five couples with one spouse suffering from PDA. Second, it analyzed the impact of PDA improvement, following therapy, on marital interaction patterns of both spouses. The partners were observed during a problem-solving task, before and after treatment. Negative behaviors at the outset of therapy, both in the PDA and the NPDA partners, predicted less improvement at post-test. It also appears that improvement in some PDA symptoms following therapy is linked to increase in the dominant behavior of the NPDA spouse and to an improvement in terms of his intrusiveness.

**Keywords**—Communication and problem-solving skills, Emotional overinvolvement, Marital relationship, Panic disorder with agoraphobia, Treatment outcome.

## I. INTRODUCTION

**P**ANIC disorder with agoraphobia (PDA) afflicts 1.5 to six percent of the population yearly [1], [2] and causes severe limitations to the individual and high costs for society [3]. When compared to individuals without PDA, PDA patients tend to be more dependent, less self-confident, more submissive, and more demanding towards their spouses and to generate fewer effective solutions during problem-solving tasks [4]-[7]. They are more likely to have the impression of being criticized and are more irritable and hostile [8]-[10]. Several studies link the onset, severity and evolution of PDA following treatment to interpersonal conflicts, marital stress, family problems, poor problem-solving skills, and expressed emotions in non-PDA spouses [6], [11]-[15]. Although PDA seems to negatively affect the couple, the marital relationship can contribute to the development and maintenance of the disorder.

G. El-Baalbaki, PhD, was with the University of Quebec in Montreal; he is presently with McGill University. (Corresponding author: ghassan.elbaalbaki@videotron.ca).

C. Bélanger, PhD, is with the department of psychology, University of Quebec in Montreal; department of psychiatry, McGill University, and Douglas Institute Research Center, Quebec, Canada (belanger.claude@uqam.ca).

M. Perreault, PhD, is with the department of psychiatry, McGill University, and Douglas Institute Research Center, and with the department of psychology at the University of Quebec in Montreal, Quebec, Canada. (michel.perreault@douglas.mcgill.ca).

S. Fredman, PhD, is with the Boston University School of Medicine and VA Boston Healthcare System (fredman@email.unc.edu).

D. Baucom, PhD, is with the University of North Carolina at Chapel Hill (dbaucom@email.unc.edu).

Cognitive-behavioral therapy (CBT) is the most effective treatment for PDA [16]. Sixty-six to 80% of the individuals demonstrate a significant reduction in symptoms following treatment [17], [18]. However, a considerable proportion of patients do not get better. Moreover, only half of recovered patients are completely symptom free after treatment [19], and residual symptoms are frequent even in cases with clinically significant remission [17], [20]-[21]. Given the links between marital relationship and PDA, several studies have tested couple-based treatments for PDA combined with exposure therapy. These studies either involved the spouse as a co-therapist or the couple received training in communication and problem-solving skills. Results proved that couple-based treatments are equally effective in reducing PDA symptomatology and tend to improve the quality of the relationship more than CBT for PDA without the partner (for a review see [22], [23]). Nevertheless, a substantial number of patients do not improve even with the addition of the couple-based intervention component.

In their efforts to enhance treatment, researchers have focused on the study of marital factors that may interfere with therapeutic success of PDA, but results have been inconsistent. According to some studies, better quality of marital relationship before treatment is linked to an improved treatment response after individual- or couple-based CBT for PDA. This may be due to PDA individuals perceiving their relationship as cohesive and their partner as supportive. Other studies found no association after treatment nor at follow-up (for a review see [22]-[24]). These mixed results may be due partly to the fact that those studies were based on self-reported questionnaires even though behavioral observation is recommended as a very reliable method in measuring marital quality [24], [25]. Dehle and Weiss [26] have suggested that the anxiety of the PDA partner may influence both partners' perceptions and reports of marital quality. Moreover, they tend to deny or avoid marital and interpersonal problems [27], [28]. The couple may seem well adjusted or satisfied while having a dysfunctional interaction within the PDA relationship that was not detected by self-report marital measures [24]. As suggested by Carter et al. [29], a better definition is needed regarding the nature of the relationship difficulties that are purported to impact or be impacted by treatment. For example, the measure of specific interpersonal variables such as criticism and hostility may lead to a better understanding of the association between marital adjustment and PDA symptomatology. Chambless and Steketee [12] point out that high expressed emotion (EE), particularly hostile criticism, by relatives of patients with agoraphobia or obsessive-compulsive disorder is a strong predictor of drop-

out and negative treatment outcome. However, they also found that non-hostile criticism is a strong predictor of a better outcome on behavioral avoidance test. Relatives are considered to be high in expressed emotion (EE) when they show high levels of hostility, criticism, or emotional overinvolvement (EOI) in reference to the patient. Emotional overinvolvement refers to the relative's intrusiveness, excessively self-sacrificing behavior or exaggerated emotional response to the patient's illness. In Chambless & Steketee's [12] study, they observed that patients with high EOI relatives were more likely to drop out of treatment prematurely. Although it is unclear whether marital difficulties are a predisposing or a maintaining factor of PDA, we can assume that marital variables may be related to treatment outcome and that clarifying this association may help to enhance treatment outcome for these individuals. Most prior work in this area has relied on self-report measures to evaluate the marital interactions of PDA individuals, potentially obscuring important components of the interactional patterns between patients and spouses that may not be easily reportable by patients or their partners. Therefore, the first objective of this study is to use behavioral observation measures to shed light on specific components of the marital interaction of PDA couples and to determine the predictive marital interaction factors of PDA treatment outcome.

It has also been argued that PDA symptoms may offer secondary gains for one or both partners. Accordingly, improvement of PDA during or after treatment may induce a threat in couples whose relationships are based on this secondary gain, and the destabilization within the relationship may compromise the therapeutic gains and precipitate relapse [30]-[35]. Nevertheless, results from empirical studies do not support this theory. In fact, none of the studies found successful PDA treatment outcome to be detrimental to the quality of the marital relationship. On the contrary, several studies showed that marital quality improved [36]-[40]. The above studies were mainly based on self-reported measures. This study will try to clarify the impact of PDA symptom reduction on specific components of the marital interaction retained for this study and that will be discussed hereafter.

To examine specific marital interaction variables that may affect treatment outcome for PDA, we used data from a study comparing the efficacy of two treatments modalities for PDA, a standard cognitive-behavior therapy for PDA versus a treatment combining CBT and training in communication and problem-solving skills for the couple. Overall findings revealed that both treatments were equally effective in reducing all PDA symptoms and that there was no significant difference between the two [41]. Thus, in the present study, the two treatment groups are collapsed across treatment modalities.

We hypothesized that (1) negative communication patterns, such as criticism and hostility, dominance, and avoidance at the outset of therapy will predict less improvement after treatment whereas positive patterns such as support and good quality solutions in problem-solving will predict a better treatment outcome; (2) PDA patients with spouses presenting

high in emotional overinvolvement (EOI) at pre-test will improve less than those with lower EOI; (3) improvement of PDA symptomatology will predict improvement in the quality of interaction patterns at post-test; and, (4) improvement of PDA symptomatology will predict improvement of the EOI in the non-PDA spouse at post-test.

## II. METHOD

### 1) Participants

The sample initially consisted of 65 heterosexual couples in which one spouse met the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; [1]) criteria for a primary diagnosis of panic disorder with agoraphobia (PDA) for at least six months, with a severity ranging from moderate to severe according to the *Anxiety Disorders Interview Schedule, Lifetime Version* (ADIS-IV-L; [42]). The higher ratio in women (2:1) reported by White and Barlow [43] is reflected in our sample of 46 women and 19 men with PDA.

Recruitment of this sample occurred through advertisements in the Montreal metropolitan area local newspapers ( $N = 47$ ), at the Douglas Hospital Anxiety Clinic ( $N = 12$ ), and at the Centre for Intervention for Cognitive-Behavioral Therapy at Louis-H. Lafontaine Hospital ( $N = 6$ ).

To be included in this study, participants had to meet the following criteria: (a) age between 18 and 65; (b) married or cohabitating with the same partner for at least one year; (c) a primary DSM-IV diagnosis of PDA assigned by a psychiatrist; (d) a primary diagnosis of PDA according to the ADIS-IV-L [42], with a clinical severity rating of four or more on a scale ranging from zero (none) to eight (very severely disturbing-disabling) and present for at least six months; and (e) if a secondary DSM-IV axis I diagnosis was present, its clinical severity rating according to the ADIS-IV-L should be two or more levels lower than the PDA rating. Exclusion criteria included: (a) the presence of substance-related, psychotic, or bipolar disorders; (b) the presence of any unstable medical condition; (c) the presence of mental retardation; and (d) having followed psychotherapy for PDA in the past 12 months.

Out of the 65 PDA patients, 56 (sub-sample 1: 17 men and 39 women) completed both the treatment and the PDA post-test questionnaires, whereas only 37 (sub-sample 2: 12 men and 25 women) completed the treatment, the PDA post-test questionnaires, and the post-test videotaped problem-solving interaction. The current analysis will be based on the statistically adequate sub-sample for each hypothesis. Sub-sample 1 will be referred to as sub-sample without post-test interaction, and Sub-sample 2 will be referred to as sub-sample with post-test interaction. Descriptive statistics for socioeconomic variables of the two sub-samples are presented in Table I.

### 2) Measures

In addition to the assessment of the overall clinical severity of PDA using the ADIS-IV-L interview during the selection

TABLE I  
DESCRIPTIVE STATISTICS OF SOCIOECONOMIC VARIABLES

Socio-economical Variables	Sub-sample Without post-test interaction (N=56)		Sub-sample with post-test interaction (N=37)	
	M	SD	M	SD
Age of PDA patient	39.77	8.95	39.81	9.01
Duration of cohabiting	11.67	9.56	12.51	9.70
Duration of PDA	12.74	9.96	11.76	9.81
Number of Children	1.13	1.26	1.32	1.27
Years of education	12.00	3.86	12.86	3.28
Household income	6.05	1.79	6.32	1.78

process, all participants completed a battery of questionnaires, including a general information socio-demographic questionnaire — constructed by the authors for the needs of this study — and seven self-reported PDA symptoms measures: the body sensations questionnaire (BSQ) and the agoraphobic cognitions questionnaire (ACQ) [44], the mobility inventory for agoraphobia (MIA) [45], the anxiety sensitivity index (ASI) [46], the beck anxiety inventory (BAI) [47], and the Beck depression inventory-II (BDI-II) [48]. To measure marital functioning we used two self-reported marital measures, the Dyadic Adjustment Scale-4 (DAS-4) [49] and the questionnaire for the sources of agreement and disagreement (QSAD) [50] and two observational coding systems of the spouses' marital interactions, the global couple interaction coding system (GCICS) [51] and the observational coding system for emotional overinvolvement (EOI) [52]. All self-report questionnaires were used in their French-Canadian validated versions. Cronbach's index of internal consistency ( $\alpha$ ) varied between 0.74 and 0.94.

The GCICS is a macro-level coding system used to code video-taped marital problem-solving interactions. It evaluates each partner on five components of their verbal and non-verbal marital interaction during a problem-solving situation. Behaviors are rated according to four levels of severity (absent- mild- moderate- excessive). The five components of the GCICS are divided into three negative dimensions: (a) avoidance of, and withdrawal from, the discussion, (b) dominance, asymmetry in the control of the conversation, and (c) hostility, criticism and conflict; and two positive dimensions: (a) support and validation, which reflect active listening and warmth; and (b) problem-solving skills. The latter dimension is composed of two sub-categories: (1) efforts at clarification and negotiation, desire to find solutions, and (2) quality of proposed solutions.

The observational coding system for EOI, permits individual ratings for intrusiveness, excessive self-sacrifice and exaggerated emotional response displayed by the relative (parent, spouse, and sibling) of a psychiatric patient during a video-taped problem-solving interaction. Each dimension is scored on a scale that ranges from none (1) to extreme (5). Following Leff and Vaughn [53], the authors of this coding system [52] define (a) intrusiveness as the relative's attempt to exert psychological or physiological control over the patient's well-being through age-inappropriate means, overprotection, and control, (b) excessive self-sacrifice as the relative's consistently and unreasonably placing the patient's needs ahead of his or her needs, and (c) exaggerated emotional response to the patient's illness as the relative's excessive anxiety directly related to the patient's welfare as shown by excessive emotionality, empathy, or melodrama regarding the patient's well being.

The videotapes were coded by two different graduate students in clinical psychology, trained to criterion by the first author of this study, one coded with the GCICS and the other with the EOI coding system. The coders were unaware of the research hypotheses. We evaluated interrater reliability using tapes of 25 couples randomly selected, and it proved to be excellent for all dimensions of GCICS  $\rho(3,1) = [0.63; 0.94]$  and for all dimensions of the EOI coding system  $\rho(3,1) = [0.95; .99]$ , [54].

*Global Functioning Index (GFI)*. This index is a composite measure of clinically significant changes calculated on the basis of all PDA severity questionnaires (BSQ, ACQ, MIA, ASI, BAI, BDI-II) according to a procedure proposed by Jacobson and Truax [55]. Among the three possible ways provided by these authors to determine a cutoff point for clinically significant change, the "C score" was used for the current analysis. The cutoff score is the level a subject has to cross at post-test assessment in order to be considered as having experienced a clinically significant change for a given variable. The "C" cutoff point represents the level of functioning that places the patient closer to the mean of normal population than to that of a dysfunctional population. Data for the normal population were taken from the questionnaire validation studies mentioned above. Validation data on French-Canadian normal population was preferred when available. When a patient's score for a variable was lower than the cutoff point, a mark of one (1) was given, indicating a clinically significant improvement (CSI); a mark of zero (0) was given when the individual score was higher than the cutoff point, indicating that there was no CSI. The overall clinical PDA severity according to ADIS-IV-L interview does not require a C score and was also used for calculation of the total GFI score. When the PDA severity according to ADIS-IV-L interview at posttest was equal to, or less than three, a score of one (1) was added to the GFI total score, and when clinical severity was between four and eight, a score of zero (0) was given. All the C scores were added for a potential maximum total of eight. The total GFI variable was further divided into three sub-variables or clinical levels of functioning. Total GFI scores of 6, 7 or 8 meant a high level of functioning; 3, 4 or 5 a moderate level; and 0, 1 or 2, a low

level. Ten participants, had missing data for 1 or 2 questionnaires, were also given a GFI score, as a rule of three was used to balance their marks with those who completed all the questionnaires.

Before the beginning of treatment (pre-test) and one week after the end of it (post-test), PDA patients were asked to answer all the symptom questionnaires, whereas their partners were asked to respond only to the DAS and the QSAD. Both partners had to agree to be video-taped during a 15-minute problem-solving interaction, once at pre-test and once at post-test.

An outcome measure for GCICS was calculated as follows. If a global negative behavior (first three categories of the GCICS) was present before treatment and absent after treatment or if a global positive behavior (fourth and fifth categories of the GCICS) was absent before treatment and found to be present after treatment a mark of one (1) was given, indicating improvement. If a behavior was absent (respectively, present) before and after treatment, a mark of zero (0) was given, indicating no change. Finally, if a negative behavior was absent before treatment and present after treatment or if a positive behavior was present before treatment and absent after treatment, a mark of minus one (-1) was given, indicating worsening.

An outcome measure for EOI was calculated by applying the same logic as for the negative behaviors of the GCICS.

### 3) Procedure

*Selection of participants.* Following a telephone preliminary screening, all participants were assessed with the ADIS-IV-L by an experienced advanced graduate student in clinical psychology. Participants with a primary diagnosis of PDA were then evaluated by a psychiatrist to confirm the diagnosis and absence of exclusion criteria. Interrater reliability test of PDA diagnosis and PDA severity according to the ADIS-IV-L, showed a strong concordance with a Kappa coefficient of 0.77. All PDA patients and their spouses provided informed consent.

*Interaction task.* The participants were invited with their partners to one of the participating clinics for the videotaped problem-solving interaction task. We proposed a topic for the discussion that both partners found to be a source of moderate conflict and agreed to discuss. The couple was then with the instructions to discuss the problem for 15 minutes and to work toward finding mutually satisfying solutions. This procedure is very reliable even when one spouse has a clinical disorder, and it is commonly used in marital research to identify interaction patterns in couples [56].

*Treatment.* Following the assessment procedure, PDA patients were randomly assigned to a standard PDA cognitive-behavior group therapy without the spouse (14 sessions) or to a combined intervention including a condensed version of the standard cognitive-behavior therapy (7 sessions) and a training which involved the non-agoraphobic spouses and focused on communication and problem-solving skills in the couple (7 sessions). All three-hour sessions were conducted

by psychologists duly trained in PDA and/or couple cognitive-behavior therapy. Among the 56 participants who completed the treatment and the post-test questionnaires (sub-sample without post-test interaction), 30 (8 men and 22 women) received the standard cognitive-behavior therapy and 26 (9 men and 17 women), the combined therapy. Among the 37 participants of the sub-sample with post-test interaction — who completed the treatment, the post-test questionnaires and the video-taped interaction — 18 participants (5 men and 13 women) received the standard cognitive-behavior therapy and 19 (7 men and 12 women) the combined therapy. The standard therapy included the following main strategies: cognitive restructuring about symptoms and fears associated with panic attacks, breathing retraining, exposure to interoceptive stimuli, and in vivo graduated exposure to feared situations [57]. The first block of the combined treatment provided all the information and exercises covered during standard therapy, while devoting only half the time for each item during the sessions. Spouses joined the group at the start of the second block. The following items were taught during the second block: active listening, constructive expression of emotions, identification of hidden expectations, problem-solving strategies [58]-[60], management of anger [61], and agoraphobic marital interaction patterns [62]. Every session, PDA patients were also encouraged to carry on with their in vivo exposure.

## III. RESULTS

### A. General and Descriptive Results

#### 1) Group Homogeneity

We assessed group homogeneity for the two sub-samples independently, running independent *t*-tests and Chi square tests to verify that there was no significant differences in terms of PDA baseline symptoms, marital adjustment, and problem-solving interactions, (a) among participants recruited from advertisements and those recruited from either one of the two clinics (b) between the standard and combined treatment groups, and (c) according to medication intake. Results

showed no significant differences ( $ps > .05$ ) except for participants from the sample with pre- and post-test

interactions, recruited from the participating clinics who reported respectively more fear of bodily sensations and more agoraphobic avoidance when unaccompanied than those recruited from advertisement  $t(35) = 2,12, p < .05$ , and  $t(35) = 2,1 p < .05$ .

#### PDA Clinically Significant Improvement After Treatment

Results as measured by the global functioning index (GFI) show that 84% of the participants from the sub-sample without post-test interaction reached a high level of functioning, 7% reached a moderate level of functioning and 9% were still at a low level of functioning. For the sub-sample with post-test interaction, 81% of the participants reached a high level of functioning, 11% reached a moderate level of functioning and 8% were still at a low level of functioning.

2) Marital Adjustment in the Two Sub-samples Before and After Treatment

Before treatment, 37 PDA spouses and 38 NPDA spouses from the sub-sample without post-test interaction ( $N = 56$ ) reported to be maritally adjusted.. After treatment, 31 PDA spouses and 32 NPDA spouses reported being maritally adjusted. Data was missing for 14 PDA spouse and 16 NPDA spouses at post-test for this sub-sample.

Our sub-sample with post-test interaction ( $N = 37$ ) showed that, at pre-test, 26 PDA spouses and 28 NPDA spouses were maritally adjusted. At post-test, 28 PDA spouses were maritally adjusted. As for the NPDA spouses, 30 reported being maritally adjusted, six reported being maritally distressed, one had missing data. The Pearson correlation of marital adjustment between partners was strong in both sub-samples ( $r_s = .68$  to  $.75$ ,  $ps < .0001$ ). A repeated measure ANOVA showed no treatment effect on the dyadic adjustment scale of both PDA and NPDA spouses ( $ps > .05$ ). Tests of within-subjects effects demonstrated that, after treatment, DAS scores of participants who received the standard treatment were not significantly different from those of participants who received the combined treatment.

3) Marital Interaction in the Two Sub-samples According to the GCICS and EOI Before and After Treatment

Due to the non-normal distribution of severity for each measured dimension in the sample, we dichotomized the severity ranges of each dimension of the GCICS and the EOI coding system.

Positive intercorrelations for each dimension of the GCICS are found between spouses both before and after treatment ( $r_s = .29$  to  $.90$ ,  $ps < .05$ ), as shown in Table II, indicating that the presence of a behavior in one partner is linked to the presence of the same behavior in the spouse.

A hierarchical log-linear analysis did not show the presence of any interaction effect between gender, the presence of PDA or not and the coded marital interaction behavior in the sample both at pre-test ( $N=56$ ) and at post-test ( $N=37$ ) ( $ps > .05$ ).

4) Therapy effect on treatment outcome

The analyses of the relative efficacy of standard and combined treatments of this study are reported in another paper [41]. In short, participants in both groups showed significant improvements on measures of PDA severity. In terms of within-group (pre-test, post-test) analysis, we found adequate power to detect at least medium effect sizes, a repeated measures ANOVA was performed on the first sub-sample ( $N=56$ ) — with subjects having completed only the pre-test interaction task and both the treatment and pre- and post-test self-report questionnaires (see Table III).

The analysis showed a main effect of treatment on all PDA variables ( $ps < .0001$ ) confirming that treatments indistinctively produced significant improvements on all PDA symptoms.

To determine if there was a significant effect of treatment on the marital interaction behaviors and on the non-PDA

spouses' EOI, a repeated measures ANOVA was performed at pre-test and post-test on the sample with post-test interaction ( $N=37$ ), and no significant results were found ( $ps > .10$ ).

TABLE II  
INTERCORRELATIONS OF GCICS DIMENSIONS AT PRE-TEST AND POST-TEST BETWEEN PDA SPOUSE AND NPDA PARTNER

		PDA spouse (N=56) Before Treatment						
GCICS dimension		1	2	3	4	5	5a	5b
NPDA Partner (N=56)	1. Withdrawal	0.29*	0.02	-0.21	0.05	0.02	0.02	0.08
	2. Dominance	0.26+	0.44+	0.15	-0.16	0.19	0.19	-0.23
	3. Criticism	0.41+	0.28*	0.52+	-0.30*	0.05	0.05	-0.08
	4. Support	-0.14	-0.15	-0.21	0.58+	-0.06	-0.06	0.18
	5. Problem-solving Skills	-0.16	0.14	0.07	0.19	0.48+	0.48+	0.11
Before Treatment	5a. Clarification	-0.16	0.14	0.07	0.19	0.48+	0.48+	0.11
	5b. Quality of solution	-0.16	0.03	-0.10	0.21	0.10	0.10	0.50+
		PDA spouse (N=37) After treatment						
GCICS dimension		1	2	3	4	5	5a	5b
NPDA Partner (N=37)	1. Withdrawal	0.57+	-0.09	-0.02	-0.01	0.16	0.16	-0.04
	2. Dominance	0.07	0.54+	0.51+	0.04	0.42+	0.42+	-0.09
	3. Criticism	-0.02	0.34*	0.54+	-0.19	0.21	0.21	-0.10
	4. Support	0.07	0.31	-0.15	0.68+	0.42+	0.42+	0.26
	5. Problem-solving Skills	0.16	0.42+	0.21	0.38*	0.90+	0.90+	0.11
After treatment	5a. Clarification	-0.10	0.10	-0.17	0.30	0.11	0.11	0.18
	5b. Quality of solution	0.16	0.42+	0.21	0.38*	0.90+	0.90+	0.11

\* Correlation is significant at the 0.05 level (2-tailed).  
+ Correlation is significant at the 0.01 level (2-tailed).

TABLE III  
REPEATED MEASURES ANOVA FOR TREATMENT EFFECT (PRE AND POST-TESTS).

PDA variables (N=56)	df	MS	F	$\eta^2$	p
Within subjects					
ADIS-IV-L PDA severity	1	313.27	143.80	0.738	0.0001
Fear of bodily sensations	1	72.26	122.84	0.695	0.0001
Catastrophic thoughts	1	44.59	108.95	0.665	0.0001
Agoraphobic Avoidance (accompanied)	1	38.51	102.72	0.651	0.0001
Agoraphobic avoidance (unaccompanied)	1	83.12	134.03	0.709	0.0001

TABLE III (continued)

PDA variables (N=56)	df	MS	F	$\eta^2$	p
Severity of anxiety symptoms	1	9600	67.13	0.588	0.0001
Fear of consequences of anxiety	1	9260.1	85.26	0.655	0.0001
Severity of Depression symptoms	1	4243.79	78.68	0.598	0.0001

### B. Preliminary Analyses of Variables

#### 1) Analysis of Socio-economical Variables and Clinically Significant Improvement (CSI) of PDA (Sub-sample 1, sub-sample without post-test interaction)

Pearson correlation analyses revealed that a higher household income was associated with improvement of PDA severity as measured by the ADIS-IV-L ( $r = .32, p < .05$ ), and a shorter time of cohabiting is linked to improvement on the measure of fear of consequences of anxiety ( $r = -.30, p < .05$ ).

#### 2) Preliminary Analysis of pre-test Marital Interaction Variables and Clinically Significant Improvement (CSI) of PDA (Sub-sample 1, sub-sample without post-test interaction)

Pearson correlations (Table IV) show that when PDA participants present criticism and hostility behaviors during problem-solving interaction at pre-test, they tend to improve less in terms of global functioning and show less improvement in agoraphobic avoidance when unaccompanied and less improvement on clinical severity of PDA (as per ADIS-IV-L) after the treatment ( $r_s = -.28$  to  $-.35, p_s < .05$ ). As for the NPDA spouses' problem-solving behaviors at pre-test, results show that presence of withdrawal is linked to a clinically significant improvement in terms of depression symptoms ( $r = .27, p < .05$ ), whereas the presence of dominance is linked to less improvement in terms of global functioning of the PDA participants and less clinically significant improvement in agoraphobic avoidance when unaccompanied ( $r_s = -.28$  to  $-.30, p_s < .05$ ). Finally, when NPDA spouses show support and validation at pre-test, PDA participants tend to show a clinically significant improvement in terms of clinical severity of PDA (as per ADIS-IV-L) after the treatment ( $r = .27, p < .05$ ).

#### 3) Analysis of PDA Clinically Significant Improvement (CSI) and Marital variables' outcome (sub-sample 2, sample with post-test interaction)

Pearson correlation analysis revealed that a clinically significant improvement of the fear of bodily sensation (BSQ) associated with an increase in dominance behavior in the NPDA spouse ( $r = .33, p < .05$ ), suggesting that when the BSQ improves the NPDA partners tend to present more dominance behavior during post-test problem-solving marital interaction than they did in pre-test. The same observation is made when the global functioning index of the PDA patient is

higher ( $r = -.33, p < .05$ ). In addition, a better CSI on the fear of consequences of anxiety is linked to a worsening between pre-test and post-test in the NPDA spouse's quality of solutions ( $r = -.39, p < .05$ ). We also found that the NPDA spouse's quality of solutions deteriorates after treatment when the CSI on the depression scale is higher ( $r = -.52, p < .01$ ). Regarding the EOI variables and treatment outcome, NPDA partners showed a decrease in intrusiveness when the PDA spouse reports a higher CSI on the catastrophic thoughts scale ( $r = .34, p < .05$ ) and a higher GFI ( $r = .33, p < .05$ ).

### C. Tests of Predictions

#### 1) Pre-test Marital Interaction Variables as Predictors of PDA Clinical Significant Improvement

To assess whether marital interaction variables during a problem-solving interaction task at the outset of therapy — as measured by the GCICS and the EOI coding systems — predicted PDA treatment outcome, we performed a two block hierarchical regression analysis. In step 1, socio-economical variables were entered, after having controlled for collinearity among variables. In step 2, the pre-test marital interaction variables for both the PDA and NPDA spouses were entered to determine whether or not the dimensions of the GCICS and those of the EOI coding system explained additional variance above and beyond variables entered in step 1, and, if so, which dimensions are the best predictors of a clinically significant improvement of PDA symptoms as measured by the ADIS-IV-L, the BSQ, the ACQ, the MIA(a), the MIA(u), the BAI, the ASI and the BDI-II after treatment.

Results, presented in Table VI, show that when PDA patients present criticism and blame behavior during problem-solving at pre-test, there was less clinically significant improvement on the PDA clinical severity (as per ADIS-IV-L), as well as a lower global functioning as measured by the IGF scale. Regarding NPDA partner behavior, the presence of dominance at pre-test predicted less clinically significant improvement in agoraphobic avoidance when unaccompanied. When the NPDA partner manifested withdrawal at pre-test, the PDA partner's depressive symptoms improved significantly after treatment. The EOI variables were not significantly associated with outcome.

#### 2) Clinically Significant Improvement of PDA Variables as Predictors of Marital Interaction Outcome

Finally, we wanted to see if improvement of PDA symptoms after treatment predicted improvement in marital interaction, during a problem-solving task, between the spouses and improvement in the EOI of the NPDA spouse as measured by the GCICS and EOI coding systems after treatment. We ran another two-block hierarchical regression analysis in which we included in step 1 all personal and marital socio-economical variables, after having controlled collinearity within variables, and in step 2 all PDA CSI variables. Results show that clinically significant improvement on some of the PDA symptom variables after treatment accounted for significant variance in the quality of marital interaction.

TABLE IV  
CORRELATIONS OF MARITAL INTERACTION VARIABLES (SGICAND EOJ) AT PRE-TEST AND CLINICALLY SIGNIFICANT IMPROVEMENT (CSI) ON PDA AFTER TREATMENT

Marital Interaction Variables (pre-test)	CSI On (ADIS)	CSI On (BSQ)	CSI On (ACQ)	CSI On (MIAa)	CSI On (MIAu)	CSI On (BAI)	CSI On (ASI)	CSI On (BDI-II)	Global Functioning Index (GFI)
<b>PDA spouse</b>									
<i>(N = 56)</i>									
<u>GCICS (pre-test)</u>									
Withdrawal	-0.13	-0.02	-0.07	-0.01	-0.03	0.26	0.28	0.06	0.02
Dominance	-0.17	-0.19	-0.14	0.04	-0.13	-0.10	-0.03	-0.03	-0.14
Criticism	-0.35**	-0.26	-0.26	-0.21	-0.28*	-0.19	-0.07	-0.10	-0.33*
Support-Validation	0.19	0.01	0.09	-0.01	-0.05	0.02	0.13	0.05	0.06
Problem-solving skills	0.07	-0.09	-0.07	-0.10	-0.12	-0.07	-0.06	-0.08	-0.08
Clarification-negotiation	0.07	-0.09	-0.07	-0.10	-0.12	-0.07	-0.06	-0.08	-0.08
Quality of solutions	-0.01	0.25	0.18	0.06	0.12	-0.07	-0.19	0.10	0.08
<b>NPDA partner</b>									
<i>(N = 56)</i>									
<u>GCICS (pre-test)</u>									
Withdrawal	-0.06	-0.02	-0.07	-0.01	-0.03	0.24	0.24	0.27*	0.06
Dominance	-0.24	-0.12	-0.17	-0.15	-0.30*	-0.28	-0.08	-0.21	-0.28*
Criticism	-0.06	-0.03	0.01	0.01	-0.16	-0.27	-0.06	-0.18	-0.14
Support-Validation	0.27*	0.07	0.19	0.04	-0.02	0.25	0.05	-0.01	0.18
Problem-solving skills	-0.13	-0.09	-0.07	-0.10	-0.12	-0.11	-0.06	-0.08	-0.14
Clarification-negotiation	-0.13	-0.09	-0.07	-0.10	-0.12	-0.11	-0.06	-0.08	-0.14
Quality of solutions	-0.22	0.17	0.20	0.10	-0.02	-0.02	0.11	0.25	0.07
<u>EOI</u>									
Intrusiveness	0.16	0.11	0.08	-0.07	-0.04	0.11	0.09	0.10	0.10
self-sacrifice	0.04	-0.18	-0.20	0.00	-0.12	-0.02	0.11	0.10	-0.07

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).

Results, displayed in Table VI, show that a clinically significant improvement in terms of fear of bodily sensations predicts increase in terms of dominance behavior in the NPDA partner. Likewise, a clinically significant improvement of depression symptoms as measured by the BDI-II predicts a worsening of the NPDA partner's quality of solutions. Finally, an improvement in terms of catastrophic thoughts predicts an improvement in terms of NPDA partner's intrusiveness at post-test.

TABLE V  
HIERARCHICAL REGRESSION ANALYSIS FOR PRE-TEST INTERACTION MARITAL VARIABLES PREDICTING PDA CLINICAL SIGNIFICANT IMPROVEMENT AFTER TREATMENT (N=56)

Step and predictor variables	R <sup>2</sup>	ΔR <sup>2</sup>	β	sr <sup>2</sup>
<b>CSI of PDA clinical severity (ADIS-IV-L)</b>				
Step 1	.09*			
Household income			.32*	.10
Step 2	.18*	.09*		
Household income			.26*	.07
Criticism and Blame (PDA patient)			-.30*	.09
<b>CSI of Agoraphobic Avoidance unaccompanied (MIAu)</b>				
Step 1	.10*			
Criticism and Blame (PDA patient)			-.21	.04
Dominance (NPDA partner)			-.30*	.09
<b>Global Functioning Index of PDA patients</b>				
Step 1	.09*			
Criticism and Blame (PDA patient)			-.27*	.07
Dominance (NPDA partner)			-.20	.03
<b>CSI of Depression symptoms (BDI-II)</b>				
Step 1	.06*			
Withdrawal (NPDA partner)			.27*	.07

\*  $p < 0.05$ ; \*\*  $p < 0.01$

Note: the clinical significant improvement of agoraphobic avoidance when accompanied, as well as of the depression symptoms did not correlate with any of the socioeconomic variables. The same observation was noticed with Global Functioning Index.

TABLE VI  
HIERARCHICAL REGRESSION ANALYSIS WITH STEPWISE SELECTION FOR PDA CLINICAL SIGNIFICANT IMPROVEMENT VARIABLES AS PREDICTORS OF MARITAL INTERACTION OUTCOME AFTER TREATMENT (N=37)

Step and predictor variables	R <sup>2</sup>	ΔR <sup>2</sup>	β	sr <sup>2</sup>
<b>Outcome of NPDA partner's dominance behavior</b>				
Step 1	.08*			
CSI on Fear of bodily sensations (BSQ)			-.33*	.10
<b>Outcome of NPDA partner's quality of solutions</b>				
Step 1	.25**			
CSI on Severity of Depression symptoms (BDI-II)			-.52**	.27
<b>Outcome of Intrusiveness on EOI</b>				
Step 1	.09*			
CSI on Catastrophic thoughts (ACQ)			.34*	.11

\*  $p < 0.05$ ; \*\*  $p < 0.01$

Note: all of the predicted variables reported did not correlate with any of the socioeconomic variables.

#### IV. DISCUSSION

The results of this study partially confirmed two of four hypotheses. Our first hypothesis, that PDA patients with negative interaction patterns within their relationship at the outset of therapy will improve less at post-test and those with positive patterns will improve more, was partially confirmed. Regression analysis showed that only the presence or absence of negative interaction patterns before therapy predicted PDA treatment outcome. More specifically, higher levels of hostility and criticism in the agoraphobic spouse at pre-test predicted less improvement in PDA severity as measured by the ADIS-IV and less improvement in global functioning as measured by the GFI score. Criticism and hostile behavior of the agoraphobic patients often reflects a defensive attitude during the problem-solving task, which may be due to their tendency to be less problem-focused in their coping style [63] and less confident in their problem-solving abilities [4]. Confidence in problem-solving abilities predicted treatment outcome of PDA catastrophic thoughts and depression [41]. From another perspective, Filak et al. [64] found hostile and resentful attitudes toward others to be highly predictive of the patients' level of collaborative, positively toned participation in the therapeutic relationship. Though Filak's et al. [64] study was based on short-term individual psychodynamic therapy, this explanation might apply to our PDA participants who showed hostile interpersonal attitudes toward their spouses

before therapy began. Further research is needed for this observation.

The presence of dominant behavior in the NPDA spouse's marital interaction at pre-test was predictive of less improvement in agoraphobic avoidance when the PDA partner is unaccompanied. Dominant partners may take charge while accompanying their PDA counterpart to feared situations. Participants with PDA facing these feared situations with their partner may experience feelings of low self-efficacy and little self-control. This type of interaction may reinforce the patients' desire to escape or avoid and to be accompanied by their dominant partners, thus rendering exposure less effective for this clientele. Positive interaction behaviors including support and validation or quality of solutions were not predictive of PDA treatment outcome.

Post-treatment depressive symptoms also improved when the NPDA partners showed withdrawal behavior during pre-treatment problem-solving task. Research shows that during a problem-solving task, partners tend to focus their attention to the dysphoric feelings and depressive symptoms experienced by the PDA client rather than on their problematic issue [65]-[68]. In such couples, clinical spouses perceive their partners as more dominant, more criticizing and they find their interactions less friendly and more hostile thus, fueling a feeling of helplessness that is known to maintain depressive symptomatology [65], [66], [69]. Lower perceived criticism has also been shown to predict a better treatment outcome for depression [70]. These studies appear to support our findings. The presence of withdrawal behavior in NPDA partners seems to positively affect their depressed PDA counterparts' perception of how critical their partners are and how helpless they feel towards problematic situations, thus favoring remission after treatment.

Given that EOI was not predictive of PDA treatment outcome, we could not confirm our second hypothesis, that PDA patients with spouses high in emotional over involvement (EOI) at pre-test will improve less than those with lower (EOI). This could be due to the severely restricted range of EOI in this sample.

Our third hypothesis stipulating that improvement in PDA symptoms would predict greater quality of problem-solving interaction patterns at post-test regardless of treatment modality was not supported. Results from the hierarchical regression analysis showed that, contrary to expectation, significant improvement in fear of bodily sensations actually predicted increase in the dominance behavior of the NPDA partner after treatment. We also found that improvement in depressive symptoms predicted worsening in the PDA partner's quality of problem-solving. Greater global functioning in PDA following treatment was correlated with lower levels of dominance in NPDA partners' dominance. Significant reduction in fear of the consequences of anxiety was linked to poorer quality in the NPDA partners' problem-solving. These results support the theory of a pathology based marital functioning [30]-[35]. El-Baalbaki et al. [13] found that (a) prior to treatment, the presence of dominant behavior in the NPDA spouses was linked to higher symptom severity

in their PDA partners, specifically in terms of catastrophic thoughts, fear of bodily sensations and fear of the consequences of anxiety; and (b) marriages of PDA patients do not seem to be more distressing than that of non-clinical couples. In addition, the present study showed the marital adjustment of both PDA and NPDA partners did not significantly change after treatment. Thus, it is plausible to suggest that following symptom improvement in the PDA partner, the NPDA spouse may perceive a threat to their relationship dynamic revolving around the PDA symptomatology. As a result they may have increased their dominant behavior to maintain the status-quo of the relationship.

Our last hypothesis stating that PDA symptom improvement will predict improvement in EOI behavior of the NPDA spouse, after treatment, was partially confirmed. Findings showed that improvement in catastrophic thoughts predicted decrease in intrusive behavior of the NPDA spouse. In addition, correlation analyses showed a similar association between intrusiveness and improvement in global functioning. Intrusiveness is defined as the relative's attempt to exert psychological or physiological control over the patient's well-being through age-inappropriate means, overprotection, and control. These results are surprising given the similarities between intrusiveness and dominance. However, the discrepant findings may be due to the differences in coding. Intrusiveness was coded as control or dominance exerted in relation to PDA symptoms or the patient's well being, whereas dominance, as coded by the GCICS, reflected control over a broader range of problematic situations.

#### *1) Limitations and Future directions*

This study suggests that both therapy and marital interactions play an important role in the maintenance or improvement of PDA symptoms. Nevertheless, there are several limitations associated with it. First, we did not have a clinical control group to compare with the treatment group. Second, information was not available regarding the presence of psychopathology in the NPDA partners. Thus, it is not known whether their observed behaviors are influenced by a psychiatric disorder. Finally, one-third of the couples did not participate to the post-test interaction task, which reduced the sample size and the power of some of the statistical analyses.

Further research is needed on marital dynamics of PDA couples that is based on observational coding. Moreover, follow-up measures may enhance understanding of the current findings. For instance, measuring changes in the quality of the marital interaction up to 12 months after treatment may provide predictive information regarding the evolution of PDA symptoms. It would be interesting to determine whether an increase in dominant behaviors in NPDA partners negatively impacts the therapeutic gains made by their PDA spouse. If therapeutic gains are maintained, changes in the couple's dyadic adjustment, marital satisfaction, and marital interaction should be assessed. Finally, it would be important to determine whether couples who re-establish their negative pre-treatment marital dynamics have an impact on relapse in PDA and depressive symptoms.

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