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Benefits of Combining Massage Therapy with Group Interpersonal Psychotherapy in Prenatally Depressed Women

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Abstract

One hundred twelve pregnant women who were diagnosed depressed were randomly assigned to a group who received group Interpersonal Psychotherapy or to a group who received both group Interpersonal Psychotherapy and massage therapy. The group Interpersonal Psychotherapy (one hour sessions) and massage therapy (30 minute sessions) were held once per week for six weeks. The data suggested that the group who received psychotherapy plus massage attended more sessions on average, and a greater percentage of that group completed the six-week program. The group who received both therapies also showed a greater decrease in depression, depressed affect and somatic-vegetative symptom scores on the Center for Epidemiological Studies Depression Scale (CES-D), a greater decrease in anxiety scale (STAI) scores and a greater decrease in cortisol levels. The group therapy process appeared to be effective for both groups as suggested by the increased expression of both positive and negative affect and relatedness during the group therapy sessions. Thus, the data highlight the effectiveness of group Interpersonal Psychotherapy and particularly when combined with massage therapy for reducing prenatal depression.

Keywords

Massage therapy; group interpersonal psychotherapy; stress hormones

Prenatal depression affects 10% to 50% of women in different samples, with the incidence being higher in low socioeconomic status samples (De Tychey, Splitz, Briancon, Lighezzolo, Girvan, Rosati, Thockler, Vicent, 2005; Stowe, Hostetter, & Newport, 2005). The importance of prenatal intervention is highlighted by the depression-associated vulnerability to other problems such as caffeine, nicotine, drug and alcohol use (Diego, Field, Hernandez-Reif, Vera, Gil, & Gonzalez-Garcia, 2007; Zuckerman, Frank, & Mayes, 2002), as well as prenatal and perinatal complications (Jablensky, Morgan, Zubrick, Bower & Yellachich, 2005; Nakano, Oshima, Sugiura-Ogasawara, Aoki, Kitamura & Furukawa, 2004). Depressed women are also more likely to deliver prematurely (Field, Diego, Dieter, Hernandez-Reif, Schanberg, & Kuhn,

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et al, 2004a; Sandman, Glynn, Schetter, Wadhwa, Garite, Chicz-DeMet, Hobel, 2006), and they often have neonates who require intensive care for postnatal complications including bronchopulmonary dysplasia and intraventricular hemorrhage (Chung, Lau, Yip, Chlu & Lee, 2001).

Neonates of depressed mothers are also at greater risk for being low birthweight (<2500 grams) and small for gestational age (< 10th percentile) (Field et al., 2004a; Hoffman & Hatch, 2000), with low birthweight being one of the leading causes of fetal morbidity and mortality (National Center for Health Statistics, 2006). These infants continue to experience growth retardation across the first year of life (Rahman, Iqbal, Bunn, Lovel & Harrington, 2004), and the growth and development problems continue across childhood and adolescence (Murray & Cooper, 1997).

In a study we conducted on prenatal depression effects on the fetus and newborn (Field et al, 2004a), prenatal mood and biochemistry levels were assessed in women with and without depressive symptoms during their second trimester of pregnancy. At the neonatal period, maternal and neonatal biochemistry, EEG and vagal tone levels were assessed, neonatal behavior states were observed, and the Brazelton Neonatal Behavior Assessment Scale was conducted. The mothers with depressive symptoms had higher prenatal cortisol levels and lower dopamine and serotonin levels. Mothers with depressive symptoms were also more likely to deliver prematurely and have low birthweight babies. The newborns of mothers with depressive symptoms had higher cortisol levels and lower dopamine and serotonin levels, thus mimicking their mothers' prenatal levels. The newborns also had greater relative right frontal EEG activation and lower vagal tone, again mimicking their mothers' prenatal EEG and vagal tone. On the Brazelton Scale, the newborns of depressed mothers had less optimal habituation, orientation, motor, range of state, autonomic stability and depression scores. A path analysis was conducted to assess the effects of prenatal depression and the mothers' prepartum biochemistry on gestational age and birthweight. As predicted in the model proposed, prenatal depression was related to prepartum cortisol and norepinephrine levels. Cortisol levels were, in turn, negatively related to gestational age, and norepinephrine levels were negatively related to birthweight.

Prenatal interventions for depressed pregnant women have included antidepressants, alternative therapies and psychotherapy. The literature on the use of selective serotonin reuptake inhibitors and other antidepressant medications during pregnancy is inconclusive (see Field, 2008 for a review). These studies have been limited by small sample sizes, uncontrolled study designs and unknown long-term medication effects. In addition, most women, even those already on antidepressants, have elected to stop taking antidepressants during pregnancy and have expressed a preference for the use of alternative therapies. Light therapy (Oren, Wisner, Spinelli, 2002) and massage therapy (Field, Diego, Hernandez-Reif, Schanberg, & Kuhn, 2004b) are examples of alternative therapies that have reduced prenatal depression.

Massage therapy had positive effects on prenatally depressed women including decreasing their depression and cortisol levels and decreasing the incidence of prematurity and low birthweight (Field, Diego, Hernandez-Reif, Schanberg, & Kuhn, 2004b). In this study, depressed pregnant women received a 20-minute massage from their significant other twice per week from 20 weeks to 32 weeks gestation. Over the course of the study, the massage group experienced fewer symptoms of depression, and they had lower urinary norepinephrine and cortisol levels and elevated dopamine and serotonin levels compared to the relaxation and standard care control groups. The massage group also had fewer obstetric and postnatal complications including a lower rate of prematurity. (all P s<.05)

Although only one study has been published on the use of Interpersonal Psychotherapy (IPT) with prenatally depressed pregnant women, several clinical trials have documented the efficacy of Interpersonal Psychotherapy in the treatment of postpartum depression. Interpersonal Psychotherapy is a time-limited form of psychotherapy that focuses specifically on interpersonal relationships and their improvement or changing expectations about relationships (Klerman, Weissman, Rounsaville, & Chevron, 1984; Stuart, & Robertson, 2003). This therapy differs from other forms of therapy such as psychoanalysis by focusing on present rather than past relationships and by being a shorter term treatment, and from cognitive behavior therapy which focuses more on behavior change using homework assignments. The efficacy of this therapy was investigated by the National Institute of Mental Health Treatment of Depression Collaborative Research Program and was found to be equal to imipramine and Cognitive Behavior Therapy in the treatment of mild to moderate depression (Elkin, Shea, Watkins, Imber, Sotsky, Collins, 1989).

Empirical studies have been conducted on Interpersonal Psychotherapy with postpartum depressed women both in individual and in group sessions. In a study on IPT using an individual therapy format, 120 postpartum depressed women were seen for 12 weeks and compared with a wait-list control group (O'Hara et al, 2000). The women receiving IPT showed a significantly greater decrease in Hamilton Depression scores and on Beck Depression Inventory (BDI) scores. In a similar study, but on a smaller sample (N=18) receiving fewer sessions (N=10 sessions), the postpartum depressed women were seen for 2 individual sessions followed by 8 IPT group sessions (Reay, Fisher, Robertson, Owen, & Kumar, 2006). Again, BDI and Hamilton scale scores decreased, and the women's relationships with their significant others improved. However, this study lacked a control group, and 67% of the women were on antidepressant therapy, confounding the effects of the group interpersonal psychotherapy. Similar limitations applied to another study using group interpersonal therapy with postpartum depressed women, namely a small sample size and no control group (Klier, Lenz, Muzik, & Rosenblum, 2001).

In the only published study on the use of interpersonal psychotherapy with depressed pregnant women, positive results were also noted (Spinelli & Endicott, 2003). The IPT group received 16 weeks of individual sessions, and a comparison group received the same number of sessions focused on parenting education. The IPT group showed significant improvement compared to the control group on 3 measures of depression including The Edinburgh Postnatal Depression Scale, The Beck Depression Inventory and The Hamilton Depression Rating Scale, and that group also had a lower attrition rate. Problems with this study included the lack of generalizability given that all the women were immigrants from the Dominican Republic, and many of the women had been abused. Of interest were the curves on the three depression scores in this study, which suggested that the significant decrease in depression scores had occurred by the 6th week of the treatment period.

The purpose of the present study was to determine: 1) the effects of group Interpersonal Psychotherapy on prenatal depression and pregnancy outcomes; and 2) the effects of adding massage therapy to group Interpersonal Psychotherapy on prenatal depression and pregnancy outcomes. Based on the studies on group Interpersonal Psychotherapy with postpartum depressed women, this therapy was expected to reduce depression. Based on our research on prenatal massage therapy, the group who received both group Interpersonal Psychotherapy and massage therapy was expected to show a greater decrease in depression as well as a better neonatal outcome than the group receiving only group Interpersonal Psychotherapy.

METHOD

Participants

Eligibility criteria for the study were as follows: 1) age greater than 18 years; 2) singleton pregnancy; 3) uncomplicated pregnancy; and 4) a diagnosis of depression based on the SCID (Structured Clinical Interview for Depression). Exclusion criteria included: 1) medical illness (diabetes, HIV); 2) other psychiatric condition (e.g., bipolar disorder and anxiety disorder); and 3) self-reported drug use.

Three hundred twenty women were screened for depression on the SCID during their second trimester between 18 and 22 weeks gestation at two Prenatal Ultrasound Clinics. One hundred twelve women were diagnosed as depressed (96% with Major Depression Disorder and 4% with Dysthymia) and randomly assigned to the group Interpersonal Psychotherapy or group Interpersonal Psychotherapy plus massage groups. Sample size estimates (Chan, Ng, & Chan, 2006) were derived from: 1) our pilot data on changes in depression and anxiety scores for pregnant women receiving group Interpersonal Psychotherapy; and 2) our published pregnancy massage therapy data. Attrition rates were 64% in the group Interpersonal Psychotherapy group and 51% in the group Interpersonal Psychotherapy plus massage therapy group. Replacement of subjects net equal size groups (N=21 in the group interpersonal psychotherapy group and N=22 in the group interpersonal psychotherapy plus massage group).

The women were low socioeconomic status ($M = 4.0$ on the Hollingshead SES Index), were distributed 27% Hispanic, 68% Black and 5% White, and 31% were immigrants. Marital status was distributed 23% married, 39% with significant other, 35% single and 3% divorced. By self-report, 6% experienced medical complications during pregnancy and 2% were on antidepressants during pregnancy. The groups did not differ on these background variables.

Procedures and measures

Following informed consent at the prenatal clinic, a Research Associate accompanied the woman to a private room where a Structured Clinical Interview for DSM-IV Diagnoses (SCID) was conducted to diagnose depression (dysthymia or major depression disorder). If the woman was diagnosed depressed (dysthymia or major depression disorder), we proceeded with the study assessments. A saliva sample was collected for assays of cortisol. Self-report measures were also completed at that time including a demographic questionnaire, the CES-D for depression, the STAI for anxiety, the STAXI for anger and the Relationship Scale.

Assessments

Interviews, self-report measures, saliva-sampling and the videotaping of therapy sessions were conducted at our Research Institute during the prenatal period at the first session ($M=22$ weeks gestation) and next to last session ($M=27$ weeks gestation). The mothers were then called after delivery for the neonatal data.

Structured Clinical Interview for DSM-IV Diagnoses—The SCID-I (Non-patient edition: research version) was used to determine depression and anxiety diagnoses and to screen out other disorders including bipolar disorder, schizophrenia and other psychotic disorders. Anxiety was assessed because of its noted comorbidity with depression and its negative effects on pregnancy (Glover, Teixeira, Gitau, & Fisk, 1999). The SCID was administered by psychology graduate student research associates following training and with continuing supervision by a clinical psychologist.

Compliance Variables—Treatment compliance was assessed by 3 variables. These included attendance at group psychotherapy sessions, drop-out rates and lack of interest being the reason given for leaving the program.

Sociodemographic/Social Support Questionnaire (Field, 2002)—The Sociodemographic/ Social Support Questionnaire is comprised of 20 items concerning age, education, occupation, income, marital status, number of children in the family, ethnicity and social support. Other questions include the use of any drugs, medications (including antidepressants) and therapies.

Center for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977)—This 20-item scale was included to assess symptoms of depression. The woman is asked to report on her feelings during the preceding week. The scale has adequate test/retest reliability (.60 over several weeks), internal consistency (.80–.90) and concurrent validity (Wells, Klerman & Deykin, 1987). Test-retest reliability over a one-month period on this sample was .79, suggesting some short-term stability of depressive symptoms. A score of 16 on the CES-D is considered the cutpoint for depression (Radloff, 1991).

State Anxiety Inventory (STAI) (Spielberger, Gorsuch & Lushene, 1970)—The State Anxiety Inventory is comprised of 20 items and is summarized by a score ranging from 20 to 90 and assesses how the subject feels in terms of severity ("not at all" to "very much so"). Characteristic items include "I feel nervous" and "I feel calm." Research has demonstrated that the State Anxiety Inventory has adequate concurrent validity and internal consistency ($r=.83$).

State Trait Anger Expression Inventory (STAXI) (Spielberger, 1988)—The STAXI provides a relatively brief, objectively scored measure of the experience, expression and control of anger. The STAXI consists of 22 items on general angry reactions. Four point ratings range from "not at all" (1) to "very much so" (4). Examples of the items are "I am furious", "I feel like screaming", "I am quick tempered", "When I get frustrated, I feel like hitting someone", "When angry or furious I control my temper", "I try to simmer down". The cut-off score for high anger is 52.

The Relationship Questionnaire (Figueiredo et al, 2008)—This scale is comprised of 12 items on a 4-point Likert scale. It was designed to be completed in a short time, to be behaviorally focused, to be as relevant for women as for men, and to be focused on positive and negative aspects of the relationship. The positive dimensions include a sense of support and care, as well as affection, closeness and joint interests and activities, and the negative dimensions include, for example, anxiety, irritability and criticisms that have been associated with undesirable outcomes.

Cortisol Samples—Women were asked to provide saliva samples at the beginning and at the end of the first and next to last sessions of the study to assess stress hormone levels (cortisol). Saliva samples were collected by asking women to insert a cotton sorbette in their mouths until fully saturated (approximately 1–2 minutes) and then placing the sorbette inside a microcentrifuge tube which was frozen and sent to Salimetrics (Salimetrics, State College, PA) for cortisol assays. Saliva samples were labeled using unique identifying numbers without group information.

Saliva samples were then assayed by Salimetrics using expanded range, high sensitivity salivary cortisol enzyme immunoassays. This method consists of coating a microtitre plate with monoclonal antibodies to cortisol. Cortisol standards and salivary cortisol then compete with cortisol linked to horseradish peroxidase for the antibody binding sites to cortisol. After

incubation, unbound components are washed away and bound cortisol peroxidase is measured by the reaction of the peroxidase enzyme on the substrate tetramethylbenzidine (TMB). This reaction produces a blue color. A yellow color is formed after stopping the reaction with sulfuric acid. Optical density is read on a standard plate reader at 450 nm. The amount of cortisol peroxidase detected is inversely proportional to the amount of cortisol present. The minimal concentration of cortisol that can be distinguished is $<0.003 \mu\text{g/dL}$. The correlation between serum and saliva samples suggests a strong linear relationship ($r = 0.91$; $p < 0.0001$). All samples were tested in duplicate, and the mean of the duplicate tests was used in the statistical analyses.

Coding of the Videotaped Sessions—The first and penultimate group sessions were videotaped by a videocamera mounted on the wall of the group therapy room. The videotapes were coded by research associates who were trained to .90 reliability on the behaviors that seemed most salient to the members' progress in our pilot study videotapes. These behaviors included positive and negative affect and relatedness (focusing attention or comments on other members in the group). These were coded using a laptop computer program, and the percentage time that the behaviors occurred was compared for the penultimate versus the first session. The research associates coded one-third of the videotapes for interobserver reliability that was calculated by Cohen's Kappa, (corrected for chance disagreements). Cohen's Kappa averaged .83 across the behaviors.

Group Interpersonal Psychotherapy

The group therapy sessions were held for one hour once per week for a total of 6 sessions at our Research Institute. These started at a mean of 22 weeks gestation and ended at 28 weeks gestation. The group sessions were focused on processing pregnancy experiences and relationship problems. The curriculum for the group Interpersonal Psychotherapy was based on the Weissman et al. (2000) Comprehensive Guide to Interpersonal Psychotherapy. As in that guide, the therapist served as a client advocate who was active, not neutral or passive. The specific techniques that were used included exploratory, encouragement of affect, clarification, communication analysis, and behavior change techniques. The therapist was trained in these techniques and received ongoing supervision from another trained therapist. The first and next to last sessions were videotaped to code the participants' behaviors from the videotapes. The next to last session was videotaped as opposed to the last session so as not to be affected by any sadness associated with the group terminating.

Massage therapy

The group Interpersonal Psychotherapy plus massage group also received a twenty minute massage once per week over 6 weeks (From 22 to 28 weeks gestation). Trained experienced female (9 therapists with $M=2$ years of experience) massage therapists gave the massages using the same moderate pressure massage protocol used in the Field et al (2004b) study on depressed pregnant women. Moderate pressure was used because recent studies highlighted the critical nature of moderate pressure to achieve positive effects (Diego et al, 2004). Each session began with the pregnant woman in a side-lying position, with pillows positioned behind her back and between her legs for support. The massage was administered in the following sequence for 10 minutes: 1) Head and neck; 2) Back; 3) Arms; 4) Hands; and 5) Feet. The same routine was repeated once (for a total of 20 minutes) with the mother lying on her other side supported by pillows.

RESULTS

ANOVAs and Chi Square analyses were conducted on the data using SPSS data analyses programs. ANOVAs on demographic variables yielded no significant differences between the two groups including mother's age, education, socioeconomic status or gestational age at the

first session (see table 1). ANOVAs and Chi Square Analyses on the compliance variables suggested that the women in the group Interpersonal Psychotherapy plus massage therapy group versus the group Interpersonal Psychotherapy only group attended more sessions on average, and a greater percentage of the combined therapies group women completed the six-week program (see table 2). Also in the combined therapies group versus the group Interpersonal Psychotherapy only group, a lower percentage of the women used “lack of interest” as a reason for leaving the program.

ANOVAs on the assessment variables revealed that the group Interpersonal Psychotherapy plus massage group women had greater decreases than the group Interpersonal Psychotherapy only group women: 1) on the CES-D depression total scale scores and on the depressed affect, somatic/vegetative and positive affect (reverse scored) subscale scores; 2) on the STAI anxiety scores; and 3) on cortisol levels. No significant changes were noted on the CES-D interpersonal distress subscale, on the STAXI Anger Scale or on the Relationship Scale scores. As can be seen in table 4, both groups showed significant behavior changes on the videotaped group sessions across the study period. These included increased positive and negative affect and increased relatedness.

The groups did not differ on neonatal outcomes. The mean gestational ages were 36.89 (SD=4.96) and 38.54 (SD=1.98) for the group Interpersonal Psychotherapy and the combined group Interpersonal Psychotherapy and massage therapy groups respectively, and the mean birthweights were 3006.09 (SD=1070.39) and 3116.82 (SD=517.68) for the group Interpersonal Psychotherapy and combined group Interpersonal Psychotherapy and massage groups respectively.

DISCUSSION

The group Interpersonal Psychotherapy plus massage therapy group in this study experienced greater decreases in depression, depressed affect, somatic/vegetative symptoms and anxiety, although their anger and relationship scores were unchanged. The decreased depression and anxiety are consistent with data from another study using Interpersonal Psychotherapy with depressed pregnant women (Spinelli & Endicott, 2003), although that study used individual, not group therapy. Reduced depression and anxiety also followed massage therapy in our previous study on depressed pregnant women (Field et al, 2004b). The group who received both psychotherapy and massage also had significantly greater decreases in cortisol levels by the next to last session, consistent with our massage therapy study on depressed pregnant women (Field et al, 2004b).

Massage therapy also contributed to the women’s compliance in this study. Attendance rates were greater and drop-out rates were lower for the group Interpersonal Psychotherapy plus massage therapy group, which is extremely important given that this greater compliance following massage therapy may encourage the women’s prenatal care visits and, in turn, reduce risks for prenatal complications and non-optimal neonatal outcomes. Their better compliance rates may have related to the greater percentage of women in the combined therapies group expressing interest in the psychotherapy. The better compliance may have also related to the greater decreases in somatic-vegetative symptoms and cortisol levels being experienced by the women in that group. The better the women were feeling, the greater their attendance and completion of the program. Massage therapy has been noted to decrease prenatal depression (Field et al, 2004b; Field, Diego & Hernandez-Reif, 2006) and anxiety scores as well as cortisol levels in many studies (see Field, Hernandez-Reif, Diego, Schanberg & Kuhn 2005 for a review).

The fewer significant changes for the group Interpersonal Psychotherapy only group may have related to their attending fewer group therapy sessions and receiving half the contact with therapy per se. A six session group therapy program may be too short. Although pregnant women in 12-week (O'Hara et al, 2000) and 16-week programs (Spinelli & Endicott, 2003) have shown decreased depression about half-way through the program (at the six- to- eight-week mark), simply knowing the program is only half-finished versus actually being finished may lessen their depression.

The lack of change on the CES-D interpersonal distress subscale scores, the anger and the relationship scale scores for both groups was surprising given that Interpersonal Psychotherapy is focused on interpersonal distress and relationships (Klerman et al, 1984; Stuart et al, 2003). At least one study, for example, showed improved relationships of postpartum depressed women following ten Interpersonal Psychotherapy sessions (Reay et al, 2006). Again, it could be that the therapy program in the current study was too short for relationship changes. But it could also be that the women's perceptions of their relationships remained guarded as they worked on them in therapy. Behavior observations of the partners' interactions might be more revealing. The process could also be stepwise or stagewise, with the first step being the decrease in the women's depression, and the relationship changes occurring only later. Another possibility is that the individual Interpersonal Psychotherapy used in other studies yielded more immediate effects than group Interpersonal Psychotherapy. Still another possibility is that anti-depressants taken by the women in the earlier studies may have facilitated earlier changes (Reay et al, 2006). Finally, Interpersonal Psychotherapy groups may be more effective when both members of the relationships are present (i.e. couples' therapy groups).

The group therapy process, nonetheless, was effective for increasing the display of positive and negative affect and for increasing relatedness in both groups. At least for these changes, the group Interpersonal Psychotherapy was effective.

The absence of massage therapy effects on neonatal outcomes, especially the lack of group differences on prematurity and low birthweight was surprising given earlier study results showing reduced prematurity and low birthweight following massage therapy (Field et al, 2004b). In that study, however, the women had 12 weeks of massage therapy versus 6 weeks in the current study, and they had the same person (the significant other) giving the massages across the study. Having more sessions and by the same therapist may have been the critical variables for better neonatal outcomes in the earlier study (Field et al 2004b). Further research is needed on these variables, i.e. number of sessions and same versus different therapists as well as other variables like massage techniques, duration of sessions, training and experience of therapists. It should also be noted that the massage therapy and talk therapy sessions people typically experience, i.e. tailored to their own individual needs, may be even more effective than the standard protocols used here.

In summary, these data suggest that massage therapy can facilitate compliance with group Interpersonal Psychotherapy and even lead to greater decreases in depression, anxiety and cortisol levels in prenatally depressed women. In this way, massage therapy essentially enhanced the time-limited characteristics of group Interpersonal Psychotherapy.

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Table 1

Means for Demographic variables (standard deviations in parentheses)

Variables	GROUP	
	Psychotherapy	Psychotherapy plus Massage
Mother's Age	23.71 (5.19)	26.77 (7.17)
Education	4.33 (1.30)	4.46 (1.33)
Socioeconomic Status	4.05 (1.20)	4.00 (1.05)
Gestational Age at 1 st Session	21.65 (4.44)	19.98 (5.57)

Table 2

Means for treatment compliance.

Variables	GROUP Psychotherapy	Psychotherapy plus Massage ^{x2}	F	p
Sessions (#)	4.4	5.2	7.08	.01
Completed treatment (% of group)	35.6	48.86		.05
Lack of interest (% of group)	37.8	25.68		.05

Table 3

Means for self-report and cortisol measures (standard deviations in parentheses)

Variables	GROUP					
	Psychotherapy		Psychotherapy plus Massage		p	
	First	Last	First	Last	F	
Depression (CES-D) (0–60)	20.33 (10.10)	18.00 (10.66)	23.81 (9.33)	16.55 (11.06)	9.28	.004T×G
• Depressed affect	6.19 (4.57)	4.67 (3.89)	6.55 (4.17)	4.14 (4.48)	8.49	.006 T×G
• Somatic/Vegetative	6.29 (3.12)	6.76 (3.99)	7.64 (3.32)	6.14 (3.40)	5.21	.03 T×G
• Positive affect	4.81 (3.82)	4.19 (3.88)	5.00 (3.15)	3.14 (3.28)	5.44	.003 T×G
• Interpersonal distress	.86 (1.20)	.90 (1.64)	1.18 (1.30)	.91 (1.87)		NS
Anxiety (STAD) (0–80)	42.00 (9.98)	39.52 (10.88)	44.05 (11.00)	36.76 (12.31)	7.90	.008 T×G
Anger (STAXI) (0–40)	17.43 (4.75)	17.91 (6.14)	17.95 (5.57)	19.14 (8.49)		NS
Relationships (0–4)	3.10 (.81)	2.92 (1.12)	2.93 (.63)	2.92 (.81)		NS
Cortisol	.24 (.12)	.22 (.13)	.25 (.14)	.20 (.09)	4.94	.05 T×G

T×G = trial by group interaction effect

Possible ranges of scored are in parentheses next to the variable name

Table 4

Means for group psychotherapy session behaviors (standard deviations in parentheses)

Variables(% time)	GROUP					
	Psychotherapy		Psychotherapy plus Massage		F	p
	First	Last	First	Last		
Positive Affect	32 (24)	42 (24)	23 (13)	33 (13)	4.12	.05 T
Negative Affect	6 (9)	19 (27)	4 (5)	12 (15)	4.61	.05 T
Relatedness	50 (20)	72 (20)	45 (34)	66 (36)	4.62	.05 T

T= trials effect

Kappas were .83 for positive affect, .87 for negative affect and .79 for relatedness.