

**Therapeutic Alliance and Neurophysiology during Psychotherapy: 60 hours of clinical sessions in the symptomatically anxious: What happens in the brain and body during critical moments in therapy.**

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## **Short Title:** Neurophysiology of Therapeutic Alliance

### **Abstract**

Currently no studies exist on assessing neurophysiological correlates, especially brain activity, during therapeutic alliance (TA) between client and therapist. The aims of this study were to assess electroencephalography (EEG) activity in the client with symptomatic anxiety throughout therapy during moments of high TA established using SCR measurements from both client and therapist. Fifteen clients aged,  $48 \pm 9.4$  years (males:  $n=7$ , females:  $n=8$ ) underwent six (S1-S6), weekly 1-hour psychotherapy sessions (90 hours of repeated measures). For the duration of therapy the frontal site remained active while the occipital site 'went to sleep'. During high TA the parietal cortex - the 'seat of imagination,' was active. The parietal cortex appears to be highly active when processing trauma as the client develops cognitive and emotional insight. The temporal site reflected accessing emotional memory with high alpha and beta activity. Heart-rate (HR) and anxiety levels decreased over time. This research is beginning to provide a common language between psychotherapy and neurosciences and its implication as an important factor in training, practice and research in psychotherapy. The study has identified that there are specific sites in the brain that become active when there is a strong connection between therapist and client; especially indicated by the increased activation of the parietal cortex during moments of TA. A positive clinical outcome in therapy is dependent on a successful TA being established and this was reflected in our study which showed decreased anxiety and HR over time.

## **Introduction**

### ***Concepts and Neurophysiology of Therapeutic Alliance:***

As a clinical construct therapeutic alliance has been in use since Freud (1912). He named it as the 'sine qua non' of therapy and is understood to be referring to empathy. Research into the role and function of therapeutic alliance did not exist prior to 1976 due to the limited range and lack of reliable empirical techniques (Horvath & Greenberg, 1994). Therapeutic alliance describes the special relational aspect between client and therapist during psychotherapy (Horvath, Gaston & Luborsky, 1993). It's the active, relational element in the therapeutic dyad that produces change at a cognitive, behavioural and emotional level (Bordin, 1975). It's an unnoticed intuitive dance of non-verbal communication (Word, Zanna & Cooper, 1974), and in Gestalt terms it is the inter-subjective relationship which is the critical medium for healing and the development of a sense of self (Hycner & Jacobs, 1995). TA only becomes conscious when it is absent or the therapist and client sense they're out of sync in their communication (Bernieri & Rosenthal, 1991).

Research data investigating therapeutic alliance is mainly qualitative and usually based on one-off case studies (Marci & Reiss, 2005). In a recent study, the Harvard Medical School conducted the first empirical research into therapeutic alliance. The researchers tracked galvanic skin conductance recordings (SCR) between therapists and twenty clinically diagnosed anxious clients during a one-hour psychotherapy session. The times when the client reported they felt an empathic connection with the therapist, or were in a state of therapeutic alliance, correlated with a high level of concordant (SCR) between the therapist and client. When the client reported they felt no empathic connection results showed disconcordant levels of SCR. High amplitude in the SCR readings also showed the clients had

a higher level of anxiety than they perceived or the therapist detected. This information was able to be used as a diagnostic tool (Marci & Reiss, 2005).

The current concept of therapeutic alliance is framed in terms of the ability of the therapist to relate to the client in a genuine caring fashion while striving to achieve moments of authentic encounter (Mitchell, Bozart & Krauft, 1977). This is achieved by approaching the client without judgement or presumption enabling the therapist to enter into and share the client's world. It's in this space of genuine encounter that the client becomes open to the possibility of changing behaviours, thoughts and feelings (Yalom, 1980). In Gestalt terms redefining the sense of self would happen at the point when one experiences the 'me' in relation to that which is not 'me' and through this contact both are more clearly defined (McLeod, 1993).

The creation of TA relies on the therapist's ability to access their intuitive subjective responses as well as their objective theoretical knowledge (Schore, 2003b). Neuroscience defines intuition as 'the subjective experience associated with the use of knowledge gained through implicit learning' (Lieberman, 2000, p. 109). This supports the assertion that therapy with the most positive clinical outcome is achieved by a trained psychotherapist who is naturally intuitive (Bowlby, 1991, p. 16). A successful therapeutic relationship creates an interactive affect or mood regulating context that allows for growth in the continually evolving unconscious right brains of the therapist and client, where psychic activity or unconscious meaning making takes place (Schore, 2003a, p. 38).

A growing body of knowledge agrees that the major factor contributing to change in therapy

is the development and continuation of a good quality therapeutic alliance (Lambert, 1992). In Gestalt terms this would be where the client locates their sense of self at the contact boundary in the field of awareness with another (Perls, 1969). A meta-analysis of twenty four clinical outcome studies published between 1975 and 1991 (Horvath & Symonds, 1991) proposes the development of a strong TA is an important determinant of positive client outcome (Hendricks, 2002; Horvath, 2000; Kaufman, 2000; Lambert & Hill, 1994; Smith, 1990; Summers & Barber, 2003). Therapeutic alliance is now recognized to be causal in the change process of psychotherapy by contributing to new neural network growth and integration in the client (Cozolino, 2002).

For this research project, as described under, therapeutic alliance will be defined according to Horvath and Greenberg's (1994) goal, task and bonding principles. The goal of the alliance is defined as the client's underlying intention for change as distinct from the motivation for coming to therapy. The task is the specific action required to achieve the goal and the bonding is the relationship between the client and therapist. This bonding is both transference and authentic in its encounter (Horvath & Greenberg, 1994, p. 15). Researchers agree a 'good enough' alliance needs to be established before successful therapy can occur (Horvath & Greenberg, 1994, p. 3) and that TA is a key variable predictor for a successful clinical outcome (Garfield & Bergin, 1986).

Mental illness was the leading causes of disease in Australia in 2005. It accounted for 13% of the total health/disability burden in a study undertaken by the Australian Institute of Health and Welfare (AIHW, 2001). Half, (50%) of all subjects in the report suffering from mental and behavioural health issues had depression and 46% experienced anxiety. The proportion of

people reporting long-term psychological and behavioural problems has increased over the last three National Health Surveys undertaken by Mental Health Services Australia during 2001, 2002 and 2003. In 1995 the proportion was 5.9%; in 2001 9.6%; 2004 11% and in 2005 over 13% of the adult population reported experiencing high to very high levels of psychological distress. The percentage of years of healthy life lost to anxiety and depression is 7 years compared to 9.8 with ischaemic heart disease; 3.3 years with lung cancer and 2.3 with breast cancer (AIHW, 2001). 12% of adolescents aged 14 years and over reported an anxiety attack in the last year, 14% were treated for a mood disorder including depression and bi-polar, 28% had experienced diagnosed stress and 9% a panic attack (Benjamin, 2007). Figures from WorkCover NSW (2004-2005) show teachers made 843 claims for stress, depression and anxiety over one year (WorkCover New South Wales, 2005).

Psychotherapy is usually a long-term commitment, demanding on the client's time and finances. Research demonstrates that if a positive therapeutic alliance is established early, a successful clinical outcome can be achieved in a shorter time-frame (Gaston et al., 1991; Horvath & Symonds, 1991; Luborsky, 1990). The client's evaluation of a positive or negative therapeutic alliance can be evaluated as early as the first session and can be a good predictor of unsuccessful therapy due to premature termination or drop-out (Kokotovic & Tracey, 1990). It can also distinguish between clients who will benefit from psychotherapeutic treatment and those who will not (Horvath & Symonds, 1991; Plotnicov, 1990). Clients who form a positive therapeutic alliance early stay in therapy longer as they are more able to survive therapeutic ruptures or disengagement with their therapist (Mitchell, Bozart & Krauft, 1977).

There has been little attempt to examine the neurological and physiological activity over a sustained period of time during psychotherapy. However current medical technology can reliably measure the neurophysiology of the brain and neural processes during mental activities associated with psychotherapy and therapeutic alliance. Some of these measurement approaches include recording and processing physiological parameters such as electroencephalogram (EEG), electrocardiogram (ECG) and skin conductance resonance (SCR). These neurophysiological measures can provide insight into a better understanding of the function of the brain and body during TA. Electroencephalography is a measurement of the electrical activity present in the brain (Fuller, 1980) and can provide information as to what areas of the brain become active during TA. ECG is the measure of electrical activity of the heart and in the frequency domain, analysis of heart rate variability can provide information about the autonomic nervous system (Furlan et al., 1990; Malliani et al., 1991). SCR is a common measure of psychophysiology that reflects changes in attention and arousal through monitoring increased sweating of the sympathetic branch of the autonomic nervous system (Marci, 2004).

The autonomic nervous system contains the parasympathetic and sympathetic branches of the nervous system which act in parallel with each other. The sympathetic division is responsible for the flight, fight, freeze syndrome which primes the body to defend against an actual or perceived threatening situation. It increases heart rate, blood pressure and sweating while the function of the parasympathetic division is to reduce heart rate, blood pressure and the sweating response returning the body to homeostasis or balance (Bear, Connors & Paradiso, 2001, p. 507).

TA as an aid to improving therapeutic and health outcomes will be discussed for its potential in training therapists working in the psychotherapeutic profession and other health professionals. In a recent randomized, controlled health study into motivating patients to stay on a cardiac rehabilitation program to reduce risk factors for further heart episodes, it was found that a good therapeutic alliance was a key factor in helping patients develop and maintain a lifestyle program preventing subsequent coronary episodes (Health Report ABC Australia, 2007).

***Definition of Therapeutic Alliance:***

Developing an accurate agreed definition of therapeutic alliance produces debate among psychotherapists due to many concepts of the term ‘therapeutic relationship.’ These have developed from conditions of positive transference theories, through the therapeutic dyad, to a currently accepted ‘collaborative-interactive’ model developed by Horvath (2001). He defines two main features of the therapeutic relationship as the interactive relational and the integrative technical aspect, which sets TA apart from other relationship constructs (Horvath & Greenberg, 1994). Buber (1960) described therapeutic alliance as a reciprocal relationship and van Deurzen (1997) states therapeutic alliance establishes an ‘I-Thou’ relationship to enable clients’ to build an ‘I-Me’ relationship.

Recent literature shows neural firing follows attention (Siegel, 2006) with neural wiring and affective or emotional functioning of the psychotherapist being experienced and integrated by the client through resonance or therapeutic relationship (Lewis, Amini & Lannon, 2000).

Therapeutic alliance has been defined as a state of critical attunement, where the highs and lows of the therapist’s affective state are in resonance with similar states in their client (Schoore, 1994a).



Bion (1962) defined TA as ‘dream state alpha’, implying a right brain state and Marcus (1997) states the analyst listens with the right brain directly to the client’s right brain. Buck (1994) states therapeutic alliance is a right brain to right brain spontaneous emotional communication system between the limbic systems of the sender and receiver that detect specific non-verbal cues in the sender which activate similar emotional sensors in the receiver.

The limbic system is essential for emotion, learning, memory and the control of the stress/fear regulation of the freeze, flight, fight approach/avoidance response system (Patterson & Schmidt, 2003). The amygdale, which is part of the limbic system, is responsible for fear regulation, attention, learning and emotional memory (Davis, 1997). The hippocampus controls spatial, sequential, and emotional learning and memory (Edelman, 1989). The hypothalamus interprets our internal experience into changes in bodily processes such as temperature, hunger, thirst and the balance of aggression and sexual behaviour (Cozolino, 2006, p. 57). The Orbital Medial Prefrontal Cortex (OMPFC) helps to regulate affect functioning (Schore, 1994b) and to integrate information by assessing our internal and external experience of the world with the emotion, motivation and reward systems (Cozolino, 2006, p. 54). For the present study TA was quantitatively assessed according to SCR measures established by Marci et al., 2007 and qualitatively defined using the WAI according to (Horvath & Greenberg, 1986).

Hence, the aims of this study were to assess electroencephalography (EEG) activity in the client while undergoing therapy with symptomatic anxiety during moments of high TA

established using SCR measurements from both client and therapist. Our hypothesis was that there would be a change in brain activity during TA.

## **Methods**

### ***Subjects***

A total of 15 subjects (7 males, 8 females) volunteered to participate in the study. They were aged between  $48 \pm 9.4$  years with a BMI of  $24 \pm 2.6$ . The cohort was randomly selected after a sample was compiled from the local community. The demographics of the subjects reflected the multicultural make up of the New South Wales population of Australia.

Participants responded to the internet and advertisements placed at local community, mental health and medical clinics and educational institutions. Volunteers gave written consent for the study, which was approved by the institutional ethics committee. To qualify for the study, participants were screened to ensure no medical contraindications such as severe concomitant disease, alcoholism, drug abuse and psychological or intellectual problems existed that were likely to limit compliance. This was determined during the initial interview using the lifestyle questionnaire (Craig, Hancock & Craig, 1996). Internal consistency was high with a Cronbach alpha of 0.89.

Five highly experienced clinical psychotherapists, 3 female and 2 male, participated in the study. Two were registered Gestalt therapists, two Psychosynthesis psychotherapists with Masters level training and one Clinical Psychologist. All therapists practiced an integrative client-centred approach to therapy, with the clinical psychologist attending a refresher workshop on client-centred psychotherapy, prior to starting the research. This was to standardise and enhance an integrative therapeutic approach to be used during the sessions.

All subjects reported they were experiencing high levels of anxiety. Anxiety was evaluated prior to the commencement of the clinical psychotherapy sessions, using the trait anxiety and state anxiety measures with the Spielberger State-Trait Anxiety Inventory which has high internal consistency reliability and validity, Cronbach alpha 0.93 (Spielberger et al., 1983).

### ***Study protocol***

The study was conducted in a temperature-controlled laboratory where the psychotherapy sessions were held. Clients underwent a total of 6 psychotherapy sessions, once per week for 6 weeks. This study reflects 90 hours of total therapy sessions. Each session was 45 -60 minutes in duration. Figure 1 shows a flowchart of the study protocol.

### **Figure 1: Study protocol**

### ***Physiological measures***

Simultaneous physiological measures were obtained during each session using a physiological monitor. These consisted of EEG, electrocardiogram (ECG) and skin conductance resonance (SCR). Four channel EEG was recorded according to the International 10-20 system (Fisch, 1991). Electrodes were located at the orbitofrontal (F1, F2), temporal (T7, T8), parietal (P3, P4) and occipital (O1, O2) sites. Electrodes were taped down using adhesive. Refer to Figure 2.

**Figure 2: Subject set-up with electroencephalography (EEG) electrodes according to the 10-20 system (Jasper, 1958)**

Three lead ECG was recorded using electrodes (EKG-Flex/Pro, Model SA9306M, Thought Technology, USA) placed on the chest, one reference and two active electrodes. The ECG provides a measure of the electrical changes occurring during the hearts contraction. Skin conductance resonance (SC- Flex/Pro, Model SA9309M, Thought Technology, USA), was measured from both the therapist and the client with electrodes taped around the index and middle finger of their hands. Galvanic skin conductance (SCR) appears to be the most consistent, sensitive physiologic measure of emotional and empathic responsiveness (Critchley et al., 2000; Levenson & Ruef, 1992; Marci & Orr, 2006; Weisenfeld, Whitman & Malatesta, 1984). From the SCR measurement in both the client and the therapist, TI was calculated according to Marci et al. (2007) (refer to analysis section below).

Sterile techniques were used for all procedures involving the use of electrodes and gel. All interventions were painless with minimum discomfort. Sitting brachial blood pressure (BP) and pulsated heart rate (HR) were measured using a digital monitor (Omron, Model M5 (HEM-742C-C1), Omron Corporation, USA), and these were recorded before and after each individual therapy sessions.

Client anxiety states were assessed according to the validated Speilberger State Trait Anxiety Inventory (STAI), Speilberger et al. (1983). State anxiety is a measure of immediate anxiety while trait anxiety measures long-term anxiety. Anxiety states are defined by subjective

feelings of tension, apprehension, nervousness and by excitement of the autonomic nervous system. Trait-anxiety refers to moderately steady individual disparity in anxiety-proneness, that is, to dissimilarity between people in the propensity to identify stressful situations as dangerous or threatening and to respond to such situations with an increase in the strength of their state anxiety reactions. The client's trait anxiety was measured pre study with state anxiety being measured both pre and post session.

The working alliance inventory (WAI) (Horvath & Greenberg, 1986) was administered after each session to both client and therapist, which provided a subjective measure of the bonding aspect of TA. The Working Alliance Inventory (WAI), by Horvath & Greenberg (1986) is a 36 item, self-reported questionnaire rated on a 7 point Likert scale, comprising of three subscales of task, bond and goal, with internal consistency. Cronbach alpha for bond is .92, for task .92 and for goal .89. The WAI is one of the first validated instruments to measure therapeutic alliance (Hanson, Curry & Bandalos, 2002). Based on Bordin's (1979) theoretical conceptualization of the alliance as divided into bond, goal and tasks, it's designed to evaluate three factors: client and therapist perceptions on agreement of goals, assignments of tasks and the development of a bond, which are seen as core components of the therapeutic alliance (Bale et al., 2006). The client assesses the quality of the alliance with the therapist and the therapist assesses how the client perceives the quality of the alliance. Several instruments have been developed to measure the therapeutic alliance (Horvath, Gaston & Luborsky, 1993) of these the WAI has been the most extensively used (Bale et al., 2006), and is the most reliable instrument for measuring the therapeutic relationship (Horvath & Greenberg, 1989).

### **Data acquisition and analysis**

The EEG was analysed to derive activity in four frequency bands: delta (0-4 Hz), theta (4-8 Hz), alpha (8-13 Hz) and beta (13-20 Hz) (Fisch, 1991). For each frequency band the average EEG power ( $\mu\text{V}$ ) was computed for all four sites: orbitofrontal (F1, F2), temporal (T7, T8), parietal (P3, P4) and occipital (O1, O2). ECG data was computed to derive the number of beats/minute. SCR was analysed for both the therapist and the client for deriving the TI (ratio of the sum of all the positive correlations divided by the absolute of the sum of all the negative correlations) (Marci et al., 2007; Marci & Orr, 2006).

The total sample time was individually determined, with sessions lasting 45-60 minutes. All neurophysiological data was analysed using software developed in-house (creators: Andrew Varis and Budi Jap).

### **Statistical analysis**

Statistical analysis package Statistica (for Windows, V 8, StatSoft, USA) was used for data analysis. A repeated measures study design has been used which gives a total of 90 hours of therapy. The differences between sitting HR, and state anxiety measured before and after each therapy session were compared using paired Student's *t* test.

The EEG changes, HR, state anxiety and WAI (the latter 3 measured before and after each session) across the 6 therapy sessions were compared using repeated measures analysis of variance (ANOVA). A post hoc analysis for comparison of means using the Fischer LSD test

was used to determine specifically where differences existed between the 6 sessions. Fischer LSD method allowed a less conservative approach to explore the data. Therapeutic index (TI) was derived from the SCR measurements of the client and the therapist according to the formulation provided by (Marci et al., 2007). The highest TI found across 3 minute segments of the session (which reflected the greatest therapeutic alliance between client and therapist) was used to observe the effects of high TA on the simultaneous neurophysiological data (EEG and HR activity). High TI indicates positive concordance (TA) between client and therapist. Significant results at a p value of  $<0.05$  are reported.

## **Results**

During high TA, the frontal site showed increased activity for all EEG frequency bands during sessions 2 and 5. The occipital site showed decreased fast wave brain activity (alpha and beta) after session 1, while delta and theta, the slow wave brain activity, started to show an increase from session three. The parietal site showed significantly higher theta, alpha and beta activity during session 4 compared to all the other sessions ( $p<0.05$ ). Delta activity was also higher during session 4 but not significant. Simultaneously, the temporal site showed a general decrease in most sessions and then an increase after sessions 5 in all brain activities.

Heart rate, measured before and after each session, was found to decrease significantly after all sessions ( $p<0.05$ ) except for session 5, which was still lower but not significantly. Session 4 demonstrated the greatest decrease from pre to post therapy session. Refer to Figure 3.

There was a general trend of reduced post study HR measures across the 6 sessions, reducing from session 1: 75 bpm to session 6: 71 bpm on average.

**Figure 3:** Heart rate changes from pre- to post- therapy sessions

The TI score derived from the SCR measurement increased from session 1 to session 4. The highest TI was recorded during session 4 and was significantly higher than session 2 ( $p=0.03$ ), indicating high TA (Figure 4).

**Figure 4:** Therapeutic Index (measure of therapeutic alliance) derived from skin conductance resonance between client and therapist across the six sessions

Figure 5 shows a trace of SCR from both client and therapist showing periods of concordance in the SCR.

**Figure 5:** Therapeutic Alliance according to Skin Resonance Conductance in Client and Therapist

Results showed clients had an above normal trait anxiety average of  $45 \pm 12.4$ ; which is indicative of a symptomatic anxious sample. **Figure 6** shows state anxiety levels before and after each therapy session. State anxiety levels were significantly lower on average ( $p<0.05$ ) after each therapy session, except for session 6 where it was still lower but tended towards significance ( $p=0.09$ ). **Refer to Figure 6.** There was also a general trend for state anxiety to decrease across the 6 sessions. For example, pre-state anxiety decreased from session 1:  $40 \pm 12.5$  to session 6:  $32 \pm 12.3$ ; while post-state anxiety decreased from session 1:  $32 \pm 8.4$  to session 6:  $28 \pm 6.7$ . The WAI showed the bonding aspect of TA developed by session 3 and continued to increase over 6 sessions (replicating findings of Horvath and Greenberg (1986)).



**Refer to Figure 7.**

**Figure 6:** Shows pre- and post-therapy state anxiety levels

**Figure 7:** Working Alliance Inventory (WAI) scores self-rated by client and therapist (subjective measure) post session

## **Discussion**

From these results it would appear that different parts of the brain are either switched on or off during therapy during moments of high TA. The prefrontal cortex is active across all EEG frequency bands. This would indicate that the prefrontal cortex is responsible for integrating interpersonal and social behaviour (Dolan, 1999), and is stimulated when regulating emotional affect (Schoore, 1997) and attachment (Cozolino, 2006). It would also support the theory that the prefrontal is active when accessing memory and learning (Barbas, 1995; Sullivan & Gratton, 2002), and plays a key role in coordinating and contrasting cognitive representations of a sense of self/other (Marci et al., 2007).

During moments of deep therapeutic connection or high TA our study showed clients occipital lobe ‘went to sleep’ as indicated by increased slow wave delta activity. This moment of being totally absorbed in the ‘here and now’ is reflective of internal problem solving by the client, eyes open but attention focused inwards. This supports earlier research by Kounios et al. (2006) that during moments of insight, the occipital site slows down. This study shows that clients appear to be looking at the therapist, but may not be registering them visually or

‘seeing’ them as their attention is focused inward. This research may be isolating the exact moment of insight or what we call the ‘AHA’ or eureka moment.

In contrast to the visual part of the brain that switched off during high TA, the parietal site switched on. It showed significantly increased theta, alpha and beta activity across all sessions but was especially high during session 4. This would support current literature that shows that the therapeutic relationship must develop by session 3, with the client’s response in the first three sessions being highly predictive of successful clinical outcome (Miller, Duncan & Hubble, 1997). The parietal lobe co-ordinates all our sensory information and is where we determine focused attention (Veitch, 2008). It links our senses with our bodies and gives us a sense of space in our environment (Cozolino, 2002). It is also involved in directing attention toward visual and emotive stimuli (Fink et al., 1996; Peyron et al., 1999) and is the ‘seat of imagination’ (Decety & Chaminade, 2003). As an initial investigation into the neurophysiology of TA, this research offers more questions than answers, but as there is very little known about the parietal cortex during therapy this study shows it could be a crucial area of the brain for decision making during therapy. When the client and therapist meet in deep relationship, the beta frequency of the parietal lobe becomes active. This may enable clients to pay focused attention to what they’re feeling and experiencing in their body and brain and also the reactions they’re observing in the therapist. The relaxation from the alpha waves could allow feeling and experiencing to take place at a body level while the hypnagogic theta waves would assist clients to begin to imagine their new future. This supports the view of Perls et al., 1951, that environment does not create us nor do we create our environment. It is only in relationship that we can begin to know ourselves.

The temporal site reflected a general decrease in brain wave activity, from an active to a relaxed state, over the six therapy sessions. This may indicate that we need to be in a calm emotional state to access and process trauma. The amygdala, buried in the temporal lobes and the bed nucleus of the stria terminalis (BNST) are the areas in the brain that appear to regulate the control of fear and anxiety (Davis, 1997). The amygdala activates the fear/flight response to particular stressful stimuli whereas the BNST seems to be concerned with a sense of dread, over time, increasing anxiety levels. These results support current literature which indicates we need to be in a relaxed state for the brain to 'normalise' its affect (Farrow, Hunter & Wilkinson, 2005). Interestingly our results showed an increase of activity in session 6 which could indicate an anticipatory 'fear' of ending therapy.

This study proposed that during high TA or a state of deep connection with a therapist, the brain and body of clients would be affected. In Gestalt terms to show there is no split between the mind and the body (Mackewn, 1997). We established that heart-rate (HR), which was measured before and after all six sessions, decreased significantly after all sessions, except session 5, which could be reflective of the anticipated distress of therapy ending as discussed above. HR showed an overall decrease in cardiovascular activity, both post-session, at the conclusion of each session, as well as a continued downward trend in post HR over the six sessions. There is little doubt that heart-rate (HR) will rise under the threat of shock or in an anger producing situation (Elliott, 1974). Ax (1953) showed blood pressure, skin conductance and HR were higher in fear than in anger. Lowered HR is a factual and distinct occurrence within the therapeutic dyad and our empirical study shows that the talking cure of psychotherapy does indeed cure.

Client's anxiety also decreased over the six sessions. The sample in this study was representative of a symptomatic anxious client group, reflected by an average trait anxiety above the norm for this measure. Anxiety and fear are the premeditated features of our body's continual appraisal of threat that appreciably affects our thoughts or cognitive functioning (Charney, 2004). Anxiety is defined as a relentless state of uneasiness accompanied by signs of physiological arousal which can be short and long-term (Andreassi, 2000, p. 373). State anxiety which is a measure of anxiety 'right now', 'at this moment', was found to reduce significantly after each session, including session 6 which was still lower but only showing a trend towards significance. Once again this may have reflected the phenomenon of anticipating the end of therapy.

Therapeutic alliance was established from a therapeutic index (TI) measure. The TI score (a measure of TA Marci et al. (2007)) was derived from skin conductance response (SCR) which increased from early sessions up to session 4 where it peaked showing a strong establishment of TA. SCR is an indicator of shared empathy between client and therapist in a therapy session by tracking the autonomic arousal system (Marci et al., 2007).

Marci et al. (2007) designed a study to investigate the relationship between concordant physiological arousal and therapist empathy during clinical psychotherapy sessions. Simultaneous (SCR) measurements were recorded from both clients and therapists throughout twenty, full-length psychotherapy sessions of approximately 55 minutes. Results showed that when the two people felt understood by each other their physiology lined up with a significant correlation. When the neural dance of two brains was established, Marci (2007)

called this a ‘logarithm’ for empathy.’ The point at which the clients noted that they felt emotionally disconnected from the therapist the SCR measurements were not aligned. When they felt in therapeutic alliance or emotionally connected to the therapist the SCR measurements began to flow in unison. Thus the intimate dance of a shared neuro-physiology through therapeutic alliance was documented.

### *Subjective measures*

Research is showing that short term therapy, where clients typically go to six to eight sessions and leave when they believe they’ve reached a ‘good enough’ resolution of their issues can be as effective as long-term therapy (Hubble, Duncan & Miller, 1999). Gestalt therapy focuses on the importance of the client-therapist relationship rather than specific techniques (Perls, 1976, cited in (Corey, 2005). It maximizes the awareness of all aspects of the sense of self, as in the mind, body and soul, or the ‘whole’ (O’Leary, 1995). It is not the duration but the quality of the therapeutic relationship that makes Gestalt therapy successful and six sessions are an acceptable duration for short-term therapy (Houston, 2003). The efficacy of short-term therapy is well evidenced (Bloom, 1992). Six sessions of psychodynamic therapy delivers similar results to long-term therapy (Messer & Warren, 1995). The relationship between therapeutic alliance and therapy outcome was measured over 8 and 16 sessions using both CBT and psychodynamic client-centred counselling. The results suggested that both 8 and 16 sessions were very effective with no substantial outcome differences between the two durations (Stiles et al., 1998). Short term brief psychodynamic psychotherapy known as brief Psychodynamic Intervention Therapy (BPI) showed four sessions were enough to effect positive outcome in the client. It also showed therapeutic alliance was clearly established by the third session (Despland, Drapeau & de Roten, 2005).

## *WAI*

The WAI is a qualitative instrument to measure the establishment and growth of TA. In our study WAI provided a qualitative measurement of TA. It was completed by both the therapist and the client after each of the 6 sessions. Researchers agree that for TA to be established, it must develop by session 3, and continue to increase over time (Horvath & Greenberg, 1986). Our study agrees with this finding and shows that if TA is established by session 3, clients begin to further deepen their therapeutic journey. The bond subscale of the WAI is a reliable indicator as to whether clients return to therapy after the first session (Marci, Glick & Ablon, 2006). Researchers agree the WAI correlates positively with other alliance measures in measuring bond, task and goal therapeutic dimensions such as the CALPAS (Safran & Wallner, 1991); the Helping Alliance and the Vanderbilt Scales (Tichenor & Hill, 1989).

Horvath and Greenberg (1986) showed the therapist and client evaluate the alliance on two very different concepts. Therapists assess the quality of the alliance on a theoretical model of what they believe should happen, coupled with their experiences of the alliance in therapy whereas the client based their interpretation on intimate knowledge of past relational experiences (Horvath & Symonds, 1991).

In our study the outcomes of WAI replicated previous research. We established that TA had developed by session 3 and continued to increase for the client. This is reflected in the WAI measures as shown in Figure 7.

## **Future Direction and Conclusions**

By linking neuroscience and psychotherapy this study has major implications for the practice and training of therapists. By investigating what goes on in the brain and the body during therapy, all psychotherapists will be better prepared to help clients break emotional habits based on established neuronal pathways that sustain destructive and psychologically damaging patterns of behaviour. By deepening our knowledge and understanding of brain patterns formed early in life, which continue into adulthood and surface in therapy, we can cultivate a more pronounced climate of change through expanded psychotherapeutic skills. This allows clients a chance to grow anew in a therapeutic relationship that modifies old emotional habits for new ways of self regulation so clients can develop a new concept of 'self'. This releases the power of the potential for human change through the mechanism of neuro-plasticity.

Research shows high TA to be the catalyst for effective therapeutic client outcome. Only at this contact boundary through the function of sitting in the space in between can we identify our true sense of self (Polster & Polster, 1973). We have also shown that the highest therapeutic index occurs during session 4, producing simultaneous physiological changes in the brain shown in the EEG activity associated with different parts of the brain during therapy. This study also found a strong relationship between the brain and the body during therapy. When there is a strong therapeutic alliance, HR and anxiety levels decrease, after each session and continued to decrease further after each session. This indicates that therapy was effective in decreasing HR and anxiety levels and begins to develop the concept of therapy helping to heal on a physical as well as a psychological level.

This research is demonstrating that the therapeutic alliance continues to be a forceful construct in considering factors for successful therapeutic outcome. It is beginning to provide a common language for physiological and neuro-psychological sciences to ascertain how clients are accessing change during the therapeutic process. By tracking subjective experiences through neuro-physiology we are providing a matrix for all therapeutic models to develop new ways of creating more effective & efficient psychotherapy for clients. Most importantly this empirical study categorically identifies the value of the quality of the therapeutic alliance as the key player for successful therapeutic outcome.

### **Bibliographies:**

**Patrisha Stratford** is the primary author and researcher of this paper which is part of her doctoral research. Trisha is completing her PhD in Medical Science (Neuroscience) investigating the neurophysiology of therapeutic alliance and how this impacts the therapeutic relationship. Trisha Stratford is also a clinical psychotherapist in private practice, a clinical supervisor, trainer, and lecturer in neuroscience and psychotherapy. She's interested in the interplay between the conscious self and brain structure and how this manifests in intra and inter-personal relationships.

**Dr Sara Lal** is the principal academic supervisor and has expertise in the area of neurosciences and psychophysiology. Dr Lal researches in the area of human factors and neurophysiology research. Some of these research spans across areas such as fatigue, sleep, anxiety, mood, cardiovascular factors, transport safety, cognitive function and psychophysiology. Lal is keen to advance the understanding of therapy and associations in the field of Neuroscience and Psychophysiology. Lal has presented papers, published her



work in various medical and scientific journals as well as co-edited a book and published book chapters and obtained several competitive grants for research.

**Alan Meara** is a co-supervisor of this research and a Gestalt Therapist in private practice, a clinical supervisor and trainer. He has an interest in incorporating concepts from nonlinear dynamics into the practice of individual and group therapy. In particular, he is also interested in how recent developments in neuroscience support these concepts, as well as embodiment, in refining the theory and practice of relational approaches to gestalt. He has presented several papers and workshops at conferences, and has been published in Australian and overseas Journals in these areas. Alan is the President of Gestalt Australia and New Zealand (GANZ), and is a member of the editorial board of the Gestalt Review.

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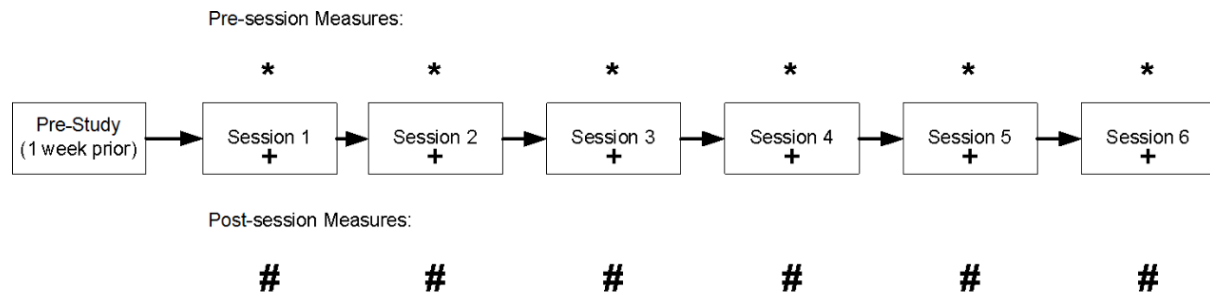
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**Figure 1: Study protocol**



**Pre-study:**

- Lifestyle
- Trait Anxiety

**\* Pre-session:**

- BP/HR
- State Anxiety

**+ During-session:**

- EEG
- SCR

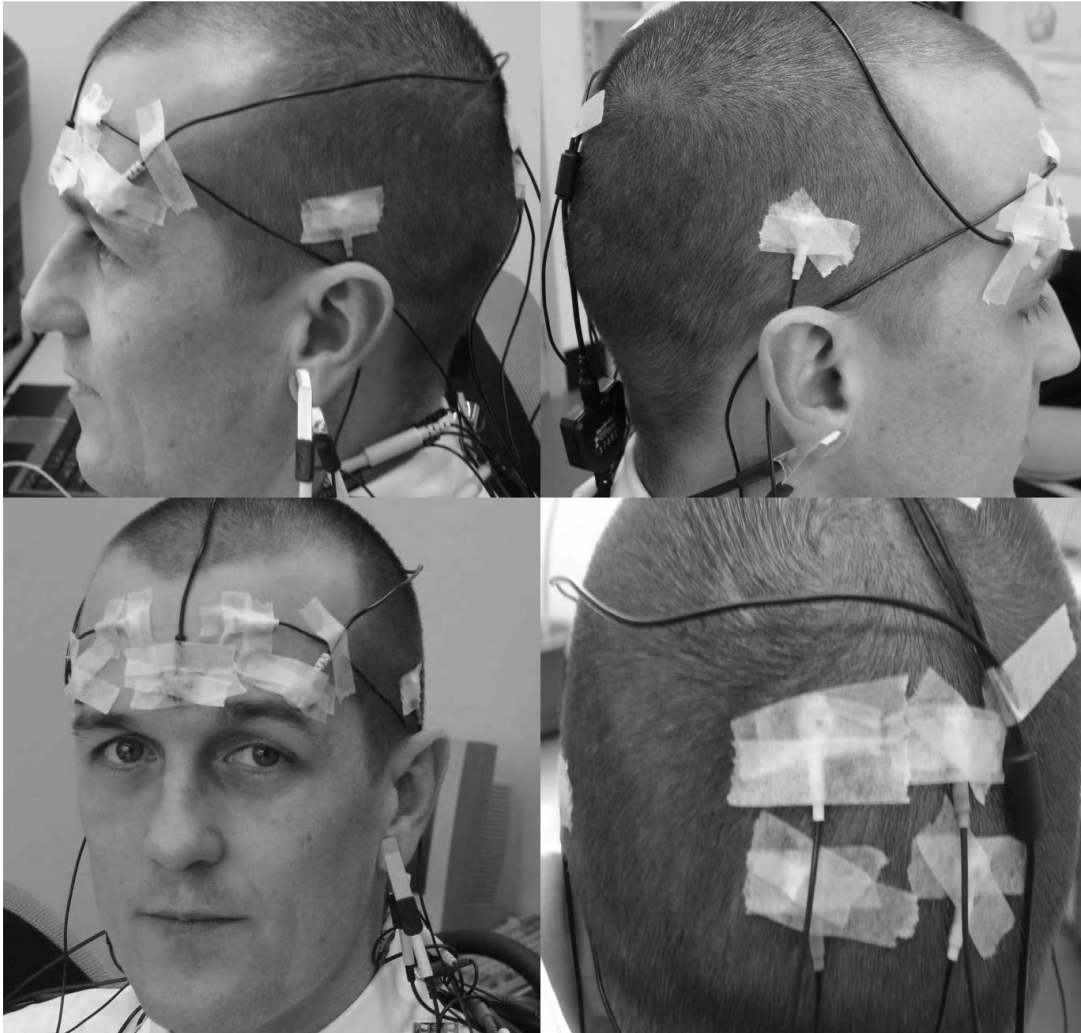
**# Post-session:**

- BP/HR
- State Anxiety
- T – Work Alliance Inventory
- C – Work Alliance Inventory

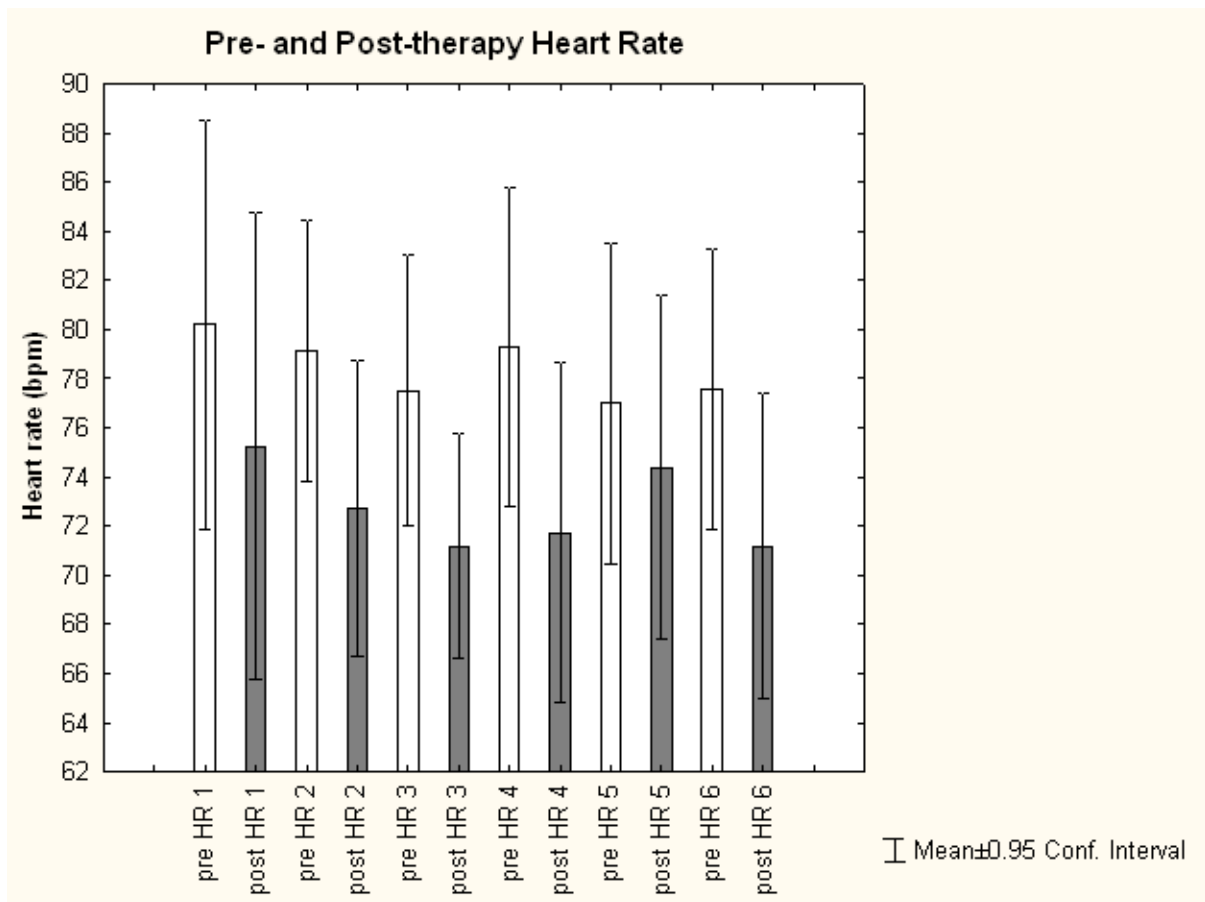
**Key:** BP= blood pressure, HR= heart rate, EEG+ electroencephalography, SCR= skin

conductance resonance

**Figure 2: Subject set-up with electroencephalography (EEG) electrodes according to the 10-20 system (Jasper, 1958) (permission granted to reproduce images).**

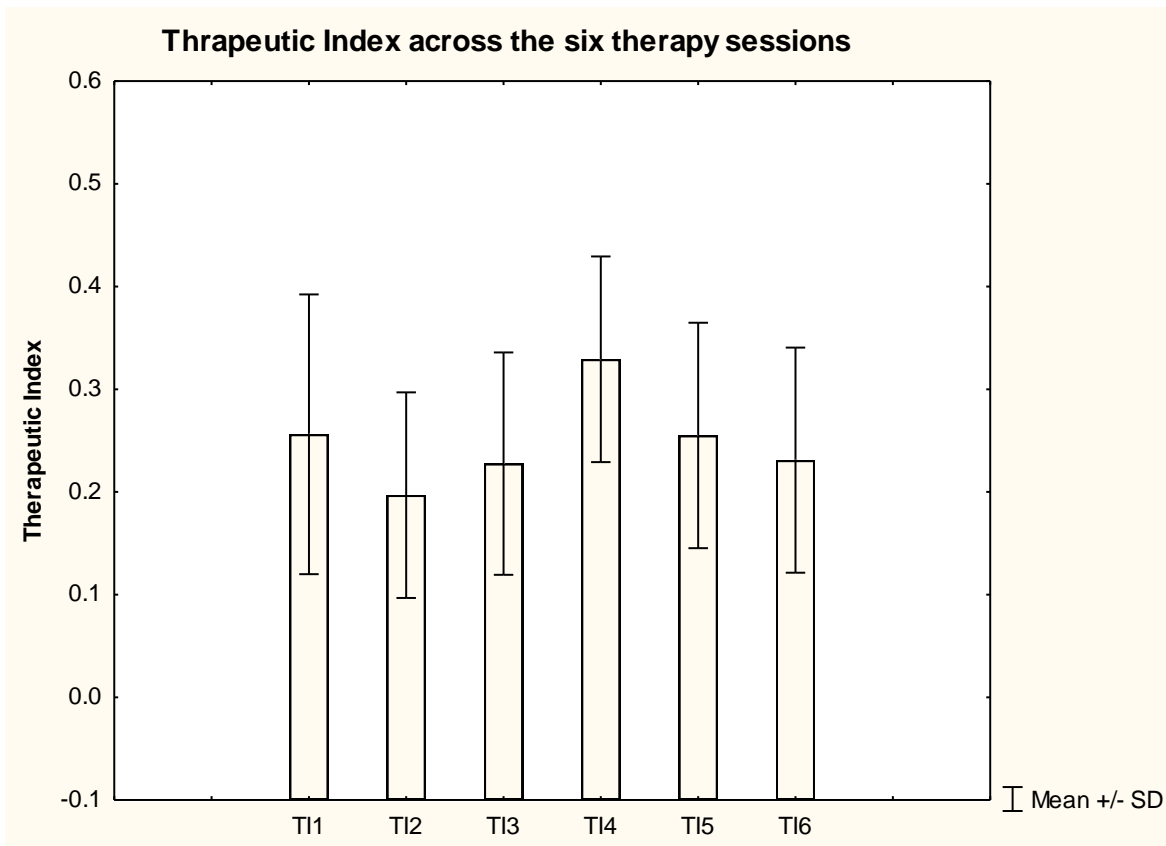


**Figure 3:** Heart rate changes form pre- to post- therapy sessions





**Figure 4:** Therapeutic Index (measure of therapeutic alliance) derived from skin conductance resonance between client and therapist across the six sessions



**Figure 5: Therapeutic Alliance according to Skin Resonance Conductance in Client and Therapist**

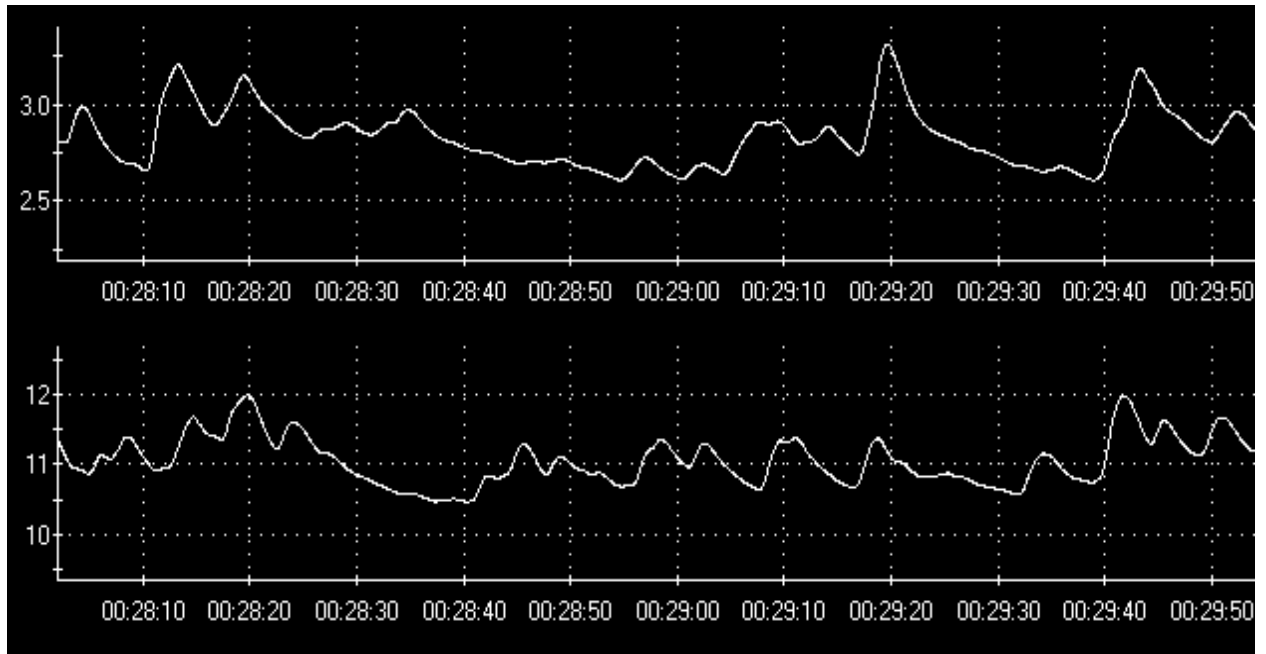
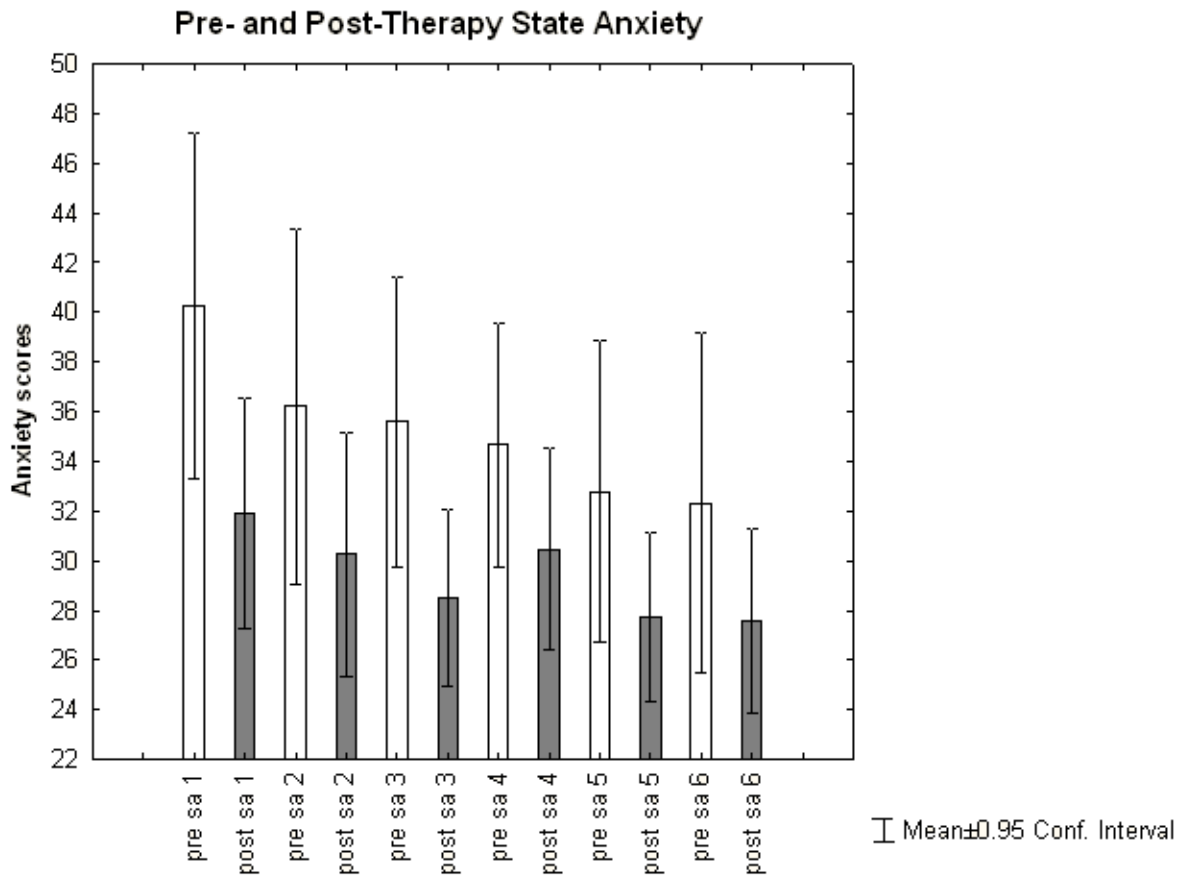


Figure 6: Shows pre- and post-therapy state anxiety levels



**Figure 7:** Working Alliance Inventory (WAI) scores self-rated by client and therapist  
(subjective measure) post session

