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Heart Rate Variability as an Outcome Measure for Thought Field Therapy in Clinical Practice

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ABSTRACT

The need for empirical, objective outcome measures for clinicians that are practical to use in such a setting has long been recognized, in order to make a more objective determination of the efficacy of the therapy being given. Heart Rate Variability (HRV) is gaining increasing popularity for use in clinical settings as a measure of treatment success. Being stable and placebo-free, HRV has the potential to meet this need. Thirty-nine cases are presented from the clinical practices of the authors and three other clinicians, where HRV was used as an outcome measure for TFT (Thought Field Therapy). The cases included TFT treatments which addressed a wide variety of problems including phobias, anxiety, trauma, depression, fatigue, ADHD, learning difficulties, compulsions, obsessions, eating disorders, anger, and physical pain. A lowering of SUD was in most cases related to an improvement in HRV.

INTRODUCTION

This paper provides data from 39 cases where Heart Rate Variability (HRV) was used to measure the results of Thought Field Therapy (TFT) in the clinical practice settings of the authors and three other TFT trained professionals. The purpose of this paper is not to provide a controlled study, but rather to show how HRV can be used as a tool to measure treatment outcomes in a clinical practice setting. Buetler (2000) notes the difficulty and resistance clinical practitioners have in incorporating empirical standards into their practice. In recent years, HRV has been used increasingly as a measure for psychotherapy outcomes (Cohen, Matar, Kaplan & Kotler, 1999). HRV is easy and practical to implement in a clinical practice setting, and thus can provide (particularly when brief psychotherapy techniques are used) an empirical and objective outcome measure easily accessible to clinicians.

Thought Field Therapy

TFT is a treatment for psychological problems, developed by psychologist Roger Callahan in which meridian points on the body are stimulated, usually by tapping, in specifically determined sequences while the client focuses attention on the problem being addressed (Callahan, 1985; Callahan & Callahan, 2000; Callahan & Trubo, in press). To date, TFT has been used by over 5,000 mental health professionals from around the world to help people with problems such as phobias, anxiety, trauma, obsessions, compulsions, depression, addictive urges and a variety of other problems.

Heart Rate Variability

HRV measures the variation of the intervals between heart beats (Malik & Camm, 1995) and measures activity and balance of the sympathetic and parasympathetic systems of the autonomic nervous system (ANS) (Hirsch, Karin & Akselrod, 1995). In numerous studies, low HRV has been shown to be a strong predictor of sudden death and all-cause mortality (Magid, Martin & Kehoe, 1985; Kleiger, Miller & Bigger, 1987; Doherty & Burr, 1992; Bigger, Fleiss, Rolnitzky & Steinman, 1993; Singer & Ori, 1995; Task Force of the European Society of Cardiology and North American Society of Electrophysiology, 1996). As part of the Framingham study (Tsuji et al, 1996) subjects with no clinical symptoms of prior cardiac

problems who had low HRV were also found to be at risk for sudden death. Therefore, HRV is of concern, not only to people with known cardiac problems, but also to those who are considered healthy and normal.

In a study of older people, those with very high HRV were also shown to be at risk for sudden death (deBruyne, et al., 1999). This study showed that those who had HRVs which scored in both the upper and the lower quartiles were at risk for sudden death, with those in the upper quartile having an even higher risk than those who had low HRV. The authors note that this is an area needing further exploration.

An additional study (Dekker, et al., 2000) was done on a random sample of 900 subjects selected from the 14,672 middle aged men and women without coronary heart disease (CHD) who participated in the Atherosclerosis Risk In Communities (ARIC) study. The sample was divided into tertiles. Those in the tertile with the lowest HRV had the highest all-cause mortality, as well as mortality from cancer and CHD. However, the mortality rate of people in the highest tertile of HRV was higher than that of the intermediate tertile, showing once again that HRV that is too high also puts people at risk. These differences in mortality rates were present even after adjustments were made for other factors known to be associated with HRV or with the aforementioned diseases. The authors note that since that since this study was done on people who had no known disease, "This suggests that low HRV precedes manifest disease" and that "It may be hypothesized that low HRV is an indicator of poor general health" (P. 1244).

It has been established that HRV does *not* respond to the placebo effect (Kleiger, et al., 1991; Vybrial, et al., 1993; De Ferrari, Mantick & Vanoli, 1993; Casadei, Conway, Forfar & Sleight, 1996; Venkatesh, et al, 1996). HRV has also been shown to be a highly stable measure over periods of months in the absence of any intervention to change it (Kleiger, et al, 1991; Bigger, et al., 1992; Stein, Rich, Rottman & Kleiger, 1995). Furthermore, people with very low HRV such as those with cardiac problems, had even more stability in their HRV scores than healthy subjects (Van Hoogenhuyze, et al., 1991). The stability of HRV and lack of placebo effect make HRV a very appropriate choice for measuring outcomes in researching new treatments.

The Relevance of HRV to Psychological Problems

We are often asked by mental health professionals how HRV measurements are relevant to the field of psychology. Perhaps the best answer to this question is contained in the recent study by Damasio, et al. (2000) where areas of the brain were found to be associated with specific emotions that were not previously traditionally thought to be involved with emotions. The areas Damasio found to be associated with various emotions were associated with autonomic nervous system activity, that which keeps the body in a state of homeostasis, which is precisely what HRV is measuring. The HRV is a non-invasive test that gives us a window in which to view such activity, thus providing an objective measure of an individual's emotional state.

Low HRV has also been linked to psychological problems. Anxiety and phobias were related to low HRV in a number of studies (Middleton, 1990; Kawachi, Sparrow, Vokonas & Weiss, 1995; Freidman & Thayer, 1998a; Freidman & Thayer, 1998b; Watkins, Grossman, Krishnan & Blumenthal, 1999). Subjects with post traumatic stress disorder (PTSD) were also shown to have consistently lower HRV, even when not exposed to a trauma related reminder, than those who did not have PTSD (Cohen, et al., 1998). There are also data that suggest a relationship between low HRV and depression (Carney, et al., 1995; Krittayaphong, et al, 1997), although not all studies found this connection (Watkins, et al., 1999; Yeragani, et al., 1991) and controversy exists in this area (Carney, Freedland & Stein, 2000).

In addition to the demonstrated relationship between low HRV and anxiety, a recent study (Dishman, et al., 2000) showed a statistically significant relationship between subjects' self-rated anxiety and emotional stress and low HRV. This relationship existed independent of age, gender, trait anxiety, cardiorespiratory fitness, heart rate, blood pressure and respiration rate.

For a more detailed review of the literature on HRV, its relationship to psychological problems and other factors that can affect it, see Callahan (in press).

METHODS

Data Collection

Thirty-nine cases are presented where outcomes of TFT were measured with HRV, selected from the private practices of the authors located in New York City, NY (Pignotti) and

Los Gatos, CA (Steinberg). Three additional cases were reported to us by three other TFT practitioners who practiced in Ann Arbor, Michigan and Mexico City, Mexico. Details of the cases presented in this paper were disguised to protect client confidentiality. Additionally, data from four of the cases came from HRVs done pre- and posttreatment at training seminars in TFT. Our sample was not random; we selected cases we believed were representative of results with HRV; these include many successful treatments and also some treatments that were not entirely successful.

Measures

Five-minute HRV tests were done with the HeartScanner (Biocom Technologies 1998-1999). As an instrument used to measure HRV, the HeartScanner conforms to standards set forth by the North American Society of Pacing and Electrophysiology (1996).

The specific HRV measure used was SDNN (Standard Deviation of Normal to Normal) which measures the standard deviation of all normal to normal intervals between heart beats during the test period. The Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology (1996) gave norms for the 24 hour test as follows: an SDNN of less than 50 is considered to be “highly depressed” and an SDNN of less than 100 is considered to be “moderately depressed”. The task force further noted that these cut-off points are “likely to be broadly applicable” (p. 1055).

Although there are no currently established norms for the 5-minute HRV test, we chose to look at relative changes in SDNN. It should be taken into consideration, however, that SDNN scores on the 5-minute test would tend to be lower than those of a 24-hour test on the same person (Biocom Technologies, 1998-1999). Additionally, one should keep in mind that an HRV test showing very high SDNN, especially in older and middle-aged people could be pathological (DeBruyne et al., 1999; Dekker, et al., 2000). Since these data are very new and only two published studies exist on SDNN that is too high, there are no specific figures yet given for what exactly is considered too high an SDNN score. The cases presented in this paper that were defined by the authors as “high SDNN” were based on the fact that these subjects showed a pre-treatment SDNN that was high, relative to other cases that we observed in our practices.

In addition to HRV testing, we also measured our results by the subject's self-report, using the Subjective Units of Distress Scale or SUD (Wolpe, 1969). After being asked to think about the problem, subjects were asked to rate the degree of emotional distress they felt right at that moment on a scale of 1 to 10 where the number 10 indicates the highest degree of distress possible and 1 indicates complete absence of such distress.

The TFT treatment protocol used on all cases presented is the same as that used by Callahan (in press) and consists of the following:

Step 1: The subject was asked to think about the presenting problem and rate the emotional distress, if applicable, on a scale of 1-10 (the SUD). It is not necessary for the person to talk about the problem, as long as attention is focused on it during the treatment although the problem can briefly be identified, if the subject desires. The 5-minute pre-HRV test is administered with the client sitting in a chair, in the upright position.

Step 2: The therapist determines which TFT treatment to use and in the appropriate order (through TFT's causal diagnosis procedure) or selects an appropriate TFT algorithm. The TFT procedure is carried out while the client is instructed to focus on the problem being addressed.

Step 3: When it is determined which treatment points to use, the subject is then instructed to stimulate these points by tapping them 5-7 times on each point in the specific, set sequence.

Step 4: After the treatment, the subject is again asked for a SUD. The treatment is considered complete when the SUD is down to a 1 (the client self-report of no trace of emotional or physical distress) or when all appropriate TFT procedures have been used to reduce the SUD as low as possible. At this time, a post-HRV test is done, also with the subject sitting upright as in the pre test.

Clients were advised that our use of HRV does not constitute medical treatment or diagnosis. Those who had medical problems were under the care of a physician and were advised to consult the physician for diagnosis or advice on any medical issue.

RESULTS

The results of each case are summarized in Table 1. The following is a description of each case treated.

Case 1. A 35 year old male had feelings of overwhelm and frustration. His pre treatment SUD was a7, which dropped to a 2 post treatment. SDNN increased from 62 to 73. More sessions were done at a later date with this client with further improvement in symptoms, but unfortunately no HRV equipment was available at that time to measure the results.

Case 2. A 37 year old female suffered from fear of other people's anger and judgment. Her beginning SUD was a 7 and post treatment SUD was a 1, indicating complete elimination of her symptoms. Her SDNN, which was 29.3 pre-treatment, proved after treatment to 95.7.

Case 3. A 52 year old female had a SUD of 10 on shame about her body image and weight. Treatment with TFT completely eliminated these feelings, with a reported post treatment SUD of 1. Her SDNN improved from 57.1 to 68.5.

Case 4. This is a 16 year old girl with a history of depression, suicidal ideation, anger, obsessive rumination, headaches and blackouts. Treatment for the anger and depression began with the client reporting a SUD of 8 and an SDNN of 79 was recorded. After treatment, she reported a SUD of 1 and her SDNN improved to 105.4.

Case 5. A 15 year old boy with a history of Attention Deficit Disorder (ADD) reported a SUD of 7 on frustration with school and his HRV showed an SDNN of 62.5. His post treatment SDNN was 86.9 with a SUD of 1 on his frustration with school.

Case 6. This 48 year old mother reported a SUD of 8 on frustration over communication with her daughter. Her HRV showed a very low SDNN of 15.7. Her post-treatment HRV showed a nearly three-fold increase in her SDNN to 42.2, along with complete elimination of her feelings of frustration, reporting a SUD of 1.

Case 7. This 38 year old woman suffered from anxiety, defensiveness and a problem with being able to be assertive without anger. She reported a pre-treatment SUD of 10 on these issues and her SDNN was 53.8. TFT treatment brought her SUD down to a 1 on these issues and nearly tripled her SDNN, which was 152.9, post treatment.

Case 8. A 6 year old boy who had been diagnosed with a learning disability and ADD

had upset about not being allowed to go to the toy store, as well as a craving for cupcakes, with a pre-treatment SUD of 6 on these issues and an SDNN of 43.1. Post treatment, his upset was completely eliminated with a SUD of 1, with his SDNN increasing to 61.3.

Case 9. This 40 year old woman reported a high degree of upset (SUD of 10), wanting to run away from her family and feeling disrespected by her daughter. Her pre treatment SDNN was 54. Post treatment, her SDNN improved to 124.8, along with complete elimination of her upset.

Case 10. A 45 year old woman felt tired and stressed out with what she described as a "hermit-like feeling." Her pre-treatment SUD was a 5 and SDNN was 109.4. Post treatment, her SDNN (which was not too low to begin with) improved to 116.4 with a SUD of 1.

Case 11. This 48 year old man had restless leg syndrome. The shaking of his legs was visible to the therapist, pre treatment with a SUD of 6 reported by the client. His SDNN was 45.2. After treatment, the shaking in his legs was completely eliminated, both by the client's self-report and the therapist's observation and his SDNN improved to 69.8.

Case 12. A 70 year old woman was traumatized by the loss of her husband who had suffered from lung cancer. Her SUD was a 6 and SDNN was 61.9. The TFT treatment completely eliminated her upset and her SDNN improved to 116.4.

Case 13. This is a 53 year old woman who is extremely obese with a history of stroke. She reported low back pain and general malaise, with a pre treatment SUD of 8 and a very low SDNN of 18.5. Post treatment, her SDNN rose to 124.7, which is more than a 600% increase, along with a report of complete elimination of her pain and malaise. The following day, another HRV was done, showing an SDNN of 98.3, indicating that the improvement in SDNN had mostly been sustained.

Case 14. This 12 year old boy had suffered from headaches in the car on a daily basis for the past two months. He reported a pre-treatment SUD of 7 and his SDNN was 67.9. Post-treatment, his SUD was a 1 and SDNN was 90.8. Later, his mother called and reported that the child no longer had headaches while riding in the car and had even been able to read a science book in the car with no headache.

Case 15. A 62-year-old woman had sadness and grief about her mother who was dying and was also upset about her son's illness. Her pre-treatment SUD of 9 was reduced after TFT treatment to a 1. Her pre treatment SDNN was 42.8 and her post treatment SDNN was increased to 64.8.

Case 16. A 26 year old man was obsessed with the possibility of his girlfriend's infidelity. He rated the obsession at a 5 and his pre treatment SDNN was 50.1. The treatment completely eliminated his obsession and his post treatment SDNN was 59.7.

Case 17. A 9-year-old boy with a history of ADD and learning disabilities felt a dislike for schoolwork, which he rated at a 6. His SDNN was 71.5. After treatment, his SUD was a 1 and his SDNN markedly improved to 150.1.

Case 18. A 34 year old man had upset and frustration in connection with his job, which he rated a 7 and had a pre treatment SDNN of 82.0. After treatment, his SUD was a 1 and SDNN rose to 138.2.

Case 19. This 30 year old woman had a fear of needles, doctors and losing control, which she rated at a 6. Her pre treatment SDNN was 57.9. There was only a small improvement in this case, with the post treatment SUD going down to a 4 and SDNN rising to 67.4.

Case 20. This 16 year old female had a history of an attempted suicide, anger and conflicts at home which had resulted at one time in her being kicked out of the house. Her pre treatment SUD on the anger was a 5, with an SDNN of 73.2. The TFT treatment completely eliminated the anger and improved her SDNN to 103.9.

Case 21. This 40 year old woman had an urge to overeat and as a result, an inability to stick to a diet. Her pre treatment SUD, which was an 8, was reduced to a 1. Although the treatment was successful in reducing her urge, there was only a slight change in her SDNN from 19.9 to 20.6.

Case 22. This 11 year old boy with a history of ADD was referred because of persistent talking in class and was considered by the teacher to be a disruption to the class. His pre treatment SUD on the urge to talk was an 8 and was completely eliminated, with a reported post treatment SUD of 1. Pre treatment SDNN was 67.6 and rose to 102.9, post treatment. One

week later a follow-up report was received that his behavior had greatly improved in class.

Case 23. A 50 year old woman was extremely obese and suffered from arthritis and Chron's disease. She also had a history of depression and ADD. Her pre-treatment rating of joint pain and difficulty swallowing was a 7 and her SDNN was 47.4. Post treatment, her SUD was a 1 and SDNN rose to 63.4.

Case 24. A 75 year old man reported an extreme degree of fatigue, which he rated at an 8. His pre treatment SDNN was 33. After treatment, his fatigue was completely eliminated and his SDNN rose to 94.

Case 25. This was a 79 year old woman who had a phobia of elevators. Her pre treatment SUD was an 8 just thinking about it in my office and her pre treatment SDNN was 67.2. After treatment, her fear was completely eliminated with a SUD of 1 and her SDNN rose to 171.9.

Case 26. This 46 year old woman had chronic depression and reported a pre treatment SUD of 6 with an SDNN of 29. After treatment, her SDNN rose to 81 and her depression was completely eliminated with a SUD of 1.

Case 27. This 30 year old woman had a compulsion to pick at the skin around her nails. Her pre treatment SUD was a 6 and SDNN was 60.2. Treatment brought some reduction in the SUD to a 3 and her post treatment SDNN was 65.5.

Case 28. This 28 year old woman had been upset for several months after the breakup of a romantic relationship and rated her emotional distress at a 7. Her SDNN was 31.1. After treatment, her upset was completely eliminated and her SDNN rose to 75.0.

Case 29. This 62 year old woman had a fear of heights which she rated at a 6 just while thinking about it in the office of the therapist. Her pre treatment SDNN was 35.1. Post treatment, her SUD was a 1 and her SDNN increased to 148.3.

Case 30. This 50 year old woman had cravings for chocolate, which she rated at a 5. Her pre treatment SDNN was 59.2. After treatment, her craving was completely eliminated and her SDNN rose to 111.3.

Case 31. A 45 year old man suffered from depression that he reported having felt since

he was a child. Although currently on anti depressant medication, his feeling of depression was constant, which he rated at a 7. He had previously tried psychoanalysis, cognitive and behavioral therapies which had not helped him. His SDNN was 138 before treatment. Post TFT treatment, his SDNN, which was not low to begin with, rose to 150 and he reported a complete elimination of his depression with a SUD of 1, where no treatment, including anti depressants had helped him before. Although his SDNN was well within normal range to begin with, the pre test HRV did show dominance of the parasympathetic system. His post treatment SDNN showed that the parasympathetic and the sympathetic systems were balanced.

Reducing Very High SDNN

The following are cases of subjects who had SDNN that was very high, relative to other cases we have observed, and was reduced after TFT treatment. Table 2 presents a summary of these cases.

Case 32. This was an 81 year old woman with a phobia of flying. Her pre treatment SDNN was 215.2 and she reported a SUD of 8 while focusing on the fear. After TFT treatment, her SDNN came down to 139.8 and she reported a SUD of 1.

Case 33. This was a 60 year old man who had been given a diagnosis of atrial fibrillation by his cardiologist. The treatment done was not directed towards any particular psychological problem, so he did not report a SUD. We did the treatment while he was focusing on his problem with atrial fibrillation, while making it clear to him that this was *not* meant to be a treatment for a medical problem and that he needed to consult with his Cardiologist for treatment. The TFT treatment was simply designed to balance his body's bioenergy system and to see if in doing so, we could get a change in his HRV. It was also explained to the client that the therapist was not a physician and therefore could not interpret the medical meaning of this change and that he would need to consult his physician for such an interpretation. His pre treatment SDNN was high at 212.4. After TFT treatment, his SDNN came down to 96.6. The HeartScanner also gives a diagram indicating balance in the autonomic nervous system. The results of the diagram in this case indicated that activity in this subject's sympathetic nervous system, which had been above normal on the pre test, had come down into normal range after TFT treatment.

Case 34. This 83 year old woman was highly distressed about a trauma as well as suffering from physical pain, reporting a SUD of 10 on both. Her SDNN was 192.2, pre treatment. After a brief TFT treatment, her distress and pain were completely eliminated. Her post test SDNN was 68.6.

Case 35. This was a 36 year old man who reported a high degree of generalized anxiety, which he rated at an 8. His SDNN was 304.6, prior to the treatment. After TFT treatment, which reduced his SUD to a 1, his SDNN came down to 213.5. Although the study we refer to (DeBruyne, 1999) showing high SDNN to be dangerous was on older people and it is unknown what effect high SDNN has on younger people, we decided to include this case, since the lowering of SDNN corresponded with his reduction in emotional distress.

Case 36. A 42 year old woman had a fear of public speaking, as well as a history of panic attacks and a cardiac arrhythmia that according to her Cardiologist did not have any known physical cause. Her pre treatment SDNN was 258.1 and at the time of the treatment, she reported a SUD of 4, although at other times it had been much higher. Her post treatment SUD went down to a 1 and her SDNN was 88.3.

Case 37. This 68 year old woman had suffered her entire lifetime from the after-effects of childhood trauma, which visibly upset her when thinking about it. She reported her level of upset to be at a SUD of 10 when remembering the trauma. Her pre-treatment SDNN was 180.2. After the treatment, which completely eliminated all of her upset about the traumas to a SUD of 1, her SDNN decreased to 123.7.

Case 38. This 51 year old woman suffered from severe asthma which she had since childhood. The therapist observed that when she came in she was severely wheezing and coughing. She was on three different inhalers as well as steroid medication. Her pre treatment SDNN was 266.9. Post treatment, her symptoms immediately went completely away and she reported feeling better than she had felt in her entire life. Her SDNN dropped to 71.4. The therapist reported feeling skeptical that this would last. However, upon follow up one month later, she reported being symptom free, had stopped using her three inhalers and was working with her physician to taper off her steroid medication. Her SDNN was in normal range at 103.7.

Follow-up done by the therapist four months after that revealed that this client continues to report being symptom free.

Case 39. A 44 year old woman had nearly drowned as a child, and remained severely traumatized by this event, including a phobia of water. Her pre treatment SDNN was 428.7, the highest we have ever had reported, along with a SUD of 10. Post-treatment, her SDNN dropped to 272.4 and she reported being completely free of any upset or fear related to this event that had traumatized her for her entire life. A follow-up was done 6 months later, where she reported having remained symptom free and her SDNN was 115.9.

DISCUSSION

In most of the cases presented here, the client's self reported lowering of the SUD, coincided with an increase in SDNN, or a decrease, where SDNN was very high. The fact that we were able to improve SDNN in both cases where it was too low and cases where it was too high makes it evident that we are bringing the autonomic nervous system into its optimal state rather than just treating a symptom. Unlike drugs which have been specifically found to only lower HRV or other drugs found to only (slightly) increase HRV, TFT is a treatment that will make changes in HRV in the direction that is optimal. In other words, if a person's SDNN is too high, TFT, when successful, will lower it. If, on the other hand, a person's SDNN is too low, TFT has the capacity to raise it. Thus, we conclude that successful TFT treatment coincides with the discriminant HRV function that varies according to optimal balance in the autonomic nervous system for each individual and for the particular problem addressed through treatment. It is as if the HRV acts as a window to particular changes that enable the autonomic nervous system to normalize at the point in time and physiological stability.

Note that in cases #19 and #27, when only a partial drop in the SUD occurred, there was only a small improvement in SDNN, indicating a close relationship between HRV and the client's self-report. There were a few exceptions to this, such as cases #3 and #21, where the client reported that the psychological problem being addressed had been completely eliminated and a SUD of 1 resulted, and yet had only a small change in the HRV. More research is needed to explore the reasons for this.

Since the majority of cases presented here were people who were treated during scheduled appointments, it was not possible to do a follow-up a few hours later to see if there was a delayed response of improvement in HRV. This possibility begs further exploration, obviously requiring a setting feasible and conductive to such analysis. It is also possible that for clients who had multiple issues and only one was treated, more issues would need to be treated to see a change in HRV. Other cases, such as cases #10 and #31, did not have abnormally low or high SDNN to begin with and so the change, even after a successful treatment, was minimal. However, in the vast majority of cases, a noticeable change in HRV occurred, immediately following TFT treatment.

CONCLUSION

Although other factors are known to improve HRV -- such as exercise (Adamopoulos, et al., 1992; Hull, et al., 1994; Stein, Rottman, Kleiger & Ehsani, 1996), social support (Horsten, et al., 1999), sexual intercourse in cohabiting couples (Brody, Veit & Rau, 2000), biofeedback (Cowan, Kogan, Burr, Hendershot & Buchanan, 1990), and some drugs such as scopolamine (Vybrial, et al., 1993; De Ferrari, et al., 1993; Casadei, et al., 1996; Venkatesh, et al., 1996), -- these changes are minimal. Furthermore, the lower the SDNN is, the more stable and thus more difficult to change it is (Van Hoogenhuyze, et al., 1991). The magnitude of some HRV changes (some more than 100%) directly following TFT treatment are unprecedented, and were unexpected by the experts in HRV who first observed these effects (Callahan, 1997b). One HRV expert who had done thousands of HRV tests on people, upon seeing the changes after a brief TFT treatment, had thought that his equipment was malfunctioning and had to check it because he had not thought such immediate change was possible (Graham, 1999).

It is important to realize, however, that we are not diagnosing or treating medical conditions and that no one who is not a physician with an expertise in HRV can make interpretations or representations to the client about the medical significance of the changes in the HRV test. For such interpretations, clients are advised to consult a physician, such as a cardiologist.

What we can say is that the changes in HRV, after a brief TFT treatment for an emotional

problem, are predominantly substantial and changes to this extent have not been traced to any other modality. As mentioned previously, anxiety, panic disorders, phobias, PTSD and depression have been linked to low HRV. Given the link between low HRV and all-cause mortality, those who bear these conditions are at physical risk as well. Our work shows that, after successfully treating these and other conditions with TFT, HRV substantially improves. Whether or not this will translate into reduced risk for sudden death and increased life span is unknown at this time. This is a topic for longitudinal research that is certainly worthy of further undertaking.

We are often asked how long these results will last. Although we do not have long-term follow-up on all the cases presented here, on the ones where there was follow-up, it would appear that the results did endure over time. For example, in Cases 38 and 39, both of whom had long-standing, persistent problems being addressed, the results of the treatment were shown to be holding up after 5 and 6 month follow-ups. The first case Dr. Callahan treated, Mary (Callahan, 1997a), who had a life long fear of water, had this fear eliminated in minutes and has now remained free of her fear for the past twenty years. In cases where there is a recurrence of the problem, recent discoveries by Dr. Callahan have revealed the reason for this and that this can be dealt with so that the results will endure in the vast majority of such cases (Callahan & Callahan, 2000). It would be useful in future studies to do follow-up on subjects treated with TFT, where the full protocol for recurrences was used when necessary.

One of the practical findings of this study is that HRV is a useful outcome measure of treatment interventions for negative emotions. Since the 5-minute HRV test is easy and practical to administer in a clinical setting, we encourage clinicians to acquire this equipment and use HRV as an outcome measure with whatever modality of therapy that they practice. As HRV becomes more widely used in a clinical setting, this will become an objective way to determine physiological changes and the magnitude of changes that occur under specified modalities and treatment conditions. This course of research inquiry has positive scientific and ethical implications for treatment selection beneficial to clients, as well as potential emphasis and refinement in the training of psychotherapists. Since HRV has been demonstrated as

unresponsive to placebo effect, it is demonstrable that treatments showing HRV improvement concurrently have positive therapeutic impact on clients.

Huikuri, et al. (1999), noting the paucity of effective treatments for changing HRV, posed the question of whether HRV was to be considered a clinical tool or just an interesting research adjunct with no practical utility for effecting change. The results from cases presented here and those documented by Callahan (in press) show that immediate and clinically significant changes in HRV are indeed predictably achieved in many cases through the use of TFT.

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Table 1. Summary of Cases Treated with TFT where SDNN Increased

		SDNN			SUD	
Case #	Type of Problem	Pre Tx	Post Tx	% Chg	Pre Tx	Post Tx
1	overwhelm & frustration	62.0	73.0	17.7%	7	2
2	fear of anger/judgment	29.3	95.7	226.6%	7	1
3	shame on body image	57.1	68.5	20.0%	10	1
4	depression, anger	79.0	105.4	33.4%	8	1
5	frustration with school	62.5	86.9	39.0%	7	1
6	family upsets	15.7	42.2	168.8%	8	1
7	anxiety	53.8	152.9	184.2%	10	1
8	food cravings, sadness	43.1	61.3	42.2%	6	1
9	family upsets	54.0	124.8	131.1%	10	1
10	stress, tiredness	109.4	116.4	6.4%	5	1
11	restless leg syndrome	45.2	69.8	54.4%	6	1
12	loss of husband	61.9	116.4	88.0%	6	1
13	back pain, malaise	18.5	124.7	574.1%	8	1
14	headaches	67.9	90.8	33.7%	7	1
15	family upsets	42.8	64.8	51.4%	9	1
16	obsession	50.1	59.7	19.4%	5	1
17	dislike of schoolwork	71.5	150.1	109.9%	6	1
18	work upsets	82.0	138.2	68.5%	7	1
19	fear of doctor, needles	57.9	67.4	16.4%	6	4
20	anger	73.2	103.9	41.9%	5	1
21	eating disorder	19.9	20.6	3.5%	8	1
22	school behavior problems	67.6	102.9	52.2%	8	1
23	joint pain, swallowing difficulty	47.4	63.4	33.8%	7	1
24	fatigue	33.0	94.0	184.8%	8	1
25	phobia	67.2	171.9	155.8%	8	1
26	depression	29.0	81.0	179.3%	6	1
27	compulsion	60.2	65.5	8.8%	6	3
28	loss of relationship	31.1	75.0	141.2%	7	1
29	phobia	35.1	148.3	322.5%	6	1
30	food cravings	59.2	111.3	88.0%	5	1
31	depression	138.0	150.0	8.7%	7	1

Table 2. Summary of Cases Treated with TFT where SDNN Decreased

		SDNN			SUD	
Case #	**Type of Problem**	**Pre Tx**	**Post Tx**	**% Chg**	**Pre Tx**	**Post Tx**
32	phobia	215.1	139.8	35.0%	8	1
33	atrial fibrillation	212.4	96.6	54.5%	N/A	N/A
34	trauma, loss	192.2	68.6	64.3%	10	1
35	anxiety	304.6	213.5	29.9%	8	1
36	phobia, panic disorder	258.1	88.3	65.8%	4	1
37	childhood trauma	180.2	123.7	31.4%	10	1
38	asthma	266.9	71.4*	73.2%	N/A	N/A
39	Trauma/phobia	428.7	272.4*	36.5%	10	1

*For Case #38, a follow-up HRV was done one month later, with an SDNN of 103.7, and at a 5-month follow up reports remaining symptom free. For Case #39, a 6-month follow up revealed that this client had remained symptom free and that her SDNN had improved further, to115.9.