

SPECIAL ISSUE

Interpersonal Biofeedback: Biofeedback in a Relationship Context

Steven C. Kassel,¹ LMFT, BCB, BCN and John LeMay,² MFT, BCB, BCN, QEEGT

¹Biofeedback and Family Therapy Center, Santa Clarita, CA; ²Private Practice, Pismo Beach, CA

Keywords: interpersonal biofeedback, couples and family psychophysiological profile, integrated marriage and family therapy

Marriage and family therapy has had well over 70 years of research and clinical practice. The roots of biofeedback therapy go back to the 1960s for both research and clinical practice. This article reviews both couples therapy and group family therapy to illustrate the integration of psychophysiological based interventions (interpersonal biofeedback), into relational therapy contexts. It also illustrates the utility of this approach for both clients and clinicians.

Background

The correlation between health and relationships has been studied since the 1960s. Early studies focused on quality of life and relational satisfaction. Research has now expanded to include the effects of chronic stress on marriage, child-parent interactions, and immune and endocrine functions based on perceived relationship quality (Keicolt-Glaser & Newton, 2001; Pennebaker, Kiecolt-Glaser, & Glaser, 1988), physiological arousal (Carlstrom, Levenson, & Gottman, 1993), and health and longevity (McCubbin et al., 1983; Schulz & Martire, 2004). The physiology of stress and the psychophysiology of attachment have also been studied, showing that people with more secure and fulfilling relationships have better health in terms of both longevity and quality of life (Franiuk, Cohen, & Pomerantz, 2002).

Marriage and family therapy is a process in which people are coached toward more fulfilling and healthy relationships and is practiced by counselors, pastors, marriage and family therapists, and psychologists. Biofeedback is a process by which an individual learns to manage physiological activity and recovery through the aid of instruments for the purpose of enhancing performance and health (Yucha & Montgomery, 2008).

In the 1990s, John M. Gottman, at the University of Washington, developed a research-based approach to marriage and other interpersonal relationships. During that time he applied psychophysiological interventions directly to relational therapy contexts and encouraged others

practicing relational therapy to do the same. Gottman (2002) collected physiological data to better understand couples; however, he did not give moment-to-moment physiologic feedback (biofeedback) to the patients to help them alter physiology. Instead, Gottman (2013) had patients reflect upon feedback given after the session.

Integrating Biofeedback into Clinical Practice

There have been several interesting and playful inquiries into working with couples using biofeedback. Between 1975 and 1981, video artists Nina Sobell and Brian Routh, in their video piece *Interactive Electroencephalographic Video Drawings*, created an improvisational feedback loop in which two people could look at their brainwaves on an oscilloscope while silently trying to communicate with each other (Phillips, 2008, p. 206). Open Focus Training, developed by Les Fehmi, helped patients increase attention and awareness of mind and body through the use of alpha EEG biofeedback. Fehmi wired a couple to biofeedback instrumentation that measured alpha EEG and placed the couples in separate rooms. They received a sound tone and light feedback when they produced synchronous alpha waves within and between themselves and reported after treatment that they had a “honeymoon response” (Fehmi & Robbins, 2007). Paul Swingle also reported using EEG biofeedback with couples or families (Swingle, 2008).

These interesting techniques using brainwave (EEG) biofeedback are in contrast to the present authors’ work, which has emphasized peripheral biofeedback. A literature search on the topic of biofeedback with couples or families reveals very few articles referencing biofeedback as a possible application to therapy. One exception is an article by Michael Kerr in which he discussed the possibility of biofeedback being used in family therapy (Kerr, 1977). There is now a small but growing body of research into the psychophysiological effects of relational interventions (Perrone-McGovern et al., 2014).

Interpersonal biofeedback is the process by which patients learn to manage their physiology, such as heart rate, hand temperature, skin conductance, respiration, and muscle tension, in a relational context. With the help of biofeedback instruments, these specific measurements can be displayed on a computer screen, and software can rewind the audio and video of a recent negative or positive communication, allowing a couple to better understand their emotional and physiological reactivity, increase their ability to recover from stressful communications, and witness the physical and emotional effect of one another's negative and positive communication styles.

Gottman and Silver (1994) spoke of the "Four Horsemen of the Apocalypse: Criticism, Contempt, Defensiveness, and Stonewalling." When these negative communication styles occur, there is typically a large excitation of sympathetic nervous system that engages a fight or flight response. In such a state, escaping or winning are the survival strategies and clear thinking is difficult at best. A constant engagement of the fight or flight response leads to negative health consequences as well as behaviors that can undermine the relationship (Johnson, 2012). Sympathetic arousal confounds the ability to listen and thwarts creative problem solving (El-Sheikh et al., 2009; Lapidus, 2011).

When couples come for interpersonal biofeedback therapy, they are encouraged to take responsibility for their own physiology, learn relaxation techniques, observe the other person's physiology, and develop a more humanizing understanding of their partner. In doing so, they are better prepared to listen productively and problem solve. In this way self-soothing and self-regulation are learned as well as other-soothing and emotional empathy. Communication skills training such as the use of "I" statements and active listening (Lang, Floyd, & Beine, 2000) encourages clients to deepen communication. Combined with observing what happens physiologically during disagreeable events or while engaging in argument, clients can learn to alter strategies by managing impulsiveness and reactivity (Buckner, Schmidt, Bobadilla, & Taylor, 2006; Roisman, 2007). This same type of strategy can be used in the treatment of a child in family therapy. Parents who can see their child's reaction to their communication often develop a deeper understanding of their child.

Biofeedback as a psychophysiological intervention is extremely helpful in three domains. The first is that of reactivity and flexibility. In this domain, the client's reactivity to situations can be trained toward greater flexibility (Roisman, 2007). This is much like what happens through physical exercise. As a person's flexibility increases, so does his or her strength and ability to adapt. The

second domain is recovery and resilience. Here the client learns to recover from upset and tap into skills and strengths to overcome the current challenge (Tull, Barrett, McMillan, & Roemer, 2007). The third domain is unique to relationship therapy and involves the self and other boundary (Guidano, 1991). In this domain, the ability to contain one's self-defensive impulses in relationship to one's partner and listen rather than overreact is the work of the emerging self. Bowen (1971) describes this as "differentiation from family of origin" in which "A person with a well-differentiated 'self' recognizes his realistic dependence on others, but . . . can stay calm and clear headed enough in the face of conflict, criticism, and rejection to distinguish thinking rooted in a careful assessment of the facts from thinking clouded by emotionality" (Kerr, 2000).

In the assessment phase, interpersonal reactivity is assessed to get an idea of personal and relational dysregulation. An interpersonal stress profile may be used consisting of the following 3-minute segments:

- Sitting still to measure baseline,
- Neutral talk,
- Recovery,
- Problem discussion (stress trial), and
- Another recovery.

The observations of the physiology in this stress profile then guides interpersonal biofeedback treatment protocols. In the final session of either a research trial or clinical session, a post assessment can be made to compare with the data from the earlier assessment to see how each partner has changed or not changed in various measures of physiology during the problem discussion and recovery phases.

Another psychophysiological assessment method involved recording two conversations while the couple is monitored physiologically (Gottman, Coan, Carrere, & Swanson, 1998). One conversation reflected support and the second centered on conflict (Cacioppo, Von Hippel, & Ernst, 1997). The recordings include peripheral measures of heart rate, heart rate variability, galvanic skin response, temperature, respiration, and sometimes surface electromyography. Figure 1 shows a biofeedback display using the Thought Technology Biograph® Infinity system (Thought Technology, Ltd., Montreal, QC, Canada) with physiological data and webcams for both members of a dyad. These conversations reflecting support and conflict are structured into the assessment and are then reviewed by the therapist with each patient (Stuart, 2003). This process can be used to design an interpersonal biofeedback treatment plan. This

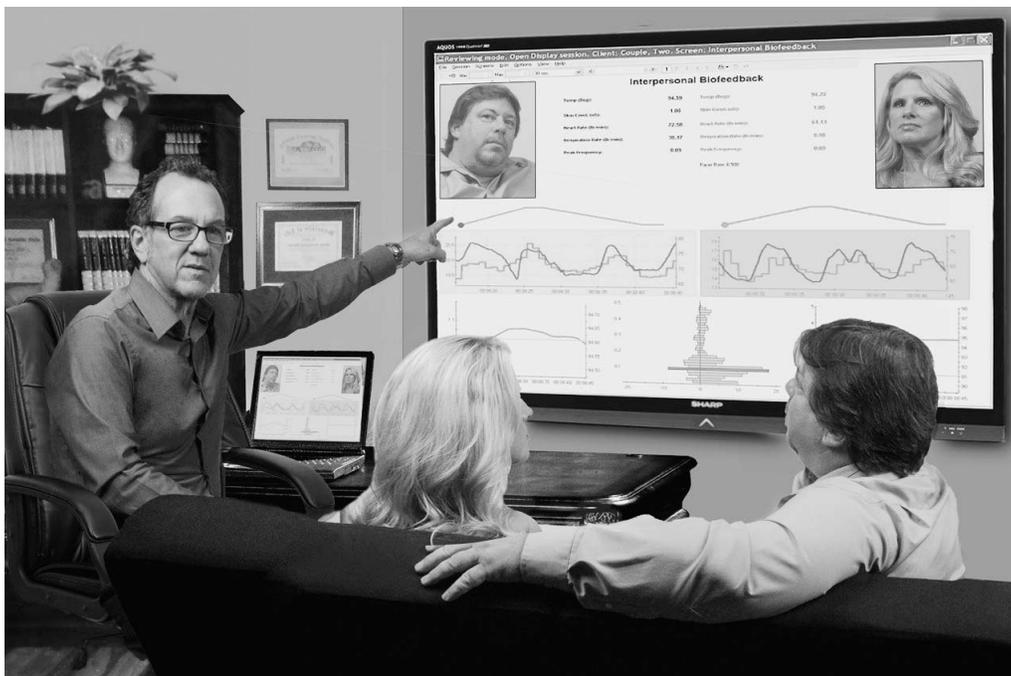


Figure 1. Room Set-up for Interpersonal Biofeedback.

assessment guides both in-clinic and home-based change strategies. Home practice may also include biofeedback devices or guided relaxation exercises.

With smaller children, the interaction between the parent and the child is observed over a 1-hour period in a room filled with board games, toys, and age appropriate video games. The parent(s) are told to talk and play with their child. This time period is recorded and when feasible, physiologic measures on the parent and/or child are gathered using telemetry monitoring utilizing physiological monitoring instrumentation from Thought Technology, Ltd. The parents are instructed to talk about something that is bothering them with the child, as well as to have a conversation with the child about how that child is succeeding. The child, depending on age, can do the same with the parent by expressing to the parent one thing at home that the child likes and one thing that the child does not like. The data and conversations are then viewed by the parents and the therapist in order to craft interventions.

The beginning of therapy consists of a psychophysiological stress profile, relationship history, goal establishment, and completing general intake questionnaires. The middle portion of therapy includes the implementation of relaxation training and interpersonal skills training, based on the assessment from the beginning phase. The end portion of therapy includes a discussion of termination, an end date, a review of what has been learned, and a list of

future goals and skills. A limited number of sessions are set to work on these goals, and follow up sessions at 3, 6, and 9 months are set. Both authors find that setting firm termination dates and concrete goals leads to greater follow through.

Two Case Examples

Jane and Bill entered marriage therapy to help reestablish “a sense of peace” after Bill had an affair. Topics of anger, sadness, and forgiveness were discussed by the couple. The role of the therapist was defined as a coach to help them express themselves clearly and establish safety. Discussions happened in the standard fashion, without biofeedback intervention. However, the sessions were video recorded and the couple returned to the office to watch portions of the video sessions while engaged in biofeedback training. Using this type of intervention, each spouse was able to learn how to better manage his or her emotions and reactions. Ultimately this led to increased flexibility, greater empathy, decreased reactivity, and the ability to relax together.

Jane and Blaine were a couple referred for three sessions as part of an employment assistance program (EAP) after Jane told Blaine to move out. The therapist explored topics such as mutual expectations, communication patterns, family of origin history, and what skills had worked in the past but were not working now. After these EAP

sessions ended, interpersonal-biofeedback was initiated along with autogenic phrases (Luthe, 1963; Tuschen-Caffier, Florin, Krause, & Pook, 1999) to be practiced at home.

During sessions, each practiced hand warming and engaged in heart rate variability training. In one session, Jane observed that Blaine's heartrate increased. This led Jane to recognize that she triggered defensiveness in him. This in turn helped the couple to explore their relationship more deeply through interpersonal psychophysiology. Over the next few sessions Jane and Blaine learned to increase their emotional trust. In the midst of this Jane's fear about her "ticking clock" surfaced. A baby was something they had previously avoided talking about. Three months after this conversation, Jane was pregnant and the relationship was described as "better than ever."

Conclusion

Interpersonal biofeedback therapy is an approach to assessment and intervention that helps increase a person's physiological flexibility, resilience, and interpersonal skills. It allows for a deeper exploration of the relational context in which each member of a family lives. Interpersonal biofeedback therapy can be applied in any setting where more than one person is involved, such as to help improve coworker or employee-supervisor relationships. As with any treatment approach, there are contraindications to consider. For example, proper training and certification is suggested, especially while using more advanced biofeedback modalities such as neurofeedback (EEG biofeedback), training with couples. Further, a well-developed neurofeedback treatment plan would include the use of individual brain mapping prior to setting training goals for each partner, because training toward a particular EEG frequency may be helpful for one person, yet harmful to the other. Finally, interpersonal biofeedback therapy can create insights into functioning not available through standard relational therapy techniques.

References

- Bowen, M. (1971). Family and family group therapy. In H. I. Kaplan & B. J. Sadock (Eds.), *Comprehensive group psychotherapy* (pp. 284–421). Baltimore, MD: Williams and Wilkins.
- Buckner, J. D., Schmidt, N. B., Bobadilla, L., & Taylor, J. (2006). Social anxiety and problematic cannabis use: Evaluating the moderating role of stress reactivity and perceived coping. *Behaviour Research and Therapy, 44*(7), 1007–1015.
- Cacioppo, J. T., Von Hippel, W., & Ernst, J. M. (1997). Mapping cognitive structures and processes through verbal content: The thought-listing technique. *Journal of Consulting and Clinical Psychology, 65*(6), 928–940.
- El-Sheikh, M., Kouros, C. D., Erath, S., Cummings, E. M., Keller, P., & Staton, L. (2009). Marital conflict and children's externalizing behavior: Pathways involving interactions between parasympathetic and sympathetic nervous system activity. *Monographs of the Society for Research in Child Development, 74*(1), vii, 1–79. doi: 10.1111/j.1540-5834.2009.00501.x
- Fehmi, L. G., & Robbins, J. (2007). *The open-focus brain: Harnessing the power of attention to heal mind and body*. Boston, MA: Shambhala Publications.
- Franiuk, R., Cohen, D., & Pomerantz, E. M. (2002). Implicit theories of relationships: Implications for relationship satisfaction and longevity. *Personal Relationships, 9*(4), 345–367.
- Gottman, J. M., Coan, J., Carrere, S., & Swanson, C. (1998). Predicting marital happiness and stability from newlywed interactions. *Journal of Marriage and the Family, 60*(1):5–22.
- Gottman, J. M., Murray, J. D., Swanson, C. C., Tyson, R., & Swanson, K. R., (2002). *The mathematics of marriage: Dynamic nonlinear models*. Cambridge, MA: Massachusetts Institute of Technology Press.
- Gottman, J. M., & Silver, N. (1994). *Why marriages succeed or fail: And how you can make yours last*. New York, NY: Simon and Schuster.
- Guidano, V. F. (1991). *The self in process: Toward a post-rationalist cognitive therapy*. New York, NY: Guilford Press.
- Johnson, S. M. (2012). *Practice of emotionally focused couple therapy: Creating connection*. Brunner-Routledge, New York, New York.
- Kerr, M. (1977). Aspects of biofeedback physiology and its relationship to family systems theory. *The American Journal of Psychoanalysis, 37*, 23–35.
- Kerr, M. (2000). One family's story: A primer on Bowen theory. The Bowen Center for the Study of the Family. Retrieved November 19, 2015 from <https://www.thebowencenter.org/theory/eight-concepts/differentiation-of-self/>
- Kerr, M. E. (2003). "One Family's Story: A Primer on Bowen Theory." Georgetown Family Center, Washington, D.C., pp. 7.
- Kiecolt-Glaser, J. K., & Newton, T. L. (2001). Marriage and health: His and hers. *Psychological Bulletin, 127*(4), 472–503.
- Lang, F., Floyd, M. R., & Beine, K. L. (2000). Clues to patients' explanations and concerns about their illnesses: A call for active listening. *Archives of Family Medicine, 9*(3), 222–227.
- Lapides, F. (2011). The implicit realm in couples therapy: Improving right hemisphere affect-regulating capabilities. *Clinical Social Work Journal, 39*(2), 161–169.
- Levenson, R. W., Carstensen, L. L., & Gottman, J. M. (1994). The influence of age and gender on affect, physiology, and their interrelations: a study of long-term marriages. *Journal of Personality and Social Psychology, 67*, 56–68. doi:10.1037/0022-3514.67.1.56.
- Luthe, W. (1963). Autogenic training: Method, research, and application in medicine. *American Journal of Psychotherapy, 17*, 174–195.
- McCubbin, H. I., McCubbin, M. A., Patterson, J. M., Cauble, A. E., Wilson, L. R., & Warwick, W. (1983). CHIP. Coping health inventory for parents: An assessment of parental coping

- patterns in the care of the chronically ill child. *Journal of Marriage and the Family*, 45(2), 359–370.
- Pennebaker, J. W., Kiecolt-Glaser, J. K., & Glaser, R. (1988). Disclosure of traumas and immune function: Health implications for psychotherapy. *Journal of Consulting and Clinical Psychology*, 56(2), 239–245.
- Perrone-McGovern, K. M., Oliviera-Silva, P., Simon-Dack, S., Lefdahl-David, E., Adams, D., McConnel, J., Howell, D. et al. (2014). Effects of empathy and conflict resolution strategies on psychophysiological arousal and satisfaction in romantic relationships. *Applied Psychophysiology and Biofeedback*, 39(1), 19–25. doi: 10.1007/s10484-013-9237-2
- Phillips, G. (Ed.). (2008). *California video: Artists and histories*. Los Angeles, CA: Getty Publications.
- Roisman, G. I. (2007). The psychophysiology of adult attachment relationships: Autonomic reactivity in marital and premarital interactions. *Developmental Psychology*, 43(1), 39–53.
- Schulz, R., & Martire, L. M. (2004). Family caregiving of persons with dementia: Prevalence, health effects, and support strategies. *The American Journal of Geriatric Psychiatry*, 12(3), 240–249.
- Stuart, R. B. (2003). *Helping couples change: A social learning approach to marital therapy*. New York, NY: Guilford Press.
- Swingle, P. G. (2008). *Biofeedback for the brain: How neurotherapy effectively treats depression ADHD, autism, and more*. New Brunswick, NJ: Rutgers University Press.
- Tull, M. T., Barrett, H. M., McMillan, E. S., & Roemer, L. (2007). A preliminary investigation of the relationship between emotion regulation difficulties and posttraumatic stress symptoms. *Behavior Therapy*, 38(3), 303–313.
- Tuschen-Caffier, B., Florin, I., Krause, W., & Pook, M. (1999). Cognitive-behavioral therapy for idiopathic infertile couples. *Psychotherapy and Psychosomatics*, 68(1), 15–21.
- Yucha, C., & Montgomery, D. (2008). *Evidence-based practice in biofeedback and neurofeedback*. Wheat Ridge, CO: AAPB.



Steven C. Kassel



John LeMay

Correspondence: Steven C. Kassel, MFT, Biofeedback and Family Therapy Center, 23560 Lyons Avenue, Santa Clarita, CA 91321, email: s@kassel.us.