

The Clinical Relevance of Psychophysiology: Support for the Psychobiology of Empathy and Psychodynamic Process

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Psychophysiological measures, such as skin conductance and heart rate, have been used in both psychotherapy process research and clinical practice. We present a case report of a patient and therapist who participated in a process-oriented psychotherapy research protocol using simultaneous measures of skin conductance. Data from the research protocol were used to broaden an empathic understanding of the patient, which facilitated insight and enhanced the exploration of conscious and unconscious processes that originated in the past and have come to dominate the present—the core of psychodynamic theories of change. The case illustrates the clinical relevance of psychophysiology and its use as a potential bridge between psychotherapy research and the theory and practice of psychotherapy. The implications of the case in support of the role of empathy in psychotherapy are discussed.

INTRODUCTION

Despite decades of psychodynamic psychotherapy research, few psychotherapists practice in a way that is informed by research (Luborsky, 1992). In particular, the gap between research and practice in psychodynamic psychotherapy is as wide as any gap in the health sciences (Strupp, 1989). This gap is, in part, due to pressure to provide “empirical support” using manual-driven therapy and randomized controlled trials forcing psychotherapy research away from how therapy is most commonly practiced

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(Westen, Morrison, & Thompson-Brenner, 2004). Meanwhile, the explosion of knowledge in the neurosciences has led to calls to inform models of therapeutic change with neurobiology. This advancement in knowledge serves to widen the gap even further as increasingly complex technologies, research practices, and languages that describe them emerge (Kandel, 1998). We present the case report of a patient and therapist who participated in a naturalistic, process-oriented psychotherapy research protocol using simultaneous measures of skin conductivity. Data from the research protocol were used clinically and had a significant positive impact on the process and outcome of the case. The results support the clinical relevance of psychophysiological measures and the role of empathy in the psychodynamic psychotherapy process.

Historically, psychophysiology has been used in a variety of ways in psychodynamic psychotherapy research and practice. In a review of the literature, Glucksman (1981) divides the uses of psychophysiology into three categories: (a) to explore the relationship between physiologic responses and psychopathologic and psychodynamic concepts, (b) to investigate physiologic correlates of the patient-therapist interaction, and (c) to monitor physiologic patterns within and across psychotherapy sessions (Glucksman, 1981). Multiple physiologic measures have been employed in psychotherapy research, including skin conductance, heart rate, blood pressure, skin temperature, respiratory rate, muscle tension and electroencephalography. The goal of using physiologic indices during psychotherapy is to create an objective measure of emotional and autonomic responses to conscious and unconscious as well as internal and external stimuli. Described in the context of a research protocol exploring the relationship between patient-clinician physiology and perceived empathy, the present case uses psychophysiology as a clinical and diagnostic aide that moves the therapist toward a richer, deeper understanding and appreciation of the patient's anxiety.

A large number of research studies use psychophysiology in the study of psychopathology (Keller, Hicks, & Miller, 2000). Two consistent findings in the literature involve depression and anxiety disorders. Depressed patients show consistent changes in skin conductance including decreased overall levels, decreased frequency of response, and decreased amplitude of response when compared with non-depressed patients (Iacono et al., 1983; Thorell, Kjellman, & D'Elia, 1987; Ward, Doerr, & Storrie, 1983). These findings may cut across different cultures (Tsai, Pole, Levenson, & Munoz, 2003). Moreover, early onset and long duration of depressive symptoms are associated with low-magnitude skin conductance levels,

suggesting that low sympathetic arousal may be a trait characteristic of depressed patients (Iacono, 1984; Thorell et al., 1987). On the other hand, it is well documented that anxious patients have increased autonomic arousal, manifested by higher skin conductance levels, more frequent spontaneous fluctuations, and higher response amplitudes (Ashcroft, Guimaraes, Wang, & Deakin, 1991). In one study, the number of spontaneous fluctuations in skin conductive levels correlated with higher scores on the Hamilton Anxiety Scale (Orr & Pitman, 1987). In another study in a phobic patient during psychotherapy, the authors showed increased skin conductance levels during periods of increased symptoms of anxiety, during periods of decreased sense of mastery, and during periods of negative affect (Glucksman, Quinlan, & Leigh, 1985). Despite these findings, psychophysiology is not routinely used in psychotherapy research or as an aid in clinical diagnoses.

The role of empathy in psychotherapy research, in contrast, has a long tradition dating back to the latter half of the 20th century with the work of Rogers and later Kohut (Bohart & Greenberg, 1997). In 1959, Rogers defined empathy as the ability to accurately perceive another person's internal "frame of reference" (Rogers, 1957). Rogers' work led to the development of client-centered therapies, giving empathy a central role. However, early empirical research efforts relating empathy to treatment outcome, while promising, were hampered by confusion over definitions and poor study design (Duan & Hill, 1996). As a result, subsequent studies challenging the early findings led to a decline in interest in research in empathy (Bohart & Greenberg, 1997).

Despite the decline in interest, there is ample evidence to support a positive and significant relationship between particular measures of empathy and positive outcome in psychotherapy. For example, Orlinsky et al. (1994) found that in 54% of 115 studies reviewed, there was a positive relationship when relating empathy to therapeutic outcome. This percentage increases to 72% when empathy is considered from the patient perspective (Orlinsky, Grawe, & Parks, 1994). Researchers in another large, early study looked at different approaches to the measurement of empathy in twenty-five unique patient-clinician dyads; they found that client perception of therapist empathy was the best predictor of positive outcome (Kurtz & Grummon, 1972). In a more recent study, Persons & Burns (1985) examined the patient-therapist relationship in sessions of cognitive-behavioral therapy for depressed outpatients. The researchers found that within-session changes in maladaptive thoughts and the quality of the patient-therapist relationship, including warmth, trustworthiness

and empathy, made independent and additive contributions to mood change (Persons & Burns, 1985).

However, this research left open questions of whether the primary function of empathy is to be the agent of change or to provide a supportive context for other causative agents (Feshbach, 1997). In the largest and best-controlled study of empathy in psychotherapy to date, Burns and Nolen-Hoeksema (1992) used structural equation modeling in a group of 185 patients treated with CBT for depression (Burns & Nolen-Hoeksema, 1992). The authors found that high levels of therapist empathy predicted clinical improvement, even when controlling for other factors, including homework compliance, therapist experience, patient income, presence of borderline personality disorder, use of medication, patient age, gender and education. In addition, patients who dropped out of the study had poorer outcomes, and they perceived their therapists as less empathic than those who completed treatment (Burns & Nolen-Hoeksema, 1992). This latter finding is consistent with a critical review of negative outcomes in psychotherapy research that found lack of empathy was the best predictor for negative outcome (Mohr, 1995). These two findings suggest that empathy may be a necessary, but not sufficient factor in treatment success.

The following case illustrates the impact of psychophysiology findings on empathic understanding and the subtle complexity and psychobiology of social interaction during clinical psychotherapy practice. Data not normally available to clinicians significantly enhanced the therapeutic process and outcome. Specifically, the therapist's knowledge of the patient's intense physiologic reactions during the therapy session facilitated an empathic recognition and deeper understanding of a profound disconnection between the patient's external stolid, well-controlled, and more depressed demeanor and the intense, internal milieu of high-sympathetic arousal. This elevated level of arousal is suggestive of high levels of undisclosed anxiety. The empathic validation of the patient's hidden inner-anxious state, in the context of a psychodynamic formulation involving the role of the patient's mother in her behavior, had significant therapeutic and clinical benefits. The patient's name and some specifics of the case have been disguised, and both the patient and the Massachusetts General Hospital Human Research Committee have approved the reporting of this case.

CASE HISTORY

Jane is a middle-aged, married, white, well-educated, dual-career professional female who came to therapy five years ago on the recommenda-

tion of a nutritional counselor whom she had consulted for weight loss. At the time the patient was 70 pounds more than her ideal body weight. The nutritionist had asked Jane to keep a record of all her food intake for a period of one week. When she returned, the nutritionist was impressed with the volume and intensity of feelings that Jane had recorded in the log about her mother's controlling attitude toward food. The nutritionist clearly stated that she could not help Jane until she sought psychotherapy to resolve her issues with her mother.

Jane's life history is replete with a very negative body image that dates back to her early youth. Her mother was extremely unhappy that Jane was large-boned and overweight. She forced her daughter to attend weight loss clinics from the time she was very young. As Jane became older, her mother became increasingly obsessed with Jane's weight and tried to control her with cruel verbal abuse and manipulative tactics despite Jane being an attractive size 14 high school student with excellent grades, many friends, and healthy relationships with boys. She demonstrated high self-esteem in most other areas of her life except her weight. For many years Jane was her mother's confidant, and she remembered feeling very close to her mother except when the subject of weight came up.

Jane was the second eldest of five children in an affluent family. Her oldest sibling was born with physical and learning disabilities and it became apparent to Jane that this taxed her mother's patience enormously. One year after Jane was born, her mother gave birth to a third sibling who had severe genetic abnormalities and died within the first year of life. The last two siblings were born several years later. Growing up, Jane was keenly aware of her mother's need for her to be "perfect" stating, "I think she looked to me to help her with her feelings of failure and loss about my other siblings."

In the first two and one-half years of therapy, Jane rarely talked explicitly about her anxiety, but rather focused the therapy on her symptoms of chronic depression and her relationship with her mother. Empowered and mobilized by a strong therapeutic alliance, Jane realized she had to learn to separate herself from her role of "mother's care-taker" and set boundaries on her mother's verbal abuse about her weight. This resulted in a period of one year in which she did not speak to her mother (choosing instead to communicate with her mother through letters about the need to change their relationship) thus breaking her lifelong pattern of attending to her mother's needs at the expense of her own. This was a very difficult time for Jane. She had no support from her siblings who, over the years, had come to see her as self-sufficient and independent without any

needs of her own, thus reinforcing Jane's role as "mother's care-taker." As Jane described, "No one sees my pain or my fears." She became adept at hiding her feelings and denying her needs while serving the needs of others. However, through therapy she increasingly realized she would never make progress if she did not transform this self-defeating style and learn to express her needs verbally while taking better care of herself.

One consequence of Jane's self-defeating style was her relationship with food and her weight. Jane spoke about her obesity as a way of reminding everyone that she *did* exist and that she *did* have needs, which she met by feeding herself. However, she was in a double bind that prevented her from going on a successful weight loss diet stating, "If I lose weight it is like proving my mother right—that it was all my fault that I was overweight and all up to me to change it. If I don't lose weight I remain the object of ridicule and derision."

The next two years of therapy shifted toward working through career and life decisions. She and her husband decided not to take the step to parenthood. The decision not to have a child opened the therapy up to a discussion of Jane's other life goals. She became worried about her health. Her uncle had suffered a heart attack in his early 40's, and there was a history of heart disease and diabetes in the family. She had been sedentary her whole life and loathed the idea of exercise. However, now she was fearful of the consequences of being overweight and sedentary so she decided to embark on an exercise program. She explicitly stated that she did *not* want her physical training to be about weight loss, but about becoming less sedentary and building muscle tone. She was not at all interested in any food monitoring stating, "Why is everyone so wrapped up in being thin? Why can't people just love you for how well you treat them?"

THE RESEARCH PROTOCOL

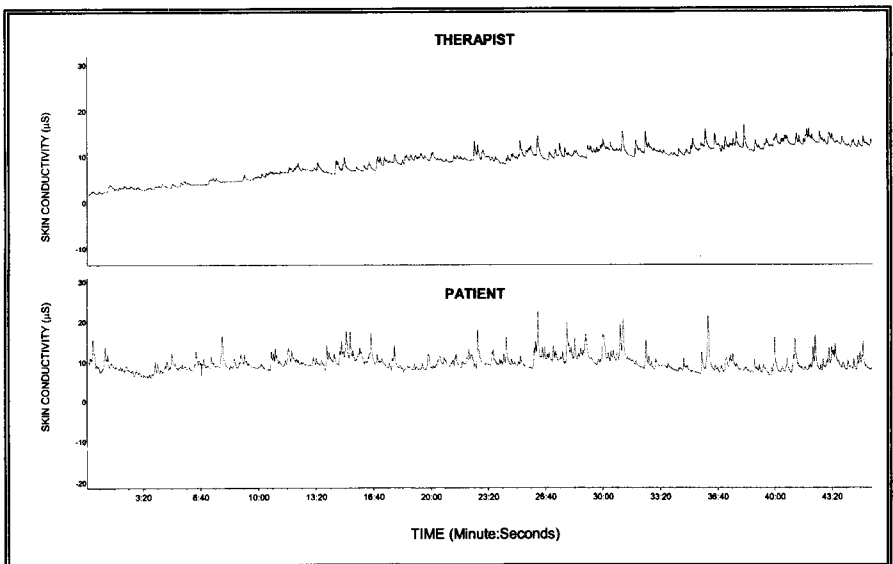
About six months into her exercise program, Jane was asked if she would like to participate in a psychotherapy research study assessing therapist empathy by using simultaneous recordings of skin conductance of the patient and therapist during their session. The informed consent described the purpose of the study as designed to help uncover the nature of the patient-therapist relationship. Jane was interested in being a research subject stating, "Anything I can do to help other people so they don't have to suffer like I do, I will gladly do." The research protocol called for a single, monitored session of an established psychodynamic psychotherapy. Following a brief interaction with the experimenter to

establish baseline measures, the patient and therapist were connected to skin conductance leads and the session was recorded. Following the session, the patient was asked to fill out a questionnaire on her perception of the therapist's empathy during the session.

A startling and surprising finding in the analysis of Jane's skin conductance was the unusually high arousal and the frequency of non-specific fluctuations in her skin conductivity during the therapy session (Figure 1). This was particularly salient given that the arousal level was often two- to three- times higher than the therapist's arousal. The analysis of the simultaneous arousal levels during the session, using time-series analysis, demonstrated that the patient and therapist had a high level of physiologic concordance. This correlated with patient perception of a high level of therapist empathy on the questionnaire for the monitored session (Marci, Ham, Moran, & Orr, 2005). There was a high degree of physiologic concordance between patient and therapist, despite the much higher amplitude of arousal in the patient, who, came across as very calm, even spoken, and mildly depressed, with very few overt indications of even mild or moderate anxiety.

After the therapist reviewed the videotape and psychophysiology data with the researcher, the therapist asked Jane if she was interested in

Figure 1.
PATIENT AND THERAPIST SKIN CONDUCTIVITY DURING PSYCHOTHERAPY.



discussing the results. After Jane expressed an interest, her therapist stated:

“The study showed that there was a high degree of physiologic concordance, or similarity, in our internal states during the session. The shape of the curve of our internal arousal was relatively synchronous. What was surprising to me was the very high amplitude of your level of arousal, suggesting a high level of anxiety.”

Jane’s high level of anxiety previously was below the therapist’s level of awareness, given Jane’s calm and reserved presentation. The patient was very intrigued that her inner state had been revealed, but she was not surprised that she did not come across anxious clinically. She had always seen her role in life as someone who managed and cared for other peoples’ anxiety, never focusing on her own high anxiety levels.

Jane said that her therapist’s comment about the research finding was the first time that anyone had “seen my true very high level of anxiety” and appreciated the extent of her suffering. Jane and her therapist talked about how this research had been like an “X-ray” of her internal emotional world and how Jane felt validated and vindicated because her inner state had finally been seen explicitly and talked about in a way that allowed someone to empathize with her day-to-day suffering. She also expressed positive feelings that her participation in the study had yielded this added insight for *her* therapy, rather than only helping others in the future. There was a sense of excitement and increased connection expressed by the patient, which was sensed by the therapist following this conversation.

CASE FOLLOW-UP

About one month after the discussion about the research, the patient began expressing dissatisfaction that her exercise program had not resulted in any weight loss. While acknowledging that weight loss had not been her explicit goal, Jane was very discouraged that she had lost no weight at all and had, in fact, gained approximately five pounds. Three months later she spoke to her exercise instructor, who became very defensive and took a rigid approach, saying it was up to the patient to eat fewer calories and that the workout did not need to be changed. Jane was displeased by the instructor’s reaction, which reminded her too much of the negative interactions she had with her mother. With her therapist’s support, Jane consulted another instructor. The new instructor had a very different idea about approaching overweight clients, but like the nutrition-

ist five years earlier, suggested that Jane begin by keeping a record of all her food intake, a task Jane was now readily able to perform.

Surprisingly, the very request that led this patient into therapy five years earlier, a request that previously resulted in an eruption of massively painful and hurtful feelings, was now something she could manage. With Jane's internal conflict about her weight resolved, she wanted to see a change in her body and was no longer content with an exercise program that did not change the way she looked. Jane has lost approximately 40 pounds since the time of the research session. She now exercises between three and four times per week. She stated, "You and my new instructor are the only people in my life who have encouraged me by seeing who I am and knowing what I needed without pushing me. I never thought I would be a person who missed working out, but now I just don't feel right when I don't exercise. I can't believe how I have changed."

After a year of not having verbal communication with her mother, Jane gradually re-established contact. She has not mentioned her exercise routine or her weight loss to her mother, who lives in a different part of the country. Despite her new level of understanding, she wants to keep her weight loss to herself, fearing that her mother will try to control her in the way she had in the past. At a recent family visit, Jane's mother made no mention of the obvious weight loss. However, Jane's mother did not make negative comments about what Jane was eating, and there is no longer any verbal abuse about Jane's eating habits and weight. Jane reports significant improvement in her depression, her relationship with her family, her overall level of self-esteem, and a reduction in her internal sense of anxiety.

DISCUSSION

The present case illustrates the complex nature of the therapeutic process as well as the limits of empathic understanding, even within the context of a good therapeutic alliance. The case also demonstrates the role of empathic accuracy in supporting psychodynamic interventions and how psychophysiology can help bridge the gap between basic science research and clinical practice, providing unique information in a way that informs the therapist's understanding of the patient during psychotherapy in a clinically relevant way.

Prior to involvement in the research protocol, the psychodynamic formulation of the case by the therapist emphasized the patient's awareness of her mother's overwhelming experience of giving birth to children with special needs. The patient feared that if she expressed her own physical and emotional needs, she would be rejected by her mother. The

patient was thereby protecting her mother from the burden of additional defects in her children. The mother's inability to identify and meet the patient's emotional needs led to the patient learning to connect with her mother (and ultimately others) primarily through attending to their emotional and other needs at the expense of her own needs. In response, the patient used unhealthy eating and exercise habits to soothe and regulate the negative emotions that masked her anxiety. This pattern ultimately led to excessive weight gain, triggering a negative reaction by the patient's mother, who equated obesity with imperfection. Jane was historically unable to avoid rejection and negativity from her mother—the very things Jane tried to avoid initially—leading to chronic feelings of anger and depression.

The therapist's pre-research protocol formulation describes the patient's core conflict. The patient, in an ambivalent pursuit of weight loss, consulted a nutritionist. When the nutritionist requested that Jane keep a food diary, Jane reacts by releasing her pent up anger toward her emotionally withholding mother, who had ignored Jane's needs and tried to regulate her food intake. This is a clear transference reaction to the nutritionist, who is also trying to "control" Jane's food intake. Thus, if the patient keeps suppressing her physical and emotional needs, she will be forced to continue to soothe herself with food. This will result in continued obesity, depression, and poor relations with her mother who will view the patient's obesity as yet another "defect" in another child. Alternatively, Jane believed she would be immediately rejected if she expressed her needs to her mother (or anyone). This is because Jane developed the expectation that it is her role to take care of others' needs before her own.

It is important to note that prior to the introduction of the research protocol, the therapist is at risk of repeating the pervasive pattern of not fully seeing the patient's true needs, despite the strong alliance and high empathy rating observed in the research protocol. This is because Jane had become extremely adept at hiding her anxiety. Thus, without knowledge of the patient's high physiologic reactivity and the resultant empathic understanding, the therapist has the potential to be repeatedly experienced by the patient in a way that was not unlike the patient's mother—that is, "not seeing her pain." Therefore, despite the therapeutic bond built early in the therapy, the patient reflexively withholds the full extent of her anxiety from herself and the therapist.

The new, deeper post-research protocol formulation draws on both the therapist's clinical experience and knowledge of the research data, resulting in the therapist's deeper appreciation of the nature of Jane's suffering.

The therapist's new, empathic understanding of Jane's anxiety validated her inner world. This helped reduce Jane's drive to "feed" and "display" her emotional needs, lowering her anxiety level, and alleviating her feelings of deprivation, which took the form of unhealthy food choices and obesity. Once her therapist, aided by the knowledge of the patient's physiology, "sees the patient's full anxiety," the cycle of countertransferential "neglect" of her extremely high levels of anxiety and autonomic arousal are broken. This allows the patient to begin to let go of her "badge" of emotional deprivation (i.e., her obesity). Jane was expressing visually, through her weight, what she could not express verbally—her physical and emotional needs.

The research-informed empathic interpretation leads Jane to re-experience the therapist as ever more committed to understanding the patient's internal world. The therapeutic work, within the expanded formulation, eventually leads to a reduction of Jane's caloric intake and increases in the number of weekly exercise sessions. Thus, the therapist's awareness of the patient's unusually high level of arousal not only created a new framework for understanding and interpreting the patient's high anxiety and emotional needs, but also shifted the interpersonal process to avoid a repetition of the emotional disconnection the patient had experienced with herself and her mother.

The beneficial clinical result of increased self-esteem, self-worth, and self-mastery, combined with improved physical and emotional health, came, in part, as a result of the research-informed therapeutic process. The results demonstrate that—despite observations by an accomplished, empathic therapist—this high functioning, intelligent and caring woman indeed had very significant internal anxieties and fears that went far beyond what she externally revealed and consciously realized. The post-research protocol formulation resulted in a deeper, mutual empathic understanding. This understanding was based on the combination of the pre-research protocol formulation and the technological display of the patient's anxiety that allowed the therapist to safely discuss the patient's anxiety with increasing confidence. This safety came from Jane's knowing that the therapist (and eventually others) would see and attend to her anxious feelings. The results support the role of empathy not as a sole agent of change, but as a facilitating experience to help create a more effective psychodynamic process.

This case also illustrates how research-based psychophysiology data can bridge the gap between basic science research and clinical practice. Previous authors have reported similar cases of success using psychophys-

iology during psychotherapy (Legalos, 1973; Toomin & Toomin, 1975; Werbach, 1977). As our understanding of the neurobiology of the central nervous system control of autonomic arousal and other psychophysiological measures evolves (Critchley et al., 2003), the opportunity to develop and test more novel and integrated biopsychosocial models of human inter-relatedness will emerge. Rather than using psychophysiology exclusively in hypnosis, meditation or biofeedback as is most common, this case demonstrates the use of psychophysiology to support, understand, and deepen the process of psychodynamic psychotherapy through improved empathic awareness. That is, knowledge of the patient's physiology facilitated the process of altering the patient's pathological pattern of behavior within the context of the therapeutic alliance. The physiologic data helped create new insight and enhanced the exploration of conscious and unconscious processes that originated in the past and have come to dominate the present—the core of psychodynamic theories of change (Jones, 2000).

This case also illustrates the importance of single case observations. History reminds us that in the middle of the 19th century, Paul Broca performed an autopsy on a man who had been hospitalized for the inability to speak fluently (Broca, 1861). His finding of a lesion in the *lateral gyrus* of the left frontal lobe convinced him, and eventually the rest of the medical community, that this area was critically involved in the production of intelligible speech. Today, in the midst of intense focus on large-scale clinical trials, it is easy to forget the importance of a single case in helping to formulate hypotheses and to illustrate important concepts. The present case illustrates a clear and expedient translation of biologically informed research concepts into a clinical psychodynamic psychotherapy case formulation. It is important to note the unique constellation of events that allowed for the transformation of the participants from subjects in a process-oriented research protocol to change agents in a clinical setting, facilitating a significant clinical breakthrough using an interpretation of technologically derived data.

The role of psychodynamic psychotherapy is to make conscious internal conflicts and ultimately change patterns in the flow of verbal and nonverbal information within and between the participants mediated by internal neurobiologic and physiologic processes (Siegel, 1999). These processes are determined in large part by how prior interpersonal experiences shape the expression of programmed maturation of the nervous system; and they are highly dependent upon early childhood relationships (Schoore, 1994). In his influential paper entitled, "Biology and the Future of Psychoanalysis," Kandel argues for the importance of neurobiology to the future of psychotherapy research,

focusing on social and biological determinants of behavior informed by psychodynamic psychotherapeutic principles (Kandel, 1999). He calls for creative ways of studying subjective phenomena, preferably with objective empirical approaches informed by neuroscience, in an effort to advance our understanding and effectiveness of psychotherapy. This case offers a modest example of one approach and reminds both researchers and clinicians of the importance of patient and process variables in understanding what leads to change in psychotherapy (Ablon & Marci, 2004).

Future studies that allow for the translation of the explosion in clinically relevant basic and clinical science into everyday practice are needed to further advance the therapeutic impact of our psychosocial interventions. Psychophysiology has the potential to aid in both generating empirically testable hypotheses and in bridging the gap between research and clinical practice. Future directions for this technology include consultations to patient-therapist dyads at an impasse, research to enhance understanding of the therapeutic process, and prospective studies on the relationship between patient-therapist physiology and other established clinical process and outcome variables.

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