Counselling Psychology and Psychophysiology: The Neglected Interface

John W. Robinson
Alberta Children's Hospital Research Centre

Bonnie J. Kaplan
Alberta Children's Hospital Research Centre and University of Calgary

Résumé

Le but de cet article est d'encourager l'utilisation de méthodes et de perspectives psychophysiologiques dans la recherche en counselling. Trois questions sont considerées: Premièrement, de quelles façons est-ce que la counselling a été étudiée jusqu'ici à l'aide de méthodes psychophysiologiques? Deuxièmement, quelles sont les méthodes psychophysiologiques qui peuvent être utiles dans la recherche à venir? Enfin, quelles sont des questions importantes auxquelles ces méthodes peuvent répondre?

Abstract

The purpose of this article is to encourage more frequent use of psychophysiological methods and psychophysiological perspectives in counselling research. Three questions are addressed: how counselling psychology has been studied up to now using psychophysiological methods, which psychophysiological methods may prove useful for future research, and what are some important questions to be answered using these methods.

It is useful to consider human behaviour as a complex of three measureable response systems: verbal-cognitive, overt motor, and physiological (Epstein, 1976; Hersen & Barlow, 1976; Lang, 1971). In their clinical practice and in their research, counselling psychologists traditionally have concentrated on the verbal-cognitive and the overt motor systems, for the most part neglecting the physiological system. One salient exception to this generality is the growing use of biofeedback (an application of psychophysiological techniques) as an adjunct to relaxation training.

Many of us use the subjective detection of physiological activity in everyday practice. For example, when we approach our clients in the waiting room, we often perform a psychophysiological assessment: Is the client's face flushed? Is respiration rapid and shallow? Shaking a client's hand also provides us with an opportunity for such an assessment: Are the hands warm and dry? Or cold and wet? The discipline of psychophysiology provides more sophisticated instruments and techniques for detecting physiological events, so that physiological activity can be related to psychological variables.

The term "psychophysiology" may be used to refer to many different aspects of the interface between psyche and soma. Biochemical markers of mood states, pharmacological interventions for psychological disturbances, and electrocortical events related to cognitive activity might all be considered under this rubric. For the purposes of this paper, we will restrict our discussion to the non-cortical electrophysiological parameters of the peripheral nervous system. These include measures of cardiovascular activity, of skeletal muscle, and of electrodermal activity.

The intention of this paper is to advance counselling psychology by building some bridges between psychophysiology and counselling psychology. The approach taken here will be to address three questions: (1) How has counselling psychology been studied with psychophysiological methods so far; (2) Which psychophysiological methods might be useful in studying counselling; (3) What important questions could be addressed using psychophysiological methods.

THE STUDY OF COUNSELLING PSYCHOLOGY WITH PSYCHOPHYSIOLOGICAL METHODS

Counselling psychologists and psychophysiologists share a common interest in emotions. It has been known for centuries that affective reactions are accompanied by certain physiological changes. Butterflies in the stomach, cold sweaty hands, and a fluttering heart are common reminders of this relationship. Most psychophysiological investigations of the emotions have involved the identification of responses which occur across subjects as a result of a single environmental (emotional) event. Studies of this type have explored the principle of stimulus response specificity (SRS), which asserts that specific stimuli produce specific physiological responses. The most often quoted evidence of SRS was provided by Ax (1953) and Schacter (1957), who reported distinct patterns of physiological activity for subjects in whom fear or anger had been evoked. Because the patterns related to fear were distinguishable from those related to anger, these data were taken as evidence of the principle of SRS. It might be noted that this principle of SRS is at odds with views of such people as Cannon (1929/1970) who believed that the same physiological response accompanies all emotions, varying only in intensity. The degree of physiological specificity exhibited by our bodies in association with specific emotions is still uncertain, although research on this topic is being conducted by ourselves and others.

Using psychophysiological measures as a window through which to view affective activity, a group of researchers at the Massachusetts Mental Health Centre published a series of studies in what they called "interpersonal physiology" (Coleman, Greenblatt, & Solomon, 1956; Di Mascio, Boyd, Greenblatt, & Solomon, 1955; Di Mascio, Boyd, & Greenblatt, 1957). They assumed that the relationship between client and counsellor is highly significant in determining the effectiveness of counselling and that much of the relationship involves subtle forms of interaction. They equipped a therapy room for physiological recording of the autonomic activity of a therapist and client and for tape-recording their conversation. Two observers visually monitored the client and therapist through a one-way mirror. One observer coded on the polygraph chart clinical judgments of the client's emotions. The other observer used the Bales system of interactional process analysis to code the various categories of interaction. Heart rate, skin conductance, and finger skin temperature of both the therapist and the client were simultaneously recorded. Having records of both the physiological activity and the social-interactional behaviour of the therapist and client enabled the research team to examine how physiological activity varied with the nature of the interaction. They reported a number of interesting results. Generally speaking, they claimed to have found a correlation between physiological activity of therapist and client. Because they assumed that physiological activity is indicative of emotional activity, they inferred that this was evidence that the therapist and client were having similar feelings, that is to say, being empathic. Further support for this assertion was gained by observing that the periods in which this co-variation between therapist and client physiological activity was not evidenced were associated with instances in which the therapist reported being disturbed by his own preoccupations.

An important though peripheral finding of these studies was that studying the therapeutic relationship did not negate the therapeutic value of the interview. Even though both parties had electrodes attached to them and knew they were being studied, the interviews were perceived by the clients as being valuable. In the 1950's there was much resistance to the idea of studying counselling/psychotherapy in the laboratory; many felt that the research situation would destroy the value of the encounter. In referring to this series of studies, however, Greenblatt (1972) stated that there was little doubt that therapist and client were deeply engaged in psychotherapy.

The research at the Massachusetts Mental Health Center could be characterized as observational: physiological activity was simply recorded in an otherwise ordinary counselling interview. A second type of setting in which physiological correlates of emotions have been studied is one in which attitudes have been manipulated during the recording sessions. For instance, Malmo, Boag, and Smith (1957) employed an experimental design in which the interviewer's attitude was manipulated from being supportive to being critical. Subjects were divided into two groups, one of which received praise and the other of which received criticism following an interpretive story from a standard Thematic Apperception Test card. The results indicated differential physiological reactions to the supportive versus the critical situations in both subjects and interviewer. Similarly, Linton, Travis, Kuechenmeister, and White (1977) studied heart rate co-variation of a hypnotist during a hypnotizability procedure, and found a heart rate concordance between subject and hypnotist. They did not believe that the concordance was evidence of an empathic relationship, as did the Massachusetts group, but rather they explained the concordance in terms of some personality variables of the subjects.

There has been additional correlational research performed in small group situations. Kaplan and his associates (Kaplan, 1963; Kaplan, Burch, Bloom, & Edelbert, 1963) extended the use of continuous physiological recording and the Bales system of analyzing social interaction. They composed groups of subjects in various ways (for example, using sociometric criteria) and then asked the subjects to discuss various topics over a series of sessions. Both social interaction and psychophysiological data were recorded. One of the ways in which the data were analyzed was with an index of physiological co-variations presumed to relate to rapport. This index was derived by correlating frequency of electrodermal responses between two individuals. The index of rapport was found to vary consistently with measures of social interaction. One unexpected finding, though, was that subject pairs who, prior to the experiment, indicated that they did not like each other, exhibited as much correlated physiological activity as subject pairs who reported that they did like each other (Kaplan, et al., 1963).

The studies cited thus far have focused on the process of counselling interaction. Psychophysiological methods have also proven useful in outcome studies of counselling and psychotherapy. As mentioned above, people respond in three modalities: verbal-cognitive, overt motor, and physiological. Thus, in order to assess the outcome of counselling, measurement of each of these modalities may be useful. Lang and Lazovik (1963) in their work on the desensitization of phobias showed that some subjects exhibited a rapid change in overt behaviour (for example, less avoidance of snakes) but showed no initial change in self-report ratings or in physiological response to the phobic object. Borkovec (1973) postulated that significant decreases in fear are difficult to achieve if motoric and cognitive changes are attempted without physiological change. As a result of this philosophy, several studies have included physiological arousal as an outcome variable in therapeutic settings (Biran & Wilson, 1981; Borkovec, Stone, O'Brien, & Kaloupek, 1974; Twentymen & McFall, 1975).

Some researchers have gone so far as to define specific physiological changes as being the desired outcome of counselling. Martin, Lundy, and Lewin (1960) postulated that as clients talk about sensitive issues at the beginning of counselling, they experience the associated negative affect, but as a result of talking about the sensitive issues in a therapeutic atmosphere of "non-critical acceptance, understanding, and so forth, the negative affect associated with the sensitive areas tends to extinguish" (Martin, et al., 1960). This study found an increase in skin resistance (indicative of lower physiological arousal) accompanied by an increase in comfort when talking about originally sensitive topics.

Most recently, psychophysiological methods have also been used as an aid in designing the course of counselling. Davidson and Schwartz (1976) have developed a model differentiating anxiety which is somatic (physiologic) from that which is cognitive. An example of cognitive anxiety is the person who goes to bed with a fatigued body but finds it impossible to fall asleep because of multitudinous thoughts. An example of somatic anxiety is the experience of butterflies in one's stomach. Davidson (1978) reports that subjects trained with progressive relaxation (a somatically based procedure) reduced only their somatic anxiety, whereas those subjects with rational-emotive therapy reduced only their cognitive anxiety. The Davidson and Schwartz model is an illustration of how a psychophysiological perspective can be used to select counselling techniques more appropriate to a client. In addition, Davidson found support for the hypothesis that measures such as heart rate and frontalis muscle tension are most closely linked with somatic events, whereas the electrodermal measures (e.g., skin conductance) are most closely associated with cognitive activity.

In summary, thus far psychophysiological measures have been used in the study of counselling in three ways. The first is as a tool to monitor the subtle moment-to-moment changes in affect for both the client and the counsellor during counselling which might otherwise be missed. Second, acceptance of the three response systems view of human behaviour has led researchers to include psychophysiological measures as outcome variables of counselling, and to question the stability of client change unless positive physiological changes are seen. Finally, psychophysiology is showing promise as a conceptual aid for selecting appropriate counselling procedures for an individual client.

WHICH PSYCHOPHYSIOLOGICAL METHODS MIGHT BE USEFUL IN STUDYING COUNSELLING

The purpose of this section is to acquaint the reader with some important considerations when using psychophysiological methods to study counselling. It will also serve as an introduction to basic terminology and concepts in psychophysiology so as to facilitate reading of the suggested resource material.

A review of the basic components of the human nervous system is a good place to start. Andreassi (1980), Grings and Dawson (1978), Sternbach (1966), and Stern, Ray, and Davis (1980) have all written good introductory textbooks; Lang's (1971) review article provides a concise but somewhat technical overview of the important concepts.

GENERAL ORGANIZATION OF THE NERVOUS SYSTEM

Functionally, our nervous system is divided into the central nervous system (CNS), which is composed of the brain and the spinal cord, and the peripheral nervous system which consists of nerves which lie outside the CNS. The peripheral nervous system is divided into two main parts according to function: the somatic system which is concerned with muscular activity, and the autonomic nervous system (ANS) which deals with internal and relatively involuntary responses that are associated with emotions. The ANS is subdivided into the sympathetic nervous system (SNS) and the parasympathetic nervous system (PNS). The SNS in general serves to activate the body, whereas the PNS conserves energy and helps to return physiological functioning to a state of equilibrium. For example, the SNS dominates in periods of stress, inhibiting the digestive process, and increasing heart rate, sweating, and vasaconstriction of the peripheral blood vessels. The PNS on the other hand performs such functions as stimulation of the gastrointestinal tract, slowing of heart rate, and control of erection of the genitalia. Most organs are innervated by both the SNS and PNS, and in those cases they usually produce opposite reactions. In other words, the two branches work antagonistically to maintain the homeostasis of the body. The sweat glands, adrenal glands, and peripheral blood vessels are innervated solely by the SNS. In very general terms, the components of the SNS tend to act in synchrony, but the components of the PNS are capable of independent function.

GENERAL PRINCIPLES OF NERVOUS SYSTEM RESPONSE

There are certain constraints on the interpretation of physiological responses which must be appreciated. The Law of Initial Values (LIV) is one of those constraints (Sternbach, 1966). In simplest terms this "law" (more properly called a principle because it doesn't always apply) means that the size of a physiological response is generally a function of the prestimulus level; that is, if a person's heart rate is 70 beats per minute, a heart rate response to a loud noise will be larger than that of a person whose prestimulus rate is 100 beats per minute. Benjamin (1967) and Sersen, Clausen, and Lidsky (1978) suggest ways of determining whether the LIV is affecting your data and how to correct for it.

One of the major difficulties in interpreting physiological data is to separate normal vegetative activity from that which is significant to the researcher. For this reason most physiological studies are performed in a laboratory where the effects of the environment can be controlled. Room temperature, humidity, and atmospheric pressure have all been shown to affect physiological responses. The response to the slamming of a door may be virtually indistinguishable from the response to an obscene word. The condition of the subject is also a large consideration.

For example, if a subject has a full bladder, the responses one observes may be more related to physical discomfort than to the experimental manipulation.

Two other related concepts which can both contribute to and constrain the interpretation of data are individual response specificity (IRS) and stimulus response specificity (SRS). IRS refers to individual differences in the patterns of physiological responses exhibited by people. This theory states that an individual tends to show the greatest degree of activity in one specific physiological system no matter what the situation. In contrast, the theory of SRS suggests that a particular stimulus brings about a unique pattern of physiological responding, when compared to other stimuli, among most subjects. Combining the principles of IRS and SRS, one might hypothesize that people are likely to show a similarity in the way they react to a given stimulus, but if you look at the way they respond to a number of different stimuli, you will find a tendency in each individual toward an idiosyncratic response pattern.

RECORDING TECHNIQUES

Most psychophysiological recording is done on a polygraph. An analogy is often made between the polygraph and the home component stereo. A record has grooves and ridges impressed on it, the stylus converts the impressions on the record into a small electrical signal, and the amplifier increases the signal to the point where it can drive the cone in a loudspeaker. For most physiological recording, sensors or electrodes are placed on the body so that they can pick up bioelectrical activity of organs. The signal from the electrodes is then amplified so that it can drive the pen on a strip chart recorder or so that it can be tape-recorded for later computer analysis. A home stereo usually has two channels whereas a polygraph has many. Thus every physiological recording system can be thought of as having three components: (1) electrodes (sensors), (2) amplifiers and filters, and (3) a device for displaying and/or storing the signal.

The choice of electrode is largely dependent on the physiological modality to be monitored. The same is true in choosing the polygraph amplifier, but there is one rule of thumb. There are two types of amplifiers: DC and AC. DC amplifiers are used for slowly-changing potentials such as temperature, electrodermal activity (EDA) and stomach contractions. AC amplifiers are used for more rapidly changing potentials such as heart activity, brain waves, and muscle potentials (EMG).

Two basic elements of any physiological recording system are amplifiers and filters. Unlike the magnitude of electricity one commonly deals with in everyday life (e.g., 120 V wall sockets), human physiological signals are measured in quite tiny units—millivolts (mV, or thousandths of a volt) and microvolts (uV, of millionths of a volt). For instance, a typical EEG wave may be only 50 uV in amplitude, and heart activity

(ECG) is typically 300 uV. Therefore, the first function of a recording system is to amplify these signals to levels which can be recorded, viewed, and analyzed.

After a signal is amplified, the experimenter usually wants to filter it in a manner which maximizes the frequencies of interest and attenuates all others. Physiological signals range from very slow potentials (e.g., DC recordings of EDA) to fairly fast ones (e.g., 70 cycles/sec for EMG). When recording EDA, one does not want fast activity such as EMG masking the slow changes. Likewise, when recording EMG, it is convenient to filter out the slow frequencies which are of no interest.

The most common and simplest device for displaying the electrical signal is a pen-writing unit that traces the physiological signal on paper. Most laboratories also have an FM tape recorder which stores the amplified bioelectrical signals for later computer analysis.

Recently, equipment specifically developed for biofeedback has attained greater sophistication, making it sufficiently flexible and reliable to be used for research. Often biofeedback units can be interfaced with microcomputers for ease of data collection and analysis.

PHYSIOLOGICAL MODALITIES

In this section we will present information about the most commonly used physiological measures. For each measure, a description will be provided, methodology reviewed, and the possible relevance for counselling mentioned.

EMG (Electromyograph)

(a) *Description.* The electrical activity from the contraction of muscles can be recorded in many different ways. Some very interesting research on voluntary control of skeletal muscles has been performed using small needle electrodes inserted into the muscles. In this manner, the activity of a single motor unit (the motor neuron from spinal cord and the muscle fibres which it innervates) can be willfully controlled by humans (Basmajian, 1974). This work has been implemented by rehabilitation therapists for patients with neuromuscular damage (Basmajian, 1979). It is the general level of muscle tension, however, which will most likely be of interest to counselling psychologists, because of its presumed relationship to anxiety.

(b) *Methodology.* Although there is some controversy in the literature about its adequacy, the forehead is the site usually chosen to evaluate general muscle tension (Andreassi, 1980). A small silver-silver chloride disk electrode is taped or pasted over each eyebrow, after the skin is carefully cleansed (with alcohol or acetone) and gently abraded. The raw EMG signal is usually integrated for subsequent quantification. This integrated signal indicates the total amount of electrical activity present for a specific amount of time. Thus the experimenter (or counsellor) typically uses the number of integrator resets as an indication of muscle tension: the higher the number, the greater the muscle activity.

(c) *Relevance.* EMG has probably been used more than any other physiological measure as an index of tension. It may not be the most accurate reflection of anxiety, especially since it does not reflect ANS activity, but it is easier to use than most other measures and it has proven useful in many contexts to assess the effects of relaxation training (see Haynes, 1978), to monitor clients during desensitization (Lang, 1977; Mathews, 1971), and in the treatment of clients with stress-related disorders (Burish, 1981). EMG is also used to detect the underlying patterns of muscle activity that produce the skin movements which are associated with facial expression (see Ekman & Friesen, 1976).

EDA (Electrodermal Activity)

(a) *Description.* The study of electrical activity of the sweat glands is somewhat confused by the variety of nomenclature systems used over the years. This paper will employ the system currently in use: EDA is the general term used to refer to this activity, skin potential (SP) refers to the electrical changes recorded from the skin, skin resistance (SR) is the resistance of the skin measured by applying a tiny current to it (usually about 10 milliamps), and skin conductance (SC) is the mathematical inverse of resistance. Most researchers now prefer to record SC because it has been shown to be linearly related to the amount of sweat secreted (Darrow, 1964), whereas resistance is not. However, it is easier to measure resistance (and in fact, that is what most DC amplifiers in polygraphs are capable of doing), so many people record resistance and subsequently convert the figures to conductance (1 ohm = 1/mho) to conform to publication convention. It should be recognized, though, that this conversion procedure does not produce data which are equivalent to those produced by the recording of conductance.

EDA can be conceptualized and recorded as tonic levels (implying long-term, enduring levels) or phasic responses (meaning momentary changes). These phasic, momentary responses can be spontaneous (not triggered by an external stimulus) or stimulus-evoked (evoked by a known external stimulus). There are those who would argue that no response is truly spontaneous, but rather that some responses occur as a result of an internal thought or feeling unknown to the experimenter.

The physiological basis of EDA is still not entirely known; specifically, the role of the peripheral vasculature has not been determined. However, it is generally true that EDA reflects minute changes in the conductivity of the skin due to sweat gland activity. The sweat glands are controlled by an unusual system of sympathetically-mediated cholinergic synapses. Everywhere else in the body, the cholinergic system functions only in the parasympathetic systems.

(b) *Methodology.* Silver-silver chloride disk electrodes are placed on the palm or the distal phalanges (tips) of the index and ring fingers, usually on the non-dominant hand. Preparation of the skin is limited to cleansing; it is never abraded prior to electrode placement. Sometimes the medial phalanges (middle segments) are used in order to avoid cuts and callouses which are often present on the distal phalanges. The choice of electrode paste is critical in EDA recording; the guidelines of Fowles, Christie, Edelberg, Grings, Lykken, and Venables (1981) should be followed.

There are basically three methods of recording EDA: (1) direct measurement of electrical potential difference between the two electrodes, (2) recording of skin resistance, accomplished by passing a very small current through the skin, and (3) recording of conductance. As mentioned above, many people still measure resistance and mathematically convert the values to conductance. The choice of which of these methods to use will be made partly as a function of available equipment, and also as a function of what variable is sought. Edelberg (1972, 1967) has written excellent chapters on skin conductance level and response; Robinson, Herman, and Kaplan (1982) provide some suggestions for the quantification of skin conductance responses.

(c) *Relevance.* For some applications, EDA is the most useful indication of emotional activity. The number of spontaneous skin conductance responses is often taken as an indicator of general anxiety, although the usefulness of this measure is somewhat compromised by Katkin's (1975) finding that the number of spontaneous responses may vary with attentional demands. It has been suggested (Davidson, 1978) that EDA activity is more closely associated with cognitive activity than other physiological measures (e.g., heart rate, EMG).

Cardiovascular Measures

(a) *Description.* Contraction of the heart muscle is associated with a complex electrical signal called the ECG (electrocardiogram). The signal is so strong that it can be monitored by placing one electrode on each side of the body, for instance on the wrists. More conventional electrode placements are on the chest. Information which can be extracted from the ECG includes the heart rate (HR), defined as the number of beats per minute, and the inter-beat-interval (IBI), which is the number of milliseconds between two successive beats. These measures are usually quantified by using the largest spike in the ECG, called the QRS or R wave.

Another cardiovascular measure familiar to everyone is blood pressure (BP), which includes systolic and diastolic pressures. Blood volume, pulse wave velocity, and pulse transit time are other indices of cardiovascular function (Steptoe, Godaert, Ross, & Schreurs, 1983). These less common measures require slightly more sophisticated instrumentation and more complicated methods of quantification. Their use requires computer analysis.

(b) *Methodology.* To get a simple HR, all that is needed is an AC amplifier and two silver-silver chloride electrodes. These are taped to the thorax, usually on each side at the bottom of the rib cage, on skin that has been swabbed with alcohol. With a time marker on the polygraph output indicating when 60 seconds begins and ends, all one needs for quantification is the ability to count the R waves. IBI can be derived mathematically for simple estimates (where HR is in beats per minute). A more precise measurement is obtained by actually timing the intervals between successive R waves. This can be done electronically with logic, or with computer software.

As with some of the previous measures, there is both an easy and a harder-but-more-precise way to measure blood pressure. The easy way is simply to wrap the subject's upper arm with a cuff and inflate the cuff periodically while reading the values from a mercury column. Unfortunately, this is a very intrusive method in which the experimenter must be in physical contact with the subject in order to place a stethoscope over the brachial artery during the inflation period. It is also very subjective. A less intrusive method is a similar cuff which has a microphone attached, thus permitting the experimenter/counsellor to remain in another room and electronically detect the arterial sounds while deflating the cuff. Depending upon the equipment you have available, it may also be possible for you to obtain an objective measure of BP with this remote inflation device, if the output can be recorded on a calibrated channel of your polygraph.

(c) *Relevance.* It may be stating the obvious to delineate the relevance of cardiovascular measures for individuals interested in human emotions. The relationship between anxiety and blood pressure is well known, as is the fact that heart rate tends to increase with arousal. The counsellor who wishes to observe some very simple indices of overall emotional level may find these variables useful. Of course, even though cardiovascular measures are easy to record, caution must be taken to control for other variables which may be affecting them (e.g., circadian rhythms, caffeine, nicotine, respiration).

QUESTIONS WHICH CAN BE ADDRESSED WITH PSYCHOPHYSIOLOGICAL METHODS

Psychophysiology offers methods which can enhance our ability to understand the complexity of human behaviour. As with any measurement device, one would not want to be lulled into the belief that a single index can truly represent human behaviour. Thus, electrodermal responsivity is not more "accurate" at portraying the nature of human behaviour than is a single score on an achievement test. But the convergence of multiple measures may enrich our ability to understand the human repertoire. The measures previously mentioned have been demonstrated to be remarkably sensitive and responsive in a variety of "emotional" states. As Lacey pointed out in 1959, "conflict, threat and frustration; anxiety, anger and fear; startle and pain; embarrassment; pleasant and unpleasant stimuli—all produce (physiological) changes" (p. 160).

We will close this paper by discussing two types of application of psychophysiological methods which offer promise to counselling psychologists who wish to make overt and observable what was once thought to be covert and internal. The first type is the attempt to evaluate subtle changes in emotion during a counselling session, in order to elucidate the affective interaction between counsellor and client. This is what the researchers at the Massachusetts Mental Health Center (cited above) were trying to do, but there is still much work to be done in this area.

In this context, psychophysiological measurement shows promise as a means of quantifying counselling variables such as empathy. C. R. Rogers, who originally introduced the word empathy to counselling (Hackney, 1978), wrote of empathy as being both a state and an associated process. He described empathy as "sensing the client's private world" (Rogers, 1957, p. 99) and perceiving "the internal frame of reference of another" (Rogers, 1959, p. 210). Sensing and perceiving are internal and unobservable states. Rogers (1957) also spoke of the need to communicate the understanding gained from an empathic state. Thus, according to the original conceptualization, there is an empathic state and communication of this state, which together result in an empathic relationship. However, the most commonly used instruments to measure empathy rate only the verbal responses of a counsellor (Gladstein, 1977).

A recent study (Robinson, et al., 1982) of psychophysiological indices of empathy looked at the occurrence of skin conductance responses exhibited by counsellor and client during therapy sessions, and also measured the degree of empathy between them as indicated on the Relationship Inventory. The degree of correlation of electrodermal responses with empathy ($r = .609$) suggested that physiological and psychological processes were fairly congruent. Finger skin temperature did not show any relationship with empathy, but it was felt that the latency of skin temperature changes (due to changes in vasodilation) was sufficiently great that corresponding changes in the client and counsellor would have been difficult to detect.

This research is intriguing but by no means definitive. Additional work is necessary to explore other physiological parameters and other psychological constructs. In addition, future research must investigate the role of effort or work, which may be a significant mediating variable which affects relationships between physiology and psychological constructs such as empathy.

The second type of potential application of psychophysiological methodology is one which we will refer to as response profiles. It has often been hypothesized that individuals respond idiosyncratically to stress with the greatest arousal occurring in one organ system or another. As mentioned previously, this is sometimes referred to as individual response specificity (IRS). Thus, people are sometimes said to be "gut responders," or "heart responders." Related to this theory of idiosyncratic responses is the hypothesis that prolonged distress in a specific organ gives rise to a localized stress-related physical disorder. Hence, a person who responds to stress with increased stomach acidity is believed eventually to develop ulcers.

This is an appealing theory, and if proven, it would be very useful to prospectively identify people who would develop stress-related disorders. Unfortunately, even the first, most elementary level of information for this is lacking. Do people tend to respond to stress consistently with the same pattern of physiological activity?

If it is the case that individuals do show unique and consistent patterns of response, and if these patterns underlie the development of stress-related disorders, then individuals with similar disorders should exhibit similar response profiles. The data on this issue are contradictory, with some investigators claiming to find response profiles which are significantly related to a clinical condition (Cohen, Rickles, & McArthur, 1978; Schiffer, Hartley, Schulman, & Abelman, 1976) or to treatment results (Blanchard, Andrasik, Arena, Neff, Saunders, Jurish, Teders, & Rodichok, 1983), while others have failed to find such relationships (French, Lassers, & Desai, 1967; Hockaday, Macmillan, & Whitty, 1967). Perhaps one reason for the inconsistency of these data is that investigators have relied on only one or two sessions of physiological recording, rather than studying the durability of an individual's response profile. Pilot data we have collected suggest that some physiological variables are very responsive to stress but habituate over several sessions, whereas others exhibit sustained responsivity. This difference may be significant in predicting the development of stress-related disorders. We are currently exploring these issues in a larger sample.

In summary, these are two examples of important questions which could be studied by counselling psychologists, where psychophysiological tools would considerably enhance the power of the research. Perhaps the greatest potential contribution of interfacing counselling with psychophysiology would be the adoption of a psychobiological view of human behaviour. This view stands in opposition to the dualistic position that psychological and physiological processes can be studied independently. These once-distinct perspectives are in fact complementary facets and will hopefully supplant partial and distorted views of human functioning.

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About the Authors

Bonnie J. Kaplan received her Ph.D. from Brandeis University in 1974. She is currently Associate Professor of Pediatrics and Psychology at the University of Calgary, and serves as Director of the Behavioural Research Unit at the Alberta Children's Hospital Research Centre. Her research interests include physiological correlates of stress, and also behavioural interventions in childhood disorders such as hyperactivity and learning disabilities.

John W. Robinson received his Ph.D. from the University of Calgary in 1984. He is now employed as an individual, marriage, and family counsellor with the Catholic Family Service of Calgary and is a professional affiliate of the Behavioural Research Unit at the Alberta Children's Hospital Research Centre. John's research interests include the etiology of stress-related disorders and counselling psychology.

Requests for reprints should be sent to: Bonnie J. Kaplan, Ph.D., Department of Pediatrics, Alberta Children's Hospital, 1820 Richmond Road S.W., Calgary, Alberta, Canada T2T 5C7.