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Review article

Patients' autonomic activation during clinical interaction: A review of empirical studies

Lidia Del Piccolo[a,*], Arnstein Finset[b]

[a] Section of Clinical Psychology, Faculty of Medicine, University of Verona, Italy
[b] Department of Behavioural Sciences in Medicine, Faculty of Medicine, University of Oslo, Norway

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ABSTRACT

Objective: To investigate how patients' autonomic responses are related to verbal or non-verbal communication during clinical encounters.
Methods: The SCOPUS database was searched to identify papers. Studies were included if measures of autonomic arousal were related to patients' emotions or patient-clinician interaction during clinical consultations such as psychotherapy, counseling or medical interviews. The search was conducted according to PRISMA criteria. The included studies were assessed using the 16 item quality assessment tool QATSDD.
Results: A total of 24 publications were identified. The studies varied greatly in design and quality. However, a few trends could be observed across studies. Patients' expressions of emotions were associated with significant autonomic arousal. Clinician behavior affected arousal levels; and in a few studies, a patient centered way of presenting information was found to attenuate arousal level, interpreted as stress reduction. There was a general, but not consistent, trend in the reduction of arousal level over time within the consultation. Examples of individual differences in autonomic responses were found.
Conclusion and practice implications: Increased awareness of potential impact of clinician behavior on patient' arousal level may be helpful for clinicians, in particular how different communication styles may augment or attenuate arousal in response to stressors.

Contents

* Corresponding author at: University of Verona, Section of Clinical Psychology, Policlinico G.B. Rossi, Piazzale L.A. Scuro 10, 37134 Verona, Italy.
E-mail address: lidia.delpiccolo@univr.it (L. Del Piccolo).

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1. Introduction

Research into the patient-clinician interaction has prospered over the past 50 years. Analyses of video- and audio-recorded clinical interviews have generated a large body of knowledge on the interaction behavior of clinicians and patients. While most of our knowledge is limited to studies of behavior only, we currently see an increased interest in the biological aspects of the patient-clinician relationship [1–3]. An emotional dimension is present in many clinical interviews [4] and autonomic nervous system (ANS) activity is a major component of the emotion response [5] as indicated by definitions of emotion reported in literature [6–9]. Hence, when studying clinician-patient interaction, physiological measures may offer several advantages over self-reported accounts, by spotting subtle changes in affect or arousal that provide clues to the differential effectiveness of communicative behaviors [3]. In addition, physiological events may yield information on emotional events not accessible from self-report or conscious control, as illustrated by Marci and Riess in a clinical case where the authors demonstrated how the use of skin conductance could unearth the patient's hidden anxiety [10]. Moreover, the combined use of physiological measures and communication aspects can contribute to increase self-awareness in either the provider or the beneficiary, providing more insight into the mechanisms underlying the words and attitudes brought during the caring process.

Psychophysiological reactions may be studied by the use of central (i.e. electrical brain activity) or peripheral measures (electrodermal, cardiovascular, hormonal activity). In this review we focused on peripheral autonomic processes, specifically electrodermal activity (EDA), heart rate (HR) and finger and facial skin temperature, which have been the most extensively studied in relation to clinical communication. EDA can be measured as the skin resistance response or its reciprocal – the skin conductance response – to the passage of an external current (set constant) across the skin. Since human eccrine sweat gland activity is predominately controlled by the sympathetic nervous system, EDA provides a valid and reliable measure in the assessment of sympathetic arousal [11,12]. Historically, EDA has been referred to as skin conductance (SC), with a distinction between skin conductance response (SCR), and skin conductance level (SCL), galvanic skin response (GSR), electrodermal response (EDR), psychogalvanic reflex (PGR), all of which are now subsumed under the term EDA [13].

Another peripheral autonomic variable is heart rate (HR). Unlike skin conductance, which is only affected by sympathetic activation, the cardiac muscle receives afferents from both the sympathetic and the parasympathetic nervous systems. HR is therefore influenced by both systems and also by changes in muscle tonus and respiratory sinus arrhythmia (RSA), the pattern related to in and out breathing by which HR rises and falls in frequency. An increase in HR is generally related to sympathetic activation. It corresponds to an increase in vigilance, active avoidance, and unpleasant affect. Conversely, HR is decreased by parasympathetic activation [14], suggesting a positive affect and cognitive processing [15]. Extended analysis of its sympathetic and parasympathetic components can be done by measuring HR variability (HRV) [16]. HRV refers to the beat-to-beat variation of heart rate over time [17] and has been considered as an effective marker of physiological arousal, associated with different emotional responses [17]. HRV is considered an important marker of emotion regulation and individual adjustment of psychophysiological responses [18], reflecting autonomic flexibility or ability to adjust physiological arousal on a momentary basis [19].

Skin temperature (ST) measurement of specific body parts, such as the fingers and the face, provides another indicator of autonomic activation. Fluctuations in blood flow beneath the skin, mediated primarily by the sympathetic nervous system, produce temperature changes at the skin surface. The orienting response, which occurs to a nonthreatening, unexpected stimulus, is characterized by vasoconstriction on the hand, but by vasodilation on the face as the blood is distributed from the extremities towards the head. In contrast, the defense response, elicited by threatening incentives, results in both cephalic and digital vasoconstriction, as the blood is pumped toward the heart [20].

A first wave of research on autonomic arousal in medical consultations was conducted in the 1950-ies, with special reference to the psychotherapeutic consultation. Results were sparse and heterogeneous. In a discussion of these findings, Cacioppo et al. signaled the importance of the time course of physiological response considering differently the numerous ups and downs of arousal in the consultation potentially related to specific events (phasic arousal) and or the long terms trends in arousal level throughout the consultation (tonic arousal) [21]. Cacioppo et al. also emphasized the importance of individual differences in autonomic responses, both in terms of general reactivity and of response profiles [21]. Hulsman et al. pointed out that the most critical challenge in linking communication and psychophysiology research "involves the establishment of valid and reliable linkages between the often discrete behavioral observations and events in medical consultations and the continuous real time psychophysiological measures" [3].

It is important to realize that emotions may show different patterns of peripheral arousal. In her review of 134 experimental investigations of emotional effects on peripheral physiological response in healthy individuals, Kreibig described examples of differential autonomic responses [3] associated to each emotion. Contentment and relief, as well as non-crying and acute sadness, all characterized by a motivational state of passivity, were accompanied by a decrease in EDA. Negative as well as positive emotions, such as amusement and happiness, which implied a tendency to react, were associated to an increase in EDA. Increased autonomic arousal during the consultation may therefore indicate an active emotional engagement, not necessarily distress. Moreover, different affects such as anxiety and anger may occur simultaneously, making it difficult to specify the association between arousal levels and specific emotions [22].

Literature on doctor-patient communication has shown that emotional support, empathy, and reassurance [2,23–26] can buffer the effect of perceived distress [27] and may have an impact also on recall [28,29], contributing to reduce patient's ability to call back information [30–33]. Finally, numerous laboratory experiments investigating the links between social support and health have shown that social support appears to be related to more positive "biological profiles" across cardiovascular, neuroendocrine, and immune functions [34].

The aim of the present review is therefore to report the evidences on patient's autonomic activity related to patient-

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