The Diagnosis of Love-Sickness: Experimental Psychophysiology Without the Polygraph

MAREK-MARSEL MESULAM

Harvard Medical School

AND JON PERRY

Department of Comparative Literature, Harvard University

ABSTRACT

Psychophysiological concepts and methodology are central to the practices of Erasistratos, Galen, and Avicenna, great physicians of antiquity whose lives span a period in history from the third century, B.C., to the eleventh century, A.D. This point is illustrated by means of a diagnostic vignette common to all three physicians' clinical experience, namely, the discovery of a concealed love object by monitoring changes in pulse rate. Within the context of these case sketches can be found the seeds of modern concepts in psychophysiology and psychosomatic medicine. Some of the texts examined are new translations of Greek and Latin originals.


The origins of psychophysiological observations must be as ancient as man's ability to perceive cause and effect relationships within natural phenomena. The blush of modesty, the tears of grief, the bodily concomitants of amorous arousal, could hardly have escaped the notice of attentive observers. However, the birth of experimental psychophysiology as a science concerned with investigating the relationships of psychological to physiological states is usually traced to the late nineteenth century and to the emergence of the polygraph in the early twentieth century.

For this reason we were surprised to discover observations reminiscent of contemporary psychophysiological methods in one of the stories in Giovanni Boccaccio's Decameròn, a collection of one hundred tales written around the middle of the fourteenth century. An episode in the tale of the Count of Antwerp, II.8 in the collection, concerns a young nobleman's concealment of the ardent love he bears for one of his parents' serving ladies. The youth grows ill and his condition worsens until a bright young physician discovers the object of the youth's desire and so reveals the emotional cause of his illness in time to save his life.

Intrigued by this finding, we decided to investigate the literary and medical sources of the tale. It is this research which brought to our attention the original Greek and Latin medical texts some of which in this paper are translated into modern English for the first time.

It will be the purpose of this paper to demonstrate through an analysis of these texts that considerable sophistication in experimental psychophysiology can be discerned in the practices of Erasistratos, Galen, and Ibn Sina (Avicenna), great phy-
Fig. 1. In Stratonice the French painter Ingres (1780–1867) depicts in a typically romantic light the crucial moment in Erasistratos’ diagnosis of Antiochus’ love for his stepmother. Musée Condé (Photographie Giraudon), by permission.

Erasistratos

At the beginning of the third century, B.C., Seleucus, one of Alexander’s generals and among the ablest of his successors, married a woman named Stratonice.1 Antiochus, his son by a previous marriage, had the misfortune to fall in love with his new stepmother. Recognizing the illicit character of his love, and the hopelessness of its consummation, Antiochus resolves not to show his feelings. Instead, he falls sick and strives his hardest to die.

We may be sure that many doctors attended the young prince, but to no avail it seems, until the celebrated Greek physician Erasistratos concludes that, in the absence of bodily disease, the boy’s malady must stem from some affliction of the mind, “through which the body is often strengthened or weakened by sympathy.” (Appian, 2nd century, A.D.) Since he is convinced that mind and body are intimately coupled, Erasistratos decides to observe Antiochus’ physiological reactions to the people who come to visit him, in the hope of divining some clue to the boy’s mysterious ailment. See Fig. 1.

Wishing to discover who was the object of his passion (a matter not so easy to decide), he would spend day after day in the young man’s chamber, and if any of the beauties of the court came in, male or female, he would study the countenance of Antiochus, and watch those parts and movements of his person which nature has made to sympathize most with the inclinations of the soul. Accordingly, when any one else came in, Antiochus showed no change, but whenever Stratonice came to see him, as she often did, either alone or with Seleucus, lo, those tell-tale signs of which Sappho sings were all there in him—stammering speech, fiery flashes, darkened vision, sudden sweats, irregular pulsations of the heart, and finally, as his soul was taken by storm, helplessness, stupor, and pallor. (Plutarch, 1st century, A.D.)

1The story of Erasistratos’ cure of the young prince’s love-sickness is to be found in the works of the historian Appian of Alexandria (early second century, A.D.), Plutarch (first century, A.D.), and Valerius Maximus (first century, A.D.). For the English translation of material from Appian we rely on the Loeb Classical Library edition, Horace White, translator, and for Plutarch, the same edition. Bernadotte Perrin, translator. None of the medical treatises by Erasistratos whose existence is attested to by Galen have survived.
Plutarch was a literary man. The bodily processes he describes so forcefully and poetically, the "tell-tale signs of which Sappho sings," are perhaps an excellent illustration of the faults of subjective, introspective techniques of observation and description. But what of the physician's role?

Even from Plutarch's highly subjective account it is evident that Erasistratos is a careful observer who must have made several sophisticated assumptions before reaching his conclusions. First, there is the belief he must hold that mind and body are in communication with one another. Secondly, he is assuming the phenomenon of visceral conditioning. The paradigm here is the stimulus-response link between a social stimulus, Stratonic, and an autonomic response, those "tell-tale signs of which Sappho sings." In other words, a stimulus in the external world, because of the special significance it has acquired, causes an internal, visceral response. Furthermore, this link is stable over time. Thirdly, Erasistratos makes the ingenious assumption that thought, its verbalization, and concomitant physiological arousal, although normally in contact with one another, may be uncoupled. Antiochus may inhibit the motor expression of his passion, but he cannot control his viscera, which respond in a pattern consistent with an emotion whose overt expression is being concealed. This notion, of course, is central to theoretical speculations concerning psychosomatic disease as well as to the underlying rationale of the "lie-detector." 2 Finally, Erasistratos was no mere passive observer. He was in fact actively testing the hypothesis of stimulus specificity. Responses to other qualities of the court, male or female, were carefully tested. Only the response to Stratonic passed the criteria, either when she came alone, or accompanied by Seleucus.

**Galen**

The scientific implications of Erasistratos' observations were largely neglected by the literary men who told and retold the story for their own moral, didactic purposes. Four centuries later, the tale came to the attention of Galen of Pergamum, the father of modern medicine, and it revealed new significance. Galen had long been an admirer of Erasistratos' practice of medicine with a view toward treating the "whole" patient suffering from disease, mind and body, and not merely focusing on the delineation and alleviation of several coexistent symptoms to effect a cure, a practice widely defended in Galen's world as it is in ours today. Though a tireless critic of Erasistratos' mistaken views of human anatomy, Galen above all respected Erasistratos as a clinical observer and this popular tale of Antiochus and Stratonic finds an appropriate place in Galen's own writing.

Galen carried the concepts of "observational" psychophysiology peculiar to the story of Antiochus to our "experimental" stage. Many physicians, "unaware of the reasoning by which Erasistratos recognized a young man's love for his father's wife," Galen writes at the beginning of the second century, A.D., take note that the physician marked "the passionate throbbing of the youth's arteries," but do not "persevere further and recognize that this was discovered by taking the young man's pulse." Galen thus stresses the experimental approach. Where he obtained this particular methodological information is not clear, the taking of the pulse is not explicitly stated in any of the primary sources now extant concerning this well-known example of Erasistratos' skill as a diagnostian. The point however, is that Galen was more interested in the experimental aspects of Erasistratos' observations than in any moral implication of the tale. 3

Galen proceeds to relate a case history from his own clinical experience. He had been called upon to examine a woman suffering from insomnia. Observing that she is afebrile, restless, and reluctant to answer...

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1 This is conscious "concealment," not "repression." In theories about psychosomatic ailments the concealment is usually secondary to unconscious "repression."

2 The physician's wisdom and Seleucus' sense of honor in giving up his new bride to save his son's life, rather than the psychophysiological observation, were emphasized in the story as it is told by Appian, Plutarch, and Valerius Maximus.
questions about her condition, Galen narrows his diagnostic choices to “melancholia dependent on black bile,” or “some trouble she was unwilling to confess.”

While I was convinced the woman was afflicted by not bodily disease, but rather that some emotional trouble grieved her, it happened that at the very moment I was examining her this was confirmed. Someone returning from the theatre mentioned he had seen Pylades dancing. Indeed, at that instant, her expression and the color of her face were greatly altered. Attentive, my hand laid on the woman’s wrist, I observed her pulse was irregular, suddenly violently agitated, which points to a troubled mind. The same thing occurs in people engaged in an argument over a given subject.

The next day, I told one of my following that when I went to visit the woman he was to arrive a little later and mention that Morphys was dancing that day. When this was done the patient’s pulse was in no way changed. And likewise, on the following day, while I was attending her, the name of the third dancer was mentioned, and in like fashion the pulse was hardly affected at all. I investigated the matter for a fourth time in the evening. Studying the pulse and seeing that it was excited and irregular when mention was made that Pylades was dancing, I concluded that the lady was in love with Pylades, and in the days following, this conclusion was confirmed exactly. (Galen, 2nd century, A.D.)

This passage, so revealing of Galen’s skills in the art of diagnosis, carried Erasistratos’ psychophysiology one step further. The belief in the relationship between mind and body, as well as the notion that the visceral correlates of an emotion may be dissociated from its voluntary display, are still present. In addition, Galen implicitly uses the concepts of “stimulus generalization” and of “higher order conditioning.” In Erasistratos’ case, the stimulus had to be present physically in order to elicit the observed response. Galen’s sophistication consists in his understanding that the name itself will elicit the autonomous reaction. Finally, we must note that Galen’s technique is essentially that of experimental psychology. As opposed to Erasistratos, who waits for the opportune environmental event, Galen manipulates the environment. He determines the stimulus field and examines the response it elicits. Further, there are control stimuli used to rule out extraneous factors such as pseudoconditioning, or the orienting response. It is not the name of just any dancer, or merely a man’s name which elicits the response, but it is the name “Pylades” which does so, and consistently, over a period of time.

Physicians without this belief in the psycho-physiological unity of man are chastised by Galen.

Why did these things escape the notice of earlier physicians attending the lady described above? They are arrived at by ordinary deduction, if the physician has even a meagre knowledge of medicine.

Indeed, I think it is because these physicians possess no clear conception of the ways the body tends to be influenced by the state of the mind. Perhaps it is because they do not even know that the pulse becomes turbulent because of strife and fears which suddenly disturb the mind.

To say then, that the pulse is disturbed by love is idle chatter among those who do not also perceive that merely an agitated pulse alone is in no way proof of an aroused passion. (Galen, 2nd century, A.D.)

In this last paragraph we find the harbinger of a modern notion: a particular autonomic response can not be specific for a psychological state, even if the former is a strong correlate of the latter. In other words, a predictable response may be elicited by a controlled stimulus, but the antecedent stimulus field cannot be deduced by examining the output from the polygraph.

**Ibn Sina (Avicenna)**

Galen’s psychophysiological methods remained largely unexplored by later physicians until the work of Ibn Sina (Avicenna), called the “Persian Galen,” came to be widely known during and after the tenth century, A.D.⁴

In his *Canon medicinae*, in the section dealing with diseases of the “head,” Ibn Sina includes a chapter on “love-sickness” where he sketches a case from his own clinical experience which closely parallels Galen’s.⁵

⁴See E. G. Browne, *Arabian Medicine*, pp. 84 and following for further anecdotes concerning the similar experiences of lesser known contemporaries of Ibn Sina.

⁵The translation in English we provide here is not taken from the Persian, but from a Latin translation popular during the Renaissance and printed at Venice in 1608.
The pulse of the patient suffering from love-sickness, he observes,

is a fluctuating pulse without any regularity whatever, as is the pulse of the fatigued. Moreover, the patient's pulse and disposition are altered when mention is made of the person he loves, and especially when this occurs suddenly. It is possible in this way to ascertain whom he loves, even when he will not reveal it himself...

The nature of the cure is this: let several names be pronounced, repeating them many times, and place your finger on the patient's pulse. When it varies by a large fluctuation and then returns to normal, and this is repeated thereafter, and is put to the test many times, then the name of the one he loves will be known.

Again, similarly, make mention of her looks and habits and that in which she excels, her family, where she lives, so that any one of these things may be associated with the name of his loved one. Observe his pulse in such a way that when it fluctuates at the mention of one of these details the particular characteristics of his loved one may then be associated with a name and with an outstanding feature, by all of which she is to be recognized.

I myself have made use of this method. I came upon a youth in time to put off his day of judgment... I myself have seen a young man whose health and strength were restored and who returned to his former self, though he had arrived at utter desiccation and given himself up, and had endured chronic, vicious illnesses and long fevers on account of the feebleness of his strength, weakened by an illicit love. But when he experienced union with the person he loved, his illness left him entirely in a short while. I considered it a wondrous thing, and an indication of the extent to which our physical nature obeys our thoughts. (Ibn Sina, 10th century, A.D.)

The belief in the interaction of mind and body, the belief in a subject's inability to inhibit visceral expression even as motor and verbal expression of the emotion are obstructed, the implicit awareness of simple conditioning paradigms, the experimental sophistication of Galen, are all evident in this example of Ibn Sina's thought and practice. In addition, a concept of stimulus generalization is expanded. The visceral response can be expected not only if the primary stimulus is physically present, as it is in Erasistratos' case, but also if such a remotely associated stimulus as the street on which the loved one lives is mentioned.

**Commentary**

In the texts presented above we have tried to locate and display in modern terminology basic assumptions about the mind-body relationship inherent in the experimental observations of each of these physicians of antiquity. Modern critics have traditionally voiced the skepticism that the men of early medicine can not have had any very clear grasp of these techniques and relationships common to the branch of study we now call psychosomatic medicine because of their erroneous views of the anatomy and pathology of the human body.

But it is small credit to our own intelligence to suppose that because they were ignorant of the larger principles of psychophysiology in the terms we now use to explain them, their experimental acquaintance with these relationships, or their powers of observation were abortive and myopic. Their considerable sophistication as observers allowed them to recognize, interpret, and extend in practical ways the application of what they had learned themselves and from one another in their own actual clinical experience. Moreover, the development of this technique and growing awareness owes little to mere chance. Each of the texts quoted above, taken chronologically, owes something to its predecessor. Galen comments specifically on the controversy surrounding the method and meaning of Erasistratos' well-known cure of a young man in love. In his turn, Ibn Sina, who knew Galen's written works by heart, develops and expands the range of application of Galen's experimental technique. This development of a clinical insight into a rudimentary but sound conception of the role of experimentation and observation in psychophysiology in these case sketches is, we hope, readily apparent.

The origins of psychosomatic observation are usually traced to William Beaumont's studies (1833), conducted only slightly more than a century ago, on Alexis St. Martin's abdominal wound.8 The origins of the

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8 Sternbach (1966) supplies an earlier experiment in psychophysiology. He quotes the 13th century historian Salimbene who says of Frederick II, Holy Roman Emperor (1194-1250), "...the sixth curiosity and folly of Frederick, as I have said in my other chronicle, was that at a certain luncheon he had two men very well beaten, and then sent one of them to sleep and the other to hunt, and on the following evening, he had them defecate in his presence, because he wanted to know which of them
"lie detector" are attributed to Cesare Lombroso, in 1895. Experimental psychophysiology and the systematic study of Pavlovian conditioning are products of the early twentieth century.

We have shown, however, that the roots of the psychosomatic approach, some basic rudiments of its experimental methodology, and the seeds of some rather modern concepts concerning the relation of mind to body are to be found in the practices of Erasistratos, Galen, and Ibn Sina. We do not intend to imply that the modern study of psychophysiology owes anything in a direct way to these giants of ancient medicine. Yet it is our desire to convey the realization that, as is true of so many other fields of science, the birth of what is apparently a completely new movement can often be linked to the reawakening and exploration of a dormant concept, new for the present, but not unknown to the past.

REFERENCES
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