

Graham F K & Clifton R K. Heart-rate change as a component of the orienting response. *Psychol. Bull.* 65:305-20, 1966.

The argument if advanced, on theoretical grounds, that the direction of heart rate change in response to simple stimuli should distinguish an orienting-attentional process from defensive and startle reactions. The available research, reviewed in terms of defining criteria, supports the argument. [The Science Citation Index® (SCI®) and the Social Sciences Citation Index™ (SSCI™) indicate that this paper was cited a total of 217 times in the period 1966-1976.]

Frances K. Graham, Ph.D.
University Hospitals
University of Wisconsin
Madison, Wisconsin 53706

December 5, 1977

"This paper was written when my collaborator and I decided that we might be working with an incorrect assumption. Rachel Clifton had joined me a year before as a postdoctoral fellow and we were trying to study orienting behavior in the newborn infant, using heart rate (HR) acceleration as the dependent measure. Soviet work on orienting, especially by EN. Sokolov, had become available in translation only recently and promised to be a powerful tool for investigating the capabilities of young infants. The theory specified that an orientation reflex which enhanced stimulus processing occurred following any kind, of discriminable change in stimulation. While orienting would be elicited by the first presentation of a stimulus, it would disappear after a few repetitions if the stimulus had no important consequences, but could be made to reappear by a minor change of stimulus characteristics. A particularly useful part of the theory was that orienting included automatic components which

did not require a subject to cooperate in responding.

"Since some stimuli might also evoke defensive reflexes which would reduce rather than enhance the effects of stimulation, it was important to be able to distinguish orienting from such a defensive reaction. There were a number of functional differences between the two kinds of reactions but employing these was cumbersome and might not be valid for studying an immature organism. What was needed were reaction components which changed differentially depending on which reaction was evoked. Although Sokolov had stated that HR acceleration was part of orienting, this appeared to conflict with an hypothesis of 'directional fractionation' advanced by the Laceys. If the Laceys' hypothesis applied to the kind of situations used to study orienting, then HR should decelerate with orienting and accelerate with protective reactions.

"To solve the puzzle, we searched the literature for HR studies where the functional characteristics allowed classifying a response as orienting or protective. Once we had posed the problem, work on the paper went quickly and provided daily suspense. We had not known whether the existing literature was sufficiently consistent to provide any conclusive answer. In the end, it was, and it supported our inference.

"The paper thus provided the rationale for a methodology that would prove useful in a number of areas. The paper's popularity was certainly due, in part, to the fact that the methodology was relatively simple and many laboratories were equipped to exploit it. More important, in the long run, was the linking of two theoretical approaches which had not previously been related to one another. This widened the range of problems that might fruitfully be explored with the methodology."