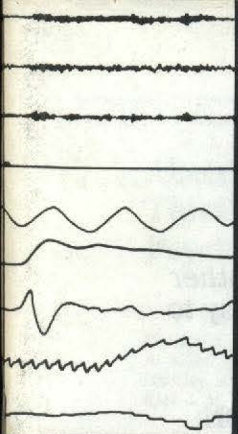

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PHYSICAL AND MENTAL TRIGGERS OF MYOCARDIAL ISCHEMIA: AN AMBULATORY EKG MONITORING STUDY

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Ambulatory EKG studies have revealed that myocardial ischemia occurs frequently out of hospital in coronary artery disease (CAD) patients. To assess physical and mental triggers of ischemia out of hospital, a structured diary system was employed during 24-48 hours of Holter monitoring. Subjects were 57 CAD patients with evidence of transient ischemia during the monitoring period.

Ischemia was defined as ST segment depression of at least 1 mm lasting 1 minute or longer. A total of 181 ischemic episodes was detected, with a mean ST depression of 1.75 mm and a mean duration of 10.11 minutes. The mean number of episodes per patient per day was 3. A circadian rhythm in ischemia was observed, such that ischemic episodes occurred more frequently and were of longer duration in the six hours after waking ($p<.0001$).

The total number of diary entries recorded by the sample was 2195, and the mean number of entries recorded by a subject in a 24-hour period was 26. Physical and mental activity variables were computed by classifying physical and mental activities according to levels of intensity on a scale from one to six. Circadian rhythms also were observed for activity, such that physical ($p<.0001$) and mental ($p<.0001$) activity levels were greatest in the six hours after waking. When adjusted for time spent in each activity level, ischemic duration was found to increase markedly with intensity of physical ($p<.0002$) and mental ($p<.0048$) activities. Circadian rhythms for mood were found and roughly paralleled those observed for activity. Again, when adjusted for differences in time spent in different levels of mood, ischemic duration was found to be significantly longer when subjects rated themselves as angry ($p<.0001$) or anxious ($p<.0001$).

Physical and mental activity, including mood, affect ischemia in CAD patients out of hospital. Time of day also accounts for variance in ischemic duration and, because physical activity, mental activity, and mood covary with time of day in the natural environment, controlled studies are needed to disentangle time from activity and mood effects on ischemia.

The Error-Related Negativity: An Event-Related Brain Potential Accompanying Errors

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The analysis of response-locked event-related potential waveforms from several experiments points to the existence of a negative component that accompanies errors in choice reaction time tasks. The studies included a sentence verification task, a Sternberg memory search task, and two letter discrimination tasks, each involving different subjects. The experiments involved two different sets of laboratory equipment. In all these experiments, the component began around the time of error onset, peaking about 100 to 150 msec later. It ranged in amplitude from 3 to 10 microvolts, was bilaterally symmetrical, and had a Cz-maximal scalp distribution. In elderly subjects, it was smaller and had a more frontal scalp distribution than in young subjects. The component was smaller for slow error responses than for fast errors, and appeared to be larger when subjects were required to be accurate than when they were given speed instructions. For one experiment, in which the response device enabled us to detect different degrees of error, the component was larger for partial error responses than for errors carried to completion. The component was larger when an error was subsequently corrected than when the error went uncorrected. Finally, correct responses elicited the component on trials where an incorrect response followed the correct response. These results suggest that the component manifests a process related to the detection, inhibition, or correction of responses that are perceived by the subject to be errors.

Blinks at Your Fingertips: A Digital-Orbicularis Oculi Reflex?

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The present study pursues an unexpected finding from earlier work that suggested an airpuff to the fingertip would often elicit an eyeblink. The present study was designed to determine if the phenomenon could be replicated and to separate the effects of the airpuff itself from the "click" from the valve which gates the puff. To assess this, we obtained usable data from eight adult subjects under five test conditions: a) two durations of the airpuff, b) the same two durations of valve-noise-only, and c) one no-stimulus control condition in which neither valve noise solenoid nor puffs occurred. As in the initial study, subjects were instructed to judge the duration of the puffs. EMG was detected from two electrodes located under the left eye.

Statistical analysis of blink probability indicated that the valve noise produce blinks only 3 percent more often than in the no-stimulus control condition. However, the puffs elicited blinks an average of 33.5 percent more often than in the no-stimulus control conditions. Seven of eight subjects tested had puff probabilities greater than with no-stimulus conditions, and five of these differences reached statistical significance when tested individually. When blinks occurred, amplitudes were significantly larger and latencies were significantly shorter for puff stimulation than for the valve-noise only stimulation. Taken together these data provide evidence that a light tactile stimulus to the finger tip can elicit a contraction of the orbicularis oculi, the muscle controlling the eye-blink.

P300, FOOD INTAKE, AND MORNING/EVENING PREFERENCE

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Variability for the P300 or P3 component of the event-related brain potential (ERP) has been associated with the physiological as well as psychological influences of food consumption (Geisler & Polich, 1990ab). However, some of this variation may stem from individual differences for food intake with respect to morning/evening activity preference cycles since this factor has been found to affect a variety of behavioral tasks. To clarify the relationship between the P3, food intake, and morning/evening preference, ERPs were measured from different subject groups who varied in the recency of their previous food consumption (food vs. no-food), activity preference type (morning vs. evening), and measurement time (a.m. vs. p.m.), with equal numbers of each gender in each condition. P3 components were elicited with an auditory discrimination task recorded from Fz, Cz, Pz, and EOG electrode sites, referenced to linked earlobes using a forehead ground. The food vs. no-food subjects were categorized on the basis of having eaten a substantial meal within three hours or having abstained from all food for a minimum of six hours. Activity preference was defined by self-report using a standard scale such that subjects with extreme morning or evening preferences were obtained (Horne & Ostberg, 1976). Half the subjects from each activity preference group were tested in the morning and the other half were tested in the evening. P3 amplitude yielded a significant three-way interaction between the food intake, activity preference, and measurement time groups ($p<.001$). Morning-preferring subjects who had eaten recently demonstrated an amplitude increase between the morning and evening measurement times and the opposite pattern if they had not eaten. Evening-preferring subjects who had eaten recently demonstrated an amplitude decrease between the morning and evening measurement times and the opposite pattern if they had not eaten. P3 latency was somewhat longer for the no-food compared to food groups. The results suggest that the P3 component is highly sensitive to the physiological responses stemming from food intake, morning/evening activity preference, and measurement time, perhaps reflecting individual differences in the effect of food on arousal level.