SCR and HRR were averaged separately for these three conditions. Principal component analysis was used to quantify the responses. HRR was described by five components, an acceleration A1 during the 6-sec interval (FI), a deceleration D toward the end of FI, an early acceleration A2 after FI, and a late acceleration A3 after FI. SCR was described by two components, one with a maximum at the end of FI, the other with a maximum 2.5 sec after reinforcement. Subjects with high PA-scores showed no difference in their SCRs among the three conditions. In contrast group PA low showed a significantly more pronounced SCR in anticipation as well as in response to positive consequences as compared to C0 and C-.

HR deceleration D also did not differ among conditions in groups PA high, but was most pronounced in groups PA low in anticipation of C-. The groups B1 high showed a pronounced late acceleration A3 after negative reinforcement. The accelerations A1 and A2 were sensitive to conditions, but did not differ between groups. The results suggest a lack of sensitivity to positive reinforcement in subjects with physical anhedonia and an increased sensitivity to negative reinforcement in subjects with body image distortions.

(Supported by the Deutsche Forschungsgemeinschaft)

8. Stiehauer, S. R., Jennings, J. R., Zubin, J., & Heidorn, P. B. (VA Medical Center and Western Psychiatric Institute & Clinic, University of Pittsburgh) Pupillary dilation, P300, and heart rate are influenced by conditional probability. Although autonomic measures have been shown to respond to cognitive manipulations that also influence the P300 component of the ERP, few studies have examined such responses in the same paradigm. To evaluate the interrelationships among such measures, pupil diameter, ERPs and heart rate were recorded from 7 volunteers who counted all occurrences of a target auditory tone (either 800 or 1500 Hz) which was randomly presented on 25% of 640 trials. The target never occurred on 2 successive trials. Thus, the conditional probabilities established were: P(T|NT) = 1.0 for a nontarget given a preceding target, P(NNT|NT) = .67 for a nontarget given a preceding nontarget, and P(T|NT) = .33 for a target (P(T|T) was zero).

Significant differences among conditional probabilities were found for both P300 (p < .01) and peak pupillary dilation (p < .01). P300 and P300 were consistently largest for target (low probability) conditions. P300 was maximal at parietal (P1) and showed no hemispheric asymmetry. While P300 in the two nontarget conditions showed no consistent differences across individuals, pupillary dilation was larger for the lower conditional probability non-target (P(NNT|NT) = .67) than for the higher probability nontarget. Thus, the pupil was more sensitive to conditional probability than P300. Heart rate, which was available from only 4 volunteers, also seemed to discriminate among the three probabilities. The deceleration following each stimulus was inversely proportional to conditional probability, with the greatest deceleration to the target stimulus.

The greater sensitivity to conditional probability of pupil and heart rate relative to P300 is a surprising result. Individual patterns of P300 responses may provide a partial explanation of this result. For some individuals, P300 clearly reflects conditional probability, as in pupil and heart rate. In others, the response is related to immediate sequential effects: nontarget responses are larger following a target (a different physical stimulus) than following another nontarget. This may possibly be an orienting effect. P300 is conceivably more sensitive to individual differences in the utilization of information than the pupil or heart rate.

9a. Proulx, G. B., & Picton, T. W. (Department of Rehabilitation and Physical Medicine, St. Vincent Hospital, and Department of Medicine, University of Ottawa) Anxiety, cognition, and the CNV. Current psychological literature suggests that anxiety is a highly cognitive process occurring when expectancies are disrupted or difficult to form. The CNV has long been related to anxiety and therefore may be used as a research tool in the physiological evaluation of anxiety.

In this study a mildly stressful expectancy paradigm was used to provide event-related potential measurements in subjects with different levels of trait anxiety. Thirty female subjects with high, average and low scores on the Spielberger Trait Anxiety Inventory participated in the experiment. Pairs of brief (50-msec) tones separated by 1 sec were presented to the right ear every 6-8 sec. The tones were either high (2KHz) or low (1KHz) in frequency and the four possible pairs of tones (Hi-Hi, Hi-Lo, Lo-Hi, Lo-Lo) were presented in random order. In the initial half of the experiment a 90dB(SL) buzzer was presented to the left ear 600 msec after the second tone in a Hi-Hi sequence. In the second half of the experiment the buzzer occurred after the Lo-Lo sequence. The subjects were instructed to turn off the buzzer as quickly as possible by pressing a button in their preferred hand. A brief psychometric questionnaire was given three times in each half of the experiment in order to evaluate the subject’s cognitive state. As the subjects discovered the relationship between the tones and the buzzer a CNV developed during the relevant tone-buzzer sequence. Initial evaluation showed that the high-anxiety subjects had a lower amplitude CNV than the low-anxiety subjects. However, many of the high-anxiety subjects did not perceive the association between the tones and the buzzer. An analysis of covariance between psychometric and CNV data revealed that if the highly anxious subjects perceived the stimulus association equivalently to the low-anxiety subjects, they actually developed larger CNVs.

These results suggest that previous data showing high-anxiety subjects to have low CNV amplitudes might be related to individual differences in the cognitive appraisal of the required task.

9b. Fitzgerald, P. G., & Picton, T. W. (Departments of Psychology and Medicine, University of Ottawa) Temporal and sequential probability in evoked potential studies. The P3 component of evoked potential to a detected target stimulus is related to the probability. The literature is unclear, however, whether the determining variable is “sex target within a probability” — the prototypical P3 of each kind. In the first train of a series of sequential events, frequency was used, giving the target stimulus 3, 5, 7, 9 sec. P3 component was significantly higher in the second and third temporal probabilities.

In the second condition, 3, 5, 7, 9 sec. P3 component significance was used, in the third temporal probability. The result was increased 17.5 sec. The probability of the temporal probability was significant. The result was variable increased.

10. Cheesey, J. Psychophysiological (Psychophysiology Urbana) P300 component was not significantly associated with the independent and dependent variables. The result is that overt predicts two independent and unpredictable variables utilising a covariant relationship between the dependent variable and the covariate. A brief psychometric procedure was then used to determine the subject’s cognitive state. As the subjects discovered the relationship between the tones and the buzzer a CNV developed during the relevant tone-buzzer sequence. Initial evaluation showed that the high-anxiety subjects had a lower amplitude CNV than the low-anxiety subjects. However, many of the high-anxiety subjects did not perceive the association between the tones and the buzzer. An analysis of covariance between psychometric and CNV data revealed that if the highly anxious subjects perceived the stimulus association equivalently to the low-anxiety subjects, they actually developed larger CNVs.

These results suggest that previous data showing high-anxiety subjects to have low CNV amplitudes might be related to individual differences in the cognitive appraisal of the required task.

16. Sixteen subject cases were observed in this study. The number of subject cases was 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 cases. The data was presented as a summary.