

## PHYSIOLOGICAL REACTIVITY TO SENSORY STIMULATION AS A MEASURE OF PERSONALITY

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*Summary.*—6 introverts and 6 extraverts were tested with respect to the increment of salivary activity as a consequence of (a) putting 4 drops of lemon juice on their tongues and (b) having them swallow 4 drops of lemon juice. Under condition (a) introverts salivated significantly more than extraverts; under condition (b) extraverts salivated significantly more than introverts. Pavlov's theory of transmarginal inhibition was suggested as a possible explanation of this reversal.

It has been shown that introverts react more strongly with salivation to the placing of 4 drops of lemon juice on the tongue than do extraverts (Corcoran, 1964; S. B. G. Eysenck & H. J. Eysenck, unpublished manuscript). Correlations between the increment in salivation so produced and E.P.I. scores are in the neighbourhood of .7, and these findings are in good accord with theoretical prediction (Eysenck, in press). The present paper is concerned with the effects of increasing the strength of the stimulus by asking Ss to swallow the lemon juice rather than to keep it on the tongue; subjectively at least this produces a much stronger sensation, and the greater number of taste buds stimulated gives reasonable physiological grounds for accepting this introspective comment universally made by Ss. What kind of prediction would one make for the increased stimulation, as far as the salivary reaction of extraverts and introverts is concerned? At first sight it seems likely that increasing the strength of stimulation would increase the differentiation between introverts and extraverts, with introverts even more responsive than extraverts. However, Pavlov's law of transmarginal inhibition suggests that when intensity of stimulation goes beyond a certain point reactions become inhibited, and Teplov and his school have demonstrated that individuals with "weak nervous systems" show transmarginal inhibition earlier than do individuals with "strong nervous systems" (Grey, 1964). If we may identify the concept of "weak nervous system" with introversion (S. B. G. Eysenck & H. J. Eysenck, unpublished manuscript), then it is possible to argue that strong stimulation might have the paradoxical result of producing greater reactivity in extraverts. The present experiment may throw some light on this point.

Six extreme introverts and 6 extreme extraverts were chosen to take part in the experiment; their scores on the E.P.I. (Eysenck & Eysenck, 1964) ranged from 1 to 6 for the introverts and from 12 to 21 for the extraverts (*M*, 4.2, and 15.7, respectively). No mean differences were found with respect to neuroticism. Each S was tested twice, once under ordinary conditions, i.e., with 4

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drops of lemon on the tongue for 30 sec. and once with instructions to swallow the drops immediately. In each case the test was preceded by establishing the salivation rate (first trial) without any stimulation, by positioning a standardized dental cotton-wool swab on S's sublingual salivary gland for 30 sec. and weighing it. The same procedure was followed during the second trial; in addition, the lemon juice was introduced. Our previous unpublished work has shown that Trial 2 scores and difference scores (Trial 2 minus Trial 1) give equally good correlations with personality scores; first trial scores do not correlate with personality to any appreciable extent.

Results under lemon-on-the-tongue conditions show that the introverts increased their salivation by .58 gr. on the average, extraverts by .15 gr. The difference is significant at the 5% level by  $t$  test, and in the same direction as previous studies. Results under lemon-swallowed-immediately conditions, however, are very different. Introverts show an increment of .83 gr., extraverts one of 1.25 gr. ( $t$  test,  $p < .01$ ). Thus an incremental difference of .43 gr. of introverts relative to extraverts under lemon-on-the-tongue conditions turns into a relative decrement of .42 gr. under lemon-swallowed-immediately conditions ( $p < .01$ ). [It is interesting that only one S (of the 6), with an E score of 15, had a low difference score under "swallowing" conditions and a high difference score under "on tongue" conditions, i.e., contrary to the average results; this S also had a lie scale score of 4, as compared with a mean of less than 1 for the rest of the girls. It is thus possible that in her case the physiological test may have given a truer result than the inventory, which of course can be easily faked.]

These results suggest that possibly transmarginal inhibition may have been active in producing the reversal in salivary reactivity of introverts and extraverts under conditions of slight and strong stimulation of the taste buds. Alternative possibilities exist, of course, and must be ruled out before such a conclusion can be firm. Thus it is possible that the first touch of the lemon juice on the tongue produces a burst of salivation in introverts; all this saliva would then be swallowed with the lemon juice, so that introverts would start out with a deficit. Only direct recording from the salivary glands, both sublingual and parotid, will permit a decision between such widely different theories.

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