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On Manility and Serality

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ABSTRACT — The notion that different people consistently function best at different and specific times of day is subjected to further analysis and discussion of methodological difficulties. When factor analytic procedures are applied to behavior inventories which supposedly capture stable diurnal characteristics, more than one dimension of "serality-manility" emerges. Factor scores thus derived were correlated with the computed acrophases of several circadian functions. Certain results suggest sex differences in the underlying structure, besides the magnitude, of these relationships. Also, hormonal contraception may alter behavioral serality-manility.

Notations of manility and serality were introduced by F. Halberg and Associates (1977) as technical terms that can be more easily given a behavioral or physiological specification than the previous vocabulary of"morningness" or eveningness," whose meanings have been numerous and ill-defined. Actually, of course, syndromes of "early" and "late" optimal functioning have been recognized for a long time. Crude typologies reflect this awareness in such diverse fields as shift work, optimal medical therapies, proneness to accident, or enjoyment of social life. "Owls" versus "larks" exemplify different types. Indeed various scales and inventories were proposed which sometimes capture aspects that are both meaningful and quantifiable (cf. Fröberg, 1975; Hildebrandt and Ishag, 1973). Thus in a Swedish-English questionnaire (Ostberg and Horne, 1973) a simple summation of about 30 items tapping lateness and earliness correlates in the expected direction with the overall diurnal trend of subjects'(Ss) body core temperature.

Recent work has suggested that more than one dimension is independently involved in the overall behavioral as well as physiological syndromes. One may be a habitual "morning person" in terms of certain sets of functions yet be an "evening person" in others. In other words, there would be more than just one kind of "manility" and "serality".

This report addresses several issues within this general context. In one project, responses to the Swedish questionnaire by 19 Ss who took part in a rigorously monitored diet study (Hirsch et al., 1975) were intercorrelated and factor analyzed, using various techniques and approaches. The most defensible solutions pointed to three independent dimensions which accounted for more than 50 per cent of the variance. The dimensions were tentatively labelled, "subjective evening type" (F°1), "effective rhythm readjustment/young" (F °2), and "late mood peak" (F °3). Factor scores were computed and compared with the computed acrophases of objective performances (e.g. adding and tapping), ratings, as well as temperature, circulatory function, cortisol and STH measures. By way of illustration, temperature acrophase was significantly correlated with the (least stable) Factor 3 in males (r = 0.64), and with all three factors in females (0.59 . . . 0.72) Cortisol acrophases correlated 0.84 with F °2 in males, but not conclusively (-0.38) in females. The difference of the two trends is significant, although the N is too small to generalize (from the 9 men, 5 women available for this comparison). The STH acrophases on the other hand, correlated negatively with F°1 in both sexes (-0.39 and -0.90): the more these Ss describe themselves as "late" overall types, the earlier in the day are their actual hormone crests. Several other significant relationships were observed, but frequently they suggested sex differences or interactions which were more difficult to interpret. Thus systolic blood pressure shows an appreciable relationship with F°3 in women only (0.72) but only a small effect (and on F°2 rather than F°3) in men (0.47). When factoring techniques are applied to statistical situations of the kind faced here, serious shortcomings are unavoidable, however. Therefore, these results can do no more than establish the likelihood that identifiable clusters of behavior, or even ratings of state, are indeed related to a specific circadian physiology. (See Aschoff et al., 1967, and Froberg, 1975).

Questionnaire to German Workers

A very similar set of questions was administered to 199 German shift workers in two industries (Ritter, 1976), and results were subjected to various analyses. The interpretation remains complex, but it is clear that more than one dimension of "morningness-eveningness" is needed to account for the structure of the relationships found among the self-reports as such, without even considering their meaning for actual performance and physiological efficiency in that environment.

Another study, using a revised 19-item inventory with 47 Ss, lends further support to the essential multi dimensionality of serality or manility. In this case two factors were extracted, the first of which has now been identified in several contexts and involves reported peaks of alertness and mood as well as actual bedtime. However, there was evidence, too, of sex and constitutional variables. For example, a simple index of "slender physique" was defined from standard scored height and weight measures. Greater relative slenderness went with earlier activity and mood peaks in men (-0.38) but with later functioning if anything in women (0.32). Again, it is the trend difference that is significant and provocative for further study rather than the effects for groups taken separately.

A new 13-item inventory was developed recently which permitted to llok at another set of problems on 56 male and female college student Ss. Additionally some of the questions were asked in a different order in sub-groups, and other devices were employed to enhance reliability. Interestingly, the order of getting the information seems to make a difference. Thus when these Ss have to classify themselves into morning or evening types based on their experienced work and performance levels during the day,

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they generally tend more to the "late" pole if this informatiom is requested first; the average type falls more in the "early"direction (or in-between) if the first questions asked deal with the actual times as recalled, of best mood, alertness, waking, and other specific events. It would seem that a more factual frame of reference is created in this way which then influences people's overall subjective integration. There is no such position effect with the overall self-rating when the Ss are asked to consider their "type" primarily in terms of their feeling and well-being during the day. For various reasons, however, this finding would not necessarily suggest one "best" method of getting information in questionnaires or inventories on matters such as serality.

Disregarding this problem, and working from intercorrelation matrices as such without attempting a factorial or other summation or reduction, three independent networks were identified in this group and checked for replication across sub-groups. When instructed to define overall type by feeling and well-being, the Ss' categorizations are related to reported clock time peaks of mood, alertness, fitness and bedtime; unrelated to time of waking or other circadian activities. However, if type is defined by performance adequacy in the circadian context, then only reported alertness peaks are predictive of this overall perception. The two findings hold regardless of the order in which the questions are asked, although results were somewhat clearer if the specific time items came first.

Correlation of Hormone Effects

Potential hormone effects also were studied. Hormonal contraception (B.C. pill) was significantly correlated with later bedtime and shorter sleep span as well as greater reported constancy of daily mood peaks across seasons. There was no relationship with events or times centering on waking, rising or other circadian characteristics. Since class of hormone and sexual habits were not assessed, we are left here with several alternative interpretations which cannot be resolved at this time.

Typological issues seem to be involved in certain aspects of rhythm adjustment besides habitual daily patterns of activity. Thus the delay male Ss report in adjusting to east and west bound jet lag is related to their actual as well as ideal bedtime (both later), and younger age. There were no effects approaching significance with any of the variables in female Ss.

Taken together, the above findings would suggest conclusions as follows.

(1) An effective conceptualization of serality and manility will involve several statistically independent dimensions;

(2) Physiological function acrophases are meaningfully related to behavioral characteristics which can in fact be reported by individuals;

(3) It may be feasible eventually to estimate some of the circadian physiological constants from reported and observed behavior or habitual activity patterns. The implications of such a development for shift work selection and effective chronotherapy, among other things, would seem to be substantial.

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