MMPI Correlates of Several Schizotypy Scales

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One of the more influential papers in modern psychology is Paul Meehl's (1962) APA Presidential Address in which he proposed a diathesis-stress model for schizophrenia. Meehl argued that what is inherited in schizophrenia is a specific neural integrative defect which he labeled "schizotaxia." According to Meehl, any person who possesses this defect will develop a particular personality organization called schizotypy. One of the most critical aspects of this model is the idea that only a portion of those people who are schizotypic will ever decompensate to the point of becoming clinically schizophrenic. This model, although far from being thoroughly tested, has generated extensive speculation and considerable research in the 20+ years since it was first proposed.

Meehl's diathesis-stress model provides a theoretical base for the investigation of both the genetic and environmental influences in schizophrenia. However, to pursue this line of research, one must be able to accurately identify the schizotype. A number of investigators have used existing scales to identify schizotypes. The most widely used scale is the MMPI and the most commonly used profile is the 2-7-8 (Gilberstat & Duker, 1965). Until recently, there has been relatively little effort directed at developing specialized measures for identifying the schizotype.

Over the last five years, Chapman and his associates have attempted to develop several scales to measure the specific symptoms that the clinical literature suggest are typical of the schizotype. These investigators used the most modern scale development techniques to create highly reliable measures with minimal response set bias. To date, approximately 10 such

scales have been developed by Chapman and his associates. About half of those scales have some significant supporting validational data, while the remainder are in the process of being validated.

Two previous studies have looked at the relationship of schizotypy scale scores to MMPI scores. Penk, Carpenter & Rylee (1979) administered the Social and Physical Anhedonia Scales and the MMPI to veterans in an inpatient drug dependence program. They found that both scales were associated with significant pathology on the MMPI including social introversion, social maladjustment and psychoticism, as well as elevated Pure Scale 7 scores which measure characteristics associated with the 2-7-8 MMPI profile. Chapman, Chapman & Miller (1982) correlated four schizotypy scales (Physical Anhedonia, Perceptual Aberration, Magical Ideation, and Nonconformity) with selected scales and composite scales of the MMPI in a college student population. These authors found consistent positive relationships between schizotypy scores and several MMPI-derived scores which have in the past been used to identify psychosis-prone individuals, including the 2-7-8 and 2-7-8-0 combined scale scores, Eysenck and Eysenck's (1976) Psychoticism Scale, and Golden and Meehl's (1979) Schizoidia Scale. In both of these studies however, unselected samples were used. Hence, it is not clear whether the correlations observed are a function of the scales identifying distinctly different subjects (i.e. schizotypes) at the high end or whether the scales show a continuous relationship with the MMPI measures of pathology. The former finding would be consistent with Meehl's hypothesis; the latter would not be.

In the current study, the validity of four of these schizotypy scales is further tested by comparing the MMPI profiles of people who score high or in the normal range on these scales. The scales used in this study are

Physical Anhedonia (Chapman, Chapman, & Raulin, 1976), Perceptual Aberration (Chapman, Chapman, & Raulin, 1978), Intense Ambivalence (Raulin, 1982), and Somatic Symptoms. Instead of using the full length schizotypy scales, much shorter screening versions were developed for this research. The hypothesis was that subjects who score highly on one or more of these schizotypy scales would show more deviant MMPI profiles than control subjects who score in the normal range on all of the schizotypy scales, and that the deviant patterns will suggest an underlying psychotic rather than neurotic disorder.

Developing Screening Scales

Our first step in this project was the development of short screening versions of the original schizotypy scales. The original scales did have high reliability and had been validated in several different situations, but their length made them unsuitable for routine screening of potential subjects. Our goal was to develop scales of 10 to 15 items each which were capable of predicting whether subjects would score above the cutoff on the full scale. Since we were primarily interested in sensitivity on the high end of the scale for our screening instruments, we did not rely solely on item-scale correlations. Instead we used a combination of item-scale correlations, difficulty levels (proportion of subjects answering the item in the keyed direction), and mean item difference between the identified experimental subjects on the full scale (i.e. those subjects who scored two standard deviations above the mean) and control subjects (those subjects who scored no higher than one half of a standard deviation above the mean on the original scales).

Subjects

The various item statistics described above were calculated on a sample of 518 male and 659 female college subjects who had completed the

61-item Physical Anhedonia Scale, the 35-item Perceptual Aberration Scale, the 45-item Intense Ambivalence Scale, the 40-item Somatic Symptoms Scale, and a 13-item Infrequency Scale designed to detect random responders. Subjects were included only if their Infrequency Score did not exceed 2. Once items were selected, the sensitivity of the screening scales was evaluated on a second independent sample of 631 male and 718 female college students.

Selection Procedure

Item statistics were computed separately for males and females. Three item statistics were computed: item-scale correlation, item difficulty, and mean item difference between experimental and control subjects. Items were retained for the screening scales only if they were satisfactory for both sexes. A three step selection procedure was used. The items were initially ranked on the basis of mean-difference which served as our primary selection criteria. The items with the largest mean differences were the ones which contributed most to the high scores of the experimental subjects. The difficulty level (frequency of endorsement in the keyed direction) was used as an exclusion criteria. Items were not retained for the screening scales if the frequency of endorsement exceeded .40. We used this criteria because we wanted to maximize the sensitivity of the scale for selecting high scorers. It would be the same logic as giving a very difficult test if you were primarily interested in discriminating the very good from the outstanding students in a given class. The item-scale correlation was also used as a exclusion criteria since we wanted items to also be able to discriminate reasonably well across the entire range.

On the basis of the above criteria, the ten best items on the Perceptual Aberration, Intense Ambivalence and Somatic Symptoms scales and

the 15 best items on the Physical Anhedonia Scale, plus five items from the Infrequency Scale were selected. The predictive validity of these scales was evaluated on the cross validation samples by computing the hit rates and false positive rates for predicting whether the subject would be classified as an experimental on the basis of the full-scale score. This next slide gives these figures for the male and female subjects respectively.

Insert Slide 1 about here

As you can see in this slide, we were able to accomplish our goal of creating sensitive screening measures which have very low false positive rates. The typical scale identifies about 70% of those subjects who would have been classified as schizotypic using the much longer scales. However, in developing these screening scales, we specifically chose criteria for selecting items that would minimize false positives, and as you can see, none of the false positive rates exceed 2%. Controlling the false positive rate is so critical because the base rate of schizotypy is quite low (best estimates are between 5 and 10%). With such low base rates, even a false positive rate as high as 5% could result in the false positives actually outnumbering the valid positives.

MMPI Correlates of the Schizotypy Scales

In the second phase of this research, subjects were selected on the basis of their scores on these screening scales and then given the MMPI. It had been predicted that subjects designated as "schizotypic" would be more likely than control subjects to show patterns on the MMPI that are typical of those found in schizophrenic or borderline patients.

Subjects and Procedure

The screening versions of the schizotypy scales were given to 1290 college students who were enrolled in an introductory psychology course and who completed the scales during an in-class mass testing near the beginning of the semester. Subjects were then selected from this pool on the basis of their scores on the schizotypy scales. Subjects were designated as "schizotypic" subjects if they scored more than two standard deviations above the mean on at least one of the four schizotypy scales (Physical Anhedonia, Perceptual Aberration, Intense Ambivalence, and Somatic Symptoms). Subjects were designated as controls if they scored no higher than one half of a standard deviation above the mean on all four of the scales. Potential subjects were then phoned and invited to participate in an experiment on personality assessment. One hundred and eighteen subjects (60 males and 58 females) agreed to participate and completed the MMPI.

Results

These next two slides present the mean MMPI profiles of the "schizotypic" and control subjects for the female and male subjects respectively. Note the similarity in profiles for the males and females. For both sexes, the pattern of the control subjects is very typical of college students in general, while the pattern for the "schizotypic" subjects is quite distinct. The schizotypic subjects show the classic inverted V in the validity scales, slight elevation on the entire profile with a distinct positive slope as you move left to right. They were significantly more elevated than controls on all scales except 3, 5 and 6 (Hy, Mf, Pa) for both males and females. For both sexes, the differences between experimental and control subjects are largest on scales 2, 7, and 8, as hypothesized. In addition to the single scale comparisons, a MANOVA using the 2-7-8 scales as dependent measures showed very significant

differences ($p < .0001$) between the "schizotypic" and control subjects for both men and women.

Insert Slides 2 and 3 about here

In addition to the analyis of individual scale differences and the multivariate analysis of the 2-7-8 pattern, a traditional configural analysis was performed on the data. All subjects were classified as either fitting or not fitting the 2-7-8 profile which was operationally defined as having all three scores above a T-score of 70, scale 2 not more than 15 T-score units above scale 8 and scale 7 no more than 20 units above scale 8. This next slide presents these data. Fifteen subjects were classified 2-7-8, all of whom were "schizotypic" subjects, which is highly significant, $\chi^2 = 6.86$, $p < .01$.

Insert Slide 4 about here

Finally, for descriptive purposes, we graphed the mean profiles for subjects scoring high on each of the four schizotypy scales used in this study. This first slide of the male controls shows a very typical college student profile. The male anhedonics, instead of showing an elevated profile, actually show a profile flatter than normal. The mean profiles for the males scoring high on Perceptual Aberration, Intense Ambivalence, and Somatic Symptoms are all classic psychotic profiles. It is interesting to note that these profiles are being predicted by scales only 10 items long. The picture for females is similar, although less striking. Again, the control subjects show a typical college student profile. In contrast

to the males, the female anhedonics show a somewhat elevated profile. The remaining schizotypy scales show the same general pattern as seen with the male subjects, although the scale elevations are less dramatic.

Insert Slides 5 though 14 about here

Discussion

These data indicate that short screening versions of the schizotypy scales used in this study can readily identify subjects from a college population who show a high degree of pathology on the MMPI. More importantly, the patterns of the pathology shown by the experimental subjects are suggestive of an underlying psychotic process as predicted. This latter finding is especially significant since a weakness inherent in this particular type of research is that both the independent and dependent variables are self-report measures. However, the alternative explanation of a response set bias accounting for the findings is less plausible because specific, rather than generalized elevations are found on the MMPI scales for the experimental subjects.

These data, coupled with previous validational data (Chapman & Chapman, 1980; Chapman et al., 1982; Chapman, Chapman, Raulin, & Edell, 1978; Chapman, Edell, & Chapman, 1980; Numbers & Chapman, 1982) indicate that the schizotypy scales utilized in the present study can identify subjects with clinically significant deviations from the norm who very well may be at risk for more serious psychopathology. A major contribution of this study is the demonstration that such individuals can be identified with very short scales (as few as 10 items) which makes screening much more practical.

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Slide 1

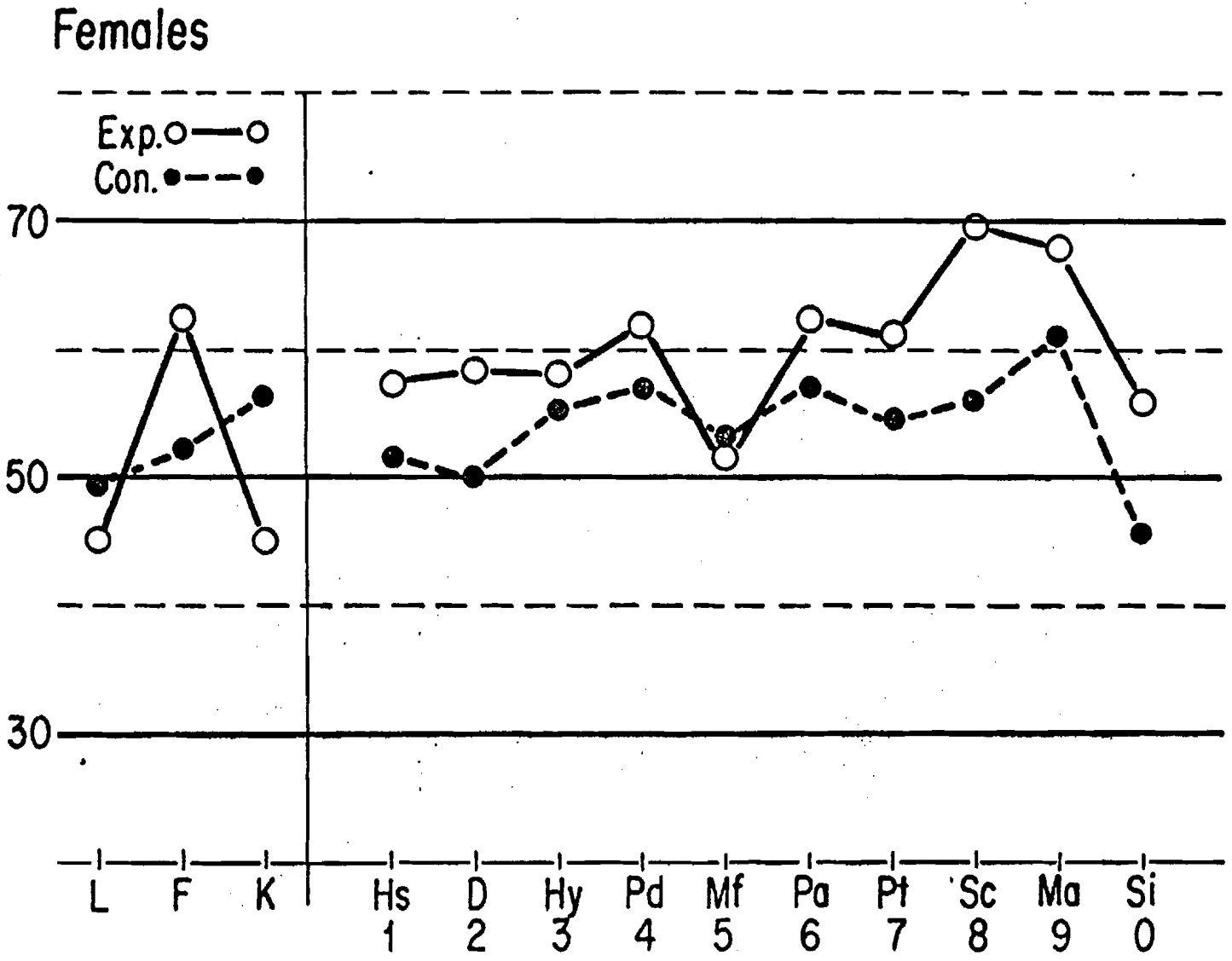
The Hit Rates and False Positive Rates for Predicting

Subjects' Full-Scale Score Designation on Four Schizotypy Scales

	Males		Females	
	Hit Rate	False Positive	Hit Rate	False Positive
Physical Anhedonia	64%	1%	56%	2%
Perceptual Aberration	75%	<1%	87%	2%
Intense Ambivalence	65%	<1%	69%	1%
Somatic Symptoms	76%	<1%	67%	2%

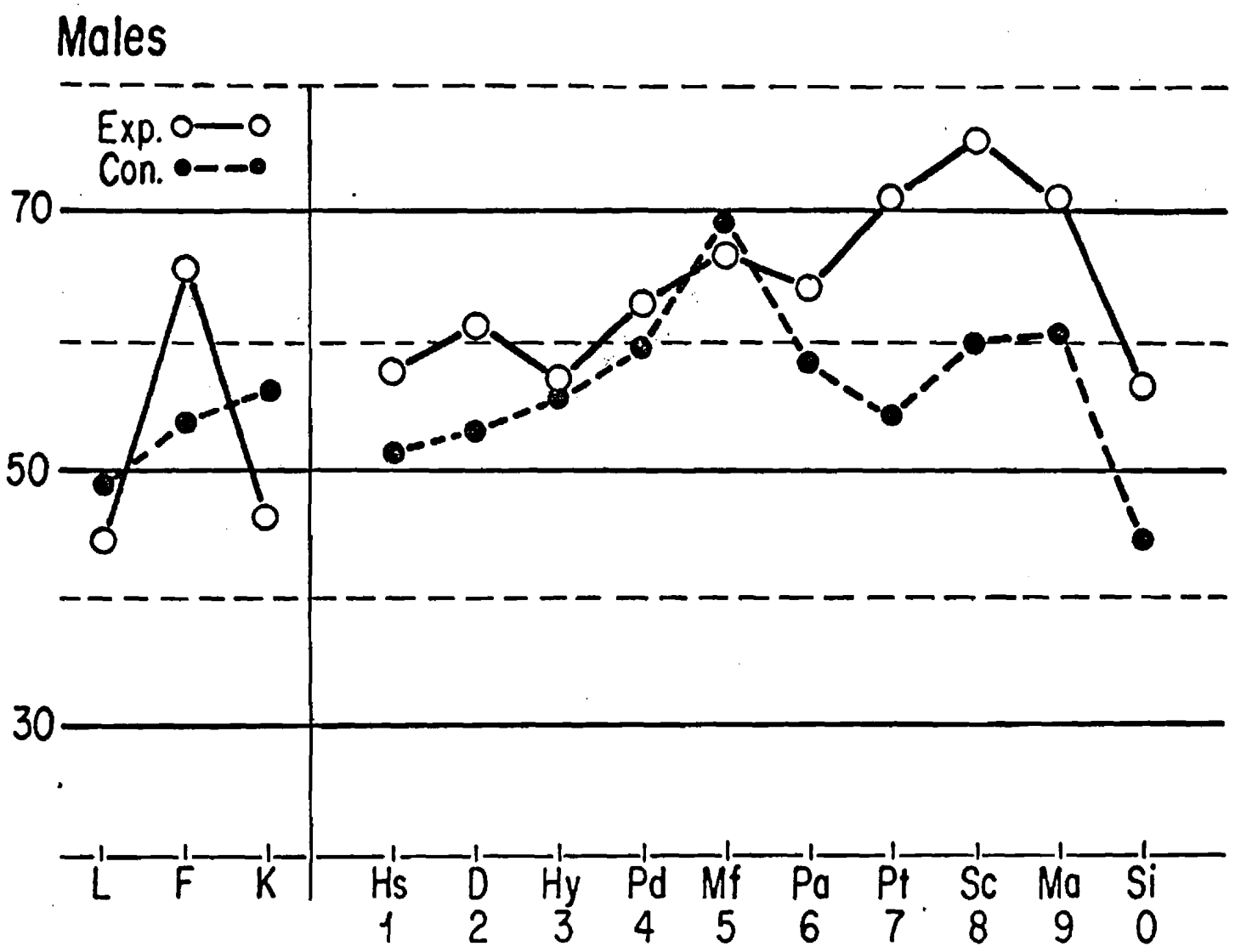
Slide 2

Mean MMPI Profiles for Female Schizotypic and Control Subjects



Slide 3

Mean MMPI Profiles for Male Schizotypic and Control Subjects



Slide 4

Contingency Table comparing the Rates of 2-7-8 profile in schizotypic and control college subjects.

	Profile Pattern	
	2-7-8	Not 2-7-8
Schizotypic subjects	15	64
Control subjects	0	39

Note: Schizotypic subjects were defined as high (more than two standard deviations above the mean) on at least one of four schizotypy scales; Physical Anhedonia, Perceptual Aberration, Intense Ambivalence, and Somatic Symptoms. Control Subjects were no more than 1/2 of a standard deviation above the mean on all four of these scales. The above difference is highly significant, $(1) = 6.86$, $p < .01$.

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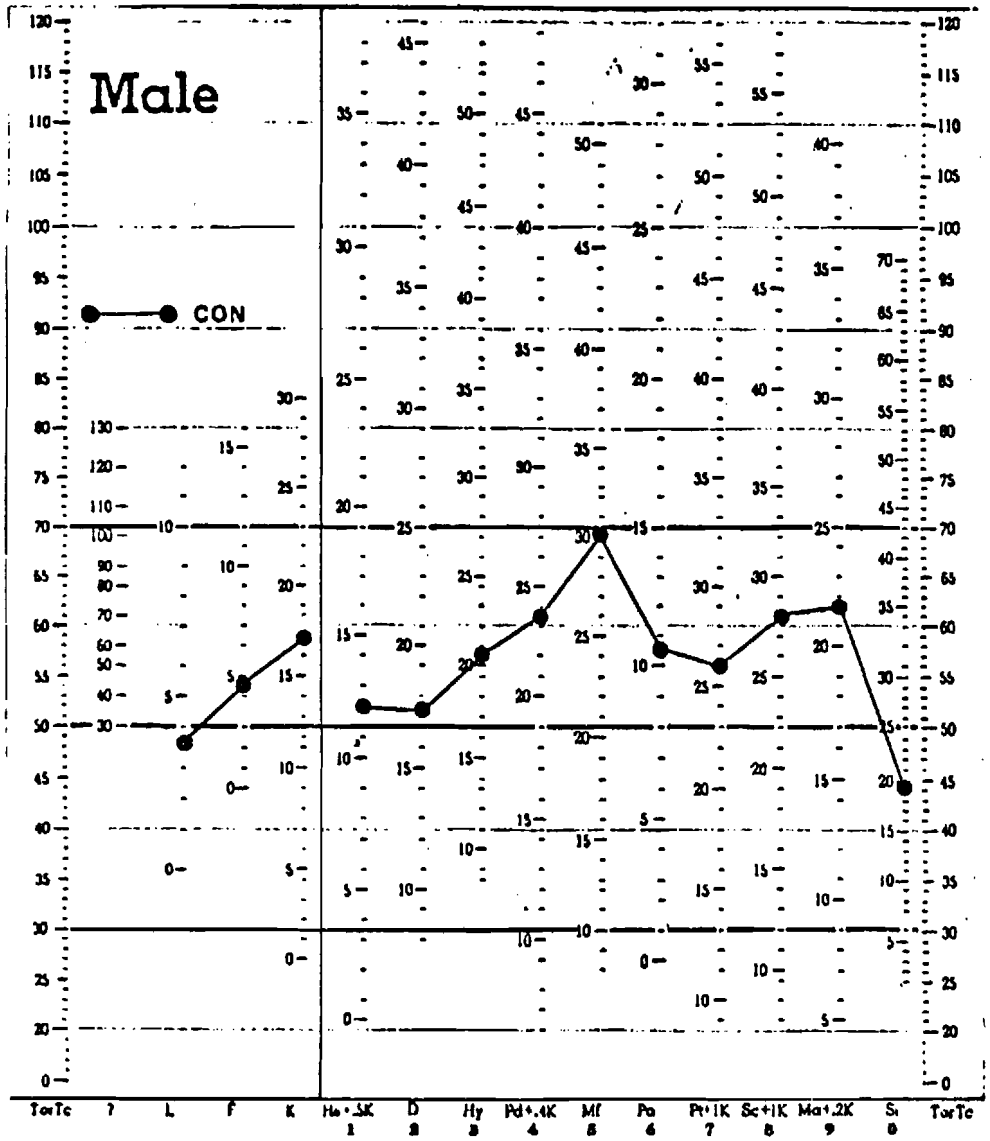

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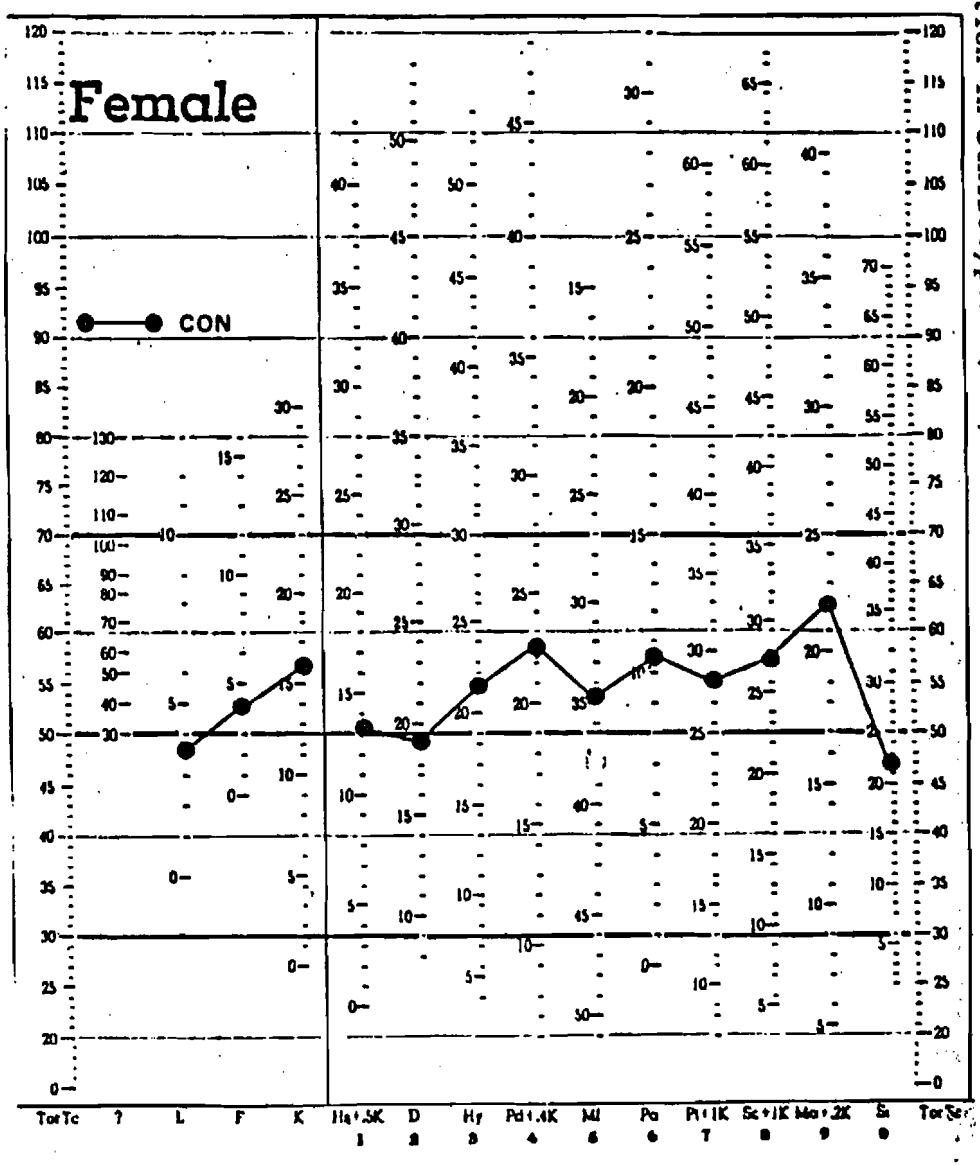

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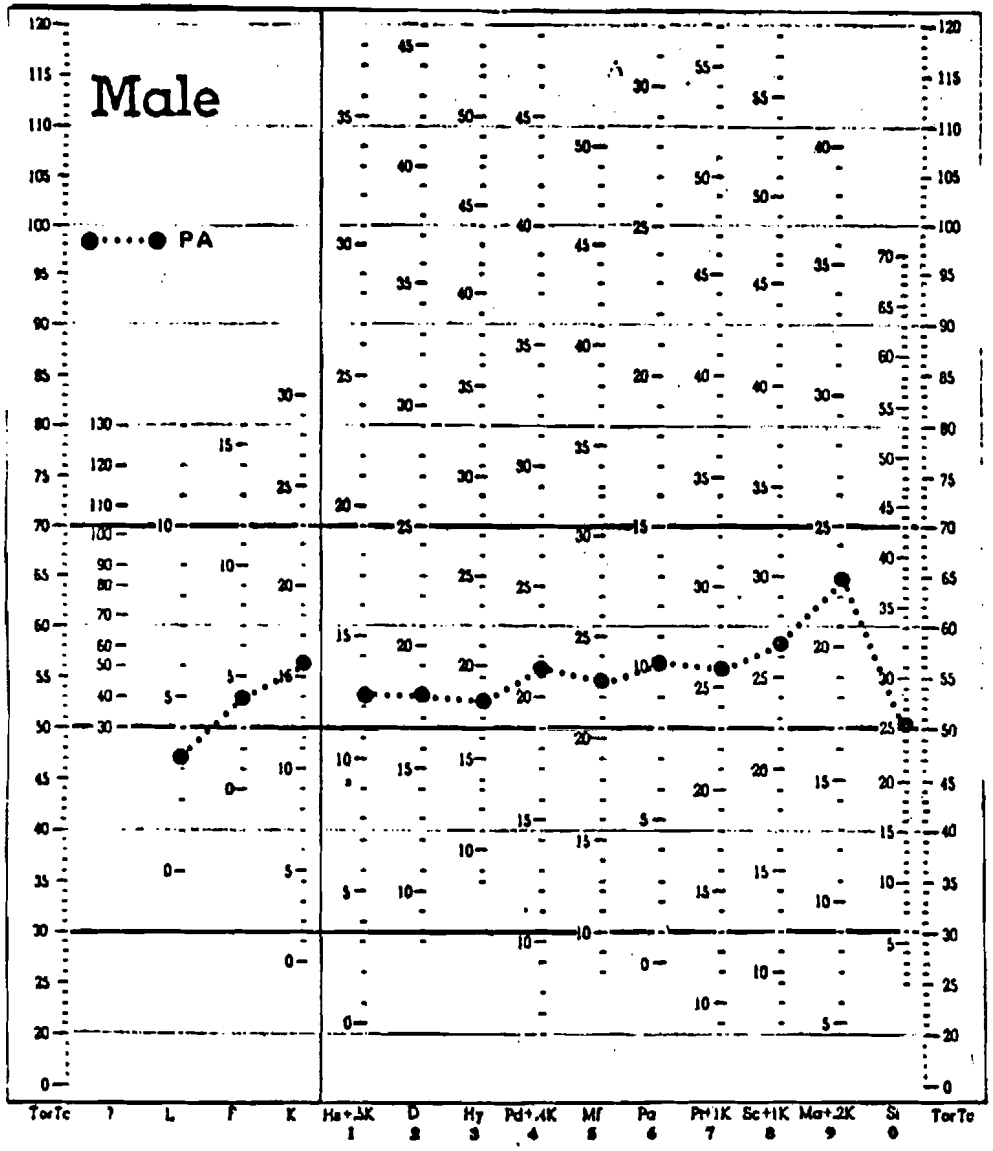

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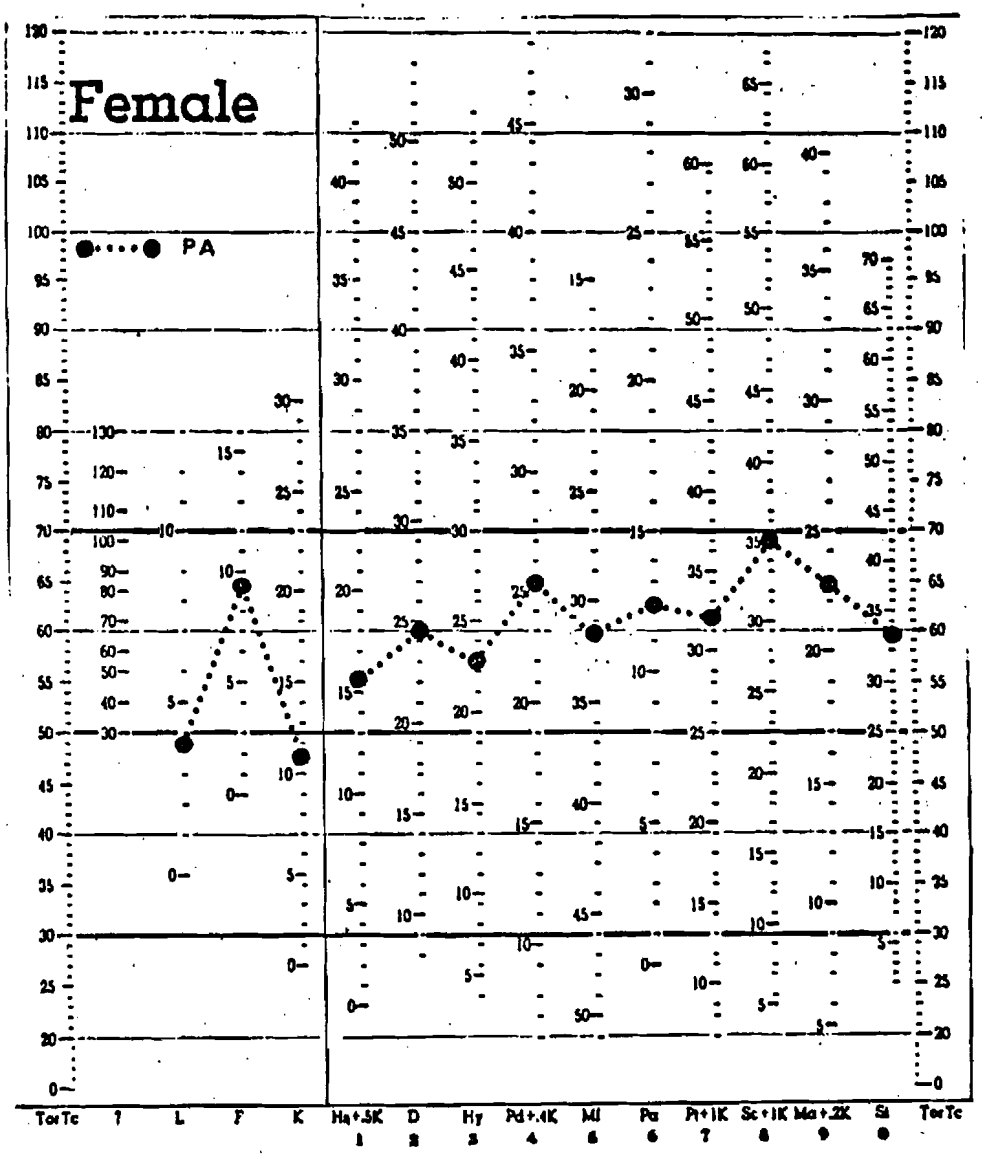

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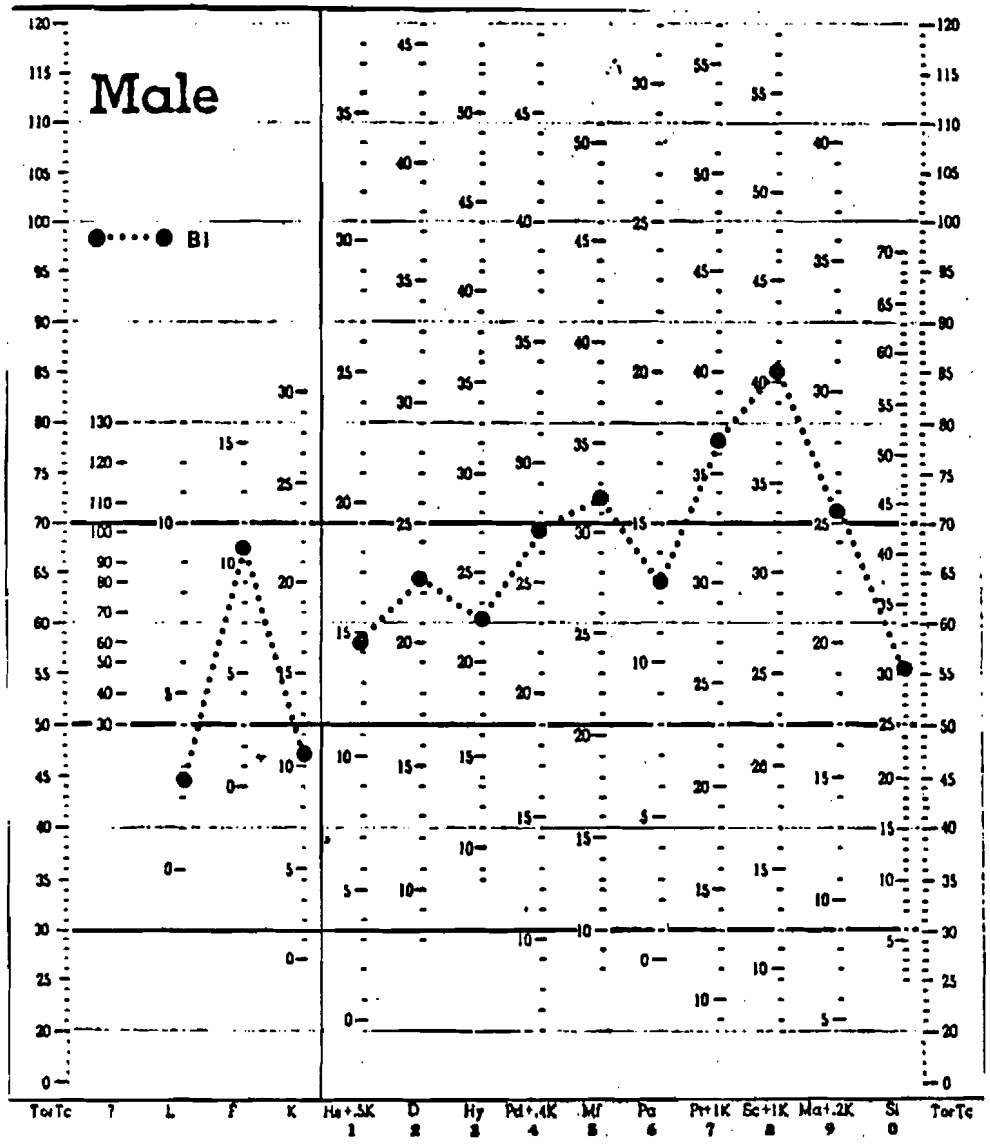

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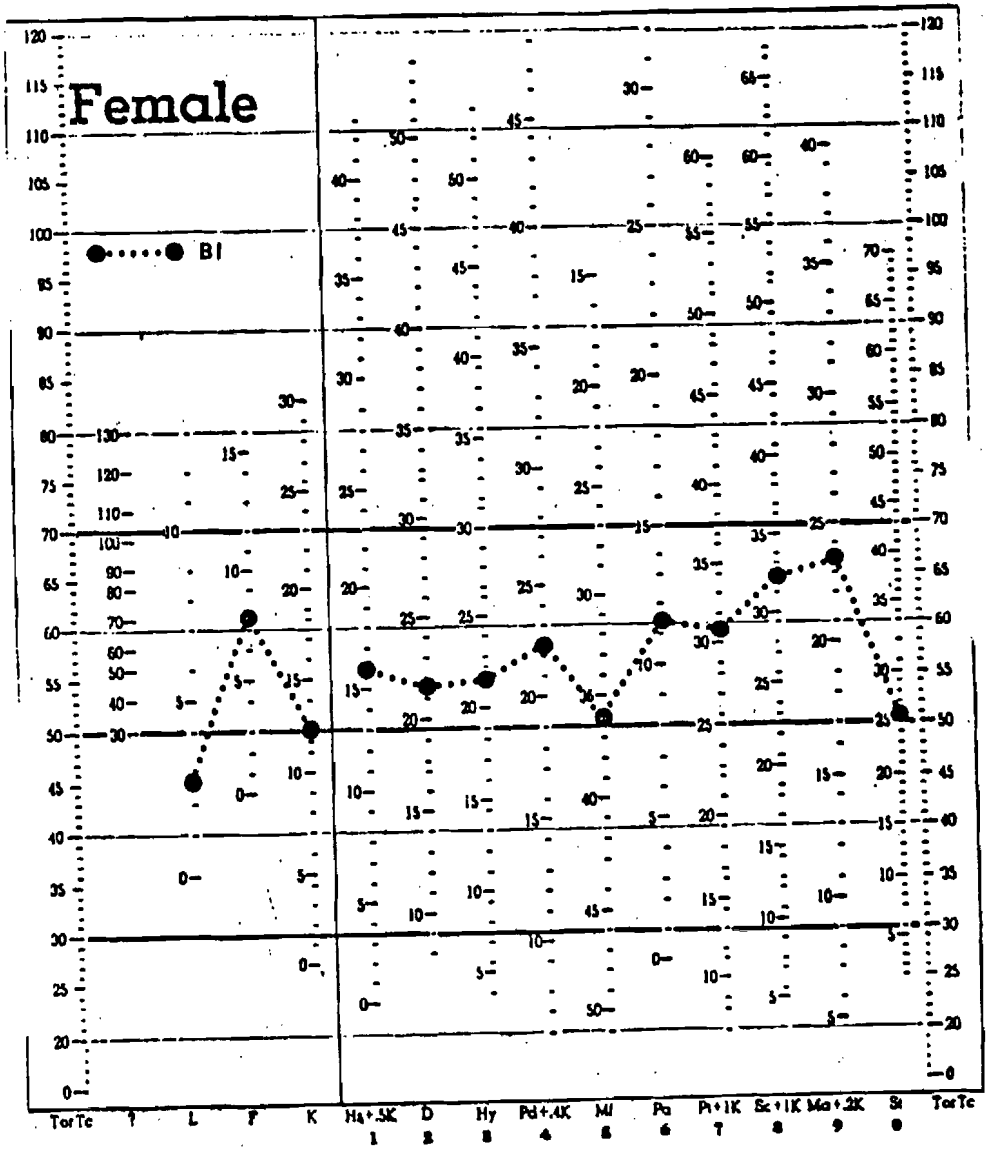

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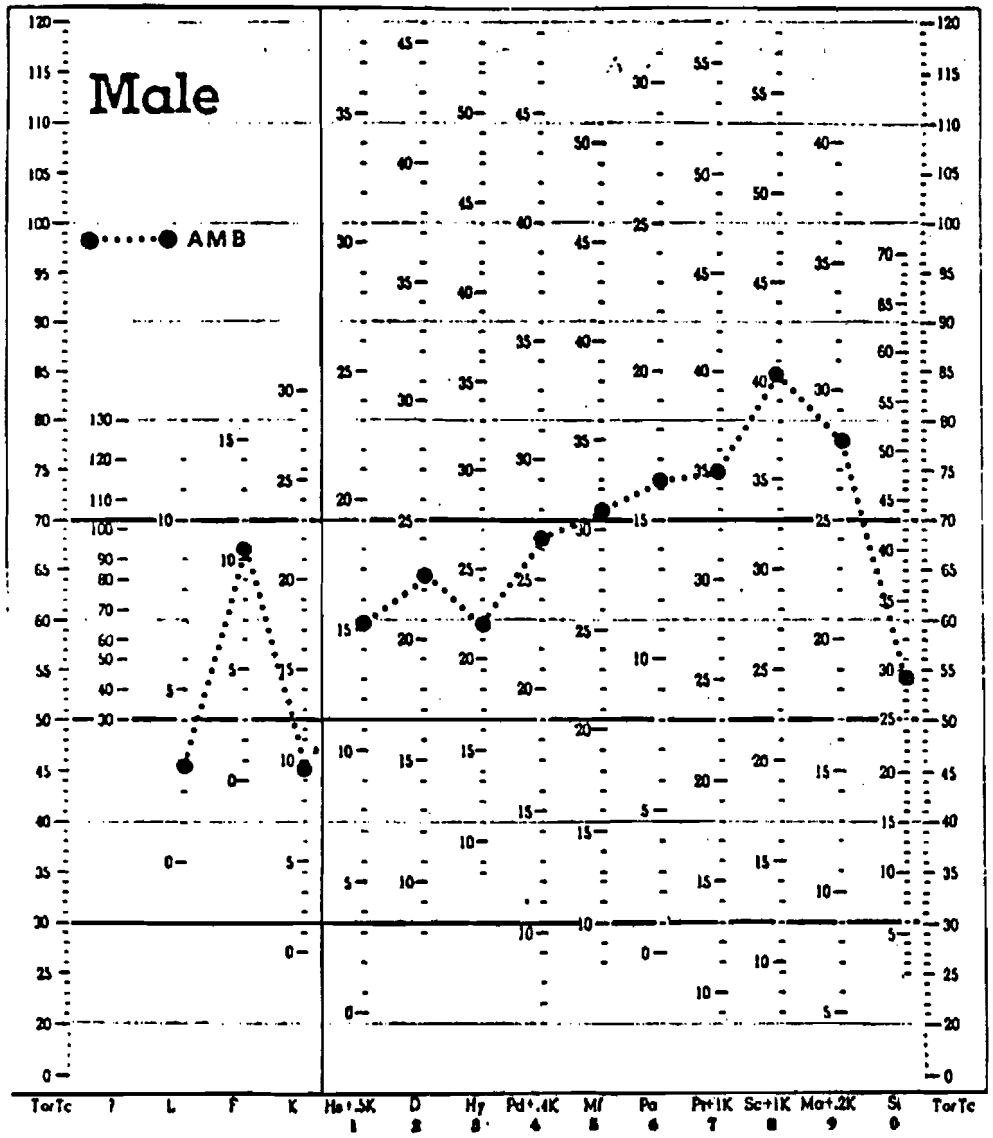

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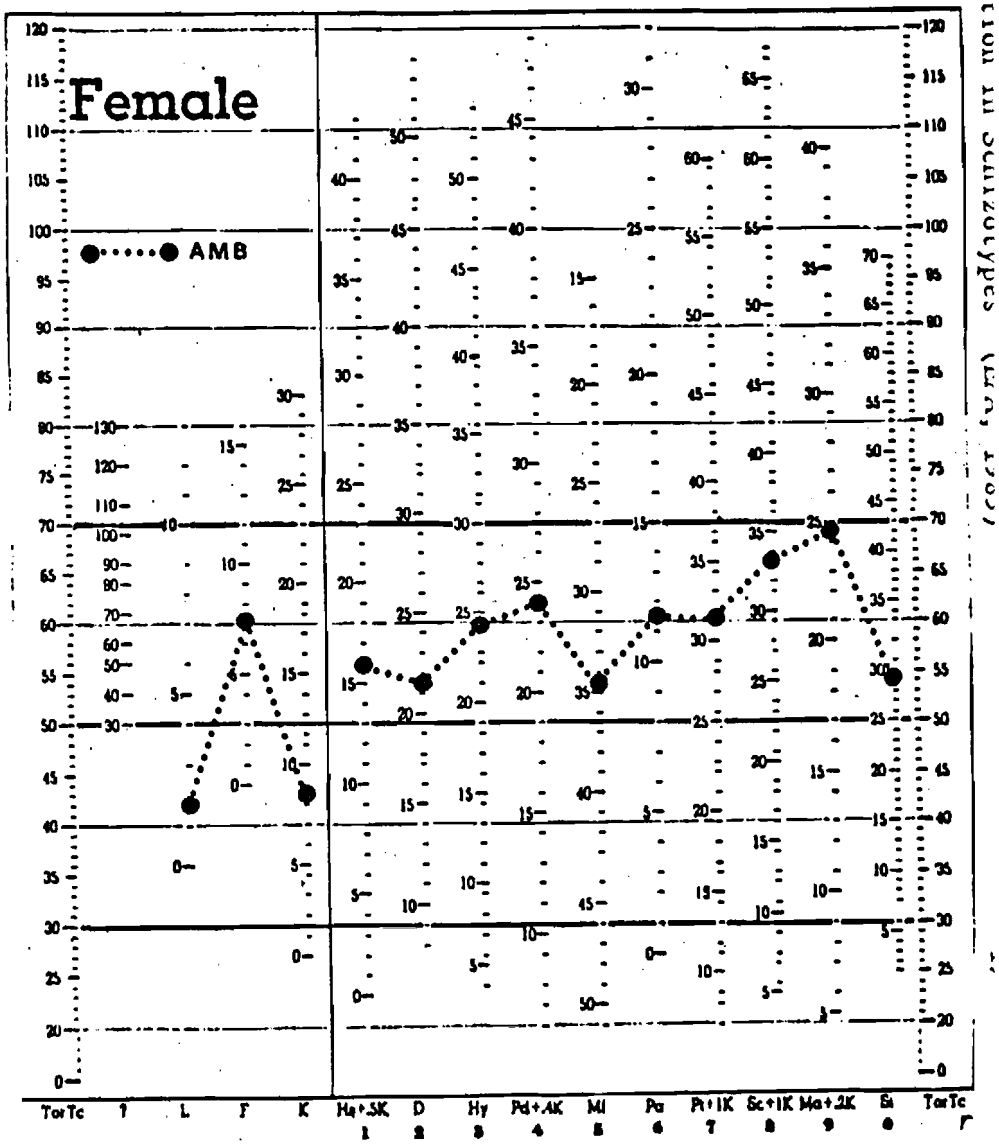

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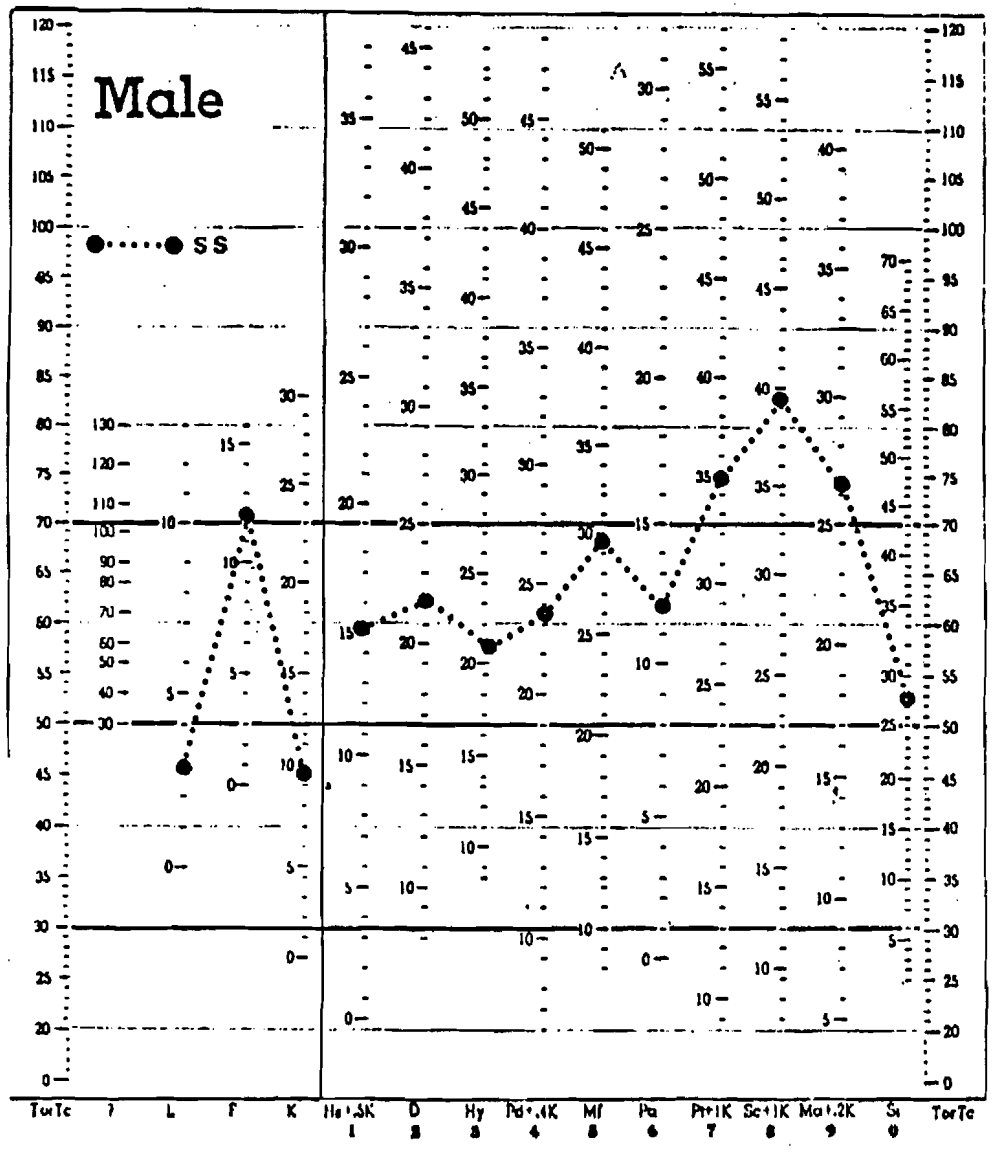

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