TABLES AND FIGURES FOR

CLINICAL INFORMATION PROCESSING SYSTEMS

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The Minnesota Multiphasic Personality Inventory

Starke R. Hathaway and J. Charnley McKinley

Scorer's Initials 125

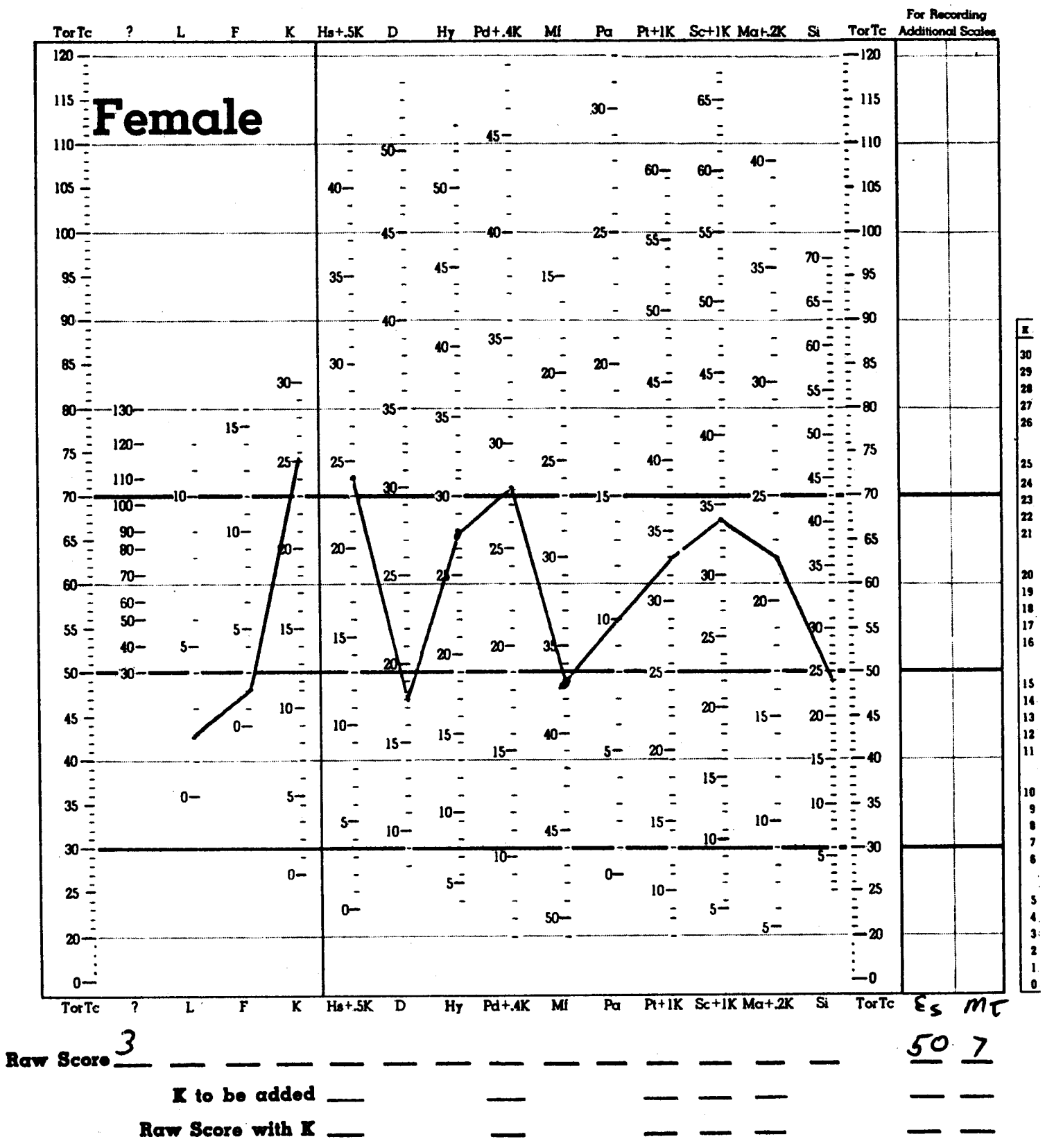

Figure 5-1: Profile Sheet of the MMPI.

Table 5-1. Fourteen-step forced normal distribution (Q-sort) of 126 MMPI profiles.

	Least Adjusted													Most Adjusted
Pile:	1	2	3	4	5	6	7	8	9	10	11	12	13	14
No. of Profiles:	2	3	4	9	12	15	18	18	15	12	9	4	3	2

(N = 126)

TABLE 5–2

MMPI Decision Rules and Tape Recorded Protocol

Rule	Protocol
1. If four or more clinical scales $\geq T$ score 70, call maladjusted.	1. Now I'm going to divide these into two piles . . . on the left [least adjusted] I'm throwing all mults with at least four scales primed.
2. If scales *Hs, D, Hy, Pd, Mf, Pa, Pt, Sc* and *Si* are ≤ 60 and if *Ma* ≤ 80 and *Mt* $\leq 10_R$, then call adjusted.	2. I'll throw all mults to the right [most adjusted] if there's no clinical scale above a *T* score of 60. I'll let *Ma* go up as high as 80 . . . maybe a raw score of 10 on *Mt* would be playing it safe . . . so I'm looking at three things now and sorting according to these conditions.
3. If the first two scales in the Hathaway Code include *Pd, Pa,* or *Sc,* and at least one of these is ≥ 70, then call maladjusted (if *Mf* is among the first two scales, then examine the first three scales in the Hathaway Code).	3. If either *Pd, Pa,* or *Sc* is primed, I'm putting it on the left side [least adjusted] . . . it would also be nice to have all of these scales slightly more elevated than the others.
4. If *Pa* or *Sc* ≥ 70 and *Pa, Pt,* or *Sc* $\geq$ *Hs, D,* or *Hy,* call maladjusted.	4. If the elevations are lopsided to the right with the left side of the profile fairly low, I'm throwing the mults to the left [least adjusted].
5. Call maladjusted if *Pa* ≥ 70 unless *Mt* $\leq 6_R$ and *K* ≥ 65.	5. Here's a paranoid character. I wish his *K* score were not quite so high and he could use more *Mt* . . . when that *Mt* score is less than 10, I figure something must be stabilizing him. I like an inverted V with *F* high on the validity scales.
6. If *Mt* ≤ 6, call adjusted.	6. Boy, I don't know that *Mt* is too low to call her maladjusted. I'll settle for calling them adjusted if *Mt* is at a raw score of 6 or lower.
7. Call maladjusted if $(Pa + Sc - 2 \cdot Pt) \geq 20$ and *Pa* or *Sc* ≥ 65.	7. Here's a nice valley between Scales 6 and 8 and both 6 and 8 are high. I'll call this one maladjusted.
8. If *D* or *Pt* are the primary elevations and *Es* $\geq 45_R$, call adjusted.	8. These 27 profiles are giving me a pain . . . if 2 or 7 is too elevated like, say, higher than a *T* score of 80 and if the *Es* scale is approaching a raw score of 50 . . . I'll call it adjusted.
9. If *Pd* ≥ 70 and (*a*) male *Mt* $\geq 15_R$ or (*b*) female *Mt* $\geq 17_R$, call maladjusted.	9. A primed *Pd* and an *Mt* raw score of 15 or more is going over to the left pile [least adjusted]. I guess on a male profile an *Mt* of 15 or more will do . . . and an *Mt* of 17 or more on a female profile.
10. If *Mt* $\geq 23_R$ and *Es* $\leq 45_R$, call maladjusted.	10. With *Mt* high and *Es* low, I'll call maladjusted at this stage of the game.
11. If five or more clinical scales ≥ 65 and if either *Pa* or *Sc* ≥ 65, call maladjusted.	11. Everything's up on this girl's MMPI. I'm especially bothered by the high *Pa* . . . here's a high *Sc* . . . everything else is up too . . . over to the left [least adjusted].
12. Call adjusted if at least five clinical scales are between 40 and 60 and *Es* $\geq 45_R$.	12. Here are a couple of nice, normal looking mults. All scales hugging a *T* score of 50, and *Es* is nice and high . . . over to the right [most adjusted].
13. Call maladjusted if the profile is male and *Mf* ≥ 70 and *Sc* $\geq$ *Pt* and *Sc* ≥ 60.	13. An elevated *Mf* is pretty common for boys around colleges, but when it's primed and when *Sc* is up and is higher than *Pt,* I'll throw it to the left [least adjusted].
14. If *Si* ≥ 60 and *Pa* ≥ 60 or *Sc* ≥ 70, call maladjusted.	14. That's a fairly high *Si* and *Pa* is up. I'll call it maladjusted . . . here's one with a high *Si* and *Sc* is also up. I'll call this maladjusted.
15. Call maladjusted if *Es* $\leq 35_R$.	15. Here's a pretty good looking MMPI, but that low *Es* makes me think something might be wrong . . . to the left [least adjusted].
16. Call adjusted if *Mt* $\leq 10_R$.	16. These are all pretty bad looking mults. I'll call adjusted if the *Mt* is lower than 10.

Note.—The subscript R refers to raw scores.

Table 5-3. A print-out of three cases on which the computer yielded clinical judgments.

New Case

Identification No. 209 Male Criterion is Adjusted

Ques.	L	F	K	Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si	Es	Mt
41	47	51	77	57	53	64	69	61	62	60	63	58	40	72	27

Raw Score 58 1

Beta = 13 Band 4 Delta = 10 A.I. = 50 I.R. = 0.89

Pa + Sc - 2*Pt = 5 Hs + Hy - 2*D = 15 Mt - Es + -45

2*F-L-K = -22

43, 8, 6, 5, 7-9, 12/0 Hathaway Code

Rules Call this person maladjusted

Rules 18, 26, 22, Call this person normal

This person is called normal on the basis of precedence rule 0

New Case

Identification No. 210 Male Criterion is maladjusted

Ques.	L	F	K	Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si	Es	Mt
44	43	53	46	39	60	60	74	59	64	52	44	68	42	54	56

Raw Score 44 19

Beta = -3 Band 3 Delta = 39 A.I. = 66 I.R. = 0.75

Pa + Sc - 2*Pt = 4 Hs + Hy - 2*D = -21 Mt - Es = 2

2*F-L-K = 17

4'963,2-,57/80:1 Hathaway Code

Rules 6, Call this person maladjusted

Rules Call this person normal

This person is called maladjusted on the basis of precedence rule 0

(Table continued on next page)

Table 5-3. (continued)

New Case

Identification No. 211 Male Criterion is maladjusted

Ques.	L	F	K	Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si	Es	Mt
41	43	55	64	52	65	62	55	76	47	62	69	45	46	59	49

Raw Score 48 12

Beta = 14 Band 4 Delta = -12 A.I. = 73 I.R. = 1.10

Pa + Sc - 2*Pt = -8 Hs + Hy - 2*D = -16 Mt - Es = -10

2*F-L-K = 3

5'827,3-41/6,0,9 Hathaway Code

Rules 11, 14, Call this person maladjusted

Rules 22, Call this person normal

This person is called maladjusted on the basis of precedence rule 2

Table 5-4. A computer print-out of the hit rates of each rule and of the entire MMPI program

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Rule No. 1 has a hit rate of 0.83; it applied to 18 profiles

Rule No. 2 has a hit rate of 0.86; it applied to 7 profiles

Rule No. 3 has a hit rate of 1.00; it applied to 7 profiles

Rule No. 4 has a hit rate of 0.88; it applied to 17 profiles

Rule No. 5 has a hit rate of 0.78; it applied to 9 profiles

Rule No. 6 has a hit rate of 0.73; it applied to 15 profiles

Rule No. 7 has a hit rate of 0.77; it applied to 13 profiles

Rule No. 8 has a hit rate of 0.75; it applied to 4 profiles

Rule No. 9 has a hit rate of 0.89; it applied to 18 profiles

Rule No. 10 has a hit rate of 0.50; it applied to 6 profiles

Rule No. 11 has a hit rate of 1.00; it applied to 7 profiles

Rule No. 12 has a hit rate of 0.79; it applied to 14 profiles

Rule No. 13 has a hit rate of 0.71; it applied to 7 profiles

Rule No. 14 has a hit rate of 0.33; it applied to 21 profiles

Rule No. 15 has a hit rate of 1.00; it applied to 8 profiles

Rule No. 16 has a hit rate of 0.54; it applied to 13 profiles

	Valid	False
Positive	.63	.14
Negative	.86	.27

Table 5-5. Percents hits and misses of revised MMPI decision rules with total sample (N=126)

	Valid	False	Unclassified	Total Unclassified
Positive	91	12	4	2
Negative	84	9	0	

Table 5–6

College Maladjustment Rules for MMPI Interpretation

The MMPI should be scored on 16 scales, and these include: ?, *L*, *F*, *K*, *Hs*, *D*, *Hy*, *Pd*, *Mf*, *Pa*, *Pt*, *Sc*, *Ma*, *Si*, *Es*, and *Mt* (Kleinmuntz, 1962, p. 396). The latter two scales usually do not appear on the conventional MMPI profile sheet and should be notated and are reported here as *raw scores*. *K* correction is assumed for scales *Hs*, *Pd*, *Pt*, *Sc*, and *Ma*. All scores except for Scales *Es* and *Mt* are reported here as *T* scores.

Application of these rules without the aid of an electronic digital computer may be exceedingly cumbersome due to the pattern analytic approach to the decision rules themselves.[A1]

The following calculations will be needed:

1. Hathaway Code
2. Band location $(Pt+Sc)-(D+Hs)=$ beta
   - Band 1: beta $=-31$ and less
   - Band 2: beta $=-31$ thru -11
   - Band 3: beta $=-10$ thru 6
   - Band 4: beta $=7$ thru 25
   - Band 5: beta $=26$ and above
3. Delta $=(Pd+Pa)-(Hs+Hy)$
4. Anxiety Index (AI) $=\dfrac{Hs+D+Hy}{3}+(D+Pt)-(Hs+Hy)$
5. Internalization Ratio (IR) $=\dfrac{Hs+D+Pt}{Hy+Pd+Ma}$

Note: Proceed to the next rule regardless of the maladjustment versus adjustment decision. Since a tally must be kept of the number of rules that apply to an MMPI profile, the rule number must be notated.

Call maladjusted if:

1. Four or more clinical scales $\geqq 70$ (*Mt* and *Es* excluded).
2. The first two scales of the Hathaway Code are among the Scales *Pd* or *Pa* or *Sc* and one of these $\geqq 70$. If *Mf* is one of the first two scales in the Hathaway Code, then examine the first three scales.
3. *Pa* or *Sc* $\geqq 70$ and *Pa* or *Pt* or *Sc* $\geqq$ *Hs* or *D* or *Hy*.
4. *Pa* $\geqq 70$, unless *Mt* $\leqq 6$ and *K* $\geqq 65$.
5. $(Pa+Sc-2\cdot Pt)\geqq 20$, if *Pa* or *Sc* $\geqq 65$ and if *Pa* and/or *Sc* $\geqq$ *Pt*.
6. *Pd* $\geqq 70$ and (*a*) *Mt* $\geqq 15$ (males); (*b*) *Mt* $\geqq 17$ (females).
7. *Pd* $\geqq 70$ and (*a*) Band 4 or 5 and $\Delta \geqq 0$ *or* (*b*) Band 1 or 2 and $\Delta \leqq 0$.
8. *Mt* $\geqq 23$ and *Es* $\leqq 50$.
9. *Mt* $\geqq 23$ and *Es* $\leqq 45$.
10. Five or more scales $\geqq 65$ and *Pa* or *Sc* $\geqq 65$.
11. Male profile with *Mf* $\geqq 70$ and *Sc* $\geqq 60$ with *Sc* $\geqq$ *Pt*.
12. *Sc* $\geqq 70$ and either *Si* or *Pa* $\geqq 60$.
13. *Es* $\leqq 35$.
14. IR $\geqq .90$ $\Delta \leqq -10$.
15. *Sc* is primary elevation (first in Hathaway Code) and is $\geqq 65$ and *F* $\geqq$ *L* and (not plus) *K*.
16. Band 2 profile.
17. Band 3 and IR $\geqq 1.00$.
18. *K* $\geqq 50$ and any scale except *Es* or *Ma* $\geqq 70$.
19. Male profile and *Mf* $\geqq 65$ and *Pd* $\geqq 63$.
20. *Sc* $\geqq 60$ and *Si* $\geqq 50$ and AI $\geqq 60$, unless *Ma* scale $\leqq 65$.
21. *Sc* $\geqq 60$ and *Si* $\geqq 50$ and *Ma* $\leqq 70$ and AI $\geqq 50$.
22. *Pd* $\geqq 63$, and *Hs* $\leqq 48$ and AI $\geqq 65$.
23. Male profile and *Pd* $\leqq 54$, *Hs* $\geqq 58$, and *Si* $\geqq 44$.
24. *Hs* $\geqq 58$, *Hy* $\leqq 61$.
25. *Hy* $\leqq 61$ and *Pd* $\geqq 63$; also hold for female profile if *Pd* is not the primary elevation.
26. *Pa* and *Sc* > 60 if male, or > 65 is female.
27. $(Hs+Hy-2\cdot D)\geqq 10$, *Pa* < 50, *Pt* $\geqq 50$, and *Mt* $\geqq 10_R$.
28. $(Mt-Es)\geqq 4_R$.

Call adjusted if:

29. *Mt* $\leqq 6_R$.
30. All scales $\leqq 60$ except *Ma* $\leqq 80$ and *Mt* $\leqq 10_R$.
31. *D* or *Pt* are primary elevations and *D* $\geqq$ *Hs* and $\geqq$ *Hy*; and *Pt* $\geqq$ *Pa* and $\geqq$ *Sc*; and *Es* $\geqq 45$.
32. *Mt* $< 10_R$.
33. Five scales between 40 and 60, and *Es* $\geqq 45$.
34. $(Hs+Hy-2\cdot D)\geqq 20$; and *Pt* $<$ *Pa* $\leqq 70$ *or* *Mt* $\leqq 10_R$.
35. $(Mt+Es)\leqq 0_R$ if female, $\leqq -20_R$ if male, unless Rule 5 calls profile maladjusted.

Up until this point only tentative decisions have been made. The following flow chart specifies the conditions for the final clinical decisions. The decisions are one of three: (*a*) call adjusted, (*b*) call maladjusted, and (*c*) call unclassified.

[A1] The band locations, the beta and delta computations, the Anxiety Index and the Internalization Ratio mentioned as basic calculations were adopted from the Meehl-Dahlstrom (1960) rules. It may be helpful to the reader who is not familiar with MMPI literature to consult Dahlstrom and Welsh's *An MMPI Handbook* (1960) for complete explanations of some of the indexes used in these rules.

Table 5-7. Percents hits and misses of revised MMPI decision rules with four cross-validation samples (N=569).

Sample		Valid	False	Unclassified	Total Unclassified
Brigham Young University (N=100) Adjusted (N=50) Maladjusted (N=50)	Positive	80	36	2	1
	Negative	64	18	0	
University of Nebraska (N=116) Adjusted (N=80) Maladjusted (N=36)	Positive	72	6	3	1
	Negative	94	25	0	
University of Iowa (N=155) Adjusted (N=98) Maladjusted (N=57)	Positive	84	38	4	7
	Negative	53	12	9	
University of Missouri (N=198) Adjusted (N=141) Maladjusted (N=57)	Positive	68	28	2	3
	Negative	70	26	5	

Table 5-8

Percents Hits and Misses of Computer Programmed Rules and Clinicians with Five MMPI Samples

Sample	Computer		Best Clinician		Average Clinician	
	Hits	Misses	Hits	Misses	Hits	Misses
Brigham Young (N = 100)	72	28	68	32	63	37
Nebraska (N = 116)	86	14	78	22	74	26
Iowa (N = 155)	65	35	65	35	61	39
Missouri (N = 198)	71	29	75	25	70	30
Bucknell (N = 151)	62	38	65	35	60	40

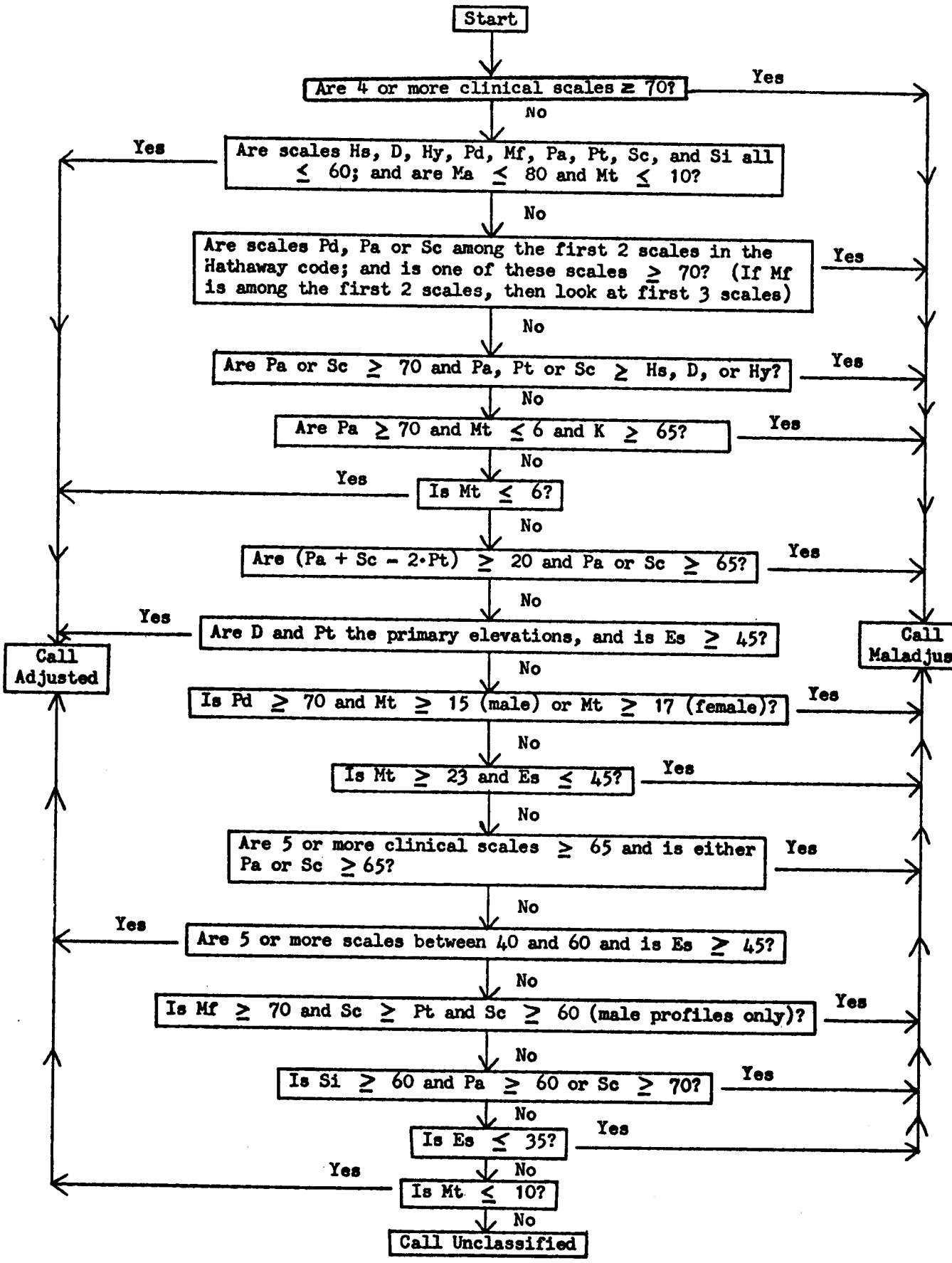


Fig. 5-2. Flow chart of MMPI decision rules.

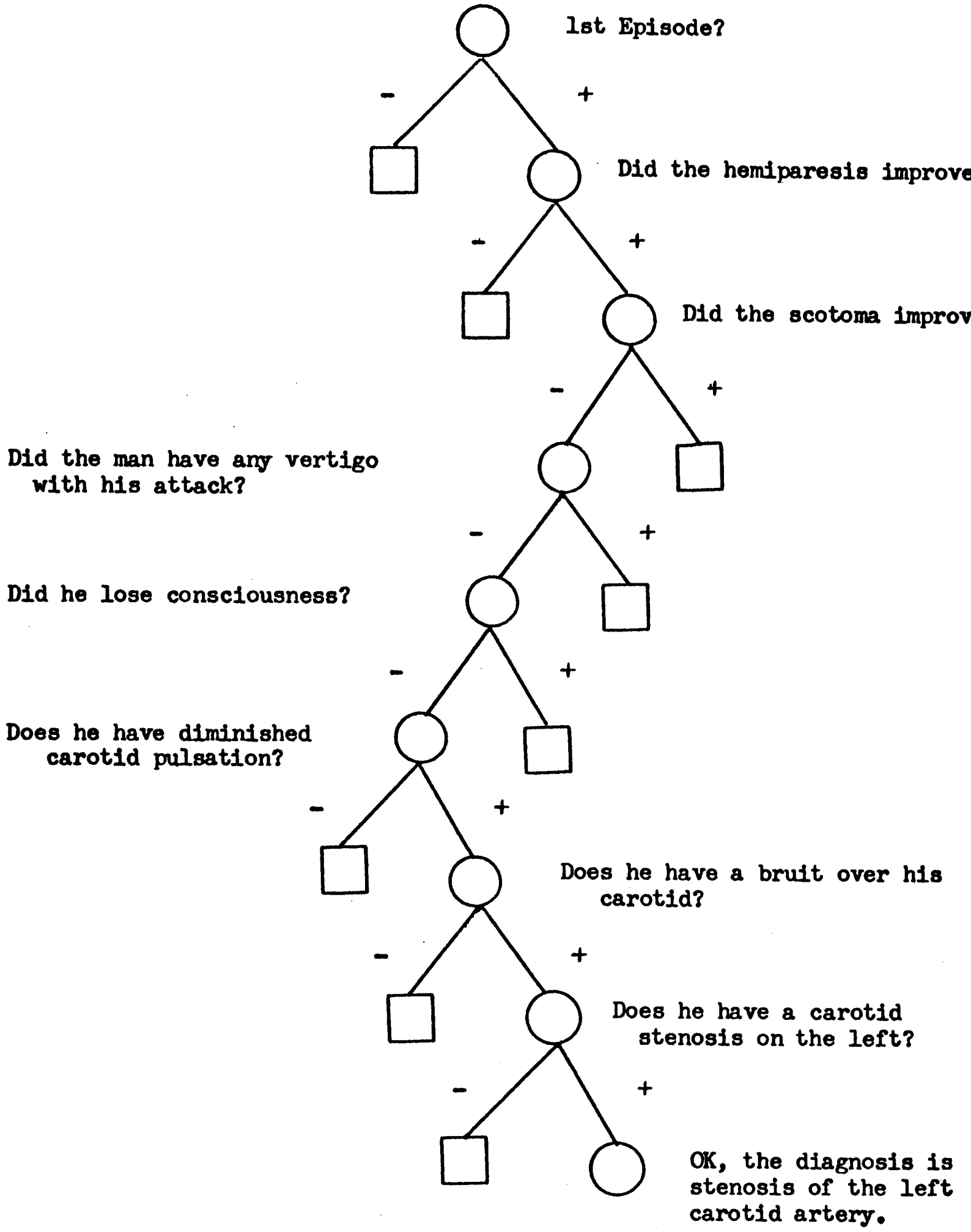
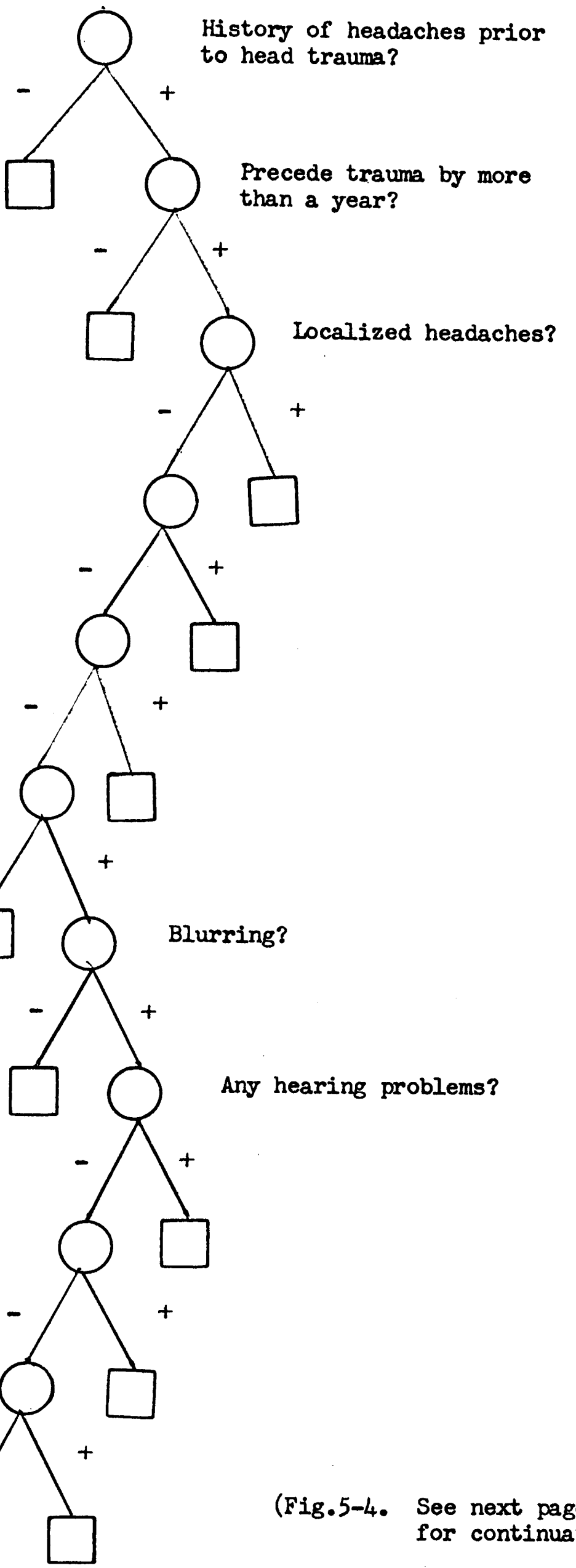


Fig. 5-3. A tree structure of a neurologist's diagnostic game in which the information given was: Sudden left central scotoma and right hemiparesis in a 55 year old.



(Fig.5-4. See next page for continuation of tree)

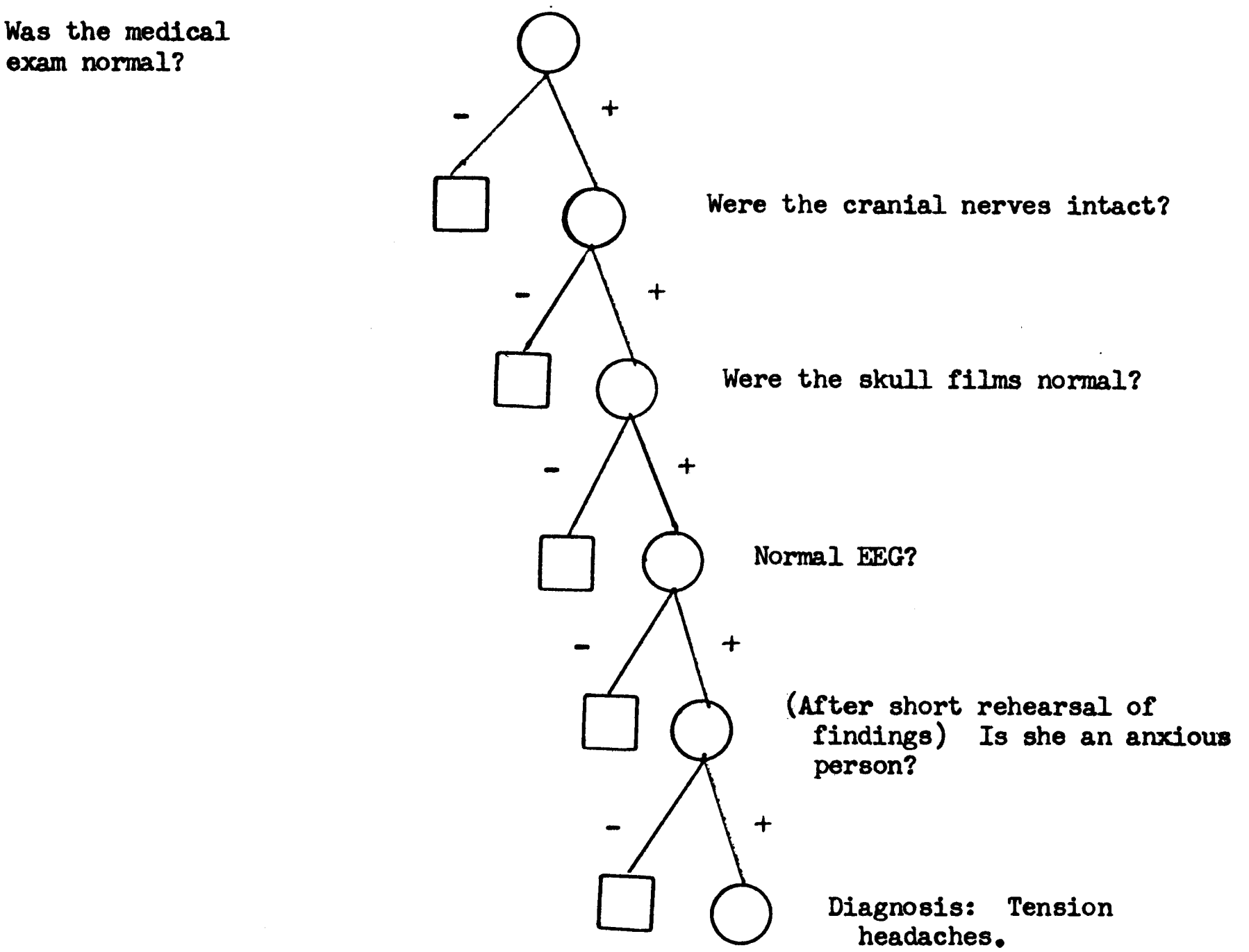


Figure 5-4. Information given to a <u>first</u> year neurology resident was: History of head trauma and severe headaches in a 40 year old female.

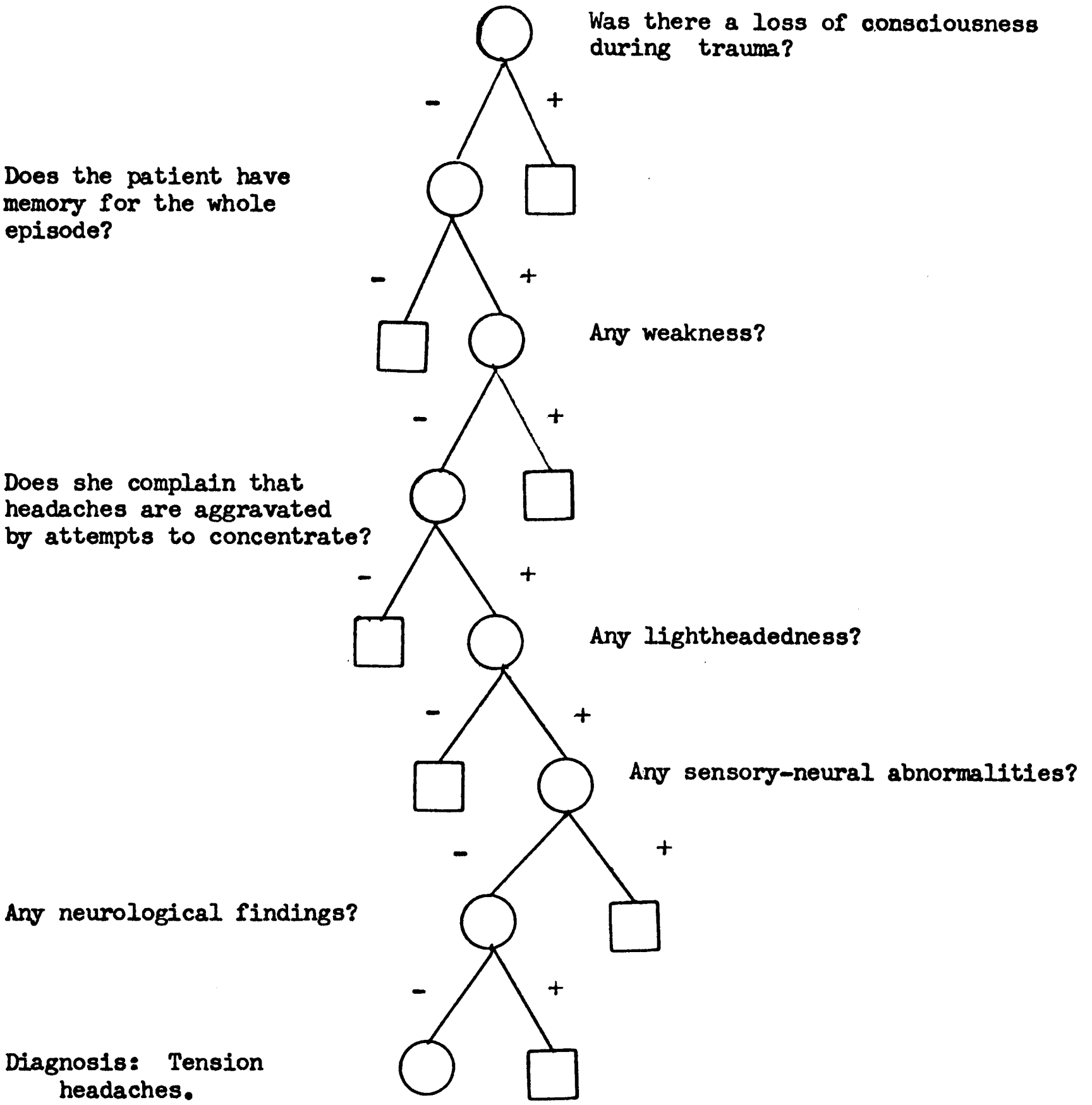


Figure 5-5. The same information as that given in Figure 5-4 was presented to a second year neurology resident.

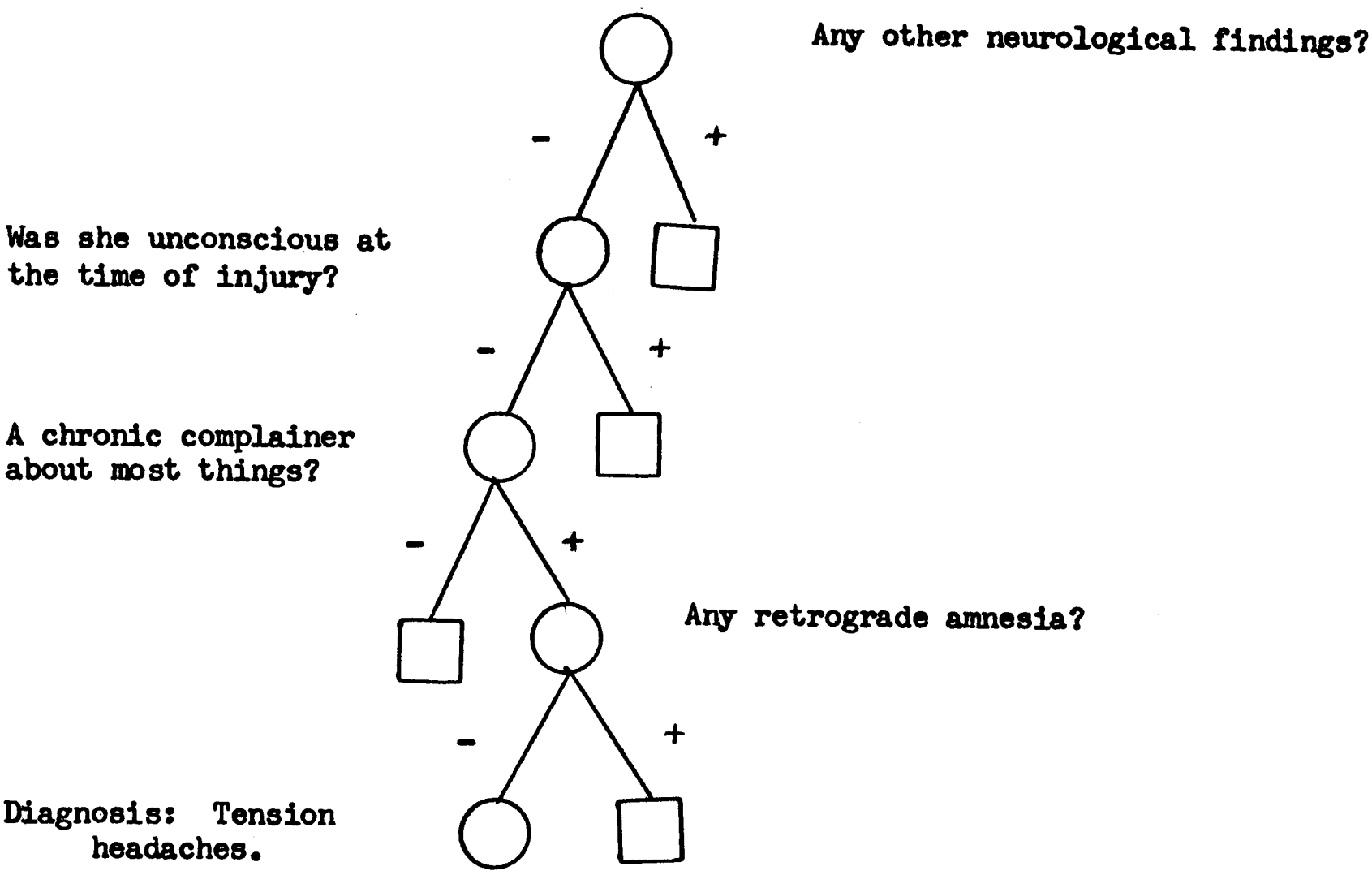


Figure 5-6. The same information as that given in Figures 5-4 and 5-5 was presented to a post-resident neurologist.

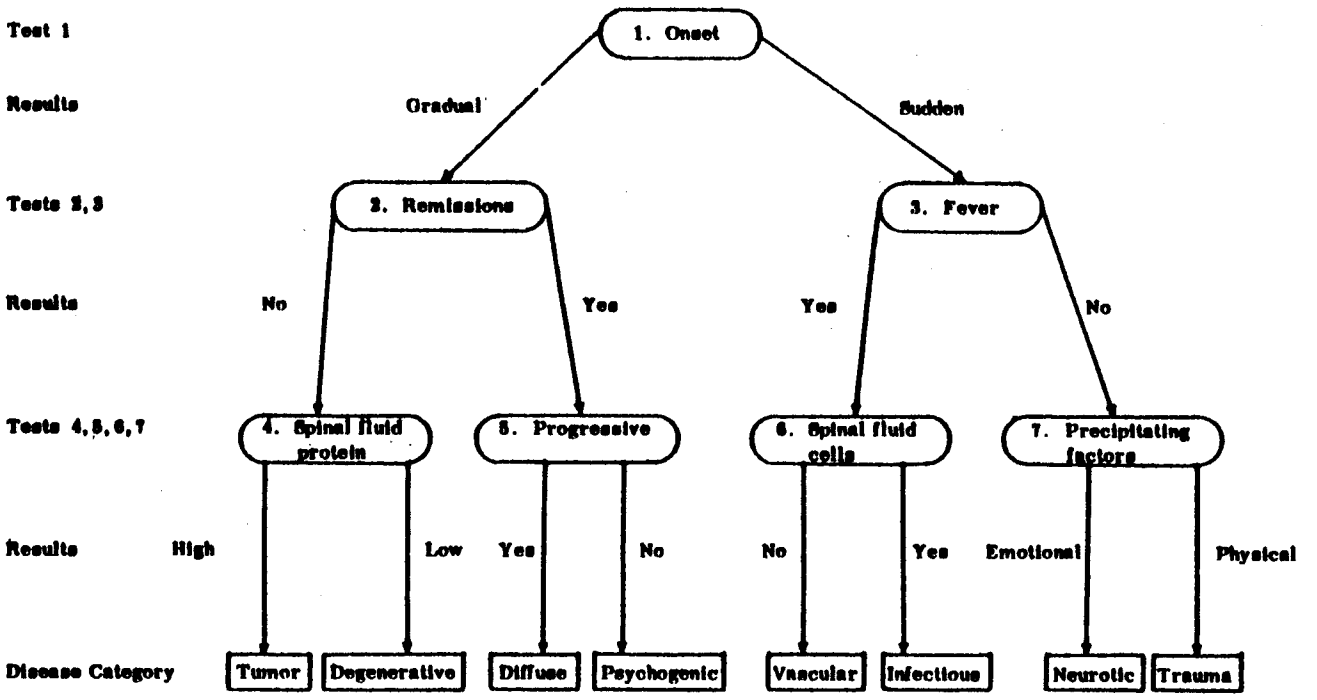


Fig. 5-8: Discrimination net sorted to disease categories.