ing losses was not shown by the younger orbital group or by the younger or older controls.

Among all the measures used, the discriminating capacity varied from practically no difference between operated and nonoperated subjects in the Picture Completion subtest to marked and statistically significant differences in eight measures. The nature of the task presented is clearly an important variable in brain-damage studies.

The marked and definitive losses by operated subjects after a postoperative interval of 8 years are in sharp contrast to the conclusions of no "permanent" decrements reported by the original and two related studies. Our results also differ from reports of long-term studies by Weinstein and Teuber (*7*) of "frontal lobe lesions" due to "penetrating brain wounds" and by Scherer *et al.* (*8*) of "lobotomies." Population ambiguities in the latter studies may have obscured losses for lesions in specific areas which might have appeared if more careful differentiation among subjects had been possible.

Our findings of differences in psychological performances due to specific site, age, and length of the posttrauma interval are in agreement with reports of clinical findings by von Monakow and Mourgue (*9*) and Goldstein (*10*) and with neurological studies of cerebra with psychosurgical lesions by Yakolev (*11*), Meyer (*12*), and Le Beau (*13*). This unusual consonance of psychological and neurological findings in unrelated studies suggests that the changes in psychological test performance of operated subjects observed in the present study may be corollaries of changes in brain structure due to neurological degeneration following brain insult (*14*).

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References and Notes

1. N. D. C. Lewis, C. Landis, H. E. King, *Topectomies* (Grune and Stratton, New York, 1956).
2. Columbia Greystone Associates (first group), *Selective Partial Ablations of the Frontal Cortex*, F. A. Mettler, Ed. (Hoeber, New York, 1949).
3. Columbia Greystone Associates (second group), *Psychosurgical Problems*, F. A. Mettler, Ed. (Blakiston, Philadelphia, 1952).
4. R. B. Malmo, "Psychological aspects of frontal gyrectomy and frontal lobotomy in mental patients," *Proc. Assoc. Research Nervous Mental Disease* 27, 537 (1947).
5. W. Penfield, "Symposium on gyrectomy," *ibid.* 27, 519 (1948).
6. A. Petrie, "A comparison of the psychological effects of different types of operations on the frontal lobes," *J. Mental Sci.* 98, 326 (1952).
7. S. Weinstein and H. L. Teuber, "Effects of penetrating brain injury on intelligence test scores," *Science* 125, 1036 (1957).
8. I. W. Scherer, C. J. Klett, J. F. Winne, "Psychological changes over a five year period following bilateral prefrontal lobotomy," *J. Consulting Psychol.* 21, 291 (1957).
9. C. von Monakow and R. Mourgue, *Introduction biologique a l'étude de la neurologie et de la psychopathologie* (Alcan, Paris, 1928).
10. K. Goldstein, *The Organism* (American Book Co., New York, 1939).
11. P. I. Yakolev, "Fronto-pontine bundle and associated projection fibers of the frontal lobe following frontal leucotomy," *Trans. Am. Neurol. Assoc.* 78, 286 (1953).
12. M. Meyer, "A study of efferent connexions of the frontal lobe in the human brain after leucotomy," *Brain* 72, part 3, 265 (1949).
13. J. Le Beau, "The surgical uncertainties of prefrontal topectomy and leucotomy," *J. Mental Sci.* 97, 480 (1951).
14. This work is being continued with other subjects and with other tests. The study reported here was partially supported by a research grant (M-1191) from the National Institute of Mental Health, National Institutes of Health, and by funds and assistance of the Research Foundation for Mental Health, Inc., of the New York State Department of Mental Hygiene.

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Taste Thresholds for Phenylthiourea among Ashkenazic Jews

Abstract. Taste thresholds for phenylthiourea were measured for 244 Ashkenazic Jews. The frequency of nontasters was 27.86 percent. In the sample, 102 individuals were of pure Polish ancestry, and the frequency of nontasters among these was significantly different from the frequencies of nontasters among Europeans and Mongoloids.

Investigations on taste dimorphism in sensitivity to phenylthiourea are of interest for population genetics and racial research, since it is possible to employ a relatively objective phenotype classification of the individuals. The populational distribution of individual taste thresholds is bimodal, and tasters can be discriminated from nontasters by use of the antimode. A racial variation in the frequencies of nontasters to phenylthiourea has been recognized (*1*) with the aid of the sorting technique described by Harris and Kalmus (*2*). Chinese (*3*) and Japanese (*1*) showed a clearly lower frequency of nontasters than the white groups (*2, 4*), and the frequencies found among American Indians (*5*) and African Negroes (*3*) are strikingly low. However, studies in many populations, including European and African ones, will have to be made before the general picture of genetic relations of human populations can be determined.

Since, on the grounds of blood-group data (*6*), Jewish populations suggest interesting evolutionary problems, we have chosen those groups for our studies. European, or Ashkenazic, and Mediterranean, or Sephardic, Jews have constituted interbreeding isolates, intermarriage with the neighboring populations probably having occurred to a relatively low extent, although to varying degrees at different times.

The purpose of the present report (*7*) is to present the distribution of taste thresholds for phenylthiourea among Ashkenazic Jews and to determine to what extent the frequency of nontasters among them differs from that in other populations. By means of the sorting technique of Harris and Kalmus and with the same concentrations of the phenylthiourea solutions as those employed by them (*2*), the taste thresholds of 244 Jewish individuals within the age range of 7 to 23 years were determined. The sample is composed of students from a Jewish school and members of a Jewish organization, both in São Paulo (Brazil). No parent-child pair was included in the sample, as can be seen from the age limits for the group. The percentage of sib pairs was 15.2 percent, and the exclusion of such pairs had no appreciable effect on the frequency of nontasters (the percentage becomes 27.05 instead of 27.86 percent). There was no blood relationship among the different families. All the individuals in the sample descend directly, without admixture, from immigrant Jews from Central Europe. For these reasons this sample can be taken as representative of the Ashkenazic Jews. The distribution of the taste thresholds, classified by sex, is presented in Table 1.

To separate tasters from nontasters, the antimodal value was taken as falling between the thresholds 5 and 6. Table 2 shows the number of tasters and the number and percentage of nontasters among Ashkenazic Jews. The frequency of nontasters is slightly lower than that found among other European populations (*2, 4*), as determined by the sorting technique. It was determined that 102 individuals of the sample were persons both of whose parents were born in Poland. The frequency of nontasters among Polish Jews, who represent the typical European Jew, is clearly lower than that among other white populations. The difference in frequency of nontasters between Polish Jews and the remainder of the Jews (Table 2) was not significant ($\chi^2 = 3.46$; $P = 0.06$). This, however, could be due to the small size of the samples and to the fact that some individuals of the remainder group had one parent born in Poland. A more detailed investigation among Jews of Central Europe will clear up this question.

Mourant (*6*) has discussed the genetic relationships of Ashkenazic Jews with respect to their ABO and Rh blood-group systems. With regard to the ABO frequencies, Ashkenazic Jews in Central Europe resemble fairly well their neighbors, showing, like Poles and Ukranians, a high *B* gene frequency (about 14 percent). Their Rh chromosome frequencies, however, are very different from those of Central Europeans. Like Medi-

Table 1. Distribution of taste thresholds for phenylthiourea among Ashkenazic Jews classified by sex.

Group	Taste thresholds																Total
	<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Males	12	11	7	3	1	2		8	10	27	22	5	3					111
Females	14	5	9	3		1	2	5	16	31	29	13	2		1	1	1	133
Total	26	16	16	6	1	3	2	13	26	58	51	18	5		1	1	1	244

Table 2. Percentage of nontasters among Ashkenazic Jews as a whole, and among Polish Jews.

Sample	Total	Tasters (No.)	Nontasters (No.)	Nontasters (%)
Ashkenazic Jews (whole sample)	244	176	68	27.86 ± 2.87
Polish Jews	102	80	22	21.56 ± 4.07 } $\chi^2 = 3.46$
Remainder	142	96	46	32.39 ± 3.92 } $P = 0.06$

Table 3. Comparative data on the frequency of nontasters among Polish Jews and among Europeans and Mongoloids.

Group	Total	Tasters (No.)	Nontasters (No.)	Nontasters (%)
Europeans*	647	443	204	31.53 ± 1.82 } $\chi^2 = 4.15$
Polish Jews	102	80	22	21.56 ± 4.07 } $P \simeq 0.04$
Mongoloids	361	333	28	7.75 ± 1.40 } $\chi^2 = 15.75$, $P < 0.0001$

* Age range of the individuals: 10 to 39 years.

terraneans, the Ashkenazim have a typical CDe (R^1) frequency (about 53 percent) and a fairly high cDe (R^0) frequency (about 5 percent) as compared with Central European populations. This latter fact could indicate an African genetic component "probably received through Egypt" (*8*). Moreover, Ashkenazic Jews present a relatively low cde (r) frequency (about 36 percent) as compared with Central Europeans (*9*).

Table 3 presents a tentative comparison of the frequencies of nontasters among the Polish Jews and European populations, and among the Polish Jews and Mongoloids, investigated by means of the sorting technique. The combined data for English (*2*) and Danish (*4*) individuals were taken as representing the Europeans, and the combined data for Chinese (*3*) and Japanese (*1*) were taken as representing the Mongoloids. The difference in frequency of nontasters between Polish Jews and Europeans was significant ($\chi^2 = 4.15$; $P \simeq 0.04$), and that between Polish Jews and Mongoloids was highly significant ($\chi^2 = 15.75$; $P < 0.0001$).

The frequency of the "nontaster" gene among Mongoloids is about 30 percent and among Europeans, about 55 percent. The value of 46 percent found among Polish Jews suggests a Mongoloid admixture, but it could also represent an African component acquired before the dispersal of the Jews throughout Europe. This latter hypothesis is supported by a relatively high cDe (R^0) chromosome frequency among Jews from Central Europe (*8*). A further comparative investigation of the taste thresholds for phenylthiourea among Ashkenazic and Sephardic Jews from different areas of Central and Mediterranean Europe will probably be relevant to the problem.

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References and Notes

1. P. H. Saldanha, *Ann. Human Genet.* 22, 380 (1958).
2. H. Harris and H. Kalmus, *Ann. Eugen.* 15, 24 (1949).
3. N. A. Barnicot, *ibid.* 15, 248 (1950).
4. J. Mohr, *ibid.* 16, 282 (1951).
5. H. Kalmus, *Ann. Human Genet.* 21, 313 (1957).
6. A. E. Mourant, *The Distribution of the Human Blood Groups* (Blackwell, Oxford, 1954).
7. One of us (P.H.S.) wishes to express his gratitude to the Rockefeller Foundation for a grant to the Departamento de Biologia Geral da Universidade de São Paulo in support of the present work. We are also indebted to Mrs. Elisa Kaufmann for her permission to perform tests in a Jewish school and to Dr. O. Frota-Pessoa for his critical reading of the manuscript.
8. A. E. Mourant, *Cold Spring Harbor Symposia Quant. Biol.* 15, 221 (1950).
9. J. Gurevitch, D. Hermoni, Z. Polishuk, *Ann. Eugen.* 16, 129 (1951).

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Newly Found Action of Cocaine

Abstract. Cocaine augments appreciably the effects of small doses of acetylcholine on the heart rate, blood pressure, and the nictitating membrane in intact, anesthetized animals. This phenomenon assigns cocaine, thus far only known as a potentiator of adrenergic stimulation, a more general role of potentiator of both adrenergic and cholinergic neurohumors.

Hitherto cocaine has been considered only as an adrenergic potentiator. A chance observation disclosed a completely new and entirely unexpected potentiating effect of cocaine on acetylcholine responses. It was found that cocaine in this series of experiments acted as an apparent in vivo cholinesterase inhibitor, augmenting various acetylcholine effects. It is known, however, that cocaine is not only devoid of anticholinesterase activity but that it actually activates in vitro pseudocholinesterase, and this only at concentrations well above pharmacological levels (*1*).

Cats under alpha-chloralose (80 mg/kg) anesthesia were used. Isotonic contractions of the nictitating membrane and arterial pressure from the carotid artery were recorded in the usual manner. All drugs were administered via the femoral vein. Maximal membrane contractions after preganglionic stimulation of the cervical sympathetic trunk through shielded electrodes were obtained with a square-wave electronic stimulator.

The duration of stimulation was 5 sec at a frequency of 20 per second; a pulse width of 0.5 msec was utilized. In each cat, three control responses of 1, 2, 4, 8, and 16 μg of acetylcholine (per kilogram) on the nictitating membrane, blood pressure, and the heart rate were recorded. After this, 3 mg of cocaine hydrochloride (per kilogram) was administered. Cocaine usually produced a primary vasodepressor and a secondary vasopressor effect. After a latency period of 60-sec duration, cocaine (3 mg/kg) itself caused the membrane to respond with a sustained, increased tension. The alteration of the baseline occurred whether or not the cervical sympathetic trunk was severed or the animals were adrenalectomized. The increased tension produced by cocaine is in itself an interesting phenomenon. If cocaine potentiates membrane contractions, this increased tension would militate against maximum potentiation. All the potentiations observed after cocaine injection are smaller than they would be if the membrane retained its normal tension.

Cocaine produced a potentiation of the acetylcholine-induced contractions of the nictitating membrane even when no acetylcholine response was observed on the nictitating membrane prior to the administration of cocaine (Fig. 1).