JUDGING PERSONALITY FROM VOICE*

From the Psychological Laboratory of Harvard University

G. W. ALLPORT AND H. CANTRIL

Each member of an ordinary congregate audience receives a clear impression of the personality of the speaker. Complex visual perceptions of his physical build, posture, clothes, and movements, in addition to auditory perceptions derived from his speech and voice, make this impression seem accurate and complete. Over the radio the rich and informative visual pattern is absent; only the voice and speech remain. The resulting judgment is somewhat fragmentary and uncertain. This situation has already received popular recognition in jokes concerning the disillusionment of those who learn to their sorrow that the radio voice with which they fell in love does not reveal accurately either the appearance or the nature of its possessor.

In spite of such hazards, however, probably most people who listen to radio speakers feel assured that some of their judgments are dependable. Often the impression is nothing more than a feeling of favor or aversion, but sometimes it represents a surprisingly definite judgment concerning the speaker's physical, intellectual, and moral qualities. One broadcasting official asserts: "The human voice, when the man is not making conscious use of it by way of impersonation, does in spite of himself reflect his mood, temper and personality. It expresses the character of the man. President Roosevelt's voice reveals sincerity, good-will and kindness, determination, conviction, strength, courage and abounding happiness."¹ Such statements, even when made with authority, require proof. It is plainly a problem for the psychologist to determine how accurate, on the average, such judgments are.

In spite of its obviousness and accessibility, the problem of judging personality by the radio voice has as yet received very little at-

*Accepted (or publication by Carl Murchison of the Editorial Board and received in the Editorial Office, June 26, 1933.

¹ *New York Times Magazine*, June 18, 1933,

tention. T. H. Pear (4) has made an auspicious beginning with the assistance of the British Broadcasting Company. Using nine speakers of different ages, sex, and interests, he secured over 4000 listeners' judgments concerning the vocation, place of residence, age, and birthplace of these speakers. Although Pear's chief interest was in such phonetic problems as accent and dialect, the free descriptions submitted by the auditors enabled him to make some tentative statements concerning the accuracy of judgments of other personal characteristics. Sex was stated correctly (except in the case of an eleven-year-old child); age, in spite of a strong central tendency in the judgments, was on the whole estimated with fair success. Physical descriptions seemed frequently to be apt, and vocation was sometimes stated with surprising exactness. Since Pear did not prescribe the manner in which the judgments should be made or instruct the listeners concerning all of the features of personality which they might judge, his results are difficult to express quantitatively or to compare with chance.

The distinction drawn by Sapir (5) between *voice* and *speech* is important in research of this type. Voice is expressive movement, an individual pattern composed of such inextricable factors as pitch, rhythm, intensity, inflection, volume, and vocal mannerisms. Voice is, in brief, the external *form* of vocal expression. Speech, on the other hand, is its *content*. The subject-matter of the discourse, the vocabulary employed, the language or dialect spoken, the grammatical structure of the sentences, and the style of composition, are all peculiarities of *speech*. They are determined in large part by the cultural background of the speaker, and furnish considerable information useful in classifying him as a member of certain racial, regional, or educational groups. It is true that in everyday life we judge a man by what he says and by his cultural affiliations quite as much as by his own individual vocal characteristics, but in research concerned with voice alone it is essential that all other cues be excluded or held constant. The same requirement confronts the psychologist working with handwriting. If individual differences in chirography alone are the object of the investigation, the context and subject-matter, the quality of the stationery, and mistakes in spelling must not be permitted to furnish an extra basis of judgment.

The ten experiments described below were all designed to determine to what extent the unanalyzed natural *voice* is a valid indica-

tor of various features of personality.³ Certain precautions were taken to exclude the cues which might arise from individual differences in *speech*. Inasmuch as uniform material was read from type-written texts, differences in vocabulary, fluency of speech, grammatical accuracy, and subject-matter were virtually eliminated. Except in the case of one speaker (a native of South Africa) there were no appreciable differences in accent among our broadcasters.

No attempt was made to analyze voice into its various attributes, as Michael and Crawford (3) and Sapir (5) have suggested. To attempt to correlate pitch with one personal quality, speed with another, and intensity with a third, would be to make the whole problem absurdly atomistic, and, as is the case with all studies which seek correlations between mere meaningless fragments of well-structured personalities, the study would be foredoomed to failure.*

THE METHOD

In the main part of the investigation eight separate experiments were performed. Six of these took place in the Harvard Psychological Laboratory where a complete broadcasting and receiving unit had been installed. The other two experiments were conducted from the broadcasting studio of Station WEEI in Boston.⁴ In the six laboratory experiments students acted as judges, the number in the different experiments ranging from 32 to 85. In the two WEEI experiments, the public was asked to send in judgments. From one of these appeals 190 replies were received; from the other, 95. The total number of judges participating in these eight experiments was 587. The procedure employed in each of the laboratory experiments (I-VI) and in the two studio experiments (VII-VIII) was practically identical.

Certain features of personality which could be reliably measured

*A preliminary account of this research was reported at the Tenth International Congress of Psychology (Copenhagen) and has been published in *Education* •» *the Air*, Columbus, Ohio State Univ., 1932. Pp. 304-310.

*Cf. G. W. Allport (1).

The authors wish to express their appreciation to The Edison Electric Illuminating Company of Boston for the use of their studio, and for the generous loan and installation of the apparatus employed in the laboratory experiments. They are likewise indebted to the numerous speakers and judges who participated in these studies, and especially to their associates and helpers, Mr. F. T. Brown and Mr. C. E. Smith.

or otherwise determined objectively were selected for study. The features chosen ranged from such definite physical attributes as age and height to certain complex traits and interests of the "inner" personality. The meanings of two semi-technical expressions (extroversion-introversion and ascendance-submission) were carefully explained to the judges. In each of the eight experiments several of the following features of personality appeared.

Physical and Expressive Features ("Outer" Characteristics)

1. age
2. height
3. complexion
4. appearance in photographs
5. appearance in person
6. handwriting

Interests and Traits ("Inner" Characteristics)

7. vocation
8. political preference
9. extroversion-introversion
10. ascendance-submission
11. dominant values
12. Summary sketch

Three speakers were selected for each of these eight experiments. Eighteen different speakers took part; twelve participated only once, and six participated in two experiments. All of the speakers were male. In general, a diversity of voices and personalities was sought, although extreme eccentricities or abnormalities were avoided. Before each experiment, objective information for each speaker was obtained on all of the features included in that experiment. The objective criteria for the first eight features are obviously gathered from direct measurement, observation, or questioning. The criterion for extroversion-introversion was the Heidbreder scale; for ascendance-submission, the Allport *AS Reaction Study*; for dominant values, the Allport and Vernon *Study of Values*.

For experiments involving the matching of voice with handwriting or with appearance in photographs, slides were made of uniform samples and projected upon the screen for the duration of the experiment. Three photographs or three samples of handwriting would remain upon the screen while the three voices read their passages. For the experiments involving a matching of voice with appearance in person, simultaneous matching was impossible. After each reading all three of the speakers walked into the room where the audience was seated. An interval of perhaps half a minute

elapsed between the voice and the appearance of the three speakers. Each speaker wore a symbol pinned to his coat, which was employed by the judges in indicating their matching.

At the beginning of each of the eight experiments there was one practice reading of the same passage by each of the three speakers, to accustom the judges to the voices. The passages which were used in both the practice reading and in each portion of the experiment averaged approximately ten lines in length, and were selected from Dickens, Lewis Carroll, or similar sources.

In Experiments I-VI small record booklets were prepared for the judges, on each page of which the necessary information concerning one feature of personality was given. One page of the booklet, for example, appeared as follows:

Racing on a test for Ascendancy-submission

Voice — very ascendant

Voice — slightly ascendant

Voice — very submissive

The subjects were instructed to match each of the three voices they would hear (designated as voice No. 1, voice No. 2, and voice No. 3) with the items of information given. The three speakers read the same passage in rotation and the judges entered beside each of the three items the number of the voice which the characterization seemed to fit best. The listeners were instructed to make independent judgments for each feature represented on the separate pages of the record booklet. In no case were they allowed to turn back or ahead.

The final part of each of these experiments consisted of matching the voices with three summary sketches based upon all the information previously given for each voice. The final page of the record booklet in Experiment V, for example, read as follows:

Voice—A teacher of physics who is very interested in acquiring knowledge and in business, but who has little religious interest. He is extremely submissive but neither extroverted nor introverted. He is 41 years old and six feet tall.

Voice—A supervisor of community centers who has social interest and likes power. He has very little artistic interest; is somewhat extroverted and slightly submissive. He is 31 years old and five feet eight inches tall.

Voice—An electrical engineer who is interested in business and

learning but is not religious. He is slightly introverted and slightly submissive. Thirty-one years old and five feet ten inches tall.

In Experiments VII and VIII (from Station WEEI) this procedure had to be modified somewhat. The announcer first instructed the auditors how to make out their own reply cards, and then before each portion of the experiment gave the necessary information concerning the three speakers. The procedure was not complicated, and the replies which were sent in showed virtually no confusion.

RESULTS

Table 1 presents the results obtained in these eight experiments. All figures indicate the reliability of the percentage of the correct judgments. This reliability was determined by subtracting the theoretical percentage for chance matching (33%) from the percentage of correct responses obtained from the judges. This difference was then divided by the probable error of the percentage

(determined by the Yule formula, $P.E. = .6745 \sqrt{\frac{pq}{n}}$) (7, p. 337).

All quotients (here represented by the symbol Q) which are four or over may be considered statistically "significant." All such quotients are boldfaced, and are positive unless otherwise indicated.

It can be seen from this table that 25 (44%) of the coefficients are significantly positive; four (7%) are significantly negative. Before drawing any conclusions, however, the results of matching each feature with voice should be inspected separately.

Age. The two experiments in which age was judged yielded positive results. In V the voices were matched to the ages given, while in VII the ages of the three speakers were merely estimated by the judges. The averages of the estimates in VII for the speakers were 25, 37, and 41 and the actual ages were 27, 36, and 51, respectively. There was thus a tendency to center the ages around a median of 35-40, corroborating Pear's discovery of a central tendency in judgments of age from voice.

Height. Herzog (2a) reported positive results in a study of the determination of height from voice.⁵ Only one of our four experi-

⁵Herzog's study, recently published, also includes results on judgments of sex, age, vocation, and weight from voice. In general, they show that all these characteristics are judged more accurately than one would expect by chance.

TABLE I
RESULTS OF MATCHING VOICE WITH VARIOUS FEATURES OF PERSONALITY

Feature judged	I	(Laboratory)		Experiment number							(WEEI)
		II	III	IV	V	VI	VII	VIII			
<i>Physical and expressive features</i>											
1. age			- 1.3		8.9						+
2. height					4.9	-0.6					1.7
3. complexion	2.8	1.2	3.6	8.8	8.9						4.6
4. appearance in photographs			- 2.8	1.0	8.0	2.8					
5. appearance in person											
6. handwriting	1.9		0.9	2.1	0.7	-2.2					
<i>Interests and traits</i>											
7. vocation	- 2.8		- 8.9	6.4	-1.3	0.4					8.3
8. political preferences	7.4		1.2	3.3							4.0
9. extroversion-introversion	14.0	15.0	- 8.4	-3.1	-3.3	-0.3					19.3
10. ascendancy-submission	18.5	14.5	17.0	8.8	-4.8						
11. dominant values	7.4	8.0	- 3.3	0.2	8.0	0.3				- 8.7	
12. Summary sketch	14.7	13.6	- 2.0	8.7	8.8	0.9					
Number of judges	55	85	34	46	50	32	190	95			
Voice number 1	A	A	D	G	K	N	Q	J			
Voice number 2	B	B	E	H	L	O	R	H			
Voice number 3	C	C	F	J	M	P	S	M			

ments on height seems to support her finding. The comparatively large percentage of correct answers (45%) for this item in V was due primarily to the case of a short, fat man whose voice was thick, mellow, and "chuckling." By 60% of the listeners (instead of the 33% expected by chance) this voice was judged to belong to the shortest speaker.

Complexion. The only experiment which included this feature yielded somewhat significant results. Little confidence can be placed in this finding, however, until it is confirmed.

Appearance in Photographs. In all cases the results here are positive, and in two cases they are significantly so. The significant results in IV and V seem to be due chiefly to the distinctive appearance of one or two of the speakers in each experiment. For example, in IV, the photograph of speaker H, whose voice was correctly taken to be that of a poet, showed him with side-burns and a drawn, pointed face.

Appearance in Person. It seems illogical that the results here are not quite so positive as those obtained from the use of photographs. This deficiency may be due to the time which necessarily elapsed between hearing the voice and making the judgment, with the result that there was a fading-out or confusion in the image of the voice before the matching could be made.

Handwriting. This matching has special significance for the problem of the consistency or harmony of an individual's expressive movements (2). If the voice and the handwriting are both expressions of personality, should they not be matched with each other? Wolff (6) found that voices recorded by means of a gramophone were correctly matched with handwriting about one and a half times as frequently as would be expected by chance. Although this matching was tried in five laboratory experiments, none of the results is significant. Four of the quotients are positive, however, and only one negative. The failure to obtain higher results may be due chiefly to the fact that untrained judges were employed, skilled neither in the judgment of voices nor of handwriting.

Vocation. Three of the experiments yielded significantly positive quotients, while one was significantly negative. The largest coefficient of successful matching obtained in the entire series of experi-

ments came from the judgments of vocation made by 190 listeners in Experiment VII. In this experiment one speaker was an artist, one a business man, and one a professor. The coefficient of correct matching was +24.5. The negative results in III are also significant. Here one speaker was a professor of English, one a psychologist, and one a journalist. The psychologist, however, was a native of South Africa and had an apparently "English accent," and was therefore consistently judged to be a professor of English! It is evident that the auditors have decided opinions concerning the kinds of voices which are typical of the various professions. Such preconceptions are frequently, though by no means invariably, correct.

Political Preferences. Like the matching with photographs, the determination of political preference from voice seems to be rather surprisingly successful. In the cases where "significant" results were obtained, however, there were present in each group of speakers at least one or two distinctive voices which made matching easy. The "poetic" voice of H, for example, was usually taken as belonging to a socialist.

Extroversion-Introversion. In three experiments this matching was accomplished with signal success. The strikingly significant results were clearly due to the loud, boisterous, care-free voices which in these three experiments happened to fit the extroverts, and the gentle, restrained voices which happened to fit the introverts. In the other experiments, where slightly negative results were obtained, these vocal characteristics were either absent or else were actually deceptive. This extremely irregular result, very unlike chance, is quite typical of all our findings, and will be interpreted later.

Ascendance-Submission. Every result for these traits is significant, four markedly positive and two moderately negative. Here, as in extroversion-introversion, the distribution of results does not in the least resemble chance. The voice gives very decided indications of traits, often correctly, but sometimes incorrectly. The degrees of ascendance-submission of the speakers in the first four experiments correctly fit into the picture of the forceful, aggressive voice as opposed to the passive, meek voice; while in Experiment VII the great majority of the incorrect answers were due to the fact that the submissive professor had cultivated (for classroom purposes) a typically ascendant manner of speaking.

Dominant Values. In half the experiments the results were clearly positive and significant. In Experiment I two of the speakers were high in both aesthetic and religious interests (as measured by the *Study of Values*), and were often confused with each other. The positive result of this experiment is due therefore to the fact that these two speakers were scarcely ever mistaken for the third, whose voice clearly betrayed his political and economic interests.

Summary Sketches. The single features just enumerated were summarized for the judges into one final thumb-nail sketch of each speaker. The purpose of this final matching was to determine whether or not the voice reveals a *complex pattern* of personality better than a single feature. The results are positive. *A pattern of qualities seems, on the average, rather more correctly matched with voice than does any single quality.*

MATCHING FREE DESCRIPTIONS OF PERSONALITY WITH VOICE

In Experiments IV, V, VII, and VIII, the judges submitted free descriptions of the speakers to supplement their matchings. Many of these descriptions seemed even more accurate than the controlled judgments. The descriptions of six of the speakers were collated and arranged in the form of six brief sketches and employed in Experiment IX. All uncomplimentary and ambiguous items were deleted. Although such editing was to a certain extent arbitrary, each sketch was made to conform as faithfully as possible to the descriptions submitted. Qualities often mentioned were emphasized, and conflicting characterizations were proportionately included. Following is one of the final sketches employed.

Mr. A is characterized by his ascendant, aggressive behavior. He has drive and initiative, knows what he wants and gets it. He has decided opinions and likes to express them. He is extroverted, easily resists salesmen, and cares little what others think about him. He is wealthy and aristocratic, and has an appreciation of good literature.

Experiment IX was divided into two parts. In *Part I* three of the speakers participated. The radio audience was instructed by the station announcer that three speakers (voice A, voice B, and voice C) would read three descriptions (descriptions 1, 2, and 3) intended to describe the speakers, and that the radio audience should decide which description best characterized each speaker. The three speakers then

read description 1, each speaker ending the passage with the question, "Does this describe me?" Then description 2 was read by each speaker, and, finally, description 3. *Part II* was identical with *Part I* except that three other speakers and their corresponding descriptions were employed.

The number of answers (25) returned by the listeners was unfortunately small (Amos 'n Andy proving to be too great a competitor for science). The results, however, so far as they go, are significantly above chance in both parts of the experiment.

	<u>0</u>
Part I	4.4
Part II	9.0

This experiment provides a kind of check upon the reliability of the impressions created by the six voices. Unlike Experiments I-VIII the judgments are not validated against objective criteria, but are compared with the judgments of other listeners who knew the speakers only by their voices. Whether the impressions are correct or incorrect, it is clear that they are essentially the same for *different* groups of listeners.

In a minor experiment (X) the free descriptions of the speakers sent in by the judges in Experiment VII were listed. The three lists of brief characterizations ("moody," "nervous," "precise," "dapper," etc) were then mimeographed on separate sheets. Copies were distributed to friends and acquaintances and they were asked to decide which list best described the speaker or speakers whom they knew. Fifty-six judgments were received and 91% of these were correct.

THE RADIO VOICE VERSUS THE NORMAL VOICE

In order to determine whether the mechanical transmission of voice reduces the ability of the judges to make correct matching*, several control presentations were introduced in some of the laboratory experiments. In these presentations, the speakers read behind a curtain in the same room where the subjects were seated. The same features which were matched with the radio voice were likewise judged in this situation.

TABLE 2
COMPARATIVE RESULTS OF MATCHING RADIO VOICE AND NATURAL VOICE WITH
VARIOUS FEATURES or PERSONALITY

Feature judged	Radio voice		Normal voice	
	% correct	<i>Q</i>	% correct	<i>Q</i>
Experiment I*				
photograph	41	2.8	89	9.1
handwriting	32	1.9	44	3.6
vocation	27	-2.8	44	3.6
political	53	7.4	51	6.0
preference				
extroversion-	67	14.0	70	13.6
introversion				
ascendence-	62	13.5	63	10.6
submission				
dominant values	53	7.4	76	17.0
summary sketch	70	14.7	64	10.9
average	51		59	
Experiment II				
extroversion-	63	15.0	37	1.7
introversion				
ascendence-	62	14.5	78	23.0
submission				
dominant values	46	6.0	64	15.5
average	67		59	
Experiment V				
height	46	4.3	50	5.9
appearance	50	5.9	78	16.5
ascendence	42	-4.8	63	2.9
submission**				
Experiment VI				
appearance	48	2.7	27	-1.2
average (Exps. V, VI)	46		55	
Average in all exps.	51		68	

* In Experiment I, 54 judges participated in the radio presentation and 45 judged the normal voice.

**Since two of the speakers obtained the same rating, the chance percentage for this feature is 5/9 rather than 1/3.

The comparative analysis of the results in Table 2, based on data obtained in four experiments, shows that there is an average difference of about 7% in favor of the normal voice. To control the effect of practice the normal voice in some experiments was introduced before, and in others after, the voice had been heard over

the radio. The order of presentation makes no appreciable difference.

This finding has considerable theoretical and practical interest. From the theoretical point of view, it may be said that the listeners are quite successful in "hearing through" the inevitable burr which accompanies a mechanical transmission of the human voice. Adaptation to the change in the quality which a voice undergoes in such transmission seems to be remarkably rapid and thoroughgoing. Even the subtlest inflections may be successfully analyzed out from all extraneous sounds. The voice, as it were, becomes a distinct and well-identified figure upon the ground of subdued mechanical noise. (A very few people, however, seem incapable of negative adaption to the ground, and persistently complain of the distortion of the voices or musical instruments which they hear. Such people usually dislike the radio for aesthetic reasons.)

Even though the broadcaster can be assured that most people readily adapt to the figure-ground situation which the radio creates, our experiments do show a slight loss in the accuracy of matching. On the average, the natural voice is somewhat more revealing of personal qualities than is the radio voice. The loss represents perhaps only such imperfections in transmission which mechanical improvements in the radio may in time remove. It should be reported here that the apparatus employed in these experiments lacked the dynamic or condenser microphone found in the newest broadcasting equipment. Except for its two-button carbon microphone the equipment used was modern in every respect.

CONCLUSIONS AND INTERPRETATIONS

This analysis of the results now enables us to answer the two fundamental questions with which the investigation is concerned.

1. *Does voice convey any correct information concerning outer and inner characteristics of personality?* The answer is *Yes*. Not only are the majority of our coefficients positive (74%), but 47% are "significantly" so, often by very large margins. If the judgments of the various features of personality were due entirely to chance we would, of course, expect an approximately equal number of positive and negative *Q*'s and a very smaller percentage of "significant" results.

2. *Is there uniformity in the expression of personality through voice, so that it might be said that certain personality qualities are consistently revealed and others not at all; or that certain types of individuals are always revealed by their voices, and others never? The answer is No.* Results which are exclusively positive and significant were obtained for no single feature excepting age and complexion (and repeated experiments would be necessary to establish their reliabilities). Nor were the results for all of the personal characteristics of any one of our eighteen speakers always positive and significant. Therefore, the only certain generalization that can be made is that by and large *many features of many personalities can be determined from voice.*

This general conclusion requires supplementation and interpretation through the following additional findings.

3. The fact that 53% of our coefficients are "significant" (either positive or negative) and the fact that only 14% fall within the range of ± 1 P.E. indicate that the judgments, even when they are erroneous, do not represent mere guesses. A voice seems to arouse a more or less uniform impression on a group of listeners even when the impression is incorrect. *The uniformity of opinion regarding the personality of radio speakers is somewhat in excess of the accuracy of such opinion.*

4. This discovery is evidence that stereotypes play an important part in making the judgments. In everyday life we frequently hear people say, "He talks like a poet," "He sounds like a politician," "You can tell from his voice that he is timid." Likewise, in the laboratory situation it appears that *for the various features of personality there is associated in the minds of the judges some preconception of the type of voice to which these features correspond.*

5. These preconceptions regarding the type of voice which "should" accompany various features of personality are not equally definite for each feature. The results show that *the more highly organized and deep-seated traits and dispositions are judged more CONSISTENTLY than the more specific features of physique and appearance.* In the group of characteristics which include physical features and handwriting only 33% of the matchings were "significant" (either correct or incorrect), while among the features classified as "interests and traits" almost twice as many (64%) were "significant."

6. *Not only are the more highly organized traits and dispositions judged more consistently than such outer characteristics as physique and appearance, but they are also judged more CORRECTLY.* One-third of the judgments on "physical and expressive" features were significantly positive, whereas one-half of the judgments on "traits and interests" were positive and significant. This finding should be taken as supporting a dynamic and personalistic theory of expression (2, Chap. VII). It is clear that vocal expression is not specific and independent; it is associated to some extent with other physical and expressive features, but especially with the highly organized qualities of the "inner" personality.

7. *If a voice arouses a stereotype of the speaker, it is likely that several features of personality will be subsumed under that stereotype.* Thus in Experiment VII, speaker Q was correctly judged to be the artist by 71% of the listeners (only 3% said he was the business man). But the stereotype of an artist's voice was not confined to vocation alone. Fifty-six per cent of the listeners said that he was markedly submissive, 73% thought he had a light complexion, and 44% said he was tall. All of these judgments were significantly above chance and all of them wrong. Likewise in the same experiment, speaker R was correctly judged by 72% of the listeners to be the business man. And 65% believed (correctly in this case) that the business man had a dark complexion.

There is therefore a kind of totalizing effect which is prejudicial to accurate and detailed judgment. It is an aspect of the common tendency toward undue economy and simplicity encountered in much recent work upon judgment and attitudes. In the field of personality especially it seems that impressions are often oversimplified almost to the point of caricature.

8. The matching of voice with *summary sketches* was rather more successful than the matching with any single feature. *The more information given concerning the speaker, the more accurately is his voice identified.* Whereas the totalized stereotype is often prejudicial to correct estimates, the totalized portrait is helpful. This finding constitutes an argument against "segmental" and "atomistic" research upon arbitrarily isolated variables in personality. Studies which deal with the interplay and patterning of qualities are closer to the realities of organized vital processes, and for that reason yield more positive results.

9. *The success of judgment is inevitably influenced by the heterogeneity of the voices and personalities of the speakers.* It is quite clear that if any of our groups of three speakers contained a captain of industry, a prima donna, and the village idiot, there would be almost no errors in matching. Too great a homogeneity among voices or personalities is equally prejudicial to representative results. The inconclusive findings in Experiment VI are to be explained by the lack of distinctive quality in the three voices. The striking results of certain other experiments (e.g., VII and VIII) are due to the use of contrasting types. Our eighteen speakers were of the same sex, and differed less than a random sampling of population in respect to age, educational status, and racial background. On the other hand, the use of the matching method required that the personalities be at least distinguishable by the objective tests and measurements which were employed as the criteria. All in all, it is probably true that our groups were neither unusually heterogeneous nor homogeneous, but represented reasonable variations in type.

10. It must be remembered that the criteria chosen for these experiments are all "objective," and are perfect neither in their reliability nor in their validity (excepting only records of physical characteristics). Those who are familiar with the complexities of the task of measuring personality will find it rather remarkable that the human voice can be so accurately matched with results obtained from the available tests for ascendance-submission, extroversion-introversion, and personal values. Such a degree of success with these objective criteria constitutes a peculiar kind of validation for the tests themselves and an encouragement to their further development. At the same time, since the criteria are imperfect, it must be borne in mind that the human voice may reveal even more concerning personality than our results indicate. *In our desire to keep the investigation objective and quantitative, we may have minimized the degree to which the voice expresses personal qualities.*

11. When some of the experiments were repeated, using a curtain rather than the radio to conceal the speaker, the average results were approximately 7% higher. This finding seems to indicate that *there is a slight distortion of the voice due to the background of mechanical noise.* Further improvements in broadcasting may reduce or eliminate this distortion.

12. Strong supporting evidence for certain of our conclusions was

obtained in two minor experiments (IX and X) which demonstrated that *free descriptions of personality from voice were successfully recognized by other listeners and by acquaintances of the speakers.*

SUMMARY

Ten experiments were conducted in the Harvard Psychological Laboratory, where a complete broadcasting and receiving equipment had been installed, and from the studio of Station WEEI in Boston. Eighteen male speakers and over six hundred judges took part. The method consisted chiefly in matching objective information obtained for twelve features of personality (e. g., age, photographs, handwriting, dominance, extroversion) with the corresponding voices. In comparing these matchings with chance it was found that the majority were successful, often by large margins, but that no single feature was always matched correctly, nor was any individual speaker correctly judged in every respect. It was also found that the uniformity of opinion regarding the personalities of the speakers was somewhat in excess of the accuracy of such opinion, showing the importance of stereotypes. In general, better results were obtained from the use of summary sketches than from single features, and judgments were more often correct for the organized traits and interests of personality than for mere physical features. There is a discussion of the relation of successful matching to the heterogeneity of the voices and personalities participating in the experiments; likewise of the use of strictly objective criteria. When the speakers read from behind a curtain instead of over the radio it was found that on the average approximately 7% higher results were obtained. Additional experiments showed that free descriptions of personality sent in by judges were in general successfully recognized by other listeners and by acquaintances of the speakers.

REFERENCES

1. ALLPORT, G. W. The study of personality by the experimental method. *Character & Personality*, 1933, 1, 259-264.
2. ALLPORT, G. W., & VERNON, P. E. *Studies in expressive movement*. New York: Macmillan, 1933. Pp. xii + 269.
- 2a. Herzog, H. Stimme und Persönlichkeit. *Zsch. f. Psychol.*, 1933, 190, 300-379.
3. MICHAEL, W., & CRAWFORD, C. C. An experiment in judging intelligence by the voice. *J. Educ. Psychol.*, 1927, 18, 107-114.

4. PEAK, T. H. Voice and personality. London: Chapman & Hall, 1931. Pp. xii + 247.
5. SAPIR, E. Speech as a personality trait. *Amer. J. Sociol.*, 1927, 82, 892-905.
6. WOLFF, W. Ueber Faktoren charakterologischen Urteilsbildung. *Xich. f. angew. Psychol.*, 1930, 35, 385-446.
7. YULE, G. U. An introduction to the theory of statistics. (8th ed.) London: Griffin, 1927. Pp. xv + 424.

Psychological Laboratory
Harvard University
Cambridge, Massachusetts

L'ESTIMATION DE LA PERSONALITÉ AU MOYEN DE LA VOIX

(Résumé)

On a fait dix expériences dans le Harvard Psychological Laboratory où l'on a installé un appareil complet d'émission et de réception radiotéléphonique, et dans la salle d'émission du poste WEEI à Boston. Dix-huit parleurs mâles et plus de six cent estimateurs y ont participé. La méthode a consisté principalement à choisir les voix qui correspondaient à des renseignements objectifs obtenus pour doute traits de personnalité (c'est-à-dire, âge, photographes, écriture, dominance, extroversion). La plupart de ces choix ont été heureux, souvent à un grand degré, mais aucun seul trait n'a été toujours choisi correctement; et on n'a estimé aucun parleur individuel correctement à tous les égards. On a constaté aussi que l'uniformité de l'opinion des personnalités des parleurs a été un peu plus grande que l'exactitude de cette opinion, ce qui montre l'importance des stéréotypes. En général on a obtenu de meilleurs résultats en employant des esquisses sommaires que de seuls traits, et les estimations ont été plus souvent justes au cas des traits organisés et des intérêts de personnalité qu'au cas des traits seulement physiques. On discute la relation entre les choix heureux et l'hétérogénéité des voix et des personnalités qui ont participé aux expériences; ainsi que l'emploi des critères strictement objectifs. Quand les parleurs ont lu derrière un rideau au lieu d'émettre la lecture à la radio, on a constaté qu'on a obtenu en moyenne des résultats plus élevés d'environ sept pour cent. D'autres expériences ont montré que des descriptions libres de personnalité soumises par les estimateurs ont été reconnues heureusement par d'autres auditeurs et par les connaissances des parleurs.

ALLPORT ET CANTRIL

BEURTEILUNG DER PERSONLICHKEIT NACH DER STIMME

(Referat)

Man führte zehn Experimente im Harvard Psychologischen Laboratorium aus, wo eine vollständige Radiogeber- und Empfangsaapparatur installiert wurde; und in Verbindung mit dem Atelier der Station WEEI in Boston. Achtzehn männliche Redner und über sechshundert Richter nahmen daran Teil. Die Methode beruhte hauptsächlich in der Paarung von Informationen, die man mit Bezüge auf zwölf Persönlichkeitsmerkmale erhalten

hatte (z. B., Alter, Photographien, Handschrift, Wille zum Herrschen, Extrorersion) mit den entsprechenden Stimmen. Diese Paarungen gelangen in der Mehrzahl, oft mit grauem Spielraum; aber kein einziges Merkmal wurde immer richtig gepaart; noch wurde jeder einzelne Redner in jeder Hinsicht richtig beurteilt. Man fand ferner, dass die Uebereinstimmung in der Meinung aber die Persönlichkeit der Redner die Genauigkeit solcher Meinung etwas übertraf, was auf die Bedeutung der Stereotypen hinweist. Im Allgemeinen erhielt man bessere Ergebnisse beim Gebrauch von summarischen Skizzen als bei dem Ton einzelnen Merkmalen, und die Urteile waren häufiger korrekt für organisierte Merkmale und Interessen der Persönlichkeit als für blosse körperliche Merkmale. Die Arbeit diskutiert die Beziehung erfolgreicher Paarrung zur Ungleichartigkeit der Stimmen und Persönlichkeiten, die an den Experimenten teilnehmen; und ferner den Gebrauch objectiver Kriterien. Wenn die Redner hinter einem Vorhang statt durch den Radio sprechen, so waren die Ergebnisse um etwa sieben Prozent besser. Weitere Experimente zeigten, dass die freie Beschreibung der Persönlichkeiten, die von den Richtern eingesandt wurden, im Allgemeinen von andern Zuhörern und Bekannten der Redner erkannt wurden.

ALLPORT UND CANTRIL.