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THE QUESTION OF ASSOCIATION TYPES¹

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In dealing with free association material it is often necessary to speak of the associations of different individuals as running along certain specified lines, or of showing certain types (*Sachlicher Typus*, *Konstellationstypus*, etc.). However, there exists no very definite knowledge of how consistently such reactional tendencies are preserved, and of how far any given series of observations with a single individual may be indicative of that individual's type of response to the association test.² With a view to contributing to a better understanding of these matters there were undertaken the calculations that form the basis of the present report.

The experimental material is largely that discussed from other standpoints elsewhere; it includes a total of 10,900 observations, with 28 different subjects, 11 men and 17 women, hospital nurses with the exception of two physicians. For further account of the experimental conditions the reader may be referred to the previous discussions.³

The working concept of individual differences, for the association test and for measurements in general, is broadly based upon the postulate that any given individual preserves, within the function measured, a range of variability that is less than the variability of normal individuals about the

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² The study most nearly related to the present is that of Fürst, *Journal für Psychol. u. Neurol.*, IX., 1907, 243-278.

³ 'Practise Effects in Free Association.' *American Journal of Psychology*, Vol. XXII., pp. 1-13. 'Some Properties of the Free Association Time.' *PSYCHOLOGICAL REVIEW*, Vol. XXIII., pp. 1-23.

normal average. In the absence of external factors such as practise, individuals must vary from themselves at different times less than they do from each other; and even in the equal presence of such factors, the individual relationships must still be preserved. To the extent to which these conditions are satisfied, we may speak of clear-cut individual differences in our various functions.

The variation of the same individual from time to time may be termed the *personal variation*, as distinguished from his variation from similar measurements of other individuals. The comparison of this *personal variation* with the mean variation of a group affords an everywhere interesting psychological datum. In some previous experiments, it thus appeared that individuals varied relatively much less among themselves and more among each other, in the preference for certain sorts of pictures than in the judgment of color-differences or of weights.¹ Indeed, if the result quoted for the weights were generally valid, the accuracy of weight perception would be of almost negligible value as a factor of individual difference. It is certainly desirable that we should have clear knowledge of the relationship of the personal variation to the group variation in all important psychological measures.

If no constant deviations, such as practise effects, are indicated, it is probably sufficient to know the comparative magnitudes of the mean variations of the function taken personally and for the groups: but where such factors are obviously present, the demands of the situation are much better met by the correlation methods. The three functions of the association experiment that appear for consideration in these respects are (1) the reaction time, (2) the tendency to give common or specialized responses (Kent and Rosanoff), (3) the relational character of the responses with reference to the stimulus word, as given in the quasi-logical methods of classifying the responses (Aschaffenburg, Münsterberg, Wreschner, Jung, et al.).

During the latter part of October, 1909, twenty-five

¹'On the Variability of Individual Judgment.' *Essays in Honor of William James*, 511-549.

subjects, ten men and fifteen women, underwent the association experiment of one hundred stimulus words prepared and standardized by Kent and Rosanoff. Fourteen months later, in December, 1910, such of these subjects as were still available, fourteen in number, underwent the experiment a second time. We are concerned here with the comparison of the records made by the different subjects with those made by the same subject on the different occasions.

The median association times for the one hundred associations of each individual in each subject compare as follows in the two experiments. The time unit, here as elsewhere, is one-fifth of a second.

Subj.	Oct., 1909	Dec., 1910
I.....	22.0	7.6
II*.....	14.8	8.0
III.....	8.3	8.2
IV.....	8.8	8.5
V*.....	19.0	15.6
VI.....	8.2	6.1
VII*.....	13.4	7.8
VIII.....	12.8	11.0
IX.....	8.7	7.2
X.....	8.0	6.3
XI.....	7.7	6.6
XII.....	7.8	6.9
XIII.....	10.2	8.3
XIV.....	8.6	7.3

The subjects marked with an asterisk are not included in these immediate calculations because of extensive intervening practise, though it is not absolutely certain that V. should have been excluded on this ground. The record is in other ways an exceptional one.

The enormous difference in the performances of subject I. is probably less important than it looks. Every other experience with the test indicates it to be one of those unfortunate experimental accidents that result from some factor, uncontrolled, because insufficiently appreciated; the second experiment is probably the representative one. It may be remarked in passing that the type of association is little different in the two tests with this subject; indeed, the actual response words were in 47 per cent. of the cases the same as before.

The generally shorter times of the second experiment may and probably should be taken as the product of better adaptation to the test. It is true that there is considerable intervening opportunity for practise in manipulating the stopwatch, but the changes are not such as would be induced in this way. It is not likely that the different medians would be thus affected in so different degrees. Very long times are also much less frequent in the second experiment than in the first. Of those reaction times of 50 (10 seconds) and over in length, the unpractised subjects had 37 in the first experiment, 9 in the second. In the matter of a better experimental adaptation, this fact means considerably more than the slight decrease in the medians.

The uniform shortening of the time limits greatly the significance of the comparative mean variations. For the unpractised subjects, the average time is 10.1 in the first experiment, and 7.6 in the second; while the mean variations of these two averages are 2.8 and 1.0 respectively. The average personal variation between the two experiments is 1.2, if the anomalous first case be included, .64 without it.¹ If the former be compared with the group mean variation for the first experiment, and the latter with the second experiment, it is seen that, in spite of the uniform decrease in time, the personal variations are smaller by about one third.

For the reasons indicated, however, the correlation methods furnish the more logical evidence. It is altogether distorted here by the practised subjects, and especially the anomalous case. If the practised subjects alone be excluded, there is still no correlation worth mentioning, the Pearson approximating .28; but if the anomalous case be also ruled out, the Pearson of the remaining ten figures out at .86. This is surely an extreme instance of distortion by a single anomalous observation, which it is presumably more accurate to exclude. In the remaining cases, the tendency to preserve the type in reaction time is fairly definite.

In calculating the reaction times of the second series of experiments, it was thought worth while to observe how much

¹ With correction for constant error, this quantity becomes .27.

the two halves of the experiment might differ in this respect. Fifty observations should here give a fairly reliable median, and we should be assured of a greater constancy of experimental attitude than in experiments separated by a wide interval. The times have a fairly uniform tendency to run longer in the second half of the experiment; it would be interesting to determine if there were a fatigue phenomenon here, as might perhaps be done with larger series of stimulus words; in this instance it is quite possible that the second fifty of the words chance to be more difficult.

Before leaving this phase of the matter, attention may be called once more to the character of the practise curves reproduced in a previous contribution.¹ In the median of fifty reaction times, the differences between four of the subjects are seen to be entirely definite; the practise curves of RED, BROWN, BLACK and BLUE, never touching except for one intersection of the last two. This evidence supports that of the figures just given, that clear-cut individual differences are to be found in the reaction time of the association experiment. It is less certain that this reaction time is determined in such a way as to make a particularly significant psychological measure. Like a high cephalic index, a long reaction time for an individual may be quite definitely made out, but both may mean absolutely different things according to the setting in which they occur.

It is but natural that in the second test a stimulus word frequently elicits the same response as in the first test. The number of responses thus repeated to the same stimulus word has found some application in pathological cases, the practise being to rate the subject higher, the more responses were changed. This interpretation is scarcely indicated for it here. The figures are as follows:

(Number of responses identical in each experiment)

Subject	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
First half.	24	7	12	21	8	19	0	8	24	22	21	23	22	26
Second half.	23	18	21	21	10	30	5	14	14	31	25	21	29	28
Total.	47	25	33	42	18	49	5	22	38	53	46	44	51	54

¹ *American Journal of Psychology*, XXII., plate facing page 2.

The range is quite extensive and a form of distribution is distinct. Excluding the practised subjects, the personal variation in this function compares directly with the group variation in the ratio of about $5\frac{1}{2}$ to 7; that is, individual differences among these subjects are not very well defined here. There appears, however, some correspondence of the tendency to differentiate the responses *in toto* with a large number of predicate associations, as well as with a tendency to individualized responses.

The simplest criterion of the egocentricity of a Kent-Rosanoff record is the number of 'individual' reactions, that is, as Kent and Rosanoff use the term, the number of given responses that do not occur in their frequency tables (or for a subject that is concerned in these tables, occur only the one time that that subject gave them). Through analyzing large masses of material in this way, it is doubtless possible to reach a number of interesting and useful conclusions. The number of these 'individual' reactions occurring in the first and second experiments is as follows in the two tests:

Subject	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
No. ind. react. 1st. exp..	0	9	2	3	4	2	17	1	4	2	2	2	8	0
No. ind. react. 2d exp. .	0	5	10	1	15	5	31	9	4	2	1	0	3	3

For all subjects, the averages are 4.0 individual reactions in the first experiment, and 6.3 in the second experiment. The group variation is 3.2 in the first, and 5.5 in the second. The average personal variation between the two experiments is 2.1. The correlation is low, being but 65 per cent. of plus signs from the median. Excluding the practised subjects, the individual differences become even less distinct, the personal variation being as great as the group variation of the first experiment.

The failure of this measure for the present calculations is due entirely to its not being sufficiently fine-drawn. It has the advantage of being rapidly determined, and perhaps suffices for comparisons between considerable groups of subjects; but in comparisons between different individuals, and

especially between different records of the same individual, it is not only much too coarse, but may be actually misleading.

For such purposes, the detailed analysis of the data of the frequency tables amply repays the time that it requires. Each association reaction has a certain value from 0 up to a possible 1,000 and an actual 650, according to its place in the frequency tables.¹ For each record may be calculated a *coefficient of community*, this being the median value of all the associations in that record. This figure varies within wide limits for different individuals. If it is high, it indicates a tendency to respond with common, ordinary reactions; if low, it indicates a tendency towards specialized and individualized responses. This coefficient of community, which may be abbreviated as *c*, is as follows for the different subjects:

Subject	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
<i>c</i> , 1st exp. . .	16.5	2.2	9.0	11.5	15.1	8.5	2.2	6.3	6.6	17.4	9.5	15.2	9.3	11.0
<i>c</i> , 2d exp. . .	15.1	3.0	6.0	10.0	2.0	7.6	.7	3.3	9.0	18.0	12.0	13.5	7.2	9.3

The most cursory glance at these figures shows that there is in reality a high degree of inherency in the tendency to give common or specialized responses, which the mere number of individual reactions altogether fails to indicate. The mean group variations of the first and second experiments are 3.8 and 4.1 respectively. The personal variation between the experiments is 1.3 including the anomalous Case V. There has here been a far-reaching alteration in the form as well as in the individuality of the associations. Without this case the group variations would approximate 3.7 and 3.9, the personal variation being .9. In the correlation methods, the only negative case from the median is that of V.; elsewhere the results with and without it are as follows:

	Incl. V.	Excl. V.
Order displacement.....	18 per cent.	9 per cent.
Pearson.....	.73	.83

In this function therefore, we appear to possess a measure of individual differences that will bear comparison with any

¹ Kent and Rosanoff, 'A Study of Association in Insanity,' *American Journal of Insanity*, Vol. XXVII., pp. 40, 48-96.

other psychological measure of equal complexity and significance.

The median of community has been calculated separately for the responses which are the same in the two experiments and for those which are different. The figures show some points worth bringing out and are as follows:

Subject	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
c repeated responses	25.7	6.2	14.7	30.6	14.1	18.4	12.5	16.5	16.6	24.6	21.3	21.7	17.2	15.6
c changed responses (1) . .	10.4	1.4	4.6	5.2	15.2	4.6	1.9	4.9	3.6	10.2	3.7	10.0	6.2	4.8
c changed responses (2) . .	7.1	2.4	1.2	4.9	1.4	4.1	.6	2.3	3.8	9.2	6.1	6.2	4.7	4.3

The main trends of this table are of course those of the one for the whole body of responses; but it is interesting to observe the great disparity in the usualness of the repeated and changed responses. The usual responses are those which are well grounded in experience, and naturally have the greatest chance of reappearance. On the other hand, there is a certain irregularity about it; the repeated responses of IV. are the most usual of all, the changed ones are in both experiments less usual than those of I., X. or XII. Rather unusual repeated responses but relatively usual changed responses are given by XIII. and XIV. The anomaly of Case V. is again evident. The correlations are not so well marked in the changed responses as in the series as a whole; the personal variation is 1.3 as against group variations of 2.8 and 1.9. The orders have 29 per cent. of displacement, 20 per cent. excluding V.; there are 80 per cent. of plus signs from the median.

In concluding the immediate discussion of the type in the community of response, it may be remarked that the distribution of the single figures from which the median is calculated uniformly have a distribution markedly skewed toward the 'individual' end, with now and then suggestions of a species at frequencies between 30 and 40 per cent. A few of the records were examined, by per cent. of like signs, with reference to correlations between the increased individuality and long reaction time; a positive relationship appeared,

rather constant, but quite slight. The median of community in all reactions of over 50 (10 seconds) in the first experiment was, however, given as no higher than 3.5 per cent.

Individual differences in community of response, however well defined or clearly significant, are subject to considerable limits in their application. One cannot operate with this measure outside the stimulus words from which frequency tables are compiled. It is certainly most desirable to investigate if there exists a method of attaining a similar insight into free association material that shall not be subject to these limitations. The obvious direction of such an inquiry is towards the superficial relation of the response word to the stimulus word. It has been put forward by previous investigators that certain psychological attitudes¹ are dynamically related to special relationships of this nature in the association test. The present task is then to test the value of this principle in the determination of individual differences in response to the test.

The relationships to be considered have already been described. There are here five categories, (1) the *predicate*, (2) the *supraordinate*, (3) the *contrast*, (4) the *miscellaneous* or 'internal-objective,' and (5) the *speech-habit group*.² Every individual's associations fall, in varying proportion, into these five classes. Continuing to deal with the Kent-Rosanoff experiment, our first question, following the previous system, is how the personal variation in these categories compares with the group variation.

It will be remembered that there are two experiments with fourteen subjects, fourteen months apart. The averages, M.V's. between the different subjects, and M.V's. between the same subjects, are as follows:

The figures speak for themselves about as well as any discussion might do. Save only in the speech-habit category, the individual differences are as clear cut as in the objectively determined frequencies of response (it may be

¹ E. g., the "Prädikattypus" of Jung.

² PSYCHOLOGICAL REVIEW, Vol. XVIII., pp. 229-233. For further definition, illustration and discussion of these five categories as such, the reader is referred to this paper.

Category	Group Av.		Group M.V.		Personal M.V. 1st and 2d Exps.
	1st Exp.	2d Exp.	1st Exp.	2d Exp.	
Predicate.....	19.5	22.9	13.5	13.8	3.7
Supraordinate.....	15.5	13.5	9.4	12.5	3.21
Contrast.....	14.9	12.1	8.1	7.1	3.2
Miscellaneous.....	44.5	47.6	5.9	6.9	2.2
Speech-habit.....	5.5	3.9	1.6	1.3	1.6

remarked in this connection that some eight months intervened between the classification of the two sets of results). They are quite definite in the predicate, for external reasons the most important, category, and somewhat less so in the supraordinate and contrast groups. The order in the number of predicates shows 9 per cent. of displacement between the two experiments. The Pearsons in the different categories in the two experiments are as follows:

Predicate.....	.83
Supraordinate.....	.77
Contrast.....	.76
Miscellaneous.....	.84
Speech-habit.....	.03

Relative tendency towards one category strongly implies tendency towards it later, save only in the small category of speech-habit responses. Definite fidelity to type appears, then, to be characteristic of the subjects in these functions of the experiment.

While these are the main findings in this respect, there is another feature of the variability that is not without interest. Each subject naturally varies a certain amount from the group in each experiment, and then a certain amount from himself between the two experiments; it is the average of these figures for each category that has just been quoted. It were also a significant question of whether a subject who tended to vary much from the group also tended to preserve greater or less fidelity to his own type. A distinct negative correlation, 14 per cent. of + signs from the median, - .40 Pearson,¹ is indicated between these two functions. This is probably significant mainly for the subjects who lie

¹ As with the median, only two cases are positive, but these pronouncedly so.

at some distance from the group average, and tend to preserve their type. At first glance, it would scarcely seem reasonable to suppose that a subject who was close to the group average, should vary more from himself than one who was far from it; yet the function does seem to possess some properties of this nature, as will be brought out in the observations of a more intensive nature now to be described.

Hitherto, no comparisons of the material with reference to association types have been made between series of different stimulus words. The extent of the error which different series of words might introduce was not known, and it was therefore endeavored to avoid it, though it was reasonably certain that its extent was not very great. A fairly precise idea of it, however, may be attained in comparing the relation of the associative categories in the first half of the Kent-Rosanoff experiment to those in the second half;¹ there thus being two groups of fifty words each. Changes occurring here are presumably due rather to a difference in the stimulus words than to fluctuations of experimental attitude such as might operate in experiments on different days. The following figures, then, give the mean personal variation of the five categories for the first and second halves for both experiments:

	Pred.	Supra.	Cont.	Misc.	Sp. H.
1st exp.	1.2	1.3	2.0	1.8	1.4
2d exp.	2.0	1.8	1.4	2.8	.6

The figures of the personal variation between the two halves of the same experiment are somewhat, not greatly, smaller than between the two experiments themselves; though considering that it is for only half the cases, they can scarcely be counted smaller at all. It is peculiar that the second experiment should show greater variability in this respect than in the first; the contrary if anything would be expected.

The indication, however, is that the variation between the different stimulus words would not be sufficient to obscure

¹ A better procedure would have been to compare alternate words.

real individual differences in association type, even though the stimulus words furnishing the material were not the same for each subject.

This question is more searchingly tested in the subsequent analysis of the 7,000 reactions which form the material of the already reported practice experiments. While this material is twice as extensive as that from the Kent-Rosanoff experiment, its interpretation with reference to the matter of types depends largely on whether or not the daily changing of the stimulus words induces special changes in associative trend peculiar to the series that is used. In any case, whatever alteration of type the changes in the stimulus words produces it ought to be in the same direction for each of the seven subjects, since the changes in the stimulus words are the same for each one; that is, if an association series did exist which prejudiced in favor of the egocentric or other categories of reaction, there ought to be a uniform change in that direction among the subjects; indeed, that would be our only criterion of such a change. It has actually been found that on nearly half the days when the egocentric category shows deviations greater than the M.V., such greater variations are in different directions for different subjects. While some influence probably is exercised by particular series of words, it is not believed sufficient, in view of such like findings, to offset the validity of the subsequent interpretations.

A priori such an influence would here be quite improbable, since the order of 1,000 words is a quite random selection.

According to observed deficiencies in the conception of the predicate category obtaining in the above it is here widened and the name changed to the *egocentric*. This widening is mainly at the expense of the miscellaneous and speech-habit categories, and consists chiefly in the transference to the former predicate category of reactions where a proper name is involved. This adds much to the significance of the classification.

As there are 1,000 reactions for six, and 500 for two subjects, it is possible to consider the prevalence of special categories in the direct comparison of the various subjects.

The averages and mean variations of each of the eight subjects in the five categories are as follows:¹

Subject	Black	Brown	Red	Orange	Green	Blue	VII	VIII
Egocentric	8.5	7.6	8.7	21.3	22.1	10.7	8.7	16.7
M.V.....	3.2	2.6	2.8	3.2	2.6	3.6	3.5	1.7
Supraordinate.....	1.4	3.3	6.1	2.5	5.0	3.4	6.8	1.7
M.V.	1.0	1.7	3.2	2.2	2.0	1.8	2.1	.9
Contrast.....	5.0	5.1	3.1	.9	.5	1.9	4.0	.6
M.V.....	2.1	2.4	1.8	1.1	.5	2.1	2.0	.6
Miscellaneous.....	27.7	28.3	28.8	20.3	20.2	26.9	26.3	28.0
M.V.....	4.2	2.6	4.2	3.3	2.5	3.8	2.8	2.6
Speech-habit.....	6.8	5.2	3.0	5.0	2.0	5.2	3.9	3.0
M.V.....	1.9	2.1	1.2	3.4	1.5	1.7	1.3	1.6

It appears here, as also in the previous analysis, that while there is an influence of practise on the form of association, it does not have any special influence on the type, save only in subject BLUE.

In the common acceptance of the experiment, the essential significance lies in the relations of the egocentric and the miscellaneous categories, and more especially in the character of the egocentric category. It is very evident that in this respect three steps are represented in the results: (1) those showing the fewest egocentric reactions, namely, BLACK, BROWN, RED, BLUE and VII.; (2) subject VIII., who occupies a midway position; and (3) ORANGE and GREEN, who occupy positions quite high in the scale of egocentricity, not only here but in the frequency valuations of the Kent-Rosanoff experiment where they are, respectively, subjects VII. and II. These three steps are separated from each other well beyond the limits of the probable error; save in one case only, beyond that of the mean variation. The variability of the measures in each subject is so small compared to the total range in the egocentric category, that there can be little doubt that the averages represent definite points of the scale about which each subject's results center with comparatively little chance fluctuation. On the basis of

¹ These are the actual figures from series of fifty stimulus words; they must be multiplied by two for direct comparison with tables on page .

these figures then, we may assign definite and limited positions to the different subjects along the scale of egocentricity in response. In the other categories, individual difference is much less pronounced. One may note the relative abundance of supraordinate reactions in VII., and their absence in BLACK and VIII.; also the peculiar absence of contrast reactions in ORANGE, GREEN and VIII. The excess of egocentric reactions in ORANGE and GREEN is associated with a corresponding decrease in the miscellaneous category. Elsewhere, little individual difference exists between these subjects, the comparative table of personal and group variations being:

	Egoc.	Supra.	Cont.	Misc.	Sp. H.
Average group var.....	5.1	1.9	1.7	2.7	1.3
Average personal var.....	2.9	1.9	1.5	3.3	1.8

The main interest of further calculation attaches to the possible correlations of the various categories. Thus there is a pronounced negative correlation, approximating $-.65$ Pearson between the supraordinates of the first Kent-Rosanoff experiment with twenty-five subjects, and the contrast associations of this group. A somewhat less marked negative relationship, $-.45$, exists between the contrasts and the predicates in this experiment. In the table just quoted, this is markedly changed. The *egocentric* category, which is supposed to represent more accurately the same psychological attitude that the *predicate* implies, shows an extreme negative correlation with the contrasts, $-.95$. On the other hand, the supraordinates are so much reduced by practise effect that the initial negative relationship with the contrast has disappeared, and given place to a slightly positive one of $.14$. The results are not inconsistent when one takes into account the practise effect on the supraordinates and the changed conception of the egocentric. A possible interpretation is that the mental mechanism of the contrast association is throughout in marked opposition to that of the predicate or egocentric. At the beginning of practise this is true also of the supraordinates, which here result largely

from the adoption of a conscious 'set' and are thus egocentrically determined; the disappearance of the supraordinates with practise coincides with the increasing freedom of response, and diminished necessity for conscious 'sets.'

A previous paragraph on the Kent-Rosanoff material brought out the result that there were marked individual differences in fidelity to type, and that those tended to be more faithful to their own types who were further away from the group averages. The practise experiments throw the essential features of this result into stronger relief. The 'average' association type appears to be a distinctly concrete one. A fair average association record of fifty words would contain about 10 predicates, 7 supraordinates, 8 contrasts, 22 miscellaneous and 3 speech-habit. The great departures from this type are in the egocentric direction; and the above finding may be re-stated in terms of a greater fidelity to type among individuals of markedly egocentric reaction tendency. It will be seen that the number of egocentric reactions is not so variable in ORANGE, GREEN and VIII., who represent egocentric types, as it is in BLACK, BROWN, RED, BLUE and VII., who represent concrete types.

The relatively large M.V. of the egocentric category in ORANGE is due largely to three days, on which there was an extraordinary variation from type; the median variation would be 2.6. Larger single variations from type in this category occur among the egocentric subjects than among the concrete; they tend to keep closer to type, but may be thrown farther away from it.

It will be distinctly understood that by an association type is meant the tendency of an individual to preserve a definite associational trend and this only; nothing has been adduced to show whether there are distinct *species* of 'egocentric' 'concrete,' or perhaps of other types. The number of cases is scarcely sufficient for a final determination of whether species exist, but they are not indicated in the examination that it has been possible to make. The question of species is probably to be cleared up, however, by a study to this end of the material gathered by Kent and Rosanoff, *in extenso*.

From actual observation, as well as from what we know of the psychology of the predicate reaction, there should be every reason to expect definite negative correlation between the tendency to give the common responses of the Kent-Rosanoff tables and the tendency towards an egocentric reaction type as given in the number of predicate responses. One can indeed see that 'unusual,' and 'egocentric' reactions are the product of largely the same mental mechanisms. The actual figures of this correlation are:

MEDIAN OF COMMUNITY AND NUMBER OF PREDICATES	
1st exp.....	-.74
2d exp.....	-.74

This material was classified before the conception of the egocentric category had replaced that of the predicate, it was this very classification that indicated the desirability of the 'egocentric' conception. The r 's would be materially higher if the 'egocentric' category had been employed, for it would have included a fairly numerous group almost always summed up in the 'individual' reactions, the proper names.

The figures of the correlation are the empirical measure of the validity of this conception. The object has been to define a category which shall be egocentric in fact as well as in name, and these coefficients plus the considerable margin of proper names, give the extent to which this object has been reached.

The results which appear more significant for further progress with the test may be summarized as follows:

1. The previously reported differences in the association time of various subjects are fairly inherent; that is, a certain range of reaction time seems characteristic of a given individual. A long median reaction time is usually associated with a skew distribution much spread out at the long end. Such an abundance of very long reaction times indicates the presence of special difficulties in responding. These may be of widely differing causations, the determination of which demands further analysis of the record.

2. The number of individual reactions appears hardly suitable for the comparison of single records and the median

value of the 100 reactions is substituted. In the tendency to give common or specialized responses by the Kent-Rosanoff experiment, individual differences are much more clear cut than in the association time. The extreme range of individual difference in single records is about 20 : 1 as against 4 : 1 in the association time. The responses (of the same subject to the same stimulus word) which differ in the two experiments, are in general less than one third as 'usual' responses as those which are the same on each occasion.

3. In this same material of the Kent-Rosanoff experiment, definite fidelity to type appears in the tendencies to give predicate, supraordinate, contrast and 'internal-objective' responses, but not in speech-habit reactions. A relatively greater fidelity to type is found among individuals whose reaction type is further distant from the central tendency of the group.

4. When the number of stimulus words in a chance-selected series is as great as fifty, the results of different series of stimulus words are for practical purposes comparable with each other in respect to the above classification by logical category. A study in eight subjects, through extended series of stimulus words, illustrated in greater detail the distinction between the individual of the *egocentric*, as apart from the individual with the *concrete* association type. Of the eight subjects, two were pronouncedly egocentric, one rather so, and five of the more concrete type.

5. There is, initially, marked negative correlation of the contrast category on the one hand, with the predicate and supraordinate categories on the other. Practise breaks down this correlation for the supraordinates, but preserves it for the mechanism represented by the predicates. Pronounced negative correlation is indicated between the egocentric (resp. predicate) category and the community of response; that is, 'egocentric' responses are seen to be unusual in the Kent-Rosanoff tables, as one would expect.

There is little significant correlation between the usualness of the response and its reaction time, as was also observed by Kent and Rosanoff; it is possible that a more definite, though

rather complex, relationship obtains in this respect between different individuals or groups. The fidelity to association type has also been largely stated in terms of correlation measures, which range between 73 and 86 per cent. positive.

It has thus been attempted to indicate the character of the variation in the principal functions of the association test; the causes of these variations, under what conditions they occur, and their relations to the personality, are to be discussed elsewhere. The present result is that the findings of quantitative study have not contradicted the data of ordinary observation, and give an affirmative answer to the question of association types.