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A Study of the Activity Connotations of Job-Related Verbs

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Prepared for

OFFICE OF NAVAL RESEARCH
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WASHINGTON 25, D.C.

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OCCUPATIONAL RESEARCH CENTER
PURDUE UNIVERSITY
LAFAYETTE, INDIANA

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A STUDY OF THE ACTIVITY CONNOTATIONS
OF JOB-RELATED VERBS

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ABSTRACT

The general purpose of this study was to explore some of the semantic problems in job description. Specifically, an attempt was made to classify verbs used in job descriptions along a continuum of orientation, where the end points were defined as:

- (1) Job-Oriented--those words which characterize what is accomplished in a work activity in terms of job objectives, but do not specifically characterize what the worker is doing.
- (2) Worker-Oriented--those words which characterize what the worker is doing, that is, the human behaviors that are involved in the job.

A sample of approximately 1000 verbs was extracted from over 4000 job definitions of the United States Employment Service. These words were subjected to two sorting procedures to identify those which had some degree of worker orientation associated with them. A total of 300 words were identified in this manner and these were judged along a 7-point scale of orientation. In addition, this scale was constructed in such a manner that subjects could indicate the inapplicability of a word to this type of classification.

Throughout the various phases of the study, it was found that the distinction between "job orientation" and "worker orientation", as applied to verbs relating to human work activities, was one which was differentiated, to a statistically significant degree, by both naive and sophisticated raters. While the reliability of individuals was not high, the pooled judgments of several raters resulted in categorizations which had very substantial reliability.

For many years personnel researchers have been concerned with the problem of developing job analysis techniques which would enable one to obtain highly reliable and valid job descriptions, valid in the sense that they accurately describe all the elements of the job. One of the methods that has been used for this purpose is some type of checklist, in which the analyst indicates all the elements that are present in the job along with supplementary information such as the degree to which these elements exist, or external factors affecting the work situation. Up to this time there has been little investigation of the meanings and connotations of the words that are used to describe the job elements covered in these checklists. This study was conceived as an attempt partially to fill this gap. In particular, it was designed to yield some information about the degree of "job" or "worker" orientation associated with a number of verbs which have been used to describe tasks in a variety of job situations.

Job- and Worker-Oriented Variables

In order to study the interrelationships of jobs across occupations and firms, one would need a system of analysis which would yield information along a common base, applicable to a great number, if not all, job situations. McCormick (1959) suggests that a system based on the description of "worker-oriented elements" may well fit this requirement.

It is conceivable that this concept of orientation falls along a continuum with end points defined in turn as worker- and job-oriented. A worker-oriented element would be one which describes an activity in terms of what actions the worker is performing without reference to the job or product involved. An example of one such element may be the verb "hears." This word alone tells one that the worker is receiving certain auditory stimuli, but gives no information as to the job that he is performing, e.g., piano tuner, radio operator, etc. A job-oriented term might be represented by the verb "labels." In this instance one knows that the worker is attaching some type of identification to an article or idea, but one has no indication of what actions the worker is performing; he may be pasting labels on a box, operating some type of machine, or even dreaming up names for a new toothpaste.

Between these extremes may lie an infinite variety of combinations of these characteristics, i.e., a word may describe what a worker is accomplishing and also give some indication as to what actions he is taking toward this accomplishment. An example of a word which might exhibit both these characteristics would be the word "proofreads." This word tells one that the worker is accomplishing the task of correcting errors in grammar, spelling, punctuation, and structure on some type of written material. However, through familiarity with the task of proofreading, one would also know that the worker reads and writes in performing this task. Thus, the word describes both what the worker does and what he accomplishes.

This study was designed to explore some of the problems of semantics in job description and attempts to apply the concept of orientation to verbs which are commonly used in job descriptions. It was thought that if words with strong worker-oriented connotations could be used in describing job variables, then ambiguity of meaning would be minimized.

Review of the Literature

A review of the literature in psychology reveals only a few studies concerning the meaning of words commonly used in describing work activities; however, there has been considerable activity in the field of quantitative measurement of meaning, and since some of this work is tangentially related to the present investigation, a number of these studies are discussed below.

Pollock (1943) holds that words derive their meaning from their context but are modified considerably by the intent of the user. Thus he warns those responsible for position classification that the words used to describe jobs are not the important determiners of the job content, but rather the duties described by these words. Grady (1948) also touches upon the subject of word usage in job description. In this discussion, the author identifies a class of verbs which he labels "general words" such as "maintains," "checks," and "takes care of." He points out that while a janitor "takes care of a boiler" so may a fireman, and in different ways. The conclusion is that if this type of word or phrase is used to describe a job, the analyst must use further statements to indicate how the work is being performed. The "general words" to which Grady referred probably would tend largely to fall in the "job-oriented" category of the current study, whereas the words which describe how a job is performed would tend to be those which are more worker-oriented.

A study conducted by Mosier (1941) tested the hypothesis that word meanings were composed of two parts, namely that which remains constant from person to person and context to context, and that which varies between individuals and contexts. The results of that study indicated that the "meaning of a word may be considered as if it consisted of two parts, one constant and representative of the usual meaning of the word, and one variable, representative of individual interpretations in usage and associated context and general usage..." (Mosier, 1941, p. 139).

An objective method of measuring word meanings labeled the Semantic-Differential has been presented by Osgood (1952) and expanded by Osgood, Tannenbaum, and Suci (1957). In an effort to determine the dimensionality of the semantic space, the above authors (Osgood et al., 1957) had 76 scales judged on 20 concepts. A factor analysis of these data led to the description of seven factors associated with the semantic space. The authors identified these factors as: I Evaluative, II Potency, III Oriented Activity, IV Stability, V Tautness, VI Novelty, VII Receptivity, and VIII Aggressiveness. They conclude from their experiences with this and other factor analytical studies that semantic space is clearly multidimensional and these dimensions are not equally important in affecting judgments; on the contrary, their work has shown that evaluative, potency, and activity factors seem to be much more dominant than the others.

In the study just cited an attempt was made to sample the domain of meaning by selecting the scales from a sample of adjectives in Roget's Thesaurus. Triandis (1960) limited both the scales and the concepts to a specific domain, namely jobs. The results of that study showed that the factorial structure differed considerably when the domain of meaning was limited. Also, two groups which were expected to perceive the particular domain differentially tended to evidence different semantic structures.

Ammerman (1958) employed the semantic differential in an effort to determine what effect the context in which a word was used had upon its meaning. Although this author did not investigate the factorial structure of the judgments obtained, the results tend to support the work reported by Triandis (1960) insofar as it was concluded that the scaling of a concept differed across contexts.

The studies cited above tend to demonstrate that word meanings are determined in a highly complex manner. There is a suggestion that at least part of the meaning of a word remains constant across individuals and situations, but

it has also been demonstrated that word meanings are in a large part situational. Even in terms of the factorial structure of meaning, if the domain of concepts is limited, this structure may also evidence changes.

In light of these studies, it would seem that much greater clarity would be achieved in job description, if the words used were as consistent as possible in meaning across different individuals. Thus, it was the purpose of this study to determine whether a number of verbs could be identified which people would consistently perceive as describing a specific worker action or set of actions.

PRELIMINARY INVESTIGATIONS

In an attempt to obtain a fairly inclusive array of verbs that might be used to describe job activities, a list was compiled of all verbs which had been used by the U. S. Employment Service (1954) in describing a sample of 4000 jobs plus additional verbs found in sampling a number of job descriptions. The sample of approximately 1000 words obtained in this manner was considered sufficiently inclusive for the present purposes.

First Sorting

Since the ultimate goal of this study was to identify those words which might be thought of as having strong worker-oriented connotations, the first step was to eliminate from further consideration those words which are perceived as "purely" job-oriented. To accomplish this aim, four judges were selected who had some familiarity with the concept of orientation as used in this study and/or had considerable experience in the field of job analysis. The entire list of 1000 words was divided into seven pages and each judge rated the words on either three or four pages. The pages were arranged in such a manner that each judge rated at least one page in common with every other judge, and each word was rated by two judges. The task for each judge at this point was to divide his list into two categories. One category ("job oriented") included those words which he considered to be strictly job-oriented and the other category ("other") included all those words which had some degree of worker orientation associated with them. The per cents of agreement between pairs of judges ranged from 47 to 58, except for one pair (judges 2 and 4) in which the agreement was 75 per cent. The overall agreement of 54 per cent was found to be statistically greater than chance at the .01 level of confidence, when subjected to a chi-square test.

It should be noted here that both judges 2 and 4 had considerable familiarity with the concepts of orientation as defined in the instructions, whereas the other two judges had little experience with these concepts beyond the instructions with which they were provided. The results indicate that judges 2 and 4 were operating under a much more similar frame of reference than were judges 1 and 3. Inspection of the number of words checked as job-oriented by each judge shows that judges 2 and 4 were much more lenient in placing words in this category than were judges 1 and 3. A post-test interview with the latter two judges revealed that when they were in doubt, they would consistently place the word in the "other" category, rather than check it as definitely job-oriented. Thus, at least with these two judges, if there is a large amount of error in judgment, it is most probably toward the direction of underchecking the job-oriented category. Considering these factors, it was felt that there was a good reason to believe that those words which both judges had checked as job-oriented did, indeed belong in that category.

Thus, the total of 316 words which were checked as job-oriented by two judges were eliminated from further consideration in this study. As one further precaution, this list was screened by one of the present writers for those words which might have some potential usefulness in the study. This screening produced only one word which was retained for further study, bringing the list of those eliminated to 315 words.

Since it was felt that the remaining list of over 600 words still included many words which could be considered as strictly job-oriented, it was decided to apply somewhat the same procedure to those words which the previous judges

had disagreed upon, setting aside for future consideration those words which two judges had considered as other than job-oriented. It was hoped that if the definitions of the various categories could be clarified, giving the judges more of a structured frame of reference, then a greater degree of agreement could be reached between judges.

Second Sorting

In all, the judges in the previous situation had disagreed on the categorization of 439 words. As a further screening, these words were then put through much the same procedure as before, the object being, again, to eliminate those words which were generally considered to be job-oriented. Six judges were employed, and the words were distributed in such a manner that each was rated by a total of four judges. Each of these judges was a graduate student in Industrial Psychology or Industrial Relations, and had some experience in job analysis.

In this situation the instructions had been expanded from those used on the previous sorting and examples were included for each category. The judges were instructed to place a check next to each word which they considered to be job-oriented, without differentiating between the other categories.

The average agreement between any two judges was found to be 61 per cent,¹ with the total number of agreements being 1597 and the total number of disagreements 1037. These data were subjected to a chi-square test with the hypothesis that the judges had randomly categorized the words. This hypothesis was rejected at the .001 level of confidence, leading to the conclusion that the judgments were not made randomly, but according to some systematic basis. Although, in view of the large number of judgments involved, even minute differences might have achieved statistical significance, it is felt that the absolute difference of 560 more agreements than disagreements is sufficient to infer that the task was a meaningful one to the individuals performing it. The results in terms of the number of times each word was judged as being job-oriented are presented in Table 1.

Table 1
Distribution of Words on the Second Sorting
by Number of Job-Oriented Judgments

Number of Job-Oriented	
Judgments Per Word	Number of Words
0	16
1	63
2	108
3	137
4	115
Total	439

1. The per cents of agreement between the various pairs of judges were: 47, 50, 53, 54, 55, 59, 61, 65, 65, 67, 67, 68, 68, and 81.

Table 1 shows that of the total of 439 words, only 16 were considered as being other than job-oriented by all four judges (no job-oriented judgments), whereas 115 words were considered to be job-oriented by all four judges (four job-oriented judgments). A chi-square test shows that the probability of the observed frequencies occurring by chance is less than .001.

Since any word could be judged as job-oriented by any number of judges from 0 to 4, the per cent of judges considering a word to be job-oriented could be either 0, 25, 50, 75 or 100. As the objective of this procedure was to eliminate those words which were "generally" judged to be job-oriented, the restricted range of possible judgments left the choice of an operational definition of "generally" at 50, 75, or 100 per cent. In view of the fact that the agreement between judges was well below unity, it was considered unrealistic to set this standard at 100 per cent. The decision was made to first eliminate those words which had been checked as being job-oriented by at least three judges. Inspection of Table 1 shows that a total of 252 words fell into this category.

At the other extreme, a total of 79 words were considered by at least three judges to be other than job-oriented. This left 108 words which, through the two sortings, a total of three judges had considered to be job-oriented and three had considered to be other than job-oriented. With the ultimate goal in mind of identifying those words which are stable in their worker orientation, it was felt that these words had already elicited enough confusion in reference to their orientation so as to make their future usefulness highly doubtful. Thus it was decided to eliminate these words from further consideration, but only after screening by one of the present writers in order to maintain those which, in his judgment, might have any potential utility in the study. Twenty-seven of these words were so selected, leaving a total of 300 words which were retained for further consideration.

Investigation of Concepts Related to Orientation

Since there had been a considerable amount of disagreement between judges thus far, the hypothesis was advanced that perhaps "orientation" could be described by another, more familiar concept, and if this were true, perhaps that other concept would elicit less disagreement.

To submit this suggestion to empirical investigation, the concepts of "complexity" and "descriptiveness" were advanced as possible alternatives to "orientation." It is conceivable that those words which describe very specific actions would be describing those details of what the person is doing and would therefore be classified as worker-oriented. Conversely, those words which describe very complex actions may necessarily describe a significant part of a job, and would therefore be classified as job-oriented. Thus if a word were classified according to its complexity, this classification might also reflect the word's orientation.

It was also felt that orientation might be expressed in terms of descriptiveness. If a word were highly descriptive of a worker action it would, by definition, be classified as worker-oriented. It was further hypothesized that as words became less descriptive of worker actions, they would tend toward job orientation, until at the end of the continuum, those words which are not at all descriptive of worker actions would be "strictly" job-oriented.

Two hypotheses were advanced at this time. The first was that the concepts of "complexity" and "descriptiveness" as outlined above are much the same as "orientation," and that separate scalings of a list of words on these three concepts would yield correlations approaching unity. The second hypothesis stated that because of the greater general familiarity of the former concepts,

there would be much less variability between judges on these scales as opposed to the orientation scale.

Description of the Scales

Three scales were constructed to measure words according to their orientation, descriptiveness, and complexity. Orientation of verbs was measured along a three point scale on which each point was defined. The three categories were defined in the instructions and examples of words falling into each category were provided the raters (appendix A). Descriptiveness of verbs was measured along a five point scale, where only the end points were defined. The raters were instructed to rate each word according to how well the word described what the worker was doing. An example of these instructions is presented in appendix B. Complexity of verbs was measured along a 5 point scale, where again, only the end points were defined (appendix C).

It should be noted that these latter two scales were less structured than the first, and the instructions less restrictive. It was felt that the concepts involved in the complexity and descriptiveness scales would not be new or unusual to the raters, so that only the continua would need to be described without describing specific points along them. In the case of the orientation scale, it was felt that these same assumptions would not be valid, and therefore it contained only those points which could be described with sufficient clarity. It was assumed that positions between these points could be determined by the relative proportions of judgments for a word in two adjacent categories.

Pretesting of the Scales

Prior to the administration of these scales, the orientation scale was pretested for the purposes of obtaining some indication of how many judges would be required to obtain sufficiently reliable scalings. It was decided on the basis of this pretest that a minimum of 20 judges would be used on each scale, with additional judges being included if available.

Subjects

The subjects used in the comparison of the three scales were 69 upper level undergraduate and first year graduate students enrolled in three sections of a dual-level course in industrial psychology. Since two classes consisted predominantly of graduate students while the third consisted of mainly undergraduates, an equal number of the three scales were distributed in each class. Each of the three classes had received instruction in scaling procedures and in job analysis and it was felt that the entire sample would be somewhat sophisticated in the type of task that was presented to them. To allow for maximum consistency between the testing situations in the three classes, no instructions were given beyond those printed instructions contained on the cover sheets of the three scales.

Seven judges were dropped because of obvious failure to follow the instructions. The total number of subjects appearing in the subsequent analysis was 20 on the orientation scale, 21 on the descriptiveness scale, and 21 on the complexity scale.

Results

In order to determine the degree of descriptiveness, complexity, and orientation reflected by each word, median values were computed from the distribution of judgments for each of these words on all three scales. Since the distribution of judgments was expectedly skewed for most words, the median would be a more representative measure of central tendency than would be the mean. Using these median values, product-moment correlations were computed between each pair of the three scales; the results obtained are reported in Table 2.

Table 2

Product-Moment Correlations Between the Median Values
on the Orientation, Complexity, and Descriptiveness Scales

N = 60

Scale	Scale	
	Complexity	Descriptiveness
Orientation	.464	-.095
Complexity		.088

It can be seen from Table 2 that the descriptiveness scale is not related to either the orientation or complexity scales, the correlations being essentially zero. The one correlation that achieves significance at the .01 level of confidence is that between the orientation and complexity scales. However, it had been hypothesized that these scales would be measuring the same dimensions and that the correlations would therefore be close to unity. If the correction for attenuation is applied to correct for unreliability in both scales, the resulting correlation is still only .58. Thus, the hypothesis was not confirmed, and, for operational purposes neither the complexity nor the descriptiveness scales could be substituted for the orientation scale.

Reliabilities were also computed for the three scales using the analysis of variance technique. The results of the computations are presented in Table 3.

It can be seen that the reliability for one rater is extremely low, with only the reliability on the descriptiveness scale barely achieving significance at the .05 level of confidence. However, when the ratings of all raters are considered, the overall values assigned the various words are much more stable, and the reliabilities are all .80 or above. As explained previously, this reliability estimate is a measure of internal consistency of the scale, and represents the theoretical correlation between the results obtained with the k observed raters and those which would be obtained with k other raters of equal rating ability.

There is some evidence available to indicate that these correlations are those that would actually be obtained if submitted to empirical observation. Such evidence came from the pretesting of the orientation scale, in which ten raters rated 30 words in common with one another. Twenty-nine of these words were included in the list of 60 words which comprised the three scales discussed

above. Thus data are available for a list of 29 words which were rated on a scale of orientation by two independent samples of 10 and 20 raters respectively. Median values were computed for these words for each sample of raters and the resulting sets of scores correlated by the product-moment method. The resulting correlation between these two samples was .77 indicating that the r_{20} value of .81 for the orientation scale would be a fairly accurate estimate of the reliability of the mean ratings for 20 raters, since one of the samples in this case consisted of only 10 raters.

Table 3
Reliability of Ratings for a Single Rater
and for k Raters on the Three Scales

Scale	$\bar{r}_{11}^*$	r_{kk}^{**}	k^+
Orientation	.174	.809	20
Complexity	.172	.813	21
Descriptiveness	.269	.885	21

* $\bar{r}_{11}$ = reliability for a single rater.

** r_{kk} = reliability of the mean ratings for k raters.

+ k = number of raters.

The hypothesis that the concepts of descriptiveness and complexity could be scaled more reliably than that of orientation is partially borne out by the data. The judges achieved a higher degree of reliability on the descriptiveness scale than they did on either of the other scales. However, since it had already been observed that neither descriptiveness nor complexity could be substituted for orientation, the somewhat greater reliability of the descriptiveness scale becomes meaningless in terms of the objectives of the study.

For each word which was scaled according to its orientation, the frequency distribution of judgments, median value, quartile deviation, and rank were determined. These results are presented in Table 4. Also included in this table is a column headed "significant at the .05 level." To obtain this measure, the distributions of judgments on each word were submitted to a chi-square test against a chance frequency distribution. Those words which are checked in this column elicited a distribution of judgments which was significantly different from chance at the .05 level of confidence. It should be noted that a word could receive as many as 11 out of the 20 judgments in one category and still not achieve significance at this level. This measure serves as an indicator of the skewness of judgments around each word. In all, the rating distributions for 28 out of the 60 words were significant in this manner, demonstrating considerable skewness in the distributions and further indicating that the raters were responding to a meaningful stimulus and not merely categorizing the words randomly.

From the median values in Table 4 one finds that those words which were rated as being the most extremely worker-oriented deal with individual sensory and motor processes such as feels, grasps, touches, and sees. It is logical

Table 4
List of 60 Words on the Orientation Scale Indicating
the Distribution of Judgments, Median Value,
Quartile Deviation, Rank, and Significance
of Each Word

Word	Category ²			Median	Q Value	Rank	Sig. at .05 Level
	1	2	3				
1. plucks	4	8	8	2.25	.63	41	
2. overhauls	13	4	3	1.27	.56	3.5	x
3. bandages	2	14	4	2.07	.36	36.5	x
4. staples	3	7	10	2.50	.61	49	
5. massages	6	9	5	1.95	.585	29.5	
6. inks	11	7	2	1.41	.56	9.5	x
7. stretches	6	5	9	2.30	.805	45	
8. sees	3	1	16	2.88	.315	58	x
9. proofreads	5	11	4	1.95	.455	29.5	
10. typewrites	6	8	6	2.00	.67	32.5	
11. operates	10	4	6	1.50	.835	14.5	
12. sweeps	3	9	8	2.28	.58	43.5	
13. rubs	6	2	12	2.67	.875	54	x
14. feels	1	1	18	2.94	.275	60	x
15. refinishes	15	2	3	1.17	.345	1	x
16. prices	11	8	1	1.41	.525	9.5	x
17. carves	6	8	6	2.00	.67	32.5	
18. brushes	4	10	6	2.10	.535	38	
19. paints	6	7	7	2.07	.73	36.5	
20. brakes	9	5	6	1.70	.805	21	
21. shoves	7	3	10	2.50	.895	49	
22. scans	1	4	15	2.83	.335	56	x
23. lectures	2	7	11	2.59	.555	52.5	x
24. shovels	3	9	8	2.28	.58	43.5	
25. dairns	3	14	3	2.00	.36	32.5	x
26. heats	13	4	3	1.27	.56	3.5	x
27. labels	10	6	4	1.50	.665	14.5	
28. skins	9	8	3	1.63	.595	19	
29. greets	1	9	10	2.50	.53	49	x
30. hemstitches	5	12	3	1.92	.415	28	x
31. butchers	7	11	2	1.77	.51	23	x
32. excavates	10	9	1	1.50	.53	14.5	x

(Table continued on next page)

2. The category headings were:
1. Job-Oriented
 2. Worker-Oriented by inference
 3. Worker-Oriented

Table 4 (continued)

List of 60 Words on the Orientation Scale Indicating
the Distribution of Judgments, Median Value
Quartile Deviation, Rank, and Significance
of Each Word

Word	Category			Median	Q Value	Rank	Sig. at .05 Level
	1	2	3				
33. experiments	12	4	4	1.33	.665	5.5	x
34. touches	1	3	16	2.88	.315	58	x
35. trains	12	6	2	1.33	.54	5.5	x
36. cultivates	11	7	2	1.41	.56	9.5	x
37. deodorizes	9	7	4	1.64	.65	20	
38. fertilizes	9	10	1	1.60	.52	17.5	x
39. rakes	4	8	8	2.25	.63	41	
40. writes	5	5	10	2.50	.75	49	
41. telephones	3	10	7	2.20	.545	39	
42. grinds	7	6	7	2.00	.79	32.5	
43. rivets	7	4	9	2.25	.865	41	
44. sculptures	6	10	4	1.90	.535	26	
45. kneads	3	6	11	2.59	.605	52.5	
46. sings	1	9	10	2.50	.53	49	x
47. dances	3	8	9	2.38	.595	46	
48. unloads	11	6	3	1.41	.61	9.5	
49. tailors	6	10	4	1.90	.535	26	
50. asks	1	6	13	2.73	.475	55	x
51. merchandises	14	3	3	1.21	.485	2	x
52. liquifies	11	4	5	1.41	.775	9.5	
53. disassembles	11	4	5	1.41	.775	9.5	
54. mixes	10	6	4	1.50	.665	14.5	
55. chops	8	5	7	1.90	.835	26	
56. photographs	8	9	3	1.72	.58	22	
57. grasps	4	0	16	2.88	.315	58	x
58. pilots	9	10	1	1.60	.52	17.5	x
59. hoses	3	13	4	2.04	.385	35	x
60. manicures	5	13	2	1.88	.385	24	x

that these words that describe specific motor and sensory activities of the individual are those which are most associated with what the worker does.

Words falling at the other end of the scale are descriptive of jobs in terms of their products or services, such as refinishes, merchandises, heats, and overhauls. Only by defining the product or the procedures involved in the job could one identify the worker's actions. Words ranked near the middle of the scale imply both product or service, and actions, such as darns, proofreads, and typewrites. Thus the judges were able to apply the concept of orientation to these words, and the resulting categorizations show decided indications of a definite underlying logic.

A further word may be interjected about the problems of individual reliability encountered thus far. Although the reliability of a single judge on the orientation scale was only .17, there are indications that perhaps greater familiarity

with these concepts would enable one to scale the words more reliably. The first indication of this possibility was that on the first sorting, the two judges who were relatively sophisticated in this task achieved a considerably higher degree of agreement than did the other two judges when the latter were compared with each other or with either of the former. This degree of agreement is some indication of the reliability of these judges in terms of the internal consistency of the judgments. Whereas this evidence is by no means conclusive, there is a further indication that the categorizations made by one of the present authors are highly correlated with those made by a number of relatively inexperienced raters. It has been mentioned that when the three scales were constructed, an effort was made to distribute the words fairly evenly across the orientation scale. For this purpose, 22 of the 60 words were selected by this author as being job-oriented, 20 as being worker-oriented by inference, and 18 as being worker-oriented. Using the formula developed by Jaspen (1946; 1952) the triserial correlation between the original categorizations and the median values assigned by 20 judges was found to be .88.

Thus, at least in these two instances, those individuals who had a considerable amount of familiarity with the concept of orientation, evidenced a tendency to categorize words in substantial agreement with other's categorizations. This factor could lead to the hypothesis that experience would enable individuals to apply the concept of orientation to the study of work activities with a high degree of consistency. However, this study was not designed to test this hypothesis, and at this point one can only speculate as to its validity.

FINAL SCALING

In order to categorize the list of 300 words mentioned previously, a scale was employed which was an extension of the 3-point scale of orientation. This scale consisted of six categories which were, in effect, further breakdowns of the three points on the previous scale. In addition a seventh category labeled "ambiguous words" was provided in an attempt to determine whether there were certain words which were perceived as lying outside of this "orientation" continuum. The seven categories as presented on this scale are listed in Table 5.

Table 5

Description of Categories on the 7-Point Scale

-
1. Describes a specific human behavior in sensory, perceptual, mental, or motor terms, such as: feels, sees, thinks.
 2. Describes a set of very unique human behaviors in sensory, perceptual, mental, or motor terms, such as: computes, hammers, lathers.
- The following three categories describe an essentially job-oriented activity but imply or infer the human behaviors involved:
3. Has one job activity meaning, such as: darns, manicures, bandages.
 4. Has a limited number of job activity meanings, such as: files, sharpens, sandpapers.
 5. Has several or many job activity meanings, such as: agitates, inserts, immerses.
 6. Job-Oriented (does not imply or infer human behavior) such as: refinishes, merchandises, heats.
 7. Ambiguous (has no particularly clear worker or job meaning) such as: directs, follows, initiates.
-

In an unpublished pilot study (Larsen, 1961), this scale was administered to 20 students enrolled in a basic course in psychology. The average reliability for one rater in this situation was found to be .29 while the reliability for 20 raters was .89.

It has been stated that the points on the 3-point scale represented what was thought to be the two extremes and the midpoint of the scale. On the larger

scale, the three categories are divided into unequal numbers of sub-categories. Therefore there is no basis for assuming equal distance between points on this scale, and the judgments obtained would be related, but not necessarily equivalent, to those on the 3-point scale. Also, there is no justification for placing the "ambiguous" category in the seventh position since, by definition, this category applied to words which were perceived as lying completely outside this continuum. Thus, in order to equate the scales in terms of construction, responses on the 7-point scale must be combined in the following manner:

1. Re-evaluate responses of 1 or 2 as 3.
2. Re-evaluate responses of 3 as 2.
3. Re-evaluate responses of 4, 5, and 6 as 1.
4. Eliminate responses of 7.

To determine the relationship of the full 7-point scale to the 3-point scale, median values of the judgments in all seven categories were computed from the 20 judges described above, and these were correlated with the medians obtained previously on the 3-point scale. The resulting correlation was $-.66$, indicating a substantial relationship between the two scales. It should be noted that this coefficient is negative since the scale positions are essentially reversed on the two scales. This correlation, though substantial, does not indicate equivalence of the two scales. When the correction for attenuation is applied to both scales, the resulting correlation is $.78$.

In order to determine whether the values yielded by the 7-point scale, when the categories are combined in the manner cited above, would be essentially equivalent to those obtained by the 3-point scale, the responses on the larger scale were re-evaluated in this manner and median values were computed for each word. These values were correlated with the values obtained in the previous scaling and the resulting coefficient was $.78$. This correlation is within the limits of the standard error of $.04$ for the $.81$ reliability of the 3-point scale. There is no precise estimate available of the reliability of the larger scale when combined in this manner, but applying a correction for attenuation to the 3-point scale resulted in a correlation of $.87$. This value indicates that the two scales approach equivalence, particularly since the unreliability in the modified 7-point scale remains uncorrected.

As these scales have been demonstrated to be essentially equivalent when the categories on the larger scale are combined, it was decided to employ this scale for the final analysis of the remaining 300 words. This was deemed advisable as the larger scale offers more precise information about the character of the words being scaled; in addition there has been a tendency noted to obtain greater consistency of judgments with this scale.

Two forms were constructed employing the 7-point scale, each form presenting 150 of the 300 words to be scaled. These were distributed to the students in three classes, one a dual-level course in job analysis and the other two undergraduate courses in personnel psychology. An equal number of forms were distributed in each class, to avoid the possibility of differences between classes being confounded with forms. Each student was instructed to complete the form at his own convenience and was requested to return the form at the next meeting of the class. A total of 60 forms were returned, but because of the volume of judgments involved it was decided to randomly choose 24 of each form for the purpose of analysis. In view of the previous results, it was felt that 24 raters would yield a sufficiently high reliability.

The complete list of words, together with their crude median and a "V" measure are presented in Appendix D. The "V" measure is an approximation of Q, the semi-interquartile range, and is thus a measure of the variability of judgments. This "V" measure is described in a study by Peters (1961) and in that study this measure was found to reasonably approximate Q for judgments on job and task information. As is the case with Q, the larger the value of V, the greater the variability of judgments. In computing the median and V, the

responses in the seventh category were omitted since, as mentioned previously, the placement of this category in the seventh position is artificial and, by definition, it was to include those words which were perceived as lying outside the orientation continuum. Thus the median is the midpoint of the distribution of judgments between categories 1 and 6.

Of the 300 words, a median was not computed for 15, since the distributions for these words were bimodal and any measure of central tendency would present a distorted view. Of the remaining words, the median values of 146 were three or below. This indicates that out of the entire list only these words can be thought of as describing or inferring a specific worker action or set of actions. Since approximately 700 words had been eliminated earlier as not describing or inferring worker actions, the percentage of words at this end of the scale is indeed small. In addition the distribution of judgments for many of these 146 words is wide, indicating that they do not have highly consistent connotations to different individuals.

It should be noted that a number of words which evidenced a preponderance of judgments in categories 1 and 2 (worker-oriented) also had a great many judgments in category 7. A number of these words, together with the frequency distributions of judgments, are presented in Table 6. It can be seen that the activities described by words receiving this type of distribution generally fall into three categories: communicative, analytical, and judgmental. Thus in a number of cases, where the word described a "mental" activity, a number of judges perceived this as being worker-oriented while a number of others perceived it as being inapplicable to this type of classification. This occurred even though categories 1 and 2 were defined as including "sensory, perceptual, mental, or motor terms."

Table 6
Words Exhibiting Bimodal Distributions Between
Categories 1 & 2 and Category 7

Number	Word	Category ³						
		1	2	3	4	5	6	7
4	announces	7	9	1	0	0	1	6
5	awakens	14	0	1	1	0	1	7
30	defines	5	2	0	0	0	2	14
36	decides	11	2	0	0	1	0	10
39	explains	4	3	0	0	2	1	13
47	imagines	13	4	0	0	0	0	6
70	questions	5	3	1	0	1	1	13
108	recapitulates	4	8	0	0	1	1	10
109	refuses	3	5	0	0	1	1	14
114	answers	4	7	0	2	2	1	8
119	cautions	3	4	0	0	2	2	13
127	disapproves	5	6	0	0	1	1	11
154	asks	11	1	0	0	1	0	11
176	criticizes	5	6	0	1	0	0	12
177	consults	4	7	0	1	1	0	11
180	depicts	7	4	0	0	2	0	11
181	determines	9	2	0	0	1	1	11
188	endeavors	4	3	0	0	1	0	15
190	greet	5	6	1	1	0	0	11
199	interprets	10	4	1	0	2	1	6
201	judges	13	3	1	0	1	0	6
205	listens	16	2	0	0	0	0	6
220	quotes	3	8	1	1	0	0	10
225	recommends	2	7	0	1	0	1	12
226	replies	7	6	0	0	2	0	8
249	advises	5	5	0	1	0	0	13
250	assures	3	3	0	1	0	0	17
251	condemns	4	4	1	1	1	0	12
265	ascertains	6	3	0	1	1	3	10
274	describes	3	5	0	1	2	0	13
288	scrutinizes	9	3	1	0	0	1	10

3. See table 5 for category headings.

DISCUSSION AND CONCLUSIONS

This study was designed to investigate some of the semantic problems in job description. In particular, an attempt was made to differentiate verbs along an orientation continuum, where the end points were defined as: descriptive of worker actions and descriptive of job accomplishments.

The first problem which becomes evident in attempting to categorize verbs according to an underlying concept of orientation is that of reliability of judgments. In this study, the reliabilities of individual judgments were quite low, except in a few isolated cases. As mentioned previously, there is some evidence that this reliability may improve with experience. However, this reliability problem is not surprising in light of some of the studies cited earlier. It will be remembered that Mosier (1941) concluded that word meanings were composed of two parts: those which are constant across situations and contexts and those which vary from person to person and context to context. Other cited authors (Ammerman, 1958; Triandis, 1960) reported similar observations. Since this study attempted to distinguish those words which are perceived consistently across both individuals and contexts, no effort was made to define the context beyond the fact that the verbs were all related in some manner to the domain of jobs. This general approach designedly allowed for the greatest variability in perception.

It was demonstrated that the problems associated with variability in judgments can be at least partially overcome by the use of a number of raters. With this approach it has been possible to identify both the approximate orientation of a given word and also the amount of disagreement among judges generated by that word.

In comparing the results of the scalings on the concepts of orientation, descriptiveness and complexity, it was found that the first two were essentially unrelated. Since the instructions on the descriptiveness scale indicated that the words were to be rated on how well they described worker actions it was thought that this scale would, by definition, be equivalent to the orientation scale. In view of the results it is plausible that the term worker actions was interpreted as work actions and thus the word was judged in terms of how well it described what was occurring, whether in terms of an individual activity or an accomplishment.

In the same portion of the study, it was found that there was a moderate relationship between orientation and complexity. Thus the orientation of a word can be identified in part by the complexity of the activity involved. However, this is only one aspect of orientation and certainly not the sole determiner, just as the work of Osgood and his associates (1957) has shown that the "evaluation" of a word accounts for part, but not all, of its meaning.

Throughout the various phases of the study it was found that the distinction between "job orientation" and "worker orientation," as applied to verbs relating to human work activities, was one which was differentiated, to a statistically significant degree, by both naive and sophisticated raters. While the reliability of individuals was not high (although significant), the pooled judgments of several raters resulted in categorizations which had very substantial reliability.

Considering the total original groups of 1000 verbs, about 15 per cent were judged by the raters to be predominantly descriptive of worker-oriented activities, or to infer such activities. Such verbs, by themselves, presumably could be used to characterize worker-oriented activities without further qualification or modification.

While not specifically investigated in this study, it seems reasonable to

believe that many strictly job-oriented verbs, with appropriate modifiers and objects, undoubtedly also could be used to characterize worker-oriented activities, but more by inference than by description. In general, it would seem that such inferences could be made to the extent that the reader has some knowledge about the technology of the activity in question, which, with appropriate modifiers and objects, would then take on substantive meaning in terms of more strictly human behaviors.

Actually, the semantic line between worker orientation and job orientation is not entirely distinct. None-the-less, there seems to be enough of a line between these orientations to capitalize upon such distinctions when it seems appropriate to do so in describing human work.

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Appendix A

INSTRUCTIONS FOR ORIENTATION SCALE

The following is a list of verbs extracted from a large sample of job descriptions. It is envisioned that these words fall into three general categories, job oriented, worker oriented by inference and worker oriented.

1. Those words which tell what is accomplished, but do not necessarily tell what the worker is doing. For example, the word constructs tells you that something is being built, but it does not tell you how. The worker may be operating a machine or using a hammer. Another example in this category are those words which have two entirely different meanings, depending on their context. Thus, driving an automobile and driving workers to produce more have two entirely different meanings, and can only be understood when they are presented in their job context. Words that fall in this category will be called JOB-ORIENTED.
2. Those verbs which tell what the worker is accomplishing, but through familiarity with the word, one has a well-defined notion of what the worker is doing to accomplish the task. An example of this type might be the word inoculates. This word tells us that the worker is giving a serum to a patient to protect that person from disease. However, through familiarity with that word, we know that the process of inoculation entails certain definite operations such as drawing serum into a syringe, piercing the patient's skin with a needle, ejecting the serum, etc. These words will be called WORKER-ORIENTED BY INFERENCE.
3. Those verbs which tell what the worker is doing. An example of this type would be the word smells. This indicates that the worker is inhaling odors through the nostrils. Notice that this word does not necessarily indicate what the worker is accomplishing, i.e. he may be testing for noxious gasses or classifying wines. These words will be called WORKER-ORIENTED.

Your task here is to review the following list of verbs and circle number 1 if you feel the word is JOB-ORIENTED, number 2 if you feel the word is WORKER-ORIENTED BY INFERENCE, and number 3 if the word is WORKER-ORIENTED. You should keep in mind that all of these verbs have some connection with work, and should be thought of only in this context.

Appendix B

INSTRUCTIONS FOR DESCRIPTIVENESS SCALE

The following list of verbs has been extracted from a large sample of job descriptions. It is felt that these words have various degrees of descriptiveness associated with them. Some describe exactly what the worker is doing, others give a somewhat hazy description of what he is doing while still others don't give any picture at all of what he is doing. Your task here will be to rate each of the words along a 5 point scale of descriptiveness. Thus if the word is highly descriptive of a worker action circle number 1. Numbers 2, 3 and 4 represent the ascending degrees of descriptiveness between these extremes.

Appendix C

INSTRUCTIONS FOR COMPLEXITY SCALE

The following list of verbs has been extracted from a large sample of job descriptions. Some of these verbs describe work processes that are highly specific, that is they are very restricted in scope. An example of this would be the word smells. Others are highly complex in nature requiring the integration of various functions. An example of this might be the word diagnoses. Your task here is to rate these words on a 5 point scale of specificity - complexity. Thus if a word describes a highly complex action circle number 1, whereas if it describes a highly specific action circle number 5. Numbers 2, 3 and 4 represent the ascending degrees of specificity.

Appendix D

Table 7

List of 300 Words Indicating Their Crude Median, and V Measure

Word	Median	V	Word	Median	V
1* agitates	5	0	37. embalms	3	1
2. anneals	5	2	38. etches	3	1
3. audits	4	4	39. explains	2	4
4. announces	2	1	40* follows	**	**
5. awakens	1	0	41. grubs	4	1
6. bakes	3.5	2	42. grasps	2	1
7* bandages	3	0	43. herds	4	2
8. bathes	4	2	44. hires	3	4
9. bevels	4	3	45. hoses	4	1
10. blues	5	2	46. handles	**	**
11. braids	3	1	47. imagines	1	1
12. broaches	4	0	48. informs	**	**
13. bucks	3	3	49. inquires	**	**
14. butchers	3	1	50. interviews	3.5	4
15. calks	4	1	51. itemizes	4	2
16. candles	3	1	52. kneads	3	0
17. carves	3	2	53. knots	3	1
18. castrates	3	0	54. ladles	4	1
19. certifies	4.5	4	55. lines	4	2
20. churns	4	2	56. lists	4.5	3
21. cleaves	4	2	57. looks	1	0
22. clubs	3	3	58. massages	3	1
23. codes	4	3	59. mortises	3	3
24. combs	3.5	1	60. marcel	3	1
25. cooks	4	2	61. navigates	4	2
26. creates	**	**	62. pans	4	3
27. compiles	**	**	63. photographs	3	3
28. corresponds	4	3	64. pitchforks	3	1
29* darns	3	0	65. poses	4	3
30. defines	1	**	66. prunes	4	1
31. designs	4	3	67. pulpifies	5	2
32. diagnoses	3.5	4	68. pushes	2	2
33* directs	**	**	69. putties	3	2
34. drags	4	2	70. questions	2	2
35. drops	3	3	71. rakes	3	1
36. decides	1	0	72. receives	5	1

*These words were included as examples in the instructions.

**These values are omitted as they would present a distorted view as a result of the unusual distribution of judgments.

(Table continued on next page)

Table 7 (continued)

List of 300 Words Indicating Their Crude Median and V Measure

Word	Median	V	Word	Median	V
73. rehearses	4	4	114. answers	2	3
74. rents	6	2	115. approves	**	**
75. requisitions	5	3	116. boils	4.5	3
76. refers	**	**	117. buffs	4	1
77. sandblasts	3	1	118. buys	4	3
78. selects	2	3	119. cautions	2	**
79. serges	4	2	120. chops	3	2
80. shoes	4	1	121. corrodes	6	2
81. shoves	2	1	122. crimps	4	2
82. sketches	3	2	123. curdles	6	1
83. smells	1	0	124. dehydrogenates	6	2
84. spears	3	2	125. dilutes	4.5	1
85. stamps	4	2	126. dots	3	2
86. stays	2	0	127. disapproves	2	1
87. strides	2	1	128. electroplates	**	**
88. styles	5	4	129. embroiders	3	1
89. sweats	1	0	130. engraves	3	1
90. sees	1	0	131. files	4	0
91. signs	2	1	132. fries	4	2
92. strops	4	1	133. hemstitches	3	0
93. tastes	1	0	134. immerses	5	0
94. translates	3	3	135. knits	3	0
95. trowels	4	1	136. miters	3	1
96. tufts	4	1	137. rivets	3	1
97. telephones	3	2	138. scarfs	3	3
98. ushers	4	2	139. sculptures	3	2
99. writes	2	2	140. shells	4	2
100. assigns	3	4	141. sieves	4	2
101. crops	4	2	142. skins	4	1
102. demonstrates	4	3	143. solders	4	1
103. examines	2	3	144. sprays	4	1
104. mops	3	1	145. sterilizes	4	2
105. pares	3	1	146. sweeps	4	2
106. pins	4	1	147. times	3	3
107. pounds	2	2	148. transcribes	5	4
108. recapitulates	2	**	149. types	3	1
109. refuses	2	**	150. varnishes	4	2
110. seasons	4	3	151. anchors	5	1
111. smears	4	2	152. anoints	3	2
112. ties	3	2	153. adheres	5	1
113. accompanies	**	**	154. asks	1	0

*These words were included as examples in the instructions

**These values are omitted as they would present a distorted view as a result of the unusual distribution of judgments.

(Table continued on next page)

Table 7 (continued)

List of 300 Words Indicating Their Crude Median and V Measure

Word	Median	V	Word	Median	V
155. baits	4	1	196. holds	4	3
156. balances	5	3	197. impersonates	2	1
157. bastes	3	1	198. inoculates	3	1
158. bends	4	3	199. interprets	4	1
159. bleaches	5	2	200. irons	3	3
160. boxes	4.5	1	201. judges	1	1
161. brands	4	2	202. knocks	4	3
162. brushes	4	3	203. laces	3	2
163. buds	4	3	204. lectures	2.5	2
164. calibrates	1	3	205. listens	1	0
165. camouflages	5	3	206. logs	3	2
166. carbonizes	6	1	207* manicures	3	0
167. cashes	4	3	208. multiplies	2	1
168. catalogs	4	3	209. mulches	5	1
169. chisels	3	2	210. nails	2.5	2
170. classifies	4	3	211. orchestrates	2.5	1
171. clinches	4	3	212. photoengraves	3	1
172. coagulates	6	1	213. pilots	4	2
173. coils	4.5	1	214. plucks	3	3
174. concentrates	1	0	215. proofreads	3	1
175. counts	2	1	216. puckers	3	3
176. criticizes	2	1	217. purchases	6	2
177. consults	2	1	218. puts	**	**
178. dances	2	2	219. plans	2	1
179. daubs	4	2	220. quotes	2	1
180. depicts	1	1	221. reads	1	1
181. determines	1	1	222. reels	4	2
182. dictates	2	2	223. rejects	**	**
183. dishes	5	2	224. reports	2	4
184. draws	3	2	225. recommends	2	0
185. deals	4.5	3	226. replies	2	1
186. edits	3	3	227. scans	2	2
187. escorts	3	2	228. sentences	3	1
188. endeavors	1.5	1	229. shaves	2	1
189* feels	1	0	230. shops	5	3
190. greets	2	1	231. sings	2	0
191. goes	**	**	232. skids	4	1
192* hammers	2	0	233. sops	5	3
193. hews	3	2	234. sponges	4	3
194. hones	3	2	235. stands	4	4
195. hunts	4	3	236. steers	3	2

*These words were included as examples in the instructions.

**These values are omitted as they would present a distorted view as a result of the unusual distribution of judgments.

(Table continued on next page)

Table 7 (continued)

List of 300 Words Indicating Their Crude Median and V Measure

Word	Median	V	Word	Median	V
237. studies	1.5	1	270. clamps	4	1
238. sucks	3	2	271. crates	4	2
239. seats	4	2	272. crosscuts	4	1
240. serves	4	2	273. curries	3.5	2
241. steps	2	3	274. describes	2	3
242. tailors	3	1	275. dismounts	4	3
243. tattoos	3	0	276. drydocks	3.5	2
244. trawls	4	1	277. ejects	5	1
245. trucks	4	1	278. embosses	4	3
246. typewrites	3	1	279. encases	5	2
247. tidys	3	1	280. erodes	6	2
248. wipes	4	1	281. forks	4	2
249. advises	2	1	282. harrows	4	3
250. assures	2	1	283. hooks	4	3
251. condemns	2	2	284. inks	3.5	2
252. igs	4	1	285. mails	3	2
253. guts	3	1	286. ripaws	3.5	2
254. pages	3	1	287* sandpapers	4	0
255. peels	4	1	288. scrutinizes	1	1
256. points	2	3	289. seines	4	2
257. powders	3.5	3	290. shovels	4	3
258. rubs	3	2	291. singes	5	3
259. schedules	4	3	292. slits	4	2
260. sells	6	4	293. sorts	4	2
261. summarizes	3	3	294. staples	3	1
262. undresses	3	2	295. stokes	4	2
263. amputates	3	0	296. tacks	4	1
264. appraises	**	**	297. touches	1	1
265. ascertains	2	4	298. trenches	4	3
266. breeds	4	3	299. upholsters	3	2
267. burns	6	1	300. waxes	4	3
268. casehardens	6	2			
269. chars	5.5	2			

*These words were included as examples in the instructions.

**These values are omitted as they would present a distorted view as a result of the unusual distribution of judgments.