PRELIMINARY DEVELOPMENT OF AN OBJECT SORTING TASK FOR NORMAL ADULTS

A Thesis Presented to

the Faculty of the Department of Psychology

University of Houston

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

---

by

Jane Zander

January, 1967

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ABSTRACT

This study involved the construction of a new object sorting task, and a scoring system to be used with it. Preliminary standardization or normative data were derived. The ultimate purpose is the creation of a more sensitive and adequate instrument than now exists for measuring or characterizing the conceptual behavior of normal adults. The form of the task was modeled after Rapaport's Revised Object Sorting Test. The scoring system was developed by scaling McGaughran's two dimensions of his conceptual area schema--"order of conceptual classification" and "extent of social agreement." A third dimension of "essentiality" was also introduced.

Two potentially equivalent forms of the task, passive phase only, were administered to an adult standardization sample composed of 15 males and 15 females. Data derived from these protocols were analyzed to assess interscorer agreement, equivalence of task forms, independence of scaled dimensions, and the variables of order effect of presentation of task forms, and sex and age.

A satisfactory degree of interscorer agreement was achieved, although with extensive collaboration of the judges during scoring. It was found that the order of object groupings

in terms of difficulty, as well as some of the object groupings within themselves, need to be rearranged in order to attain greater equivalence of task forms. In their present form, the scaled dimensions are not sufficiently independent.

Table of Contents

List of Tables

List of Tables (Continued)

CHAPTER I

NATURE OF THE PROBLEM

This study comprises a part of the preliminary work for an anticipated larger and extended project. The aim of the study is to develop a more adequate method than now exists for measuring certain aspects of conceptual behavior, using the conceptualizations of "normal" adults to derive basic standardization measures. For this purpose, the study involves (1) the construction of a more complex and sensitive object sorting task and, based upon performances on this devised task, (2) development of an adequate scoring system by scaling the two dimensions, designated public-private and closed-open, created by McGaughran in his conceptual area schema for ordering object sorting behavior.

The general form of the constructed task is like that of Rapaport's (1945) revised object sorting test; it is composed of two parts--an active and a passive phase. Only the passive phase of the devised task was utilized in the present study; however, the scaling system for the two independent dimensions was developed to be used with both phases of the task.

CHAPTER II

BACKGROUND OF THE PROBLEM

The systematic analysis of individual and group differences in conceptual behavior has received little attention in psychology. The research that has been done in this area has occurred largely within the last 10-15 years. This is particularly true in regard to conceptualization or concept formation in normal adults. No adequate method exists to measure ways in which normal adults differ in conceptually ordering their separately-perceived worlds; should such a method be developed, it could conceivably be employed also to differentiate conceptual performance among clinically "deviant" groups. Rather, the work that has been done has concentrated primarily upon identifying forms of "abnormal" conceptualization presumably characteristic of such clinical groups as brain-damaged persons, schizophrenics and mental retardates.

A subtle, but major, barrier to progress in the adequate investigation of differences in conceptual processes has been the consistent and tenacious use, in most previous studies, of a dichotomous distinction between "concrete" and "abstract" forms of "thinking." These two terms have been generally accepted and employed unquestioningly, although they have never acquired a clear, consensually-

validated meaning. Certain "deviant" groups have been (and are) automatically characterized as completely concrete in their thinking, as contrasted with normal adults, who are by definition capable of achieving the "abstract attitude." In this context, "abstract" thinking has acquired the connotation of "good" or "desirable" conceptual performance.

The lack of adequate procedures for measuring differences in conceptual behavior in normal adults applies equally to satisfactory tasks or "tests" constructed for this purpose and to adequate measuring or scoring systems.

Gelb and Goldstein (1941) were pioneers in the development of an object sorting test to observe deficits in conceptual performance by brain-damaged patients; however, it was also they who initiated the limiting abstract-concrete dichotomy. Their work with brain-injured patients after World War I led them to the qualitative distinction between abstract and concrete behavior; they represented these two types of behavior as unitary, absolute individual traits, mutually exclusive of each other. In their words, "there is a pronounced line of demarcation between these two attitudes which does not represent a gradual ascent from more simple to more complex mental sets" (Goldstein and Scheerer, 1941, p. 22). The abstract approach demands behavior of a new, emergent quality, generically different from concrete conceptualization. Tasks which presupposed the activation of the abstract performance level could not be "genuinely" solved as long as the subject operated on the concrete level. Therefore, the test was devised to

"ascertain unequivocally the corresponding approach required . . ." (p. 22).

The test was composed of a number of common, every-day objects, and involved mostly "active sorting" (i.e., in which the subject selected and grouped objects which he considered as "belonging together"). Weigl introduced a "coercive" (passive) phase, in which the subject was asked to give the basis of a grouping presented by the examiner. The analysis of test behavior was completely qualitative; it was based on the acceptability or unacceptability of the "basis of pertinence" given for the sorting, and upon whether or not the subject showed the capacity to accomplish abstract behavior volitionally and purposely.

Goldstein and his followers originally made these generalizations from observations of performance within a very limited group (i.e., brain-damaged). Unfortunately, their views have subsequently been extended to characterize the conceptual behavior of schizophrenics, young children and mental defectives, among others.

Rapaport (1945) kept the basic form of the Goldstein test; however, he simplified and standardized administrative procedures and object-groupings to be used. The test material consists of 33 common objects; the administration is divided into an "active phase," which calls for seven separate sortings chosen by the subject, and a "passive phase," which is composed of twelve separate groupings arranged by the examiner. In each of the two phases, the subject is asked to

explain the conceptual basis for each grouping.

Rapaport devised a loosely quantitative system for evaluating test behavior based upon (a) "adequacy" (i.e., the degree that sortings or verbalizations approximate or deviate from the norm for an item); (b) "conceptual level" (i.e., whether a definition is on an "abstract, functional or concrete" level); and (c) "concept span" (i.e., whether the subject omitted appropriate objects or included too many, or whether his definition did not account for all objects grouped, or accounted for objects not in the grouping).

Rapaport employed the object sorting task primarily to identify "abnormality" in conceptualization. Viewing all mental disturbance as the result of "encroachment of unconscious ideas" on consciousness, and/or a defense of consciousness against such encroachments, he postulated that "concept formation is one of the main channels through which maladjustment encroaches upon thinking, and . . . in it we may be able to discover early traces of impending maladjustment" (p. 388). In Rapaport's system, the abstract-concrete dichotomy is explicitly maintained in the "conceptual level" portion of the scoring system, since "abstract-conceptual" definitions (as opposed to "concrete" or "functional") are the only completely acceptable ones. An "abstract-conceptual" response expresses the essential abstract-conceptual common content of a grouping in a generic term. "Concrete" responses are defined merely as those which express belongingness of objects "because of a concrete attribute they have in common" (p. 403).

The object sorting test and scoring system developed by Rapaport have been frequently used with certain "deviant" groups (e.g., children, schizophrenics, brain-damaged); however, the requirements of the test are too simple for general use with normal adult groups.

In an attempt to break through the concrete-abstract dichotomy, particularly as concerns the absence of definitive meaning for "concreteness" (e.g., Rapaport characterized "syncretistic" responses as "concrete" even though they are so over-generalized that everything may belong with everything, such as "all come from plants" or "all belong to men"), McGaughran (1954) developed a classificatory and general descriptive system of scoring based upon what he termed conceptual "areas." This form of classification is based upon two postulated dimensions: "order of conceptual classification" (closed-open) and "amount of social agreement" (public-private) (McGaughran and Moran, 1956).

The "closed-open" dimension is defined in terms of the degree to which a concept permits the potential inclusion of additional objects within its limits; degree of potential inclusiveness is dependent upon the number of common attributes among the objects that are expressed or "used up" in the collecting principle. The greater the number of attributes used in the collecting principle, the fewer the degrees of freedom remaining to include other objects within the class. In other words, class principles that lead toward greater restrictiveness are concepts of a lower order of conceptual classification (i.e., more "closed").

The "public-private" dimension is defined by the extent to which an observer can predict or correctly anticipate the limits of group membership of a concept; the more "public" the concept, the more freely its limits are shared and communicated within a social group.

By intersecting the public-private and closed-open dimensions, one can form four quadrants or "conceptual areas." McGaughran defined these four conceptual areas as closed-public, open-public, closed-private and open-private. Employing the conceptual area schema to score behavior on the Rapaport test, McGaughran found significant group differences in various studies with schizophrenics and normals, and schizophrenics and brain-damaged subjects (McGaughran and Moran, 1956; McGaughran and Moran, 1957; Leventhal, McGaughran and Moran, 1959).

In addition to proposing these dimensional variables, McGaughran and Moran (1956) suggested two other potentially measurable variables that could be derived from the analysis of descriptive terms proposed by others (e.g., Goldstein, Rapaport) as criteria for abstract behavior as opposed to concrete behavior. These variables are <u>essentiality</u> of the given concept and the <u>verbalization of a generic term</u>. "Essentiality" has been introduced into the present study as a third variable. A conceptual response is considered to be "essential" if the concept is at the lowest level of abstraction necessary to delimit adequately the common attribute of the object grouping in question.

While apparently overcoming some of the limiting features of a simple dichotomous analysis, McGaughran's conceptual area system is

still at the present time only a double dichotomy. Since each response is scored in terms of one of the four areas, which is defined by both of the dimensions interactively, the two dimensions lack complete independence. Thus, there is a need to quantify the two dimensions independently in order to obtain a "clean" rating of responses in terms of each dimension.

A. B. Silverstein (unpublished paper), using the Rapaport test, has recently undertaken to quantify McGaughran's two dimensions with the aim of developing scales that can be used to describe conceptual processes more sensitively. In contrast with the method described in the present study, he is using expert judges' ratings of protocols to form the basis of scale units; the judges base their ratings on McGaughran's definitive examples and descriptions of types of responses which fall into each of the four areas, and assign a given response a position along an arbitrary point scale.

CHAPTER III

METHODS AND PROCEDURES

This chapter will deal separately with procedures followed in the preliminary study and the standardization study.

Preliminary Study

Construction of the Object Sorting Task

In the construction of a new object sorting task, a total of 77 heterogeneous, familiar items was first assembled; these included objects, pictures, and words or phrases (printed on 3" x 5" index cards). A list of these "objects" is given in Table 1. The intent was to create a sufficiently greater amount of object diversity to obtain a desirable amount of variance in responses among normal adults than is possible with existing object sorting tasks. The pictures and printed words were included to help to achieve this purpose.

In the development of the passive phase of the task, an initial series of 13 conceptual groupings of the objects listed in Table 1 was constructed. An attempt was made to arrange this series in such a way that the groupings were progressively more complex. Degree of

presumed complexity or difficulty was increased by increasing the number of objects in later groupings and by including certain objects that possessed the relevant attribute, as judged by the experimenter, in a more obscure way.

Task administration. After the initial construction of the series of groupings, the object sorting task was presented to a small group of subjects. All task objects were placed in view of the subject. The subject was given the following typed instructions to read before the task was administered.

> I will put out different groups of objects in front of you. In each case, try to tell me why they all belong together. There is a reason. If this reason doesn't occur to you after a period of time, I'll ask you to give me as few reasons as possible that seem good and appropriate to you. You may touch or handle the objects, as you like.

Responses were recorded verbatim. No time limit was imposed.

The subjects were presented with each of the 13 groupings in the series. Since it was intended to create equivalent forms of the task, with each form consisting of nine groupings ordered by degree of difficulty, the presentation was broken down into two forms of nine groups selected from the original series on an odd-even basis. All odd-numbered groupings were given to a subject during one session, and all even-numbered groupings were administered during a second session, in order to assess the comparative difficulty of the two sets of groupings.

On the basis of the subjects' performances, the 13 groupings

Table 1

Total List of Objects Used in the Object Sorting Task

Zipper
Hook and eye
Button
Door hook
Piece of aluminum foil
Hairpin
Bicycle bell
Thermometer
Ruler
Measuring spoon
Toy watch
Tin can
Glass jar labeled "For lysea"
Bayer aspirin box
Toy sugar bowl
Pair of shoe laces (one broken)
Ice tea spoon (broken)
Crayon
Small candle
Ball of yarn
Toy mouse
Larger candle
Cigarette
String of pearls
Imitation lemon (screw top)
Imitation orange
Imitation rose
Imitation cigar
Pencil (lead broken)
Spool of thread
Toy cup
Dinner fork
Toy fork
Toy spoon
Toy U. S. flag
Bottle top with "Rx"
Small bottle top
Toy marshal's badge
Washer (for faucet)
Small powder puff
Sink stopper
Two sugar cubes
Wood block with nail in top
Buffalo nickel
Small hour glass
Toy lion
Eraser
Tea cup (broken)
Comb (broken)
Kitchen match
Light bulb (burned out)
Wax paper (folded)
Large nail
Teabag

Part of printed page
Postage stamp (4¢ cancelled)
Playing card (jack of hearts)
Picture of two candles
Picture of caduceus
Two pictures of apples (identical)
Picture of shirt and tie
Picture of kitten
Drawing of sun, tree
Picture of ball and jacks
Picture of sugar bowl
Picture of U. S. Seal

Card labeled "ball of wax"
Card labeled "♣"
Card labeled "sugar"
Card labeled "deer"
Card labeled "anchor"
Card labeled "silver"
Card labeled "yellow bird"
Card labeled "paper sack"
Card labeled "crane"
Card labeled "metal compass"
Card labeled "moon"

were redistributed into a second set of two forms of nine groups each; it was found that the original order of the groupings did not produce the desired degree of progressive difficulty, nor did the forms appear to be equivalent. The changes that were introduced were intended to correct both of these difficulties. No changes appeared to be necessary in the composition of the individual groupings. The final groupings for Forms I and II, as later used in the study with the standardization group, are shown in Tables 2 and 3, respectively.

Development of a Scoring System

Rationale and initial work. In keeping with the definitions of McGaughran's two dimensions, as previously described, the criterion for scaling the publicness-privateness of a response was (a) the extent that the concept was judged to be shared and communicable (consensually validated) by the cultural majority and, thus, (b) the extent to which the conceptual group limits could be publicly predicted. Judgment of (b) was based upon the extent to which the judges would be unsure in anticipating whether additional objects would be accepted into or excluded from the subject's conceptual group limits. Primary emphasis in later scoring was placed upon this criterion of predictability of conceptual limits in terms of acceptance/rejection of additional objects. As utilized, "limits" implies no direction (i.e., the limits may be very broad but still relatively predictable).

The criterion for scaling the closedness-openness of a response was the extent to which a concept bound the possible (total available) perceptible attributes of the object groupings or, in other words, the number of degrees of freedom consumed by the concept. Therefore, the fewer the attributes included and, correspondingly, the more degrees of freedom left available, the more the response would be of a higher order of abstraction and, thus, more open (e.g., one single attribute common to all objects and potentially inclusive of a varying number of additional objects would approach maximal openness; a concept based on absolute identity of all objects or using all of their perceptible attributes and exhausting the degrees of freedom would be maximally closed).

In keeping with the definition previously set forth, a response was scored as "essential" if it was the same as the term designating the object grouping, or judged to be on an equivalent level of abstraction (i.e., of a minimal degree of abstraction necessary to incorporate adequately all objects in the grouping in terms of a single, common attribute).

An initial scoring manual was developed by deriving and designating independent rational sets of scale point designations for the two dimensions, public-private and closed-open. McGaughran's revised instructions for conceptual area scoring (1956) served as a source guide for developing the scale points. Some designations were retained, with their meanings basically unchanged; others were changed,

Table 2

Object Groupings Composing Form I of the Object Sorting Task

1. (Food)

Orange	Lemon
Picture of apples	Sugar cubes

2. (Rubber)

Mouse	Eraser	Washer	Cigar
Picture of ball	Pencil	Stopper	Rose

3. (Measuring Devices)

Broken spoon	Measuring spoon	Watch	Card "metal compass"
Toy cup	Hour glass	Thermometer	

4. (Containers)

Toy cup	Lemon	Tin can	Glass jar
Picture of sugar bowl	Tea bag	Aspirin box	Card "paper sack"
Broken spoon			

5. (Symbols)

Picture of caduceus	Playing card	Flag
Card "÷"	Badge	Bottle cap with "Rx"
Picture of Seal		

(Table continued on next page)

Table 2 (Continued)

6. (Rectangles)

All cards	Playing card	Aluminum foil	Ruler
All pictures except apples, Seal and caduceus	Printed page	Wax paper	Flag
	Postage stamp	Aspirin box	Wood block
	Sugar cubes	Glass jar	

7. (Round)

Picture of ball	Stopper	Lemon	Wood block
Card "moon"	Bicycle bell	Toy sugar bowl	Pearls
Washer	Tin can	Thread	Cigarette
Flag			

8. (Toys)

Toy sugar bowl	Picture of ball	Tin can	Small candle
Toy cup	Crayon	Watch	Mouse
Toy fork	Playing card	Badge	Cigar
Toy spoon	Flag	Lion	Hour glass

9. (Brittle)

Toy sugar bowl	Button	Pencil	Picture of candles
Toy cup	Ruler	Crayon	
Picture of sugar bowl	Hour glass	Match	Flag
Comb	Measuring spoon	Small candle	Glass jar

Table 3

Object Groupings Composing Form II of the Object Sorting Task

1. (Yellow)

Thread	Lemon	Picture of candles
Pencil	Spoon	

2. (Wood)

Pencil	Flag	Wood block
Drawing of tree	Thread	Match

3. (Broken)

Large cup	Shoe lace	Light bulb
Spoon	Comb	Pencil

4. (Fasteners)

Hook and eye	Thread	Card "anchor"	Stopper
Door hook	Zipper	Bottle cap with "RX"	Shoe lace
Button	Nail	Hairpin	

5. (Sources of Light)

Cigar	Picture of candles	Card "moon"
Cigarette	Small candle	Drawing of sun, tree
Match		

(Table continued on next page)

Table 3 (Continued)

6. (Paper)

All cards	Postage stamp	Glass jar	Cigar
All pictures	Playing card	Crayon	Thread
Printed page	Wax paper	Cigarette	Flag

7. (Numbers)

Thermometer	Measuring spoon	Postage stamp	Aspirin box
Watch	Pencil	Nickel	Thread
Ruler	Eraser	Picture of Seal	

8. (Pairs)

Toy fork	Picture of caduceus	Small bottle cap	Shoe laces
Dinner fork	Sugar cubes	Small candle	Nail
Broken spoon	Pictures of apples	Larger candle	Block with nail
Toy spoon	Bottle cap with "Rx"	Picture of candles	

9. (Movable Parts)

Thermometer	Bicycle bell	Zipper	Lemon
Watch	Door hook	Hook and eye	Stopper
Hour glass	Badge	Aspirin box	Card "crane"

and some new ones were added. For example, "Failures," which were scored in the conceptual area of closed-public, were replaced by the broader classification of "Denials" (to be discussed below), since it was anticipated that some of the "Failure" responses might differ from others in terms of degree of closedness and of publicness.

As another example, it was felt that the conceptual area disposition of "Heterogeneous" responses (i.e., more than one concept used in a response) might not adequately reflect the nature of various types of these responses obtained on each of the two dimensions. Therefore, several specific designations in the scales were made to deal with "multiple" responses.

A tentative scale for each dimension, using the scale point designations developed, was then constructed. Although the final forms of the scales were developed late in the procedure, they are presented at this time for the sake of clarity. The final form of the scaled Public-Private dimension is shown in Table 4, and the scaled Closed-Open dimension is shown in Table 5.

Data from preliminary responses. Responses obtained from the small group of subjects, plus approximately one-half of the responses given by the standardization group, were used to create a pool of item responses. Each response was considered separately in detail, and analyzed in relation to the definitions for the scale point designations. Most of the definitions were found to cover adequately the responses obtained.

Table 4

Public-Private Scale for Scoring Responses on the Object Sorting Task

1. Exact Replicates
2. Species
3. Reciprocal Cofunctionality
4. Single Noun -- Functional or Non-functional (generic or superordinate)
5. Multiple Restriction (attribute or adjective)
6. Single Attribute (adjective -- verbalized or implied)
7. Functional or Location -- qualified noun or phrase
8. Species Object Mediation
9. Closed Radial
10. Object Naming
11. Patterned Omissions
12. Universal, Dichotomy, Hyperabstraction, Metonymic
13. Multiple ("public") Generic
14. Multiple Species or Other Closed and Generic
15. Open Radial
16. Implicit Confabulation
17. Confabulation -- inappropriate to one or two objects
18. Unpatterned Omissions -- less than ½ of objects omitted

(Table continued on next page)

Table 4 (Continued)

19. Confabulation -- inappropriate to more than two, less than ½ of objects

20. Unpatterned Omissions -- more than ½, less than all objects omitted

21. Confabulation -- inappropriate to more than ½, less than all objects

22. Representation, Open Construction or Design

23. Judgmental, Incorrect Denotation, Neologisms

Table 5

Closed-Open Scale for Scoring Responses
on the Object Sorting Task

1. Exact Replicates
2. Object Naming
3. Species
4. Reciprocal Cofunctionality
5. Closed Radial
6. Relationship between two objects (species level)
7. Relationship between two (plus) Pairs (species level)
8. Species Object Mediation
9. Relationship among three (plus) objects (species level)
10. Patterned Omissions, Multiple Restriction
11. Multiple Species or Other Closed and Generic
12. Confabulation -- inappropriate to more than ½, less than all objects (small groups)
13. #12 for large groups
14. Serialized Judgmental, Representation (on narrative basis -- no overall) (small or large groups)
15. Confabulation -- inappropriate to more than two, less than ½ of objects (small groups)
16. #15 for large groups

(Table continued on next page)

Table 5 (Continued)

17. Multiple Generic (small groups)

18. Confabulation -- inappropriate to one or two objects; Open Radial (small groups)

19. Functional or Location

20. Unpatterned Omissions

21. Representation, Judgmental (location or cultural function), Judgmental (personal or feeling), Open Construction or Design (overall responses) (small groups)

22. Single Generic, Incorrect Denotation (small groups)

23. Metonymic (small groups)

24. #17 for large groups

25. #18 for large groups

26. #21 for large groups

27. #22 for large groups

28. #23 for large groups

29. Hyperabstraction

30. Dichotomy

31. Universal

A general description and definition of the scale point designations as finally developed is as follows, those having the same meaning for both dimensions being set forth first, followed by those which differ somewhat for the two dimensions:

Exact Replicates. The objects are related on the basis of absolute identity of attributes (e.g., two sugar cubes -- "exactly alike").

Species. The stated relationship of the objects is at the species or "calling-name" level, i.e., each included object is commonly identified or called by the same term (e.g., toy spoon, broken spoon, measuring spoon -- "all spoons").

Reciprocal Cofunctionality. The objects are related at the species level on the basis of a one to one reciprocal relationship (e.g., "use the match to light the candle").

(The above three scale points can be scored only in the active phase of the Task. If such responses occur in the passive phase, they are automatically scored at another scale point due to the nature of the groupings presented (i.e., depending upon the verbalization given, such responses would be scored as "Denials" or at some other "lower" scale point on both dimensions).

Single Noun -- Functional or Non-Functional (generic or superordinate). The basis of the relationship of the objects is in terms of a superordinate, unitary principle, whether verbalized (nominal) or implied (e.g., "all food;" "all give off light;" "all hold

things together" (i.e., fasteners). This scale point is designated Single Generic on the Closed-Open dimension.

Functional or Location. The relationship of the objects is stated by a qualified noun or phrase expressing a culturally recognized "functional area" (e.g., "things used in the kitchen"), or "spatially enclosed area" (e.g., "equipment that could be found in a tool box"). The concept may include one object which is not grossly inappropriate.

Species Object Mediation. The objects are related by means of a non-present mediating object, identified at the species level, which is suggested by the nature of one or more of the objects included in the grouping (e.g., tin can, fork and spoon -- "take the beans out of the can, and eat them with these"). It is anticipated that a response in the passive phase would rarely be scorable under this scale point.

Closed Radial. One object is used as a functional connecting link to relate the objects to each other (e.g., "need the match to light the candles, cigar, cigarette").

Object Naming. No collecting principle of any sort is stated. The objects are merely named or designated independently of each other. They may be designated in terms of their culturally recognized functions (e.g., "this one is used for writing, etc."), or in terms of their culturally recognized location (e.g., "this one goes in a sewing box, etc.").

Patterned Omissions. A collecting concept is stated; however, various available objects appropriate to the verbalized concept are omitted from the sorting, the excluded objects being restricted or limited in a "pattern" or manner obvious to the observer (e.g., large candle, small candle, piece of wax paper -- picture of candles, card labeled "ball of wax" omitted -- "all wax"). A response meeting the criteria for this scale point could be given only in the active phase of the Task since, in the passive phase, such response would be scored by another scale point (e.g., Denial, Implicit Confabulation).

Hyperabstraction. The objects are related by a unitary principle which is, however, over-generalized and more inclusive than is necessary to conceptualize the group of objects adequately in generic terms (e.g., "all are manufactured;" "all useful").

Universal. The stated principle is a maximal "Hyperabstraction" in the sense of being applicable, in the judgment of the observer, to all known objects (e.g., "all are God's creations").

Dichotomy. The basis of the relationship is a "Hyperabstraction" explicitly stated in dichotomous terms (e.g., "these are man-made and these are nature's products").

Metonymic. The stated principle distorts the meaning of an essential concept, being similar and related to it but clearly distinguishable from it (e.g., "cooking utensils" for "eating utensils;" "geometry" for "arithmetic").

Multiple Species or Other Closed and Generic. Multiple groups are implicitly created by the use of two or more mixed generic and species relationships (e.g., "four are fruit and the sugar is to sweeten the lemon juice").

Open Radial. This scale point is scored if the basis of the relationship of the objects involves the reuse of one or more of the grouped objects by making use of other of its (or their) attributes (e.g., "thread with the hook and eye for sewing, and the hook and eye goes with the door hook because they both are hooks and the thread can go with the pencil because both are yellow").

Confabulation. The basis for the relationship is a generic principle which is appropriate to, or fits, some but not all of the grouped objects. The response clearly indicates or states that all of the grouped objects are being included in the concept (e.g., "all are round" -- inapplicable to mouse, eraser and rose in grouping of eight objects).

Unpatterned Omissions. This scale point is covered by the definition for Patterned Omissions (above) with the distinction, however, that the objects, in this case, are not included or omitted in any restricted or purposeful manner discernible by the observer (e.g., small candle, card labeled "ball of wax," piece of wax paper -- picture of candle, large candle omitted -- "all wax").

Open Construction or Design. Some or all of the grouped objects are spatially arranged to create a visual representation

identified as a design or replication of something (e.g., button, bottle cap, orange -- spatially arranged -- "fellow with ear muffs").

Incorrect Denotation. A single, overall concept is expressed which can be judged by the observer to be completely inappropriate to all grouped objects (e.g., silverware grouping -- "all blue").

Neologisms. Used in the usual sense of the word, this designation refers to responses consisting of non-existent terms or phrases (e.g., "all are holymanners").

The following designations differ as applied to the two dimensions:

Denials. The subject "denies" if he (a) completely fails to give any reason for the grouping (e.g., "I don't know;" "they just don't go together"); (b) states that all of the objects do not belong together, but proceeds to give a qualified response (e.g., "they don't, but these two go together and these three go with each other;" "they're all toys except these two").

The scoring systems of Denials for the two dimensions are shown in Table 6. As may be seen, more distinctions appeared necessary in the Public-Private system than in the Closed-Open, in order to characterize adequately the various responses. Also, the publicness-privateness of a "they don't go together" response was deemed impossible to evaluate, and these responses were put at the mean; whereas, on the other dimension, they were considered to be maximally closed.

Table 6

Systems for Scoring Denial Responses
Given in the Object Sorting Task

Public-Private Dimension

I. Score at the Mean:

A. I don't know
B. Don't (simply don't go together)

II. Score 0.30 above the Mean:

A. Don't, but these (any part or parts; multiple groups) do -- "public" response (i.e., scale point 9 or above)

B. All do, except these

III. Score 0.30 below the appropriate category for the content of the response:

A. Don't, but (overall, single "public" response)

IV. Score 0.30 above the lowest appropriate category for the content of the response:

A. Don't, but (multiple "private" response -- see II(A) above)
B. Don't, but (single, overall "private" response)

Closed-Open Dimension

I. Score at scale point 1 (maximum closed):

A. Don't (simply don't go together)

(Table continued on next page)

Table 6 (Continued

II. Score at scale point 10:

A. I don't know

III. Score 0.30 above the appropriate category for the content of the response:

A. Don't, but these (any part or parts; multiple groups) do
B. Don't, but (overall, single response)
C. All do, except these

Implicit Confabulation. This designation is made only on the Public-Private dimension, and refers to "Confabulation" committed by omission. The given response explicitly relates some of the grouped objects, but fails to make any reference (by Denial or otherwise) to the remainder of the objects (e.g., "these are round" -- makes no reference to two remaining objects).

Representation. This designation refers to another type of "Hyperabstraction" in which one or more objects is used in the given response to represent or stand for a more general concept which maintains some recognizable relationship to the eliciting object or objects (e.g., badge -- authority; toy flag -- patriotism; pencil -- a tool of learning; hour glass -- the passage of time).

A distinction was made in the Closed-Open scale between the more closed nature of Representations which maintained the objects as largely separate entities, usually expressed in a narrative type of response and of a more personalized nature (e.g., aspirin box -- "aspirin tells how long you've had a headache;" hour glass -- "represents time in school"), and Representations using objects to express a single, overall concept of a higher (and more open) order.

A slight distinction was made in the Public-Private scale between the more private nature of Representations of a personalized sort, which would be scored under Judgmental (e.g., glass jar -- "represents all the knowledge I stored up in school"), and Representations as initially defined which have a more remote, neutral relationship between the expressed concept and the eliciting object or objects.

Judgmental. The basis of the relationship clearly reflects individual subjectivity, which may be expressed in terms of personalized, idiosyncratic judgment or opinion (e.g., "all require the use of hand and arm;" "everything is sort of domestically feminine"), or personal feeling or experience (e.g., "all seem distasteful to me;" "these remind me of my grandmother").

As with Representations, a distinction is made in the Closed-Open scale between the more open nature of a Judgmental response which expresses a single, overall concept, and one which deals with the objects more discretely, usually in narrative form, thus maintaining to a large extent separate object entities. A second distinction is made in this scale to deal with Judgmental (location or cultural function) responses which are actually Hyperabstractions, but are of a lower order of conceptualization (and, thus, less open) than true Hyperabstractions (e.g., "all are useful household objects;" "all could be found around the house").

The pool of item responses was then scored and rescored a number of times by two judges (the writer and another person) in an attempt to determine more precisely where each scale point should be placed along each dimension. Substantial changes were found to be necessary in the scaling of each dimension.

On the Public-Private dimension, for example, the designations Universal, Dichotomy, Hyperabstraction and Metonymic were felt to reflect an equal degree of publicness, as judged by the scoring

rationale. They were also felt to be more public than had been anticipated in the original scaling, and were moved to a lower scale point. Confabulation was expanded on both scales into three separate scale points, based upon appropriateness of response to number of objects in a given grouping.

More difficulties were encountered with the Closed-Open scale, and more changes were deemed necessary to characterize the responses adequately. The major change was the shifting of the emphasis of the scale (i.e., more points of distinction) toward the open pole, since it appeared that the general tendency in the sample responses was in this direction. In addition to changing the location of some of the scale points, Scale Points Nos. 13, 16 and 24 through 28 (cf. Table 5) were included to provide for more open scorings when the larger groupings were involved (Groups 1 through 5, as revised in the final forms, were designated as small, and 6 through 9 were designated as large). It was decided that the larger number of objects in a grouping initially created more degrees of freedom, since any overall type of response given had to account for a larger absolute number of object attributes.

Also, it became apparent that various responses which were "private" on the Public-Private dimension (involving instances of Representation, Judgmental, etc., as mentioned) were actually relatively closed in terms of degrees of freedom exhausted or order of conceptual classification; and changes were made accordingly (cf.

Scale Point No. 14, Table 5, for example).

On the final scales, "essential" responses were scored at Scale Points 4 or 6 on the Public-Private dimension, and 22 or 27 on the Closed-Open dimension.

Standardization Study

Subjects

The subjects used in the study were 30 white adults obtained through various sources, but were primarily students at various college levels who were taking courses during the summer session. All subjects participated voluntarily after being contacted individually by the writer. An effort was made to secure as wide a range as possible regarding age, education and occupation; however, the group turned out to be unbalanced due to the older age of the female subjects, and the comparatively large number of public school teachers and college students.

The group was composed of 15 males and 15 females, who ranged in age from 54 to 18 years; their mean age was 30.6. The mean age of the female subjects was 35.6, with a standard deviation of 12.5. The mean age of the males was 25.5, and the standard deviation was 5.6.

Eleven of the subjects were public school teachers; nine were undergraduate college students with various majors. The remainder had diverse occupations. Two of the subjects held Master's

degrees; fourteen subjects had Bachelor's degrees. Nine were presently undergraduate college students, five subjects had completed high school with no college work, and one subject had gone through only the ninth grade.

Task Administration

The method of administration used was the same as that used with the preliminary subjects (cf. page 10).

Scoring of Data

Fifteen protocols of the subjects were randomly selected for scoring by the two judges. The judges scored the protocols in sets of five, comparing scoring and discussing scoring problems after completion of each set. In order to achieve as much independence as possible between the two dimensions, the judges scored all items according to the Public-Private dimension first, and then proceeded to score according to the Closed-Open dimension.

It became evident that the provisions initially made on the two dimensions for "multiple responses" (i.e., responses that contained mixtures of different degrees of publicness and/or different degrees of closedness, such that separate parts of the total response were scorable at different scale points) were not adequate to characterize many of these complex types of responses obtained with the standardization sample. Therefore, a system of weights was developed for each dimension to supplement the scoring of these responses. The

final systems of weights for multiple responses for each dimension are shown in Tables 7 and 8.

All 15 protocols were then rescored according to rules agreed upon, and the amount of scorer agreement was again compared. It was felt that sufficient agreement in interpretation had now been obtained to conduct a formal comparison of interscorer agreement. From the remaining unscored protocols, sets to be scored for this purpose were selected by using random numbers in order to eliminate bias. If a number came up which called for a protocol which had previously been scored, it was discarded and another number used.

Results of the formal comparison are given in the next chapter.

Table 7

Supplementary System of Weights for Scoring "Multiple Responses" on the Public-Private Dimension of the Object Sorting Task

A. Positive (i.e., toward private)

1. One or more private followed by single correct public:
(score maximum public and weight 0.30 to private)

2. Single public to private to single public:
(score maximum public and weight 0.15 to private)

B. Negative (i.e., toward public)

1. Single correct public followed by one or more private:
(score private and weight 0.30 to maximum public)

2. One or more private to single public to private:
(score private and weight 0.15 to maximum public)

3. Several private subgroups at the same time:
(score maximum private and weight 0.30 to minimum private)

C. No Weights

1. Several public subgroups at the same time:
(If exhausts objects, score 13 or 14; otherwise 15 or Denial)

2. Several public in sequence:
(score least public if all are overall responses; otherwise, Confabulation)

3. Mixture of overall private and multiple private and/or public:
(score overall private)

4. Several private in sequence (overall, or reuses some of objects):
(score maximum private

Table 8

Supplementary System of Weights for Scoring "Multiple Responses on the Closed-Open Dimension of the Object Sorting Task

A. Positive (i.e., toward open)

1. One or more open followed by single correct generic:
(score generic and weight 0.30 to open)

2. Single generic to open to single generic:
(score generic and weight 0.15 to open)

3. Single correct generic followed by one or more closed:
(score closed and weight 0.30 to generic)

4. Closed to single generic to closed:
(score closed and weight 0.15 to generic)

B. Negative (i.e., toward closed)

1. Single correct generic followed by one or more open:
(score open and weight 0.30 to generic)

2. Open to single generic to open:
(score open and weight 0.15 to generic)

3. One or more closed followed by single correct generic:
(score generic and weight 0.30 to closed)

4. Single generic to closed to single generic:
(score generic and weight 0.15 to closed)

5. Mixture of overall open and other multiple concepts:
(score overall and weight 0.30 to maximum closed)

C. No Weights

1. Several subgroups at the same time (without overall):
(score maximum closed)

2. Several overalls in sequence:
(score maximum closed)

Procedures

Pertinent demographic variables were recorded for each subject. All testing was done by the writer; each form was administered individually. Each subject executed each form of the Task on separate occasions, not over one week apart, with a time interval of at least two days. In order to control for sequence effects, the examiner gave Form I first to Subjects 1 through 15, and Form II first to Subjects 16 through 30.

CHAPTER IV

RESULTS

The results will be set out first showing interscorer agreement, followed by presentation of standardization figures. Data will then be provided from comparisons of the two forms of the Task, and of the three dimensions. Next, results of an item analysis of object groupings will be set forth; and, last, the effects of order of presentation of Task forms, and of sex differences will be considered.

Interscorer Agreement

Product-moment correlation of degree of scorer agreement between the two judges for Public-Private, Form I (hereinafter referred to as P/P I) was based on 11 protocols, and for Public-Private, Form II and Closed-Open, Form II (hereinafter referred to as P/P II and C/O II, respectively) on 10 protocols. The r-values were as follows:

P/P I	.96
P/P II	.99
C/O II	.95

The initial correlation for Closed-Open, Form I (hereinafter referred to as C/O I) based upon 10 protocols was .67; therefore, an additional

set of five protocols was scored to see if more agreement were possible, and the obtained correlation was .98. The combination of both sets (15 protocols) of scorings yielded a r-value of .83.

Standardization Figures

The mean scores and standard deviations for all subjects for both scaled dimensions and for essentiality (hereinafter referred to as E) on both Task forms are shown in Table 9, broken down into total group, male group and female group.

Analysis of Standardization Data

Comparison of Forms I and II of the Task

Results for the two Task forms were examined to assess amount of equivalence between the forms for all three scoring dimensions. Table 10 gives Product-moment correlations and extent of mean differences for the three dimensions. No t-value approached the originally set .05 probability level of significance; therefore, no p-values are shown. As may be seen, considering the figures generally, current degree of equivalence is not extensive between the two forms. The largest mean difference was found between E I and E II scores.

In an odd-even item comparison, combining the two Task forms, correlations were as follows:

Table 9

Mean Scores and Standard Deviations of Subject Performances on the Three Dimensions for Both Task Forms of the Object Sorting Task

(N = 30)

	Form I						Form II					
	Total		Males		Females		Total		Males		Females	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
P/P	14.6	4.8	15.3	4.0	13.9	5.5	16.1	4.3	16.9	4.3	15.2	4.4
C/O	19.5	2.4	19.2	2.4	19.8	2.5	19.5	2.6	18.7	2.6	20.2	2.4
E	3.2	1.9	2.8	1.9	3.5	1.9	2.7	1.8	2.4	1.9	3.0	1.6

Table 10

Comparison of Equivalence of the Two Forms of the Object Sorting Task by Intercorrelations and Differences in Mean Scores for the Three Dimensions

(N = 30)

Dimension	r	t
P/P I vs. P/P II	.53	1.20
C/O I vs. C/O II	.43	0.14
E I vs. E II	.34	1.80

P/P	.84
C/O	.79
E	.59

Thus, it appears that the lack of equivalence between Form I and Form II reflected by the lower correlations shown in Table 10 is, in large part, due to differences in set, or order effects, between the first and second administration of the Task forms.

Comparison of Public-Private, Closed-Open and Essentiality Dimensions

The two scaled dimensions were compared to assess their independence from each other. Also, essentiality scores were compared with scale scores to ascertain the relationship between number of essential responses given and subjects' performances in terms of publicness/privateness and closedness/openness. Product-moment correlations between the three dimensions on Form I and on Form II are presented in Table 11. As shown, there was a substantial inverse relationship in this sample between publicness and openness on Form II, and a lesser one on Form I. There was also a large inverse relationship between degree of publicness and essentiality, and a smaller direct relationship between degree of openness and essentiality.

Item Analysis of Object Groupings of Forms I and II in Terms of Essentiality

A tally was made of the number of subjects who gave essential responses to each of the nine object groupings of each Task form.

Table 11

Intercorrelations Among the Three Dimensions on Each of the Two Forms of the Object Sorting Task

(N = 30)

Form I

	F/F	C/O	E
F/F	-	-.40	-.83
C/O	-.40	-	.45
E	-.83	.45	-

Form II

	F/F	C/O	E
F/F	-	-.81	-.85
C/O	-.81	-	.67
E	-.85	.67	-

It was considered that such an item essentiality check would provide another index of the equivalence of Task forms in terms of object groupings.

The results of the tally are given in Table 12, showing absolute number, as well as percentage of total, of subjects who gave essential responses. As may be seen, the object groupings of the two forms show a general lack of equivalence in terms of comparable difficulty, with Form I appearing to be easier than Form II. In addition, the object groupings within each form do not reflect the intended progressive increase in difficulty from Item 1 to Item 9; some of the middle and later groups evoked more essential responses than earlier ones.

Effects of Other Variables

Order Effect of Presentation of Task Forms

As mentioned in Chapter III, Subjects 1 through 15 were given Form I first; and Subjects 16 through 30 were given Form II first, in order to balance possible effects which the novelty of the first session might have on the subject's performance. First, t-tests were computed to assess differences in performance of the two groups on the same Task form measure (i.e., P/P I vs. P/P I, etc.).

Table 13 shows mean scores, standard deviations and t-values for these two groups of subjects. As may be seen, the mean differences

Table 12

Item Analysis of the Two Test Forms of the Object Sorting Task in Terms of Number of Essential Responses Given to Each Object Grouping

(N = 30)

	Form I		Form II	
Item	Number of Subjects	Percentage of Total	Number of Subjects	Percentage of Total
1	9	.30	14	.46
2	11	.36	13	.43
3	19	.63	9	.30
4	16	.53	19	.63
5	10	.33	13	.43
6	7	.23	12	.40
7	13	.43	0	-
8	11	.36	1	.03
9	0	-	0	-
	96	.36	81	.30

Table 13

Differences in Mean Scores for the Same Dimension and Task Form as a Function of Order Effects in Administration of Forms I and II of the Object Sorting Task

(N = 30)

Dimension	Before "Warm-up"		After "Warm-up"			
	Mean	S.D.	Mean	S.D.	t	p
P/P I	14.7	4.6	14.5	5.1	0.22	-
C/O I	19.5	2.3	19.5	2.7	-	-
E I	3.2	2.3	3.1	1.5	0.23	-
P/P II	14.7	3.3	17.3	5.0	3.37	<.01
C/O II	20.6	1.6	18.3	3.0	-5.14	<.001
E II	2.9	1.9	2.4	1.1	1.50	-

were not significant on Form I. On Form II, the group which had had a first "warm-up" session was significantly more public, more open and showed less variability among subjects.

The two groups were then compared in terms of their performances during the same session (i.e., first or second); this involved comparing different Task forms on the same dimension (i.e., P/P I vs. P/P II, etc.). These results are given in Table 14.

Comparison of first-session performances showed the group which received Form I first to be significantly more public and more open, with less variability among subjects. Comparison of second sessions revealed no significant mean differences on the P/P dimension; however, on the C/O dimension, the group which was given Form II second was significantly more open with less intersubject variability.

Sex Differences

Male and female subjects were compared as groups to determine possible differences in performance of the sexes. Table 15 shows mean scores and standard deviations of the two groups, and t-values of mean differences. The females were more public and more open on both forms than were the males. The essentiality scores were also higher for the female group. However, the females were significantly more public and more open only on Form II; they were significantly more essential only on Form I.

Table 14

Differences in Mean Scores for the Same Dimension on Different Task Forms as a Function of Order Effects in Administration of Forms I and II of the Object Sorting Task

(N = 30)

Dimension and Form	First Session		Second Session	
	t	p	t	p
P/P I vs. P/P II	-2.97	<.01		
C/O I vs. C/O II	2.46	<.05		
P/P II vs. P/P I			0.25	-
C/O II vs. C/O I			2.76	.01

Table 15

Differences in Mean Scores of Male Subjects and Female Subjects for the Same Dimension and Task Form of the Object Sorting Task

(N = 30)

Dimension	Males		Females			
	Mean	S.D.	Mean	S.D.	t	p
P/P I	15.3	4.0	13.9	5.5	1.59	-
C/O I	19.2	2.4	19.8	2.5	1.33	-
E I	2.8	1.9	3.5	1.9	2.10	<.05
P/P II	16.9	4.3	15.2	4.4	2.11	<.05
C/O II	18.7	2.6	20.2	2.4	3.26	<.01
E II	2.4	1.9	3.0	1.6	1.89	-

Possible differences between males and females in the degree of consistency of performance on the two Task forms were investigated. Product-moment correlations for each group between forms on both dimensions are given in Table 16. The females showed the greater consistency, with the highest correlation appearing on the P/P dimension.

Table 16

Correlations Showing Consistency of Performance of Male Subjects and Female Subjects on the Two Task Forms of the Object Sorting Task

(N = 30)

Dimension and Form	r	
	Males	Females
P/P I vs. P/P II	.24	.74
C/O I vs. C/O II	.31	.48

CHAPTER V

DISCUSSION OF RESULTS

This study was primarily an exploratory one involving a first evaluation of a newly developed object sorting task and an associated scoring system. The discussion, therefore, will focus on shortcomings and subsequent changes needed in the Task, apparent bases for some of these weaknesses, and possible explanations of various results obtained with the sample used.

Any conclusions concerning the cognitive behavior of the sample would have to be, at this point, in the nature of speculations. Only further refinement of methodological technique and subsequent further standardization can shed more light upon the present results.

The results will be discussed in the order of their presentation in the previous chapter.

Interscorer Agreement

High interscorer correlations were obtained in the final comparison of judgments, which demonstrates that very reliable agreement is possible between judges using the present scoring system. However, this degree of agreement was achieved laboriously, although both judges were thoroughly familiar with the scoring system and

Object Sorting Task in advance of any discussions held after scoring of standardization protocols was begun. Therefore, the scoring system appears to need revision in the direction of clarification and simplification. This is particularly true for the C/O dimension.

Standardization Figures

Not much can currently be said about the normative data obtained, particularly in the nature of generalizations, as pointed out in the beginning of this chapter. However, the sample used is considered to be a small but diverse sampling of the normal adult population; and, in this regard, it may be noted that the mean scores are moderately private and moderately open. As a basis for comparison, the mean score for nine essential responses on P/P I would have been 6.3; on P/P II, 7.0; and on the C/O dimension, 22.2.

It is tempting to assume that the behavior of the sample is representative of a normal adult population, and this is not an impossibility. However, the sample was a biased one, particularly regarding the variables of age and occupation. Intelligence was not controlled for. Therefore, generalizations will have to await further work.

Comparison of Forms I and II of the Task

The forms are obviously not sufficiently equivalent. Although the mean differences are not significant, the correlations

between the forms are low. Again, the C/O dimension shows up as less reliable than the P/P. However, the higher odd-even correlations bear out the inconsistency in the subjects' performances from one Task form to the other as a function of order effects. While there are scoring weaknesses and variation stemming from object groupings, the major difference between the forms appears to be due to this variable of order effects.

Comparison of the Three Dimensions

As evidenced by the high correlations, the independence sought between the two scaled dimensions is not reflected. However, it remains to be seen if this is a function of the Task construction or scoring system, or a true reflection of the behavior of the sample used. The much higher correlation between the scaled dimensions on Form II would indicate that differences in the forms is a contributing factor.

As the two scales are now constructed, it may be that, with a normal adult population, there is a large built-in correlation between the two dimensions, since the essential public scores fall at the numerically lower end of the P/P dimension and at the numerically higher end of the C/O. The large correlations between essentiality and the two scaled dimensions may be an artifact also caused by this same factor, since absolute number rather than scale-point value of essential responses was used in the calculations.

Item Analysis of Object Groupings of Forms I and II

As previously pointed out, the item analysis shows that the object groupings of the two forms are not equivalent in general difficulty, and in progressive difficulty. Form I is apparently an easier task than Form II.

Considering the individual groupings in more detail, it was discovered that a few of the groups contain one object which tended to confuse the subjects and, thus, to make them more difficult than had been intended. Also, it was found that a large absolute number of objects does not necessarily make a grouping difficult (e.g., Groups 7 and 8 in Form I and 6 in Form II). It appears that the last three groupings in Form II and the last grouping in Form I are much too obscure.

Order Effect of Presentation of Task Forms

The figures relating to this variable tend to support previous observations made regarding the Task forms and dimensions. Since performances on Form I showed no significant effects from order of presentation, this would indicate that it is the easier task. The larger mean differences on the C/O II dimension, as a function of presentation order, would suggest that the C/O scale is not as reliable as the P/P. This is also reflected by the fact that there were significant differences, in comparing second session performances, only on

the C/O dimension. Again, however, it is impossible to know whether this indicates inadequacies in the scale or reflects the actual behavior of the sample.

Concerning effects of order of presentation on subject performances, the significant differences found with Form II of the Task show that sequence was an important variable. A first, "warm-up" session led to greater publicness and greater openness. Thus, at least with this sample, it may be assumed whatever "stress" or "anxiety" is involved in uncertainty in responding to this test, is associated with more private and closed responses.

Sex and Age Variables

Since, as mentioned, these two variables were confounded in the sample, their effects are considered together. The female group was more public and open, at a level of significance on Form II, than the male group; and gave more essential responses, at a significant level on Form I, than the males. The females also showed more consistency in their performances on the two Task forms. Order of presentation could not be a significant source of variation in the above results, since more females received Form II first than Form I.

Since the female group was also the older group, it is impossible to tell whether the difference in performance of the two groups were due to sex, age, or a combination of both.

CHAPTER VI

SUMMARY

This study involved the construction of a new object sorting task, and a scoring system to be used with it. Preliminary standardization or normative data were derived. The ultimate purpose is the creation of a more sensitive and adequate instrument than now exists for measuring or characterizing the conceptual behavior of normal adults. The form of the task was modeled after Rapaport's Revised Object Sorting Test. The scoring system was developed by scaling McGaughran's two dimensions of his conceptual area schema--"order of conceptual classification" and "extent of social agreement." A third dimension of "essentiality" was also introduced.

Two potentially equivalent forms of the task, passive phase only, were administered to an adult standardization sample composed of 15 males and 15 females. Data derived from these protocols were analyzed to assess interscorer agreement, equivalence of task forms, independence of scaled dimensions, and the variables of order effect of presentation of task forms, and sex and age.

A satisfactory degree of interscorer agreement was achieved, although with extensive collaboration of the judges

during scoring. It was found that the order of object groupings in terms of difficulty, as well as some of the object groupings within themselves, need to be rearranged in order to attain greater equivalence of task forms. In their present form, the scaled dimensions are not sufficiently independent.

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