The similarity and diversity of semantic relations

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There is a rich variety of semantic relations in natural languages. Subjects' perceptions of similarities among relations were studied for a wider variety of relations than had been used in previous studies. Forty subjects sorted 31 cards bearing five example pairs of each of 31 semantic relations. Subjects were able both to distinguish the relations and to perceive their similarities. A hierarchical clustering analysis of the sorting data indicated that the subjects perceived five families of semantic relations (contrasts, class inclusion, similars, case relations, and part-wholes). The five families were distinguished in terms of three properties of semantic relations: contrasting/noncontrasting, logical/pragmatic, and inclusion/noninclusion. Within each family, relations also were sorted in ways consistent with their defining properties. Relations were therefore viewed not as unanalyzable primitives, but in terms of the relational properties that distinguished them.

Semantic relations between concepts are basic components of language and thought (Bierwisch, 1970; H. H. Clark, 1970; Evanechko & Maguire, 1972; Evens, Litowitz, Markowitz, Smith, & Werner, 1980; Katz, 1972; Leech, 1974; Miller, 1969; Miller & Johnson-Laird, 1976; Osgood & Richards, 1973; Palermo, 1978). Relying on associative and introspective data, Wundt (1893) identified and classified a wide range of relations. Wundt recognized two general classes: outer associations (part-wholes, word sequences) and inner associations (categorical relationships, similars, coordination, causal relations). At least 13 other classification systems were proposed prior to 1911 (Warren, 1921).

More recently, researchers have been directly concerned with the study of semantic relations in two related areas: the development of general models of semantic memory (Anderson, 1976; Norman & Rumelhart, 1975; Schank, 1973) and the study of semantic decisions (Cohen, 1977; Danks & Glucksberg, 1980; Kintsch, 1980; Smith, 1977). In both areas, research has focused on a limited number of relations, and the similarities between relationships have not been explored. General models of semantic memory have been developed to account for the comprehension and representation of propositional knowledge (Anderson, 1976; Norman & Rumelhart, 1975; Schank, 1973). In these models, information is represented by a network of labeled rela-

tions between nodes that stand for concepts. Relations serve as unanalyzed, primitive terms; consequently, their number has been restricted in the interest of economy. As a result, only a fraction of the total number of relations in the English language have been considered. The scope and power of current models would be enhanced by encompassing the wider range of relations considered by earlier generations of psychologists.

Semantic decision tasks have been used primarily to explore hypotheses about the processes involved in the perception of relations between concepts. In a typical experiment, subjects are timed as they decide whether or not two words exemplify a particular target relation (e.g., Is a "robin" a "bird"?). These studies have also been limited to a few relations, primarily class inclusion (Collins & Quillian, 1969; Loftus, 1973; McCloskey & Glucksberg, 1979; Smith, Shoben, & Rips, 1974), although some attention has been given to synonymy and antonymy (Glass, Holyoak, & Kiger, 1979; Herrmann, Chaffin, Conti, Peters, & Robbins, 1979) and to the part-whole relation (Chaffin, Herrmann, & Andrews, 1981; Chaffin, Williams, & Herrmann, 1982; Lorch, 1981).

The variety of relations is important both to general models of comprehension and to semantic decision models. For general models of comprehension, the differences among relations are important because relations differ in their logical properties and in the inferences that they permit. For example, contrary ("sweet-sour") and contradictory ("married-unmarried") opposition differ in that contrary opposition admits of degrees, for example, "very sweet," whereas contradictory opposition does not, for example, "very married."

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For decision models (e.g., Kintsch, 1980; Smith, 1977), the differences among relations are important because each relation might be expected to call into play a unique set of decision criteria (Herrmann et al., 1979). For example, class inclusion decisions, it has been suggested, are based on criteria for inclusion (e.g., McCloskey & Glucksberg, 1979; Smith et al., 1974), whereas antonym decisions require an evaluation of the nature of the opposition (Herrmann et al., 1979; Herrmann, Chaffin, Daniel, & Russo, 1981).

Once the diversity of relations is noted, it is apparent that relations vary in their similarity to each other. For example, there appears to be a family of contrast relations that have more in common with each other than they do with other relations (e.g., contradictories, "alive-dead"; contraries, "hot-cold"; directionals, "above-below"; reverses, "buy-sell"; incompatibles, "frank-hypocritical"; see Bolinger & Sears, 1981; Groves, 1973, and Kempson, 1977). These family resemblances must be accounted for by models of semantic memory. Relation similarity has been found to affect performance in semantic decision tasks (Chaffin, Herrmann, & Andrews, 1981; Chaffin, Russo, & Herrmann, 1981; Chaffin, Williams, & Herrmann, 1981; Herrmann et al., 1979), restricted association tasks (Perfetti, 1967; Riegel & Riegel, 1963), and ratings of conformity to a target relation (Chaffin & Herrmann, 1981). The purpose of the present research was to develop an empirically based account of similarities among relations for a wider range of relations than previous research had done.

An A Priori Taxonomy of Semantic Relations

Inspection of earlier classification schemes suggests the existence of five main families of relations: contrast, class inclusion, similars, case relations, and part-whole relations (Evens et al., 1980; Flavell & Flavell, 1959; Miller, 1969; Perfetti, 1967; Riegel & Riegel, 1963; Whitehurst, 1979; Woodworth, 1938; Wundt, 1893). The agreement on these five families is not unanimous; for example, some classification schemes group class inclusion with part-whole relations (e.g., Trautsholdt, in Warren, 1921, p. 248), whereas others do not (e.g., Aschoffenburg, in Warren, 1921, p. 249; Kraepelin, in Warren, 1921, p. 250). These five families, nevertheless, provide an a priori framework within which the relations selected for the study will be described. The relations selected include most of the relations mentioned in earlier classification schemes, together with others found in the work of linguists and philosophers. In addition, we distinguished several types of part-whole relation.

Contrast. This family consists of relations in which the meaning of one term contrasts, opposes, or contradicts the other term (Bolinger & Sears, 1981; Cruse, 1976; Groves, 1973; Kempson, 1977; Leech, 1974; Lyons, 1968; Ogden, 1932). This class includes four types of antonym relation and three types of relations involving opposition that is not generally regarded as antonymous. Contradictory antonyms are terms op-

posed dichotomously (e.g., "alive-dead"). Contrary antonyms are opposed symmetrically on a continuous dimension (e.g., "hot-cold" are equally opposed temperatures). Directional antonyms are concepts opposed in time or space (e.g., "before-after," "above-below"). Reverse antonyms, sometimes called converses, represent opposed actions (e.g., "buy-sell"). Of the relations not normally regarded as antonymous, asymmetric contraries are opposed on a continuous dimension but, as the term indicates, asymmetrically (e.g., "hot-cool"); the imperfect symmetry is the reason the relationship is not generally regarded as antonymic (Katz, 1972). Incompatibles are terms in which the denotative meaning of one term is opposed to only part of the denotative meaning of the other term; for example, "frank" is incompatible with "hypocritical" in that hypocrisy involves dishonesty, whereas frankness involves both honesty and outspokenness. Because the opposition does not involve the full denotative meaning of these terms, they are not antonyms (Groves, 1973). Pseudoantonyms are so called because their opposition is based on a connotative meaning of one term; for example, "popular" and "shy" are opposed because popularity connotes extroversion, which is denotatively opposed to shyness (Herrmann et al., 1979).

Similars. This family consists of terms that overlap in denotative meaning, connotative meaning, or both. The best known of these relations is synonymy, in which terms have the same denotation (e.g., "car-auto"; Herrmann, 1978; Naess, 1953). Dimensional similarity involves denotative agreement that is not sufficient for synonymy but that occurs at adjacent points on a common dimension (e.g., "laugh-smile"; Flavell & Flavell, 1959). Another relation in this family is attribute similarity, in which salient attributes of one term resemble those of another (e.g., "rake-fork"; Perfetti, 1967). The above similarity relations require terms to be in the same form class. Necessary attribution, in contrast, involves a term and a defining attribute of the term (e.g., "lemon-sour"; Flavell & Flavell, 1959).

Class inclusion. Relations in this family involve one term whose denotative meaning subsumes that of the other term. Unlike the other relation families, there are no precedents or clear logical grounds for distinguishing different types of class inclusion relations. Nevertheless, six types were included in the present study so that the class inclusion relation should be as well represented as the other major relations. We distinguished the six types through the kind of information that forms the basis for the inclusion relation. Perceptual subordinates are objects that are principally characterized by their visible, physical properties (e.g., "animal-horse"; see E. V. Clark, 1973, and Rosch & Mervis, 1975). Functional subordinates are objects that are principally characterized by their functions (e.g., "vehicle-car"; see Nelson, 1974). State subordinates and geographical subordinates involve, respectively, states (e.g., "emotion-fear") and places ("country-Russia"). Activity subordinates and

action subordinates involve activities (e.g., "game-chess") and actions ("cook-fry"), respectively.

Case relations. The relations involved in predication or attribution have been variously described as case, syntactic, and syntagmatic relations (Fillmore, 1968; Flavell & Flavell, 1959; Warren, 1921). These relations have played a central role in network models of propositional knowledge (e.g., Anderson, 1976; Norman & Rumelhart, 1975), in which the assignment of default values to cases of verbs has provided a powerful tool for explaining inferences (Rumelhart & Ortony, 1977). For example, a typical agent for the activity of barking is a dog; the agent-action relation is exemplified by pairs such as "dog-bark." Often, agents have instruments that they typically use; "farmer-tractor" is an example of the agent-instrument relationship. Likewise, there are often typical objects of an agent's activity; "plumber-pipes" is an example of the agent-object relation. A typical recipient of sweeping is the floor; the action-recipient relation is represented by pairs such as "sweep-floor." The action-instrument relation is represented by, for example, "cut-knife."

Part-wholes. The relations in this family involve inclusion that is pragmatic rather than necessary, as is the case with class inclusion (Chaffin, Herrmann, & Andrews, 1981; Winston & Chaffin, 1982). The relations selected were derived freely from the literature on the part-whole relation (Chaffin, Winston, & Herrmann, 1984; Cruse, 1979; Goodman, 1951; Jespersen, 1933; Lyons, 1977; Markman & Seibert, 1976; Miller & Johnson-Laird, 1976; Nagel, 1961; Scharvy, 1980). Parts of functional objects are distinguished by the fact that they must be in a particular spatial and functional configuration in order to play their proper roles in the functioning of the whole (e.g., "airplane-wing"). Parts of functional locations, in contrast, are less restricted in the spatial relations they can have to other parts of the whole (e.g., "kitchen-refrigerator"). Spatial inclusion is also a characteristic of places and their parts, but in this case the inclusion is criterial and the function of the parts is irrelevant to the relation (e.g., "Germany-Hamburg"). For organizations, spatial inclusion is irrelevant; parts are related to the whole by their organizational status and by their function (e.g., "college-admissions office").

The preceding part-whole relations involve wholes that have heterogeneous parts. Two other part-whole relations involve parts that are homogeneous. Items in a collection are all similar to each other and are part of the whole merely by virtue of being close to one another (e.g., "tree-forest"; Markman & Siebert, 1976). Groups are similar to collections of objects, except that members of groups are animate and the criteria for membership involve a social transaction rather than mere spatial proximity (e.g., "faculty-professor"). Two additional part-whole relations differ from the others in that their parts are not readily distinguishable or separable from one another. Ingredients cannot be separated readily

from the whole (e.g., "pizza-cheese"; Scharvy, 1980), and units of measure (e.g., "mile-foot") also merge one with another.

An Empirical Taxonomy

An empirical taxonomy was developed by asking subjects to sort examples of the 31 relations described above. A hierarchical clustering analysis of the results yielded a taxonomy that summarized the subjects' classifications. If subjects perceive relations as falling into the five *a priori* families, these groupings will appear in the empirical taxonomy. It is possible that the empirical may differ from the *a priori* classification. Differences may occur, first, because the relations exhibited by a word pair are often ambiguous. For example, we selected "rug-blanket" and "rake-fork" to represent the relation of attribute similarity. The relation of "rug-blanket" might also, however, be viewed as class inclusion, if a blanket is viewed as a type of rug, or as coordination, if rugs and blankets are both viewed as types of covering. To minimize this kind of misinterpretation, five examples of each relation were used. Second, a relation may have properties of more than one family. For example, attribute similarity might legitimately be regarded as a similarity relation or as a contrast relation, such as "pepper-salt." Third, the families identified in the *a priori* analysis may not represent the most natural grouping of the relations selected. For example, subjects may not distinguish part-whole from class inclusion or class inclusion from similarity; similarity might be viewed as a type of case relation or as akin to contrast.

METHOD

Subjects

Forty undergraduate students of Hamilton College performed a sorting task and were paid \$1.00 for each .5 h served.

Procedure

Thirty-one relations were selected for the sorting task, with five examples representing each relation. The five examples for each relation were typed on 3 x 5 in. cards, with each relation being represented by one card. The 31 relations and the examples used for each are listed in the Appendix.

The subjects were given the deck of 31 cards and instructed to sort the cards into two or more piles such that cards representing the same or similar relations were in the same pile. The task was illustrated with two additional relations: coordinate ("doctor-lawyer") and reciprocals ("judge-defendant").

RESULTS

The sorting data were first summarized in a 31 x 31 similarity matrix that represented the number of subjects who placed each pair of cards in the same pile. The upper and lower halves were then collapsed and analyzed by a hierarchical clustering procedure (diameter method; Johnson, 1967). The solution is shown in Figure 1; clusters based on 13 or more subjects were significant ($p < .05$; Fillenbaum & Rapoport, 1971). The

Figure 1. Hierarchical clustering solution for 31 semantic relationships.

fit of the solution to the data was assessed by correlating similarity matrices for the solution and the data; the fit was satisfactory [$r(463) = .75, p < .001$].

Inspection of Figure 1 shows that the most general distinction recognized by the subjects was that between contrasting and noncontrasting relations. The noncontrasting relations, in turn, were divided into two kinds: logical relations (the left branch) and pragmatic relations (the right branch). These were, in turn, each composed of two of the a priori groups. The logical relations—similar and class inclusion relations—involve an overlap in the meaning of the two terms in a relation and thus are based on similarity. The pragmatic relations—part-whole and case relations—do not involve similarity of meaning; rather, the two concepts are related by a pragmatic association. The two families of inclusion relations—part-whole and class inclusion—were located in separate branches of the taxonomy. The property of inclusion thus distinguished the two families of logical and the two families of pragmatic relations. The five

families were thus distinguished in terms of the three properties: contrasting/noncontrasting, logical/pragmatic, and inclusion/noninclusion.

The five main groups of relations in Figure 1 correspond to the five a priori groupings. This can be seen by inspection of the Roman numerals representing the a priori classification of each relation in Figure 1. There were four instances in which relations were placed in groups that differed from their a priori classifications. Three of these were reasonable alternative classifications; one was based on a superficial similarity of content. First, the relation of invited attributes ("stove-hot") was grouped with similars rather than with the case relations. Within the family of similarity relations, invited attributes were sorted most frequently with necessary attributes ("tower-tall"), indicating that the subjects saw invited and necessary attribution as having relation properties in common. Second, action subordinates ("cook-fry") were also included with the similars rather than with the class inclusion relations; again, this was not an error on the part of the subjects, since action subordinates and superordinates are often used interchangeably, which is a feature of synonymy but not of class inclusion. Third, attribute similars ("rake-fork") were placed with the contrast relations. This is perhaps more appropriate than the a priori grouping with the similars; attribute similars are coordinates, which is a contrast relation (Chaffin & Herrmann, 1981). The only disagreement with the a priori classification that cannot be explained in terms of defining properties of the relations was the sorting of the part-whole relation for places ("Germany-Hamburg") with the class inclusion relations. This unexpected result appears to have been due to the subjects' confusing the part-whole relation of geographic inclusion with the class inclusion relation for geographic terms ("country-Russia").

Relations within each family were also organized by similarity. Among the part-whole relations, the major distinction was between those relations involving parts that can be readily distinguished from each other, for example, integral object-proper part ("car-engine"), and the relations involving indistinguishable parts, for example, measure-unit ("mile-yard"). Case relations were divided into relations involving agents and those involving actions. Relations in the similars cluster were organized by the type of concept involved: actions, objects, or properties. The main division of class inclusion relations was between places and the other concepts, which were, in turn, divided into classes for which the membership criteria were perceptual, that is, perceptual subordinates ("tree-oak"), and classes for which the criteria were abstract, that is, states ("illness-measles"). The contrast relations were sorted in terms of degree of approximation to the antonym relation. The four relations that are generally regarded as antonyms, for example, contraries ("hot-cold"), were clustered

most closely, and the least antonymic relations, pseudo-antonyms ("popular-shy") and attribute similars ("rake-fork") were sorted with these least often.

DISCUSSION

The taxonomy in Figure 1 replicates many aspects of Wundt's (1893) classification scheme and the schemes of several others (Warren, 1921). First, as expected, there were five major branches in the solution, corresponding to the five families of relations that have appeared in many earlier classifications (Warren, 1921; Whitehurst, 1979). Second, the organization of the five families coincides with earlier semantic analyses of relations. The contrasting/noncontrasting distinction, used here to describe the highest level division of the five families, has been made by some philosophers (Kempson, 1977). Also, the logical/pragmatic distinction evident in the present data was strongly anticipated by prior schemes that classified relations on the basis of internal and external associations (Warren, 1921; Wundt, 1893). The two inclusion relations were distinguished (Markman & Seibert, 1976); class inclusion was placed with the logical relations, part-whole with the pragmatic relations.

The subjects were able to follow instructions to sort by relation similarity and did not use other criteria. Subjects did not sort in terms of the semantic similarity of the examples; for example, functional locations ("kitchen-refrigerator") and types of artifact ("kitchen utensil-spatula") were correctly placed in different families. [Only in the case of geographic inclusion ("Germany-Hamburg") did the subjects sort by semantic similarity.] The subjects also did not sort on the basis of form class; for example, relations exemplified by noun-noun pairs were correctly assigned to each of the major clusters: "car-engine" to part-whole, "farmer-tractor" to case relations, "car-auto" to similars, "vehicle-car" to class inclusion, and "rake-fork" to contrasts. The subjects also did not use strength of association as a criterion; in each family, there were some relations illustrated by strong and some by weak associations; for example, "alive-dead" and "popular-shy" were both classified as contrast relations. The subjects' ability to avoid using these alternative bases for classification indicates that they were able to identify relations from the examples and to compare them in terms of the properties that defined the relations.

In addition to providing a taxonomy and a similarity metric for semantic relations, the present results make two general points about semantic relations that have implications for models of semantic memory and models of semantic decisions. First, the study makes the point that there are more distinct semantic relations than those discussed in recent work. Current models of semantic memory that represent propositional knowledge (e.g., Anderson, 1976; Norman & Rumelhart, 1975; Schank, 1973) have limited the number of relations that they encompass in the interests of parsimony.

The power and scope of these models would be increased by incorporating the variety of relations used in the present study. This is because each relation has its own properties and therefore supports different inferences.

How many relations must be accounted for is unclear. It is clear that the types of relation will not suffer the indefinite proliferation that was thought to afflict semantic features (Bolinger, 1965). There are fewer relations than there are pairwise associations between words; word pairs that clearly share the same semantic relation were easily identified in the present study. Even if the number of relations proves to be large, the task of accounting for their diversity is made more manageable by the organization of relations into families. There may, of course, be families of relations not identified here, but it is unlikely that their number will be large, since the relations used in this study were based on an extensive search of the literature. The suggestion that models of semantic memory should encompass the diversity of relations is not, therefore, an unreasonable one.

The second point that the present data make is that relations need not always be treated as unanalyzable primitives. The subjects were able to group relations in terms of relation similarity. This required a discrimination of aspects in which relations were the same and different (cf. Tversky, 1977). Those aspects of the relations that subjects distinguished most frequently are represented by the major branches of the taxonomy: contrasting/noncontrasting, logical/pragmatic, and inclusion/noninclusion. Within each family, further distinctions were made; within the part-whole family, for example, the subjects discriminated relations with distinguishable and indistinguishable parts. These distinctions represent the semantic and logical properties that define relations (Kempson, 1977; Leech, 1974; Lyons, 1968, 1977). Each family is characterized by relation properties common to all members; the members of the family each possess additional relation properties that determine the way in which the common relation properties are expressed. For example, among the contrast relations, contrary antonyms ("hot-cold") are opposed on a continuous dimension, whereas contradictory antonyms ("alive-dead") are opposed on a dichotomous dimension.

The subjects in the present experiment were able to decompose relations into their component properties. This suggests that relation properties may play a role in other cognitive tasks involving semantic relations. (We have suggested elsewhere that antonym decisions involve an evaluation of properties that define the antonym relation; Herrmann, Chaffin, & Daniel, 1984; Herrmann et al., 1981.) The present data do not indicate how decomposition is accomplished. Some relational knowledge is almost certainly computed, for example, that a tomato is more readily squashed than a cabbage,¹ whereas other knowledge is almost certainly prestored for example, that people have thumbs (Smith, 1977)

Decomposition of prestored relations is readily explained if relations are stored as bundles of links, each link representing a property of a relation. If prestored relations are represented as atomic and unanalyzable links, some additional computation is required to account for decomposition.

In summary, a rich diversity of relations exists in natural language. We suggest that models of semantic memory would be enhanced by encompassing this diversity. The problems of representing a large number of distinct relations in semantic memory are made manageable by the fact that relations can be decomposed into defining properties that are shared in varying numbers by different relations. The ability of the subjects in the present experiment to do this suggests that a similar process of decomposition may operate in other situations that require the comprehension of relations.

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- E. Asymmetric Contrary
fat-skinny, hot-cool, rich-destitute, dry-moist, large-tiny
- F. Incompatible
frank-hypocritical, vigilant-careless, happy-morbid, slow-stationary, healthy-inanimate
- G. Pseudoantonym
popular-shy, generous-poor, right-bad, believe-deny, push-stretch
- II. Similar
- A. Synonymy
car-auto, purchase-buy, die-expire, smart-intelligent, rapidly-quickly
- B. Dimensional Similarity
smile-laugh, hungry-starving, brutal-unkind, dirty-soiled, torment-annoy
- C. Attribute Similarity
rake-fork, painting-movie, rug-blanket, valley-gutter, tower-needle
- D. Necessary Attribution
stripe-long, tower-high, bachelor-unmarried, giant-tall, hag-ugly
- III. Class Inclusion
- A. Perceptual
animal-horse, flower-rose, metal-copper, fish-salmon, bird-robin
- B. Functional
musical instrument-violin, kitchen utensil-spatula, carpenters' tool-hammer, furniture-chair, vehicle-car
- C. State
disease-polio, emotion-fear, social status-blue collar, physical shape-healthy, marital status-divorced
- D. Geographical
city-Utica, country-Russia, continent-America, state-New Jersey, planet-Mars
- E. Activity
sport-football, game-chess, crime-theft, arts-dancing, hobby-gardening
- F. Action
talk-lecture, clean-scrub, cook-fry, go-hurry, ask-beg
- IV. Case Relationships
- A. Agent Actions
artist-paint, dog-bark, lion-roar, horse-gallop, orator-speak
- B. Agent Instrument
farmer-tractor, soldier-gun, student-book, doctor-stethoscope, janitor-mop
- C. Agent Object
carpenter-lumber, baker-bread, tailor-clothes, sculptor-clay, plumber-pipes
- D. Action Recipient
sit-chair, hunt-prey, flush-toilet, eat-food, sweep-floor
- E. Action Instrument
drink-cup, cut-knife, write-pen, chew-teeth, wash-soap
- F. Invited Attribution
food-tasty, bed-comfortable, hospital-clean, lemon-sour, professor-intelligent
- V. Part-Wholes
- A. Functional Object
car-engine, tree-branch, house-roof, face-nose, airplane-wing
- B. Functional Location
house-dining room, kitchen-refrigerator, library-card catalogue, campus-student union, store-cash register
- C. Places
Germany-Hamburg, Asia-China, New York City-Empire State Building, Clinton-Town Square, Washington, D.C. White House
- D. Organization
college-admissions office, a business-sales department, police force-homicide division, government-executive branch, army-supply corps

NOTE

1. We thank Mary Crawford for this example of a computed relation.

APPENDIX

Stimuli for Card Sort

I. Contrasts

- A. Contradictory
male-female, alive-dead, remember-forget, fertile-sterile, guilty-innocent
- B. Contrary
old-young, thin-fat, smooth-rough, happy-sad, tall-short
- C. Directional
front-back, left-right, west-east, before-after, inside-outside
- D. Reverse
attack-defend, buy-sell, love-hate, expand-contract, command-obey

E. Measure

mile-yard, pound-ounce, hour-minute, gallon-pint,
dollar-cent

F. Collection

forest-tree, fleet-ship, rockpile-rocks, range-mountain,
bunch-grapes

G. Ingredients

ice cream-sugar, salad-tomato, pizza-cheese, shirt-cloth,
table-wood

H. Group

choir-singer, regiment-soldier, faculty-professor, Senate-
Senator, orchestra-conductor

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