Word Associations and Linguistic Theory

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experiments (e.g. Clark & Card, 1969). There was a tendency for a sentence such as *The girl isn't as bad as the boy* to be recalled as *The girl is better than the boy*, showing that the 'feature' that both the girl and boy are bad has been forgotten (see below, pp. 273–9).

It is natural to wonder whether the sentence is the largest unit normally involved in the recall of language. It is possible that from the meanings of sentences in a connected discourse, the listener implicitly sets up a much abbreviated and not especially linguistic model of the narrative, and that recall is very much an active reconstruction based on what remains of this model. Where the model is incomplete, material may even be unwittingly invented to render the memory more meaningful or more plausible (Bartlett, 1932) – a process which has its parallel in the initial construction of the model (Gomulicki, 1956). A good writer or raconteur perhaps has the power to initiate a process very similar to the one that occurs when we are actually perceiving (or imagining) events instead of merely reading or hearing about them. Hence it is likely that the study of linguistic memory shades imperceptibly into the study of memory in general.

15. WORD ASSOCIATIONS AND LINGUISTIC THEORY

Herbert H. Clark

'Associationism' has long been very influential in psychology. As far as language is concerned, this is the doctrine that, whenever two words occur together or in close proximity, an 'associative' link is formed between them in the mind of the hearer, and the more frequently they occur together the stronger the 'association'. This theory is at least superficially attractive (because, as Clark says below, it is 'simple'); and it seems to explain the fact that, when people are presented with one word as a stimulus and asked to produce as a response the 'first word that comes into their head', there will be a fair degree of consistency in the results (provided that the responses are made without reflexion or hesitation). It is after all a fair assumption that all speakers of a language have met the words with which they are familiar (or at least the most common words) in the same contexts. There is, however, an alternative explanation. This is that we are able to produce associations as a consequence, a side-product as it were, of our ability to understand and produce utterances; and that these associative links between words do not play any fundamental role in the acquisition or use of language. This is the point of view taken by Clark.

The reader will find this chapter easier to follow if he has read the chapters on generative syntax (especially pp. 134–8, dealing with selection restrictions and subcategorization) and semantics (pp. 166–84).

It will be noted that Clark, unlike Johnson-Laird in the previous chapter, accepts the psychological validity of 'deep structure' (in the sense of Chomsky, 1965). However, the rules he proposes in order to account for word associations do not appear to depend crucially upon this fact.

THE free-association game has been played for centuries. It requires only a stimulus, a referee, and a player who is willing to

follow the simple rule, 'Say the first thing that comes to mind when the stimulus is presented to you.' When the game is further restricted to single words as both stimuli and responses, it is more properly called the word-association game. It is this game that will be the subject of the present chapter.* Unlike conversation or the other language games we play daily, the word-association game is an artificial, derivative phenomenon, important not because it is interesting in itself, but because it reveals properties of linguistic mechanisms underlying it. Our ability to produce associations is presumably derived from our ability to understand and produce language. For this reason, language must play a central role in the explanation of these associations.

Word associations have not always been thought of in this way, and even now most psychologists treat word association in the way the British empiricists have done for several centuries. For these psychologists, two words become 'associated' with each other when the two are experienced in temporal contiguity. Quite recently, however, this simple, hence attractive, theory has been severely criticized for a variety of reasons (Chomsky, 1959; McNeill, 1966; Clifton, 1967). Most important among these reasons is that 'association theory' cannot account for language comprehension and production: language, the critics say, should not be thought of as a consequence of built-up associations; rather, word associations should be thought of as a consequence of linguistic competence (cf. p. 246).

Word associations have characteristically different effects depending on the rules the player has followed. When the player is allowed to take his time, he generally reacts with rich images, memories, or exotic verbal associations, and these give way to idiosyncratic, often personally revealing, one-word responses. But when he is urged to respond quickly, his associations become more 'superficial', less idiosyncratic, and more closely related in an obvious way to the stimulus; these responses are much more predictable in that they are the ones almost everyone else gives to

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the stimulus. But if he has to respond even more quickly, the player will ignore even the meaning of the stimulus and produce 'clang responses', words that sound like or rhyme with the stimulus. Of these three categories, it is the second that is most dependent on linguistic competence. But there are important differences even among these fast, meaningful responses. The common associations – i.e., the responses other people are most likely to give – are produced more quickly than the uncommon ones. This suggests that we can attach greater importance to the fastest, most frequent associations, for hypothetically they are the product of the basic association mechanisms.

Even the most preliminary analysis of the word-association game reveals its kinship with language comprehension and production. The game has three identifiable stages: (1) the player must 'understand' the stimulus; (2) he must 'operate' on the meaning of the stimulus; and (3) he must produce a response. It is the unique second stage that clearly sets this game apart from normal language mechanisms. It contains an 'associating mechanism', which, through its 'associating rules', fixes the response at the third stage. I will go into these associating rules in some detail, but only after examining what is known about understanding and producing sentences, the counterparts of the first and third stages in word association.

According to one current linguistic theory (Katz & Fodor, 1963; Katz & Postal, 1964; Chomsky, 1965), the meaning of a sentence consists essentially of its deep-structure relations plus the dictionary entries of the lexical items inserted into this deep structure (cf. pp. 124–8 above). There also is some psychological evidence to suggest that comprehension involves coming to know the deep-structure relations between the lexical items in a sentence (Miller, 1962; McMahon, 1963; Gough, 1965, 1966; Clark, 1969). In production, on the other hand, the speaker might begin with an abstract semantic characterization of what he intends to say, then construct a surface structure in keeping with this characterization. Psychological evidence supporting this view comes from experiments that require subjects to recall sentences presented previously. Typically, subjects are found to reconstruct sentences anew from certain fragments of the deep structure and

semantic features they have retained from the original sentence, not from fragments of surface structure (Mehler, 1963; Fillenbaum, 1966; Sachs, 1967; Clark & Clark, 1968; Clark & Stafford, 1969; Clark & Card, 1969).

When this view of comprehension and production is incorporated into the first and third stages of the word-association game, the requirements of the second stage become much clearer. Consider the stimulus *man*. At stage one, comprehension entails setting up a list of features that completely characterizes this surface realization, perhaps as follows: [+Noun, +Det—,+Count, +Animate, +Human, +Adult, +Male] (for the notation and the concept of syntactic *features*, cf. p. 135). At stage two, some associating rule is applied. If the rule were 'change the sign of the last feature', the associating mechanism would alter [+Male] to [−Male]. And then, at stage three, production would form the realization of the altered feature list [+Noun, +Det—, +Count, +Animate, +Human, +Adult, −Male] as *woman*.

Surface structure, however, is only an imperfect indicator of deep structure, and analogously the surface form of a one-word stimulus is particularly ambiguous. At stage one, the surface realization *man* could be assigned several abstract characterizations: (1) *man* meaning 'male adult human', (2) *man* meaning simply 'human' (3) the verb *man* meaning 'attend to', and so on. With these different meanings, the same stage-two associating rule will give quite different results. Whereas the rule 'change the sign of the last feature' produced *woman* from the first *man*, it might produce *animal* or *beast* from the second *man*. Ambiguity of the surface form is one of the most important problems in word association.

I will now consider various important associating rules. In keeping with traditional studies of word associations, I will treat 'paradigmatic' and 'syntagmatic' responses separately. 'Paradigmatic' responses are those that fall in the same syntactic category as the stimulus; 'syntagmatic' responses are those that fall into other categories (cf. p. 16). For example, a paradigmatic response to the noun 'tree' might be the noun 'flower'; a syntagmatic response to the same word might be the adjective 'green'.

For adults, paradigmatic responses are far more prevalent than syntagmatic ones, so they will be discussed first.*

The Paradigmatic Rules

THE MINIMAL-CONTRAST RULE. If a stimulus has a common 'opposite' (an antonym), it will always elicit that opposite more often than anything else. These responses are the most frequent found anywhere in word associations. As McNeill (1966: 555) remarks, 'It appears that for adjectives at least, and possibly for nouns also, the most frequent paradigmatic response tends to be a word with a maximum number of features in common with the stimulus. The paradigmatic response then forms a *minimal contrast* with the stimulus.' Stated in terms of features, the rule would go as follows: 'Change the sign of only one feature.' (Although not stated in this form, this rule is equivalent to the law of contrast of the early British empiricists.)

The most compelling evidence for this rule comes from the so-called 'polar' adjectives (*long* v. *short*, *good* v. *bad*, etc.). Deese (1964) found that the most frequent association to each of 80 such adjectives was its antonym. At the first stage, the feature list for *long*, for example, would end with [+Polar] (Bierwisch, 1967). The second-stage associating rule would change [+Polar] to [−Polar], and the third stage result would be *short*. Nouns, too, often show alterations of only one feature. Among animate nouns, the sign of the feature [±Male] is reversed, giving *male-female*, *man-woman*, *boy-girl*, *he-she*, *him-her*, *aunt-uncle*, etc. (and vice versa) as most frequent responses. Antonymous prepositions, e.g. *up-down*, *above-below*, and *to-from*, strongly elicit each other with a change of the feature [±Polar] (Clark, 1968), and so do verb 'converses', e.g. *give-take*, *sell-buy*, *go-come*, and so on. Other frequent single-feature contrasts include [±Plural] in verbs (*is-are*, *was-were*, *has-have*, etc.), [±Past] among strong verbs (*is-was*,

*In the rules that follow, there is much in common with proposals by McNeill (1966), Clifton (1967), Perfetti (1967, 1968) and Marshall (1968), who share the present point of view; but these rules would have been impossible to formulate without the extensive word-association norms now available (Palermo & Jenkins, 1963; Fillenbaum & Jones, 1964; Entwisle, 1966) as well as some of my own (Wright & Clark, unpublished data).

are-were, *has-had*, *take-took*, etc.), [±Nominative] among pronouns (*he-him*, *she-her*, *they-them*, etc.), and [±Proximal] among the deictic words (*here-there*, *this-that*, *now-then*, etc.). Obviously, the minimal-contrast rule accounts for a large number of the commonest responses in word associations.

We can strengthen the minimal-contrast rule considerably, however, by noting that it is not a single rule, but rather a hierarchy of rules. In many of the 'minimal pairs' just illustrated, the changed feature was not a random one, but the last feature in the list. (This, of course, assumes that features can be ordered in a motivated way: cf. Bierwisch, pp. 167–84 above and 1967.) *Man* most frequently elicits *woman*, not *boy*, indicating a change in [+Male] (the final feature), not in [+Adult] (the penultimate feature). Similarly, the changed feature among antonymous adjectives and prepositions was [±Polar] also the final feature. Features not coming in the final position are also changed, but less often. *Man* does elicit *boy*, and it does so more often than it elicits *girl*, which results from changes on two features. Table 1 shows several examples of a major contrast (on the final feature), a minor contrast (on the penultimate feature), and a double contrast, along with their proportions of occurrence in word association norms. A series of minimal contrast rules might therefore be proposed in the following form: 'Change the sign of one feature, beginning with the bottommost feature.' Allowed to apply several times, it would result in the previously illustrated responses, as well as those in Table 1.

THE MARKING RULE. This rule, a particularization of the minimal-contrast rule, was suggested by some remarks of Greenberg (1966: 53). He pointed out that there was a greater tendency to change a feature from, rather than to, its *marked* value in word-association data. (For the distinction between the 'marked' and the 'unmarked' terms of an opposition, cf. p. 17. In the assignment of values in the examples given below, I have for simplicity followed Greenberg, 1966, although I recognize that certain of these assignments are debatable.) Consider the feature [±Plural] for nouns. A plus signals the addition of the morpheme 'Pl', usually /z/; a minus signals the morpheme 'Sg', usually zero.

Table 1. Stimuli with major, minor, and double contrasts as responses with their percentage of occurrence in word association norms.

Features	Stimuli	Major Contrast		Minor Contrast		Double Contrast	
[±Child,	man	woman	62	boy	8	girl	3
±Female]	woman	man	53	girl	9	boy	1
	boy	girl	70	man	5	woman	0
	girl	boy	60	woman	5	man	1
	father	mother	65	son	15	daughter	2
	mother	father	67	daughter	5	son	0
	son	daughter	42	father	28	mother	3
	daughter	son	40	mother	10	father	7
[±Nominative,	he	she	42	him	8	her	10
±Female]	she	he	31	her	17	him	5
	him	her	65	he	5	she	2
	her	him	25	she	12	he	2
[±Nominative,	we	they	48	us	20	them	0
±Proximal]	us	them	30	we	37	they	5
	they	we	20	them	38	us	8
	them	us	22	they	7	we	3
[±Past,	is	are	19	was	14	were	0
±Plural]	are	is	21	were	5	was	2
	was	were	21	is	18	are	0
[±Deixis,	here	there	67	now	6	then	0
±Temporal	there	here	37	then	3	now	2
±Proximal]	now	then	38	here	4	there	1
	then	now	36	there	10	here	0

[+Plural] is therefore the marked value, and [−Plural] the unmarked. In word-association data, then, it should be commoner to find, say, *dogs-dog* than *dog-dogs*, and it is. Comparative adjectives also elicit their positive forms (*better-good*) more often than the reverse (*good-better*), and past participal verbs their infinitive forms (*brought-bring*) more often than the reverse (*bring-brought*). Marshall (1968) extended this rule to unmarked and marked adjectives (e.g., *long* and *short*, respectively) (cf. Lyons, 1968: 466). An examination of 16 pairs of adjective stimuli that have only one antonym (data from Deese, 1964) generally supports his extension, with 14 of the 16 pairs consistent with the rule. Also, if we take the accusative case to be unmarked with respect to the nominative case (Lyons, 1968: 356), the rule holds, with the

stimulus-response pairs *I-me*, *he-him*, *she-her*, *they-them*, etc., occurring more often than the reverse pairs. Again, if the suffix *-less* is marked with respect to *-ful*, the rule holds once more, as in pairs like *careless-careful*, *thoughtless-thoughtful*, and *useless-useful*. And there are other cases which confirm this.

On the other hand, *man* is generally considered to be unmarked with regard to *woman* (Greenberg, 1966: 25), and *he* with regard to *she*, *him* with regard to *her*, and so on. Yet *man* elicits *woman* more consistently than *woman* does *man*; the same is true for *he* and *she*, *her* and *him*, and certain others. To save the marking rule, *man* would have to be shown to be marked, and *woman* unmarked. This, however, would go against the very foundations of marking found in Greenberg (1966) and elsewhere. The marking rule therefore cannot be retained as a general rule.

Some results which seem to agree with the marking hypotheses can furthermore be explained in an alternative way by considering the surface ambiguity of the stimuli. The unmarked adjective *deep*, for example, could be assigned either of two senses at stage one: (1) 'in depth', as in *three feet deep*, or (2) 'opposite to shallow', as in *The river is deep*. But *shallow* has only one sense, 'opposite to deep'. If the minimal-contrast rule is invoked at stage two, *deep* will at times produce words like *high*, *far*, etc., from sense (1) and at other times *shallow* from sense (2); *shallow* on the other hand, will always produce *deep*. The consequence is that *shallow* should elicit *deep* more often than the reverse, which agrees with the data. Thus the minimal-contrast rule, taken together with the surface ambiguity of unmarked adjectives, might account quite simply for the asymmetry in associations between unmarked and marked words.

THE FEATURE-DELETION AND -ADDITION RULES. There also appear to be rules that either delete features from, or add features to, the end of the feature list. As Marshall (1968) points out, the deletion rule should have precedence over the addition rule, since there are many possible features that might be added, but those to be deleted are exactly specified. Deletion of features generally produces superordinates, like *fruit* from *apple*, while addition of features produces subordinates, like *apple* from *fruit*.

Both superordinates and subordinates occur often in word associations, but subjects generally offer superordinates more quickly than subordinates (Woodworth & Wells, 1911; Karwoski & Schacter, 1948). Another example of feature deletion is the dropping of [+Cause] from such verbs as *kill* yielding *die* (Lyons, 1968: 381ff.). Again, this feature is more often dropped than added, as in pairs like *kill-die*, *teach-learn*, *feed-eat*, *show-see*, etc. (Wright & Clark, unpublished data). If we assume that for *listen-hear*, *listen* is identical to *hear* except for an additional [+Volitive] and that the same is true for *look-see*, then the precedence of deletion over addition is again confirmed (Wright & Clark, unpublished data). The feature-deletion and addition rules, like the minimal-contrast rule, actually consist of a hierarchy of rules, with single deletions and additions preferred to multiple operations.

Word associations often include near synonyms, like *house-home*, *odour-smell*, *seem-appear*, *thing-object*, etc. One sense of *home* appears to contain all the features of *house* plus some extras indicating that it is someone's usual residence, but other synonyms differ in different ways. Although partial synonyms have not been characterized in any consistent form in terms of feature theory, it is clear that they usually have feature lists differing on only a few, possibly optional, features. The feature-deletion and addition rules, then, also produce synonyms. But the minimal-contrast rule has priority over these rules, for if the stimulus has a full antonym, it is always more frequently given as a response than is a partial synonym (cf. e.g. Clark, 1968: 430).

With many stimuli, applying the minimal-contrast and feature-deletion and addition rules produces semantic representations that have no surface realization in English. In such cases, the rules must be applied repeatedly. The result that does finally have a surface realization could be semantically far removed from the stimulus. Nevertheless, we should find certain of the most basic features of the stimulus untouched. This leads to the following general rule.

THE CATEGORY-PRESERVATION RULE. A long-standing observation in word-association literature is that stimuli tend to

elicit paradigmatic responses (Thumb & Marbe, 1901; Deese, 1962; Fillenbaum & Jones, 1965). This is not too surprising given the previous rules, since the responses produced by those rules are always paradigmatic. But there are seeming exceptions. Common adjectives elicit other adjectives almost invariably, but uncommon adjectives do so less consistently (Deese, 1964). As Deese pointed out, this happens because the common adjectives mostly belong to antonym pairs and have minimal contrasts, whereas the uncommon ones do not. The category-preservation rule is therefore a negative one: 'Do not change features high on the list,' such as the feature [+Noun] or [+Adjective]. The rule is, in fact, only another aspect of the rules stressing that features at the bottom of the list should be altered first.

This rule need not be restricted to the highest feature alone, e.g. the feature [+Verb]. The next few features down, according to Chomsky (1965), are the subcategorization feature, like [+——NP] for transitive verbs, and the selectional feature, like [+——Det[+Animate]] for transitive verbs that accept only animate objects (for the distinction between *subcategorization* and *selection*, cf. p. 135 above). According to the category-preservation rule, the feature [+Verb] should be preserved most often, [+——NP] less often, and [+——Det[+Animate]] least often. Evidence for this ordering is found in the word associations to common English prepositions (Clark, 1968). The category feature [+Preposition] was preserved most often, with paradigmatic responses occurring more often than anything else. But subcategorization features were also often preserved, since prepositions within the subcategories of place, manner, direction, etc. tended to elicit each other. Finally, selectional restrictions like [+——Det[−Animate]] and [+——Det[—Abstract]] were also often preserved; prepositions with similar objects tended to elicit each other. These three effects were of approximately decreasing importance, just as the category-preservation rule would predict.

Paradigmatic responses, therefore, appear to be produced by a fairly homogeneous set of rules, perhaps ultimately by one very general rule. This *simplicity-of-production rule* might be stated as follows: 'Perform the least change on the lowest feature, with the restriction that the result must correspond to an English word.'

Expanded, this rule defines 'least change' in such a way that the operations of (1) changing the sign of a feature, (2) deleting a feature, and (3) adding a feature, are of increasing difficulty. And the rule defines 'lower feature' in the way specified and illustrated above. The reason people do not always choose the easiest rule to apply is because that rule results in a semantic representation with no possible surface realization in English; unsuccessful applications of simpler rules therefore force people to use more and more complex rules.

The Syntagmatic Rules

Syntagmatic responses are found much less often than paradigmatic responses in word associations; and they are more difficult to characterize in rules. But there are two related rules that appear to account for the bulk of the syntagmatic responses.

THE SELECTIONAL FEATURE REALIZATION RULE. The list of features for a word often contains selectional features that partially characterize the meaning of the potential context of that word. The adjective *young*, for example, has selectional restrictions on the nouns it can modify, as specified in the feature [+Det[+Animate]be——]. Many responses to *young* are merely specific realizations of this feature – e.g. *boy*, *child*, *girl*, *man*, and *people*. To produce these responses, the respondent took the partial feature list [+Noun, +Animate] filled it out with other features, and gave the result; the features added were often other features of *young*, since some responses were words with the feature [−Adult] – *boy*, *girl*, and *child*. The rule that accounts for these responses might be stated as follows: 'Take the features specified by a selectional feature, adding as many features as necessary for a surface realization; in addition, restrict yourself to the "significant" part of the selectional feature, the portion specifying a lexical word.'

The selectional feature realization rule accounts for the differences in the number of syntagmatic responses people give to nouns, verbs, adjectives, and so on. Notice that in the theory put forward by Chomsky (1965) nouns have no selectional features, although verbs, adjectives, and other categories do. So nouns

should elicit relatively few syntagmatic responses in comparison to the other categories. As confirmation, we see that in Deese's (1962) large sample of stimuli and responses nouns produced only 21 per cent syntagmatic responses, while verbs produced 48 per cent, adjectives 50 per cent, and adverbs 73 per cent. Several further predictions of this sort can be verified in data from Fillenbaum & Jones (1965). First, the selectional features for adjectives specify the nouns they modify. So adjectives should elicit nouns most often, and they do, with nouns accounting for 80 per cent of the syntagmatic responses. Similarly, the selectional features for verbs specify the subjects and objects that govern the verb. So nominals (nouns and pronouns) should occur most often here also, and they do. Verbs likewise select for the particles and prepositions that occur with them, as in *get along*, *seem like*, and *try out*; these responses also occur quite often. Prepositions select for their objects, so prepositions should elicit nominals most often as their syntagmatic responses. This is also confirmed (cf. also Clark, 1968). It is within prepositions that the dominance of the previous minimal-contrast rule over the selectional feature realization rule is best illustrated. Some prepositions have a common antonym, hence the minimal-contrast rule can be successfully applied to them. These prepositions tend to elicit far fewer nominals than other prepositions do (Deese, 1965; Clark, 1968). This implies that the selectional feature realization rule is usually applied only after certain other rules have failed.

THE IDIOM-COMPLETION RULE. The stimulus *cottage* often elicits *cheese*, completing the common idiomatic phrase *cottage cheese*. Likewise, *whistle* elicits *stop*; *white*, *house*; *stove*, *pipe*; *justice*, *peace*; *how*, *now*; *so*, *what*; and so on. The rule that generates these responses is a close cousin of the selectional feature realization rule, for it seeks out a selectional feature that has only one realization. The rule might be stated: 'Find an idiom of which the stimulus is a part and produce the next main word.' Without better semantic specification of idioms, this rule will have to stand as it is.

This rule might also be appealed to to explain many apparently paradigmatic responses. *Ham* elicits *eggs*, *bread* elicits *butter*,

and *needle* elicits *thread*, probably not so much because the responses are paradigmatic, but because they are completions of common idioms. But carried too far, this reasoning might be used to explain the associations *here-there*, *high-low*, *now-then*, *man-woman*, etc, in exactly the same way. Instead, the phrase *here and there* appears to be common just because *here* and *there* are simple contrasts, and it is the latter fact that explains their frequent occurrence in word associations. This interpretation is further supported by Marshall's (1968) observation that, for example, *low* elicits *high* more often than *high* elicits *low*, in spite of the fact that the normal order of the two words is *high and low*. The rule usually applied in these cases is therefore the minimal-contrast rule, not the idiom-completion rule.

Syntagmatic responses are influenced in important ways by the normal left-to-right production of sentences. *Cottage* often elicits *cheese*, but *cheese* rarely elicits *cottage*; and the same is true of other idioms. The idiom-completion rule therefore works left to right, not right to left. Also consider adjective stimuli with the selectional feature [+Det [−Abstract] be——]. If the selectional feature realization rule is to add as few extra features as possible to [+Noun Phrase, −Abstract], it should often produce pronouns. But it does not. Almost all nominal responses to adjectives are full nouns. Nouns would be produced, of course, if the adjectives were taken to be in their normal pre-nominal position, where pronouns are impossible. So here again, normal left-to-right order dictates to some extent the form responses will take. Also, in the case of transitive verbs, their features restrict subjects and objects both, yet responses to transitive verbs tend to be objects rather than subjects (Clark, 1964); furthermore, the objects of transitive verbs can be produced more quickly than their subjects in restricted word-association tasks (Cattell, 1887).

Nevertheless, syntagmatic associations are not merely continuous fragments of normal speech, as writers such as Saporta (1959) have assumed, but rather responses that bear only an abstract relationship to normal speech. First, note that many stimulus-response pairs would never be found in normal speech – e.g., *about-house*, *bread-butter*, *on-table*, etc. – for there is a missing function word in between stimulus and response. People prefer to give lexical

rather than function words as responses. And the distance between syntagmatic associations and speech is also demonstrated in a comparison of (a) the nominal responses to prepositions with (b) the objects of the same prepositions in sentences people had composed (Clark, 1968). Whereas the nominal responses are pronouns 48 per cent of the time, the objects are pronouns only 4 per cent of the time. In word association, the rule that produces a realization for [+——[−Abstract]], for example, does so by adding as few other features as possible, so the responses are often semantically 'empty' pronouns, like *it, them, him, her*, etc. In full utterances, on the other hand, speakers tend to fill in the feature list, producing nouns as objects. So the nominal responses and the true objects of a preposition reflect the same selectional restrictions, but the selectional feature realization rule, when applied with time limitations, is more likely to produce simpler realizations in the form of pronouns.

Thus, although syntagmatic responses first *appear* to be different from paradigmatic responses, they are produced by rules that belong to the same class of rules stated for paradigmatic responses – the simplicity of production rule. To repeat that rule, 'Perform the least change on the lowest feature, with the restriction that the result must correspond to an English word.' To include syntagmatic responses, we must consider the operation of isolating selectional features and filling out their feature list to be a possible 'least change', an operation more difficult, however, than changing feature signs or deleting or adding features. The various expansions of this rule are obvious.

Concluding Remarks

By listing several paradigmatic and syntagmatic rules, I have been assuming that the process of word association is not a homogeneous one, but rather a set of alternative processes. There is independent support for this claim in the data of Moran, Mefford and Kimble (1964). They found three classes of people in word association. Those in the first class gave mostly 'contrasts' (*big-little, man-woman*) and 'co-ordinates' (*yellow-blue, apple-orange*), to use their terms, and responded very quickly. Those in the second class preferred to give 'synonyms' (*big-large*) and 'super-

ordinates' (*apple-fruit*) and responded less quickly. The people of these two classes were quite similar compared to those in the third class, who gave mostly 'functional' associations (*red-apple, needle-thread*) and did so quite slowly. Obviously, the three classes can be characterized by their reliance on the different associating rules – the minimal-contrast rules, the feature-deletion and addition rules, and the syntagmatic rules, respectively. This is strong evidence for the independence of the separate rules, or rather of the separate *operations* within the general 'simplicity of production' rule.

The rules presented here are for adults. Several important studies (Ervin, 1961; Palermo & Jenkins, 1963, 1965; Entwisle, 1966) have shown that children, in contrast to adults, give mostly syntagmatic responses, even for those stimuli that have common antonyms. And from about five to nine years of age, children go through a 'syntagmatic-paradigmatic shift', where they move from giving mainly syntagmatic to giving mainly paradigmatic responses. The shift occurs at different times for different syntactic categories, with nouns first, adjectives second, verbs third, and adverbs last (Entwisle, 1966). An ingenious explanation for these early associations has been devised by McNeill (1966), who assumes that the young child has only partly formed feature lists. Therefore, when the child attempts to find a minimal contrast, he ends up by contrasting on syntactic category features, rather than semantic features, as adults do. It seems more likely, however, that the young child does not have a minimal-contrast rule until he has the lower binary features he can apply it to. Instead, with his incomplete feature lists, he merely uses one of the syntagmatic response rules on the selectional features he already has for use in producing utterances. Unfortunately, we can only speculate in this area until more is known about the child's linguistic competence and about the relation of adult competence to word associations.

In this brief account of the word-association game, I have tried to show that any successful explanation of word associations must be formulated in terms of syntactic and semantic features. In such a theory, the explanation will consist of rules that operate on features of a stimulus to produce features of an utterable

response. Examination of the data now available suggests what several of these rules must be, but further work waits on more extensive studies of the semantic features in the lexicon. Because of the limited scope of this review, I have had to omit discussion of many very important studies – e.g. Deese's work (1964, 1965), which shows the extent of very subtle semantic information in word associations; these studies often contain rich and orderly data but have no ready explanations. Since the word-association game is so easy to play, we know plenty about the scores. We now need to find out more about the rules.

16. SOCIOLINGUISTICS

J. B. Pride

Sociolinguistics, as Pride says below, is not simply an amalgam of linguistics and sociology (or indeed of linguistics and any other of the social sciences). It embraces, in principle at least, every aspect of the structure and use of language that relates to its social and cultural functions. It will be clear from the present chapter that this is a very wide brief!

It is frequently suggested that there is a conflict between the sociolinguistic and the psycholinguistic approach to language; and furthermore that generative grammar (which, according to Chomsky, 1968: 1, is a branch of cognitive psychology) must necessarily adopt the latter. I do not believe that this is so.

The two points of view, the 'sociolinguistic and the psycholinguistic, can certainly be distinguished at the moment (and linguists tend to favour the one or the other according to their particular interests). But ultimately they must be reconciled. The ability to use one's language correctly in a variety of socially determined situations is as much and as central a part of linguistic 'competence' as the ability to produce grammatically well-formed sentences. Whether the theory of generative grammar can be extended to account for the full range of linguistic competence remains to be seen. But it is interesting to note that Campbell and Wales, who write as cognitive psychologists in an earlier chapter, do in fact advocate the necessity of widening the notion of competence to take account of at least part of what might be called the 'social context' of speech (pp. 250–57). I have already mentioned this point in connexion with Halliday's rejection (from what we may call a 'sociolinguistic' standpoint) of Chomsky's notion of competence (p. 140).

THE study of language as part of culture and society has acquired the now commonly accepted label 'sociolinguistics'. But any single name for such a vast field of inquiry would be misleading if