

BEHAVIOR

Interanimation between words

A word depends on the cooperation of neighboring words in a sentence for meaning. Now a study reported in the July 18 *SCIENCE* demonstrates that we process normal sentences at the phonetic, lexical, syntactic and semantic levels at the same time. In other words, the utterances we hear are immediately integrated at four levels of description, and analyzed simultaneously for meaning.

It is not unusual in conversational discourse to anticipate words, based on preceding words just spoken. To measure the interaction between constraints of structure and context, William D. Marslen-Wilson of the University of Chicago interwove word and context anomalies in sentence pairs, utilizing the shadow paradigm (in which subjects repeat speech as they hear it). In the second sentence of semantic and syntactic pairs, trisyllabic target-words were inserted: "The new peace terms have been announced. They call for the unconditional *universe* of all the enemy forces." Word disruptions consisted of altering any syllable of the target-word, rendering it nonsensical.

The test examined the effects of context on word restoration. It was found that 88 percent of all errors were of the "word restoration" type, repeating "tomorrane" as tomorrow, for example. Context restoration errors (the remaining 12 percent) indicated the holistic assimilation of "higher-level constraints"—reinstating words in their original forms that had been replaced by contextually deviant words.

Concludes Marslen-Wilson: "The listener analyzes incoming material at all available levels; . . . information at each level can . . . guide simultaneous processing at all other levels."

Sex and the lowland gorilla

The sex life of gorillas is interesting to gorillas—and to researchers at the Wisconsin Regional Primate Research Center in Madison who are studying the mechanisms that regulate sex behavior in ape species. In the Spring issue of the center's publication, *PRIMATE RECORD*, a recent study of the sex life of gorillas is described.

In order to study how the female's hormonal state affects sex behavior in the male gorilla, animals were paired throughout the female's estrous cycle. Researchers found copulation was related to the presence of the genital swelling that takes place when the female's estrogen level is high. The amount of swelling affected male behavior as much as the presence or absence of swelling. Males were most likely to copulate at the time of maximum swelling. This, however, restricted copulation to three days a month.

The male's ejaculating capacity did not increase with the female's swelling. Males initiated more sexual behavior but were not more likely to ejaculate. The researchers also note that gorillas, like other advanced primates, prefer certain sexual partners. And in addition to the common dorsal-ventral copulation, gorillas sometimes engage in ventral-ventral copulation (a position once believed to be unique to human primates).

Sterilization on the rise

Among U.S. couples who had reached their desired family size by 1973, 29 percent had already undergone a contraceptive sterilization. This figure is up from 18 percent in 1970 and 12 percent in 1965. An additional 14 percent said they intended to be sterilized. These are among the conclusions of a study conducted by the National Survey of Family Growth for the government's National Center for Health Statistics. The sterilizations were almost evenly divided between male and female operations.

BIOMEDICINE

Treating high blood pressure at work

High blood pressure is recognized as a major risk factor in heart disease. Since less than 10 percent of the 23 million Americans with high blood pressure are being helped, it would be ideal if Americans could be diagnosed and treated for it at their place of employment. Successful implementation of such a program, at Gimbel's department store in New York City, is reported in the July 10 *NEW ENGLAND JOURNAL OF MEDICINE* by Michael H. Alderman and Ellie E. Schoenbaum of Cornell University Medical College.

Of 1,554 employees screened at Gimbel's for high blood pressure, 186 were diagnosed as having it, and 121 of these people accepted Gimbel's-sponsored treatment. Eighty-one percent of these workers adequately reduced their blood pressure.

"The approach appears to be a safe, effective and acceptable method for hypertension control in large numbers of patients," Alderman and Schoenbaum conclude, and recommend that other employers set up similar programs.

Emotions and high blood pressure

Investigators first used emotional stress to trigger high blood pressure in experimental animals 30 years ago. Subsequently, they produced the same effect by electrically stimulating the brain. But how does mental stress actually lead to high blood pressure? An answer to this question is reported in the (just published) June *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES* by M. Samir Amer of the Mead Johnson Research Center and by Nobutaka Doba and Donald J. Reis of Cornell University Medical College.

Amer and his co-workers electrically stimulated the brains of rats. Two hours later the animals experienced a discharge of the sympathetic nervous system and high blood pressure accompanied by pronounced changes in the metabolism of cyclic AMP and GMP in the heart and aorta. The cyclic nucleotides are well recognized intracellular messengers.

So Amer and his colleagues suggest that emotional arousal might lead to high blood pressure via the sympathetic nervous system and the cyclic nucleotides. For example, the sympathetic nerves might alter the metabolism of the cyclic nucleotides in blood vessels, thus leading to changes in the structure of those vessels by making them resistant to blood flow.

How bacterial toxins do people in

How do bacterial toxins poison humans at the cellular level? Answers for three toxins—cholera, pseudomonas and diphtheria—are given in the June *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES*.

The cholera toxin first links to receptors on the membrane of a susceptible cell, reports D. Michael Gill, a Harvard University biologist. Then the toxin solicits the help of a factor in the cell's cytoplasm called NAD so that it can interact with the intracellular messenger cyclic AMP. How activation of cyclic AMP might in turn do in the cell remains to be shown.

Both the diphtheria toxin and pseudomonas toxin solicit NAD to interfere with protein synthesis in cells, Barbara H. Iglewski and David Kabat of the University of Oregon Medical School report. Since the toxins are from unrelated bacteria and are toxic to different cells, this common mechanism of action surprised them. So the two toxins, they suggest, "may have had a common evolutionary origin."

Cell susceptibility to the diphtheria toxin seems to depend on the cell's having chromosome number five, according to Richard P. Creagon and team at Yale University. A gene on the chromosome might "code for a diphtheria toxin receptor."