

**PROGRAM**  
**for The Psychonomic Society**  
**Nineteenth Annual Meeting**

SAN ANTONIO, TEXAS  
Hilton Palacio Del Rio Hotel and  
San Antonio Convention Center

Thursday, Friday, Saturday  
November 9, 10, 11, 1978

## GENERAL INFORMATION

### Hotel Accommodations

Hilton Palacio Del Rio, 200 South Alamo Street, San Antonio, Texas 78206. Telephone: (512) 222-2481.  
The Menger, Alamo Plaza, San Antonio, Texas 78295. Telephone: (512) 223-4361.

### Reservations

A Return Reservation Card for the Palacio Del Rio is enclosed with the Program. A block of rooms is reserved in both the Palacio Del Rio and The Menger (the Menger is about 5 blocks from the Palacio Del Rio), but the reservations must be made at least 2 weeks prior to the meeting or the hotels have the right to reduce the number of rooms being held. **PLEASE MAKE YOUR RESERVATION PROMPTLY.**

### Registration

A registration desk will be set up in the Convention Center.

### Programs

Please bring the Program with you. Additional Programs may be purchased at the registration desk for \$2.00 or by mail from the Secretary-Treasurer for \$2.50.

### Room Locations

The meetings will be held in the San Antonio Convention Center. The Center is located across the street from the Palacio Del Rio Hotel.

## OFFICERS

Chairman, 1978, Abram Amsel  
Secretary-Treasurer, 1978-1980, James F. Voss

## GOVERNING BOARD

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*Results of elections to the Governing Board for 1979-1984 will be announced at the Business Meeting*

## CONDENSED SCHEDULE

### Thursday Morning

Human Learning and Memory I (1-15) . . . . .	8:10-12:30, Fiesta 1 Room
Vision I (16-29) . . . . .	8:10-12:35, Room 31
Animal Learning and Conditioning I (30-43) . . . . .	8:05-12:30, Mission Room
Physiology and Psychopharmacology (44-63) . . . . .	8:00-12:40, Room 25
Psycholinguistics I (64-76) . . . . .	8:10-12:35, Fiesta 4 Room
Human Performance and Reaction Time (77-89) . . . . .	8:00-12:45, Fiesta 6 Room
Attention and Information Processing I (90-103) . . . . .	8:00-12:45, River Room

### Thursday Afternoon

Human Learning and Memory II (104-118) . . . . .	1:00-6:00, Fiesta 1 Room
Perception I (119-135) . . . . .	1:00-6:05, Room 31
Animal Learning and Conditioning II (136-149) . . . . .	1:00-5:25, Mission Room
Hemispheric Dominance (150-155) . . . . .	1:00-3:15, Room 25
Social-Personality Processes (156-169) . . . . .	1:00-5:25, Fiesta 4 Room
Developmental Processes I (170-181) . . . . .	1:00-5:20, Fiesta 6 Room
Attention and Information Processing II (182-197) . . . . .	1:00-5:45, River Room

### Friday Morning

Human Learning and Memory III (198-210) . . . . .	8:05-12:35, Fiesta 1 Room
Perception II (211-224) . . . . .	8:10-12:40, Room 31
Animal Learning and Conditioning III (225-239) . . . . .	8:10-12:50, Mission Room
Brain Function (240-255) . . . . .	8:00-12:50, Room 25
Discourse Processing (256-269) . . . . .	8:15-12:35, Fiesta 4 Room
Attention and Information Processing III (270-282) . . . . .	8:00-12:50, River Room

### Friday Afternoon

Human Learning and Memory IV (283-296) . . . . .	1:00-5:30, Fiesta 1 Room
Sensory Processes and Psychophysics (297-310) . . . . .	1:00-5:45, Room 31
Animal Learning and Conditioning IV (311-325) . . . . .	1:00-5:45, Mission Room
Animal Behavior I (326-339) . . . . .	1:00-5:45, Room 25
Psycholinguistics II (340-351) . . . . .	1:00-5:15, Fiesta 4 Room
Problem Solving and Individual Differences (352-363) . . . . .	1:00-5:05, Fiesta 6 Room
Attention and Information Processing IV (364-377) . . . . .	1:00-5:30, River Room

### Saturday Morning

Human Learning and Memory V (378-389b) . . . . .	8:00-12:45, Fiesta 1 Room
Perception III (390-397) . . . . .	8:20-11:20, Room 31
Reinforcement (398-410) . . . . .	8:15-12:50, Mission Room
Animal Behavior II (411-419c) . . . . .	8:30-12:20, Room 25
Psycholinguistics III (420-431) . . . . .	8:30-12:10, Fiesta 4 Room
Developmental Processes II (432-436) . . . . .	8:30-10:15, Fiesta 6 Room
Vision II (437-440) . . . . .	10:25-11:40, Fiesta 6 Room
Attention and Information Processing V (441-453) . . . . .	8:00-12:35, River Room

### BUSINESS MEETING

Abram Amsel, Chairman  
International Ballroom  
Friday, 5:45-6:45 p.m.

### HOSPITALITY

International Ballroom  
Wednesday, 6:00 p.m. on  
Corte Real Room  
Thursday, Friday, 6:00 p.m. on

## **A NOTE TO THE MEMBERS**

This year there are 456 papers listed on the program, as compared to 454 last year. In accord with the actions of the Governing Board, this year's schedule includes a 5-minute discussion period after each paper. With the large number of papers submitted and the inclusion of the discussion periods, I was faced with the alternatives of increasing the number of concomitant sessions and number of papers per session or rejecting a relatively large number of submissions, most of which would be sponsored papers. I chose the former alternative, primarily in order to maximize the number of presented papers. The tradeoff, of course, is that the sessions are typically longer and the number of concomitant sessions is sometimes greater than in previous years.

The titles used to denote the sessions of this year's program are general. However, in many of the sessions a number of papers are to be presented that are similar in content, at least as judged by the title and abstract. It was, however, not possible to schedule all papers in this way, both because of the diversity of paper topics and because of scheduling restrictions.

Finally, I want to mention that the programming of the convention papers should be viewed as a process which will undoubtedly be modified over time. As such, I would appreciate any constructive suggestions that anyone would like to make to improve the quality of the program and the program format.

**James F. Voss**  
*Secretary-Treasurer*

**Papers read at the 19th Annual Meeting of the Psychonomic Society  
Hilton Palacio Del Rio Hotel and San Antonio Convention Center  
San Antonio, Texas  
November 9, 10, 11, 1978**

**HUMAN LEARNING AND MEMORY I**

**Judith Goggin, University of Texas, El Paso  
Fiesta 1 Room, Thursday morning, 8:10-12:30**

**8:10-8:25 (1)**

**Stimulant-Related State-Dependent Retrieval in Free Recall.** JAMES SWANSON, *The Hospital for Sick Children, Toronto*, JAMES EICH, & MARCEL KINSBOURNE, *University of Toronto*—We have previously reported that state-dependent learning could be induced by a clinically effective dose of methylphenidate in hyperactive children (Swanson & Kinsbourne, 1976). We have now demonstrated a state-dependent effect using a free recall paradigm. As Eich (1977) found with marihuana in adults, cueing abolishes the state dependence.

**8:30-8:45 (2)**

**Anxiety Systems in Brain Dysfunction and Alcoholism.** GERALD ROSENBAUM, *Wayne State University*—A theoretical model of behavioral deterioration found in brain-damaged and alcoholic individuals is presented. Increasing stereotypy of behavior in these individuals is regarded as a joint function of: (a) the primary neuropsychological effects of brain dysfunction on new learning abilities, and (b) the secondary effects of acquired aversions to situations requiring adaptive efficiency. Evidence from research in our laboratories on neuropsychological deficits found in brain-lesioned and alcoholic subjects is shown to be consistent with the model.

**8:50-9:05 (3)**

**Encoding Specificity in the Amnesic Patient.** LAIRD S. CERMAK, *Boston V.A. Hospital*—It has been demonstrated that amnesic patients' retention of individual words can be somewhat improved by instructions to analyze semantic features of the words. However, since this improvement was so small, it was decided to provide feature cues at both input and retrieval in an attempt to gain further memory improvement. Results on both Fisher-Craik and Thomson-Tulving-type tasks indicated that improvement does occur, but only when the semantic cues are "strongly" associated to the target words.

**9:10-9:25 (4)**

**Age Differences in Adults' Free Recall, Cued Recall, and Recognition.** MARION PERLMUTTER, *Institute of Child Development, University of Minnesota* (sponsored by Herb Pick)—Associative orienting tasks eliminated age differences between 20- and 60-year-olds' recognition, but not free or cued recall. The associations generated by these two age groups were compared. In addition, it was found that while younger adults were better able to profit from retrieval cues they generated than from those an experimenter provided, older subjects performed comparably in these two conditions.

**9:30-9:45 (5)**

**Recognition and Frequency Judgments in Young and Elderly.** JOEL S. FREUND & KENNETH L. WITTE, *University of Arkansas*—Young and elderly adults completed a recognition task designed so that sole reliance on the frequency differential between the correct and incorrect alternatives as a cue would lead to below-chance performance. Underwood (1969) found that although performance of college students declined, it leveled off above chance; we replicated this finding. Performance of the elderly was expected

to fall below chance. Performance of both age groups was essentially identical.

**9:50-10:00 (6)**

**Aging and Memory: Declines or Differences?** TERRY R. BARRETT, *Murray State University*—Prior research indicates that memory differences between younger and older adults is limited to recall for meaningful material. Results of the current study suggest that most, if not all, of this recall deficit may not be due to an aging process, per se. In fact, given appropriate conditions, older adults show higher recall than younger adults.

**10:05-10:15 (7)**

**Autobiographical Memory in the Aged.** P. D. McCORMACK, *Carleton University*—A determination was made of the frequency of remembering autobiographical episodes at different points in the life cycle of elderly subjects according to Galton's method of unconstrained search. Frequency declined steadily from the first to the third quarter of life, showing some recovery for the last quarter. Latency data are also reported.

**BREAK**

**10:30-10:45 (8)**

**Solving a Problem vs. Remembering a Solution: Effects in Subsequent Retention.** LARRY L. JACOBY, *McMaster University*—The theme of this paper is: Predicting the effects of repetition requires analysis of the processes subjects engage in to deal with the repeated event. Subjects solved crossword-puzzle problems by either constructing a solution or by remembering a recently encountered solution; subsequent recall of the solution was higher when it was obtained via construction. The effects of repetition are shown to depend upon whether or not the repeated problem requires construction to obtain a solution.

**10:50-11:05 (9)**

**A Direct Manipulation of Level of Processing.** HARLEY A. BERNBACH, GEORGE J. BOGGS, *Purdue University*, & MICHAEL TOGLIA, *SUNY, Cortland*—Several experiments manipulated levels of processing for memory with a direct method, rather than inducing level from a nonmemory task. Recognition was found to be unaffected by level of processing, despite the expected effect on recall.

**11:10-11:25 (10)**

**Variation in Orienting Tasks for Immediate and Final Free Recall.** JOHN H. MUELLER, KEVIN E. KELLER, & STEPHEN M. WHITNEY, *University of Missouri, Columbia*—Subjects received either different or the same versions of either deep or shallow orienting tasks over six successive single-trial free recall lists. Variation in the specific study task was intended to induce a more elaborate encoding, and thus improve retention. There was no evidence to support this prediction; in fact, all groups with orienting tasks were worse than a no-task control group.

**11:30-11:40 (11)**

**An Investigation of Recall Failures by Intentional Learners Given "Shallow" Orienting Tasks.** PAUL W. FOX & RALEIGH LITTLE, *University of Minnesota*—Despite being warned about a forthcoming memory test, learners given nonsemantic orienting

tasks show consistently poor recall compared to controls. Neither practice over a number of lists nor increased processing time eliminates this effect. Such findings raise questions about a "levels" approach and subjects' abilities to assess the mnemonic effectiveness of experimenter-imposed orienting tasks.

11:45-12:05 (12)

**Semantic Context and Set Size.** DOUGLAS L. NELSON & CATHY L. McEVOY, *University of South Florida*—Cuing experiments relevant to encoding specificity and levels of processing will be reported. Context cues were word endings or taxonomic categories, and cue presence at study, strength, and set size were also varied. The results suggested that two principles will be required to explain amount recalled: cue-target similarity and number of functionally activated alternatives.

12:10-12:25 (13)

**The Relationship Between Recognition and Recognition Failure: An Artifact of Sequential Testing.** MICHAEL S. HUMPHREYS & PAUL A. BOWYER, *Northwestern University*—The largely invariant relationship between the proportion recognized and the proportion of recallable words recognized first noted by Tulving and Wiseman (1975) is shown to result from sequential testing effects. Both theoretical and empirical analyses support this conclusion. An alternative to recognition failure is proposed as the appropriate empirical and theoretical "puzzle."

(14)

(Read by title only)

**Effects of Vocalization in Immediate Probed Recall.** NANCY S. ANDERSON, *University of Maryland*—After a list of six words, a single item (chosen at random) was presented as a probe for subjects to recall the word that appeared after the probe in the original list. Proportion correct and reaction time at each serial position supported the effects of vocalization for the most recent items.

(15)

(Read by title only)

**Hypermnnesia for Recall of Complex Events: The Eyewitness.** ROBERT BUCKHOUT, PAUL EUGENIO, *Brooklyn College, CUNY*, & KATHERINE W. ELLISON, *Montclair State College*—Sixty subjects viewed an audio-slide simulation of a crime and gave three "eyewitness" (free recall) accounts separated by (a) 5 min of directed thinking about events or (b) a psychomotor task. There was an increase in "hits" (correctly recalled items) unaf-

## VISION I

John Siegfried, *Pennsylvania College of Optometry*  
Room 31, Thursday morning, 8:10-10:25

8:10-8:25 (16)

**Neural Referent for Stereopsis: What is it?** GEORGE S. HARKER, *University of Louisville*—A moving stimulus is viewed continuously by one eye and intermittently by the other. A constant exposure fraction of intermittent view is increased in duration (cps varied). Seen depth of the moving stimulus is a curvilinear function of exposure duration and encompasses the Pulfrich-Fertsch equivalent. Yet, the continuous view of the other eye provides no obvious referent for Mach-Dvorkak association. Direction of seen depth displacement is consistent with the stimulus origin of intermittent excitation preceding, in time, continuous excitation.

8:30-8:45 (17)

**Interocular Suppression During Apparent Fusion.** D. H. WESTENDORF, *University of Arkansas*, & ROBERT FOX, *Vanderbilt University*—Several dichoptic stimulus conditions yield stable phenomenal percepts that resemble the active suppression of binocular rivalry. Monocular increment detection thresholds were measured in an eye whose presumed dominance was altered by varying stimulation in the other eye. Results suggest that suppression does occur during apparent fusion.

8:50-9:05 (18)

**The Lag Effect in Dichoptic Viewing.** JAMES G. MAY & STEVEN W. GRANNIS, *University of New Orleans*—Using a

letter-recognition task, 10 subjects were asked to report each of two different CV pairs dichoptically presented to the same foveal area. Stimuli were presented at stimulus onset asynchronies (SOAs) ranging from 0 to 150 msec in 25-msec steps. Correct identifications were significantly depressed for the eye receiving the leading stimulus at SOAs of 25 to 75 msec. Monoptic data from three subjects indicated no significant reductions in correct identification as a function of SOA.

9:10-9:25 (19)

**Moving Phantom Contours and the Phantom-Motion Aftereffect Vary with Perceived Depth.** NAOMI WEISSTEIN, WILLIAM MAGUIRE, & MARY C. WILLIAMS, *SUNY, Buffalo*—If a physically homogeneous rectangular region partially blocks a display of vertical stripes moving sideways, "phantom" stripes (Tynan & Sekuler, 1975) and, afterwards, a "phantom-motion aftereffect" (Weisstein, Maguire, & Berbaum, 1977) can be seen within the region. Manipulating perceived depth by placing the rectangle physically closer to the observer than the moving stripes greatly reduces both effects when viewing is binocular, but not when viewing is monocular.

9:30-9:40 (20)

**Eye Signature: Myth or Reality?** CLARE PORAC, *University of Victoria*, & STANLEY COREN, *University of British Columbia*—Helmholtz maintained that the input to the two eyes is phenomenally indistinguishable. This research directly assessed whether observers could reliably identify the eye of target input. Variables considered included sighting dominance, stimulus complexity, and feedback concerning accuracy. Results indicate that observers can identify binocular input but the discrimination of individual monocular channels is poor.

9:45-10:00 (21)

**Utrocular Discrimination in Normal and Stereoblind Humans.** RANDOLPH BLAKE, *CRESAP Neuroscience Laboratory, Northwestern University*, & ROBERT H. CORMACK, *New Mexico Institute of Mining & Technology*—Human observers who lack stereopsis reliably make eye-of-origin discriminations for grating patterns under conditions which render the performance of normal observers unreliable. This lends support to the view that stereoblind individuals possess proportions of monocular and binocular cortical cells similar to those of cats and monkeys deprived of early binocular visual experience.

10:05-10:20 (22)

**Independent Stereoscopic Channels for Different Extents of Spatial Pooling.** LEO GANZ & ROBERT SCHUMER, *Stanford University*—Experiments conducted with dynamic-noise stereograms demonstrated independent stereoscopic channels for different spatial frequencies of "cyclopean" disparity modulation. One experiment showed that observers detect a compound depth grating only when one of two sinusoidal components reaches its own threshold amplitude. A second experiment demonstrated selective spatial frequency adaptation to depth gratings. The mechanisms appear to have rather broad tuning.

BREAK

## VISION I (continued)

Naomi Weisstein, *SUNY, Buffalo*  
Room 31, Thursday morning, 10:35-12:35

10:35-10:50 (23)

**Electrophysiological and Psychophysical Measures of Interocular Suppression.** JAMES G. MAY, *University of New Orleans*, M. RUSSEL HARTER, *University of North Carolina, Greensboro*, & JOHN B. SIEGFRIED, *Pennsylvania College of Optometry* (read by J. B. Siegfried)—The present study reveals that psychophysical thresholds for flashed gratings are significantly elevated when subjects view checkerboards having fundamental Fourier components of the same spatial frequency and orientation in the contralateral eye. This effect is greater in the periphery than in the fovea. Checkerboard stimuli, no matter what the orientation had no interocular suppressing effects on VEPs to flashed gratings.

10:55-11:10 (24)

**Three-Dimensional Object Coherence Can Tolerate Large Degrees of Noise.** J. TIMOTHY PETERSIK, *Miami University* (sponsored by A. J. Pantle)—Subjects judged rotation direction and depth impressions produced by computer-animated simulations of spheres rotating in depth. Noise was introduced (1) by varying the ratio of display elements that moved by perspective rules to those that moved randomly, and (2) by changing the orientation of vectors across frames of the simulation. Surprisingly, much noise could be tolerated in high-perspective conditions before coherent percepts deteriorated significantly.

11:15-11:30 (25)

**Perceived Velocity of Pursued Targets.** ISAAC BEHAR, *USAARL, Ft. Rucker*—Within the context of dynamic visual acuity threshold determinations using Landolt ring targets, subjects also provided magnitude estimates of target velocities. Judgmental scales are linear for target velocities between 10 and 90 deg/sec, but steeper for smaller than for larger targets. Three explanations for the overestimation of velocity of small targets will be discussed.

11:35-11:50 (26)

**Eye Movements and Visual Masking.** CHARLES W. WHITE & JEFFREY D. HOLTZMAN, *New School for Social Research*—A computer and an eye-tracking system were used to present a target at the beginning of a saccadic eye movement and a masking stimulus at the end. The mask was most effective whenever it was positioned at the target's apparent location (as measured by a looking-back procedure), not when it stimulated the target's retinal locus. The results are surprising in terms of current theories of visual masking that require retinal contiguity of targets and masks.

11:55-12:10 (27)

**Influence of Movement Amplitude and Target Complexity on Eye Fixation Duration.** TIMOTHY A. SALTHOUSE & C. L. ELLIS, *University of Missouri*—Subjects were required to make an eye movement of a specific amplitude, fixate on a target containing from one to four letters to decide whether a vowel was present, and then make another eye movement away from the fixation. Fixation duration increased approximately 55 msec for each additional target letter and between 5 and 10 msec for each additional degree of movement amplitude.

12:15-12:30 (28)

**Is More Motion Perceived than Is Present?** ARIEN MACK, ROBERT FENDRICH, & EVA WONG, *New School for Social Research*—When a moving point is tracked by the eyes, stationary objects in the background appear to move in the opposite direction (the Filhene illusion). While estimates of this illusion are available, we do not know whether the velocity of the tracked point is affected by the background. The question at issue is whether there is more motion perceived than is physically present. Relevant data will be reported.

(29)

(Read by title only)

**Color Aftereffects Contingent on Perceived Spatial Frequency.** KEVIN JORDAN & JOHN UHLARIK, *Kansas State University*—Spatial frequency-contingent color aftereffects were induced by adaptation to a single colored grating of a fixed spatial frequency (Experiment 1) or alternate exposure to two different colored gratings of two different spatial frequencies (Experiment 2). The test stimuli for both experiments consisted of gratings placed in two-dimensional pictorial arrays (e.g., Necker cube and corridor illusion) such that while the physical (retinal) spatial frequencies of the test gratings were identical, the perceived spatial frequencies were different due to implicit depth relationships and size constancy. The results indicated that under these conditions the color aftereffects were contingent upon perceived rather than retinal spatial frequency.

## ANIMAL LEARNING AND CONDITIONING I

Elliot Hearst, *Indiana University*

Mission Room, Thursday morning, 8:05-12:30

8:05-8:25 (30)

**Oddity Learning in the Pigeon: Why is Acquisition Faster as the Number of Incorrect Alternatives Increases?** THOMAS ZENTALL, DAVID HOGAN, CHARLES EDWARDS, *University of Kentucky*, & ELIOT HEARST, *Indiana University*—On a 5 by 5 matrix of keys, a 3 by 3 matrix was lit. Pigeons learned a red-green oddity task in which the odd key was always (1) at the center of the lit display, (2) on the edge of the display, or (3) separate from the display. Edge learning was significantly slower than either center or separate.

8:30-8:40 (31)

**Assessment of the Relative Importance of S+ and S- Using Intercurrent Simultaneous and Successive Discriminations.** J. RUSSELL MASON & DENNIS R. WIXON, *Clark University* (sponsored by David A. Stevens)—Rats were trained intercurrently on a simultaneous and a successive visual discrimination. Then either the S+ or the S- from the simultaneously presented pair was replaced by one of the successively presented stimuli. Most errors were made when S- was replaced, suggesting that S- is relatively more important than S+ in visual discrimination learning.

8:45-9:00 (32)

**Short-Term Memory in the Pigeon: A Response-Independent Procedure.** JOHN M. HALE, *University of California, Santa Barbara* (sponsored by Charles P. Shimp)—A response-independent version of Konorski's delayed pair-comparison procedure was used to study short-term memory. Memory for a visual stimulus was affected by the duration of the retention interval, the duration of the sample stimulus, and sources of retroactive interference. Advantages of this procedure over other short-term memory procedures are discussed.

9:05-9:20 (33)

**Short-Term Retention of Temporal Order in Pigeons.** R. G. WEISMAN, *Queen's University, Kingston*—Pigeons were exposed to delays of from 2 to 32 sec between various temporal sequences and the opportunity to respond for food, with only one sequence being correct. Responding to the correct sequence was not affected by delay, but responding to incorrect sequences was an increasing function of delay.

9:25-9:45 (34)

**Ambient Light Impairs Delayed Matching But Spares Discrimination Learning: Is STM Necessary for Learning?** WILLIAM S. MAKI, *North Dakota State University*—A method for measuring short-term memory (STM) during discrimination learning will be presented. In each trial, S+ or S- precedes food or no food, followed by a delayed matching (DMTS) test of STM for the preceding reinforcement or nonreinforcement. Initial results with pigeons indicate that an increase in posttrial (delay interval) illumination disrupts DMTS performance (STM) but has little, if any, effect on rate of discrimination learning.

9:50-10:05 (35)

**Determinants of Dimensional Contrast.** JOHN C. MALONE, JR., & DAVID W. ROWE, *University of Tennessee, Knoxville*—Pigeons received extensive training on a maintained generalization procedure in which a continuum of stimuli were associated with equal or different schedules of VI reinforcement. Gradient forms showed what Blough has called dimensional contrast shoulders, appearing in both positive and negative forms. Analysis showed that stimulus-specific local (sequential) effects may anticipate and even produce subsequent overall gradient forms.

10:10-10:30 (36)

**Effects of Discrimination Training on Stimulus Generalization: Role of Resistance to Extinction and Response-Produced Stimuli.**

DAVID R. THOMAS, C. F. HICKIS, RAYMOND L. JACKSON, & ROBERT J. NEWLIN, *University of Colorado*—In Experiment 1, the TD enhancement effect was observed when overtraining resulted in no sharpening of generalization during extinction. In Experiment 2, when sharpening *did* occur it was comparable for TD and PD groups. In Experiment 3, the latency of the initial response to each test stimulus revealed a sharper TD gradient. Thus, differences in gradient sharpening during extinction or in proprioceptive control cannot explain the TD enhancement effect.

**BREAK**

10:45-11:05 (37)

**Hybrid Theory of Operant Conditioning.** FRANK A. LOGAN, *University of New Mexico*—Hybrid theory of classical conditioning is extended to encompass interval schedules of operant reinforcement. Principal focus is on the dynamic processes occasioned by a change in the schedule. Barpressing behavior of rats is used to illustrate the theoretical approach in which the dependent variable is the momentary probability of a response.

11:10-11:25 (38)

**Intervening Training and the Retention of Concurrent Discriminations.** F. ROBERT TREICHLER & THOMAS PETROS, *Kent State University*—Ten naive rhesus monkeys were tested on the acquisition and retention of five different concurrent tasks, each comprising eight object pairs. These were presented in a series which allowed retention testing after one, two, or three intervening new tasks. No differences were observed in errors to criterion as a consequence of acquisition order, and larger numbers of intervening tasks did not impair retention. However, imposition of a period of no testing yielded transient increments in retention error.

11:30-11:45 (39)

**Acquisition and Extinction of a Complex Chain of Responses.** ROGER L. MELLGREN & MARK W. OLSON, *University of Oklahoma*—Rats were given large, medium, or small reward on a partial or continuous schedule after the rat pressed a bar to open a door to a tunnel which contained a ball which could be pulled back into the starting compartment, clearing the tunnel and allowing access to the goal. The influence of R-S\* vs. S-S\* associations will be discussed.

11:50-12:05 (40)

**Long-Delay, One-Trial Conditioned Preference in Monkeys.** M. R. D'AMATO & JAY BUCKIEWICZ, *Rutgers University*—Cebus monkeys were placed on the nonpreferred side of a T-maze for 1 min, and after a 30-min delay interval spent in a holding cage, they received a food reward in the startbox of the maze. One such "pairing" produced a preference for the previously nonpreferred side. Control groups that received either the placement experience or the reinforcement alone did not exhibit a reversal of preference.

12:10-12:25 (41)

**Matching-to-Sample in Pigeons with Integral and Separable Compound Samples.** MARVIN R. LAMB & DONALD A. RILEY, *University of California Berkeley* (read by D. A. Riley)—Better matching-to-sample performance has been found with one-element samples than with two-element (compound) samples. Pigeons were given compound samples that were constructed to be either integral or separable (after the ideas of Garner) and element samples. Compound type affected matching performance, supporting a divided attention interpretation of the element-compound effect.

(42)

(Read by title only)

**Gonadal Hormones and the Acquisition of a Sidman Avoidance Task.** JOEL S. MILNER, DAVID M. McCORD, ED D. HAMLIN, & GARY L. POOL, *Western Carolina University*—The effects of hormones on the acquisition of a leverpress Sidman avoidance task were investigated. Rats were assigned to six groups: (a) castration with estradiol treatment, (b) castration with estradiol plus progesterone treatment, (c) castration with progesterone treatment, (d) castration with testosterone treatment,

(e) castration with saline treatment, and (f) sham castration with saline treatment. Shocks, responses, and interresponse times were recorded during a 2-h acquisition session. Following acquisition, blood was drawn and serum hormone levels were determined by a radioimmunoassay procedure. Estradiol, relative to testosterone, produced a significant ( $p < .05$ ) reduction in individual variation in the acquisition of the avoidance task. Consistent with previous reports, estradiol-treated rats showed a nonsignificant trend ( $p < .06$ ) toward superior acquisition.

(43)

(Read by title only)

**Signaled and Unsignaled Pacing Schedules.** DAVID I. MOSTOFSKY, MOSHE KAHN, *Boston University*, & CHARLES KARIS, *Northeastern University*—Pacing schedules program reinforcement contingent upon a fixed number of responses, each of which satisfies conditions of DRL with limited hold requirements. In our experiment, three rats were trained on an FR 20 pacing (2) 0.7-1.5 contingency until behavior had stabilized. Responses outside this range (noncriterion) reset the inter-response timer without affecting the count of responses toward S'. Median percent criterion responses during the last 21 sessions were 19%, 34%, and 42% of total responses. A feedback click was then introduced for each criterion response, raising efficiency to 38%, 41%, and 55%, respectively. These changes were highly significant. Both signaled and unsignaled pacing schedules produced significant polydipsic postreinforcement drinking.

**PHYSIOLOGY AND PSYCHOPHARMACOLOGY**

J. Jay Braun, *Arizona State University*

Room 25, Thursday morning, 8:00-12:40

8:00-8:10 (44)

**Neural Mechanism of Habituation in the Mammalian Hippocampus.** LINDA K. SIMMONS & R. J. W. MANSFIELD, *Harvard University*—Evoked responses from the dentate gyrus in lamellar sections of rat hippocampus studied *in vitro* have been shown to exhibit eight parametric characteristics of behavioral habituation. Both theophylline, a phosphodiesterase inhibitor, and dibutyryl cyclic AMP were found to minimize the reduction in EPSPs associated with habituation, indicating the existence of cyclic nucleotide mediation in presynaptic terminals.

8:15-8:25 (45)

**Overeating and Finickiness in Rats with Ventral Hypothalamic Damage Fed Unpalatable Diets.** MARK W. GUNION, *Iowa State University* (sponsored by Ronald H. Peters)—Two experiments showed that rats with ventral hypothalamic knife cuts will overeat a demonstrably unpalatable diet and that rats with ventromedial hypothalamic lesions show finickiness in a strictly diet-specific manner. These results contrast with the predictions of several popular theories of food intake and the generally accepted notion of hypothalamic finickiness.

8:30-8:45 (46)

**Temporal Discrimination by Septal and Normal Rats Following Incremental DRL Training.** PAUL ELLEN & CHARLENE WAGES, *Georgia State University*—Following the establishment of typical response rate differences by septal and normal rats on DRL 20, the animals were given incremental DRL training in which the delay requirement was incremented by 2 sec. Such training did not enable septals to perform comparably to normals on a terminal DRL 20 schedule and there were major differences in the response of the two groups to the incremental procedure. Normal animals showed anticipatory responding in the 2-sec interval preceding the required delay at all values of DRL delay, while septals showed this anticipatory behavior only for DRL delay values less than 14 sec. At higher DRL delays, septals began to anticipate the requirement 4 sec prior to the elapsing of the required delay. This latter effect suggests an impairment in the discrimination of those cues associated with the passage of time since the last response in septal animals.



8:50-9:05 (47)

**Microwaves Influence Behavioral Thermoregulation.** ELEANOR R. ADAIR, *John B. Pierce Foundation and Yale University*—Squirrel monkeys, trained to regulate environmental temperature behaviorally, were exposed in the far field of a horn antenna to brief periods of 2,450 MHz cw microwaves. Incident power densities ranged from 1 to 10 mW/cm<sup>2</sup>. The higher intensities stimulated selection of lower environmental temperatures, suggesting that a thermal component of the microwaves was detected at these levels.

9:10-9:25 (48)

**Neural Correlates of a Signal Detection Task in the Rabbit.** RONALD E. KETTNER, *University of California, Irvine* (sponsored by R. F. Thompson)—Rabbits underwent classical nictitating membrane conditioning to a white noise stimulus, which was then reduced in intensity to auditory "threshold." Multiple unit neural response differences between hit and missed trials were examined in the hippocampus, cochlear nucleus, inferior colliculus, and medial geniculate. The hippocampus responded strongly on hit trials, and weakly or not at all during missed trials and under unpaired control conditions. In the auditory nuclei, the prestimulus mean was generally smaller and the onset response was generally larger during hit trials.

9:30-9:40 (49)

**An ECS-Produced Retrograde Effect for Cue-Dependent Amnesia.** DONALD J. LEWIS & ROBERT LLOYD, *University of Southern California*—Retrograde amnesia has been taken to indicate that amnesic agents affect consolidation processes. Retrograde interference gradients have recently been reported for old, consolidated, aversive memories as a result of competing response cues or amygdaloid stimulation. Retrograde amnesia for old memory was found twice with ECS in appetitive tasks, indicating that active memories, not necessarily new ones, are open to retrograde disruption.

9:45-10:00 (50)

**Effects of a Protein-Deficient Diet on Several Measures of Learning in the Rat.** N. R. REMLEY, DAVID ARMSTRONG, & DENNIS P. GILMAN, *Texas Christian University*—Weaning rats were maintained on a 2% protein, corn-based diet (grits) for 60 to 90 days. Littermates were maintained on Purina Lab Chow. When tested in a two-way active avoidance and visual discrimination task, the grits-fed animals learned as rapidly as the normal controls. These data are consistent with the conclusion that protein-deficient diets are not sufficient for the production of mental retardation.

BREAK

10:15-10:35 (51)

**Neuropsychopharmacological Studies of Human Learning and Memory.** HERBERT WEINGARTNER & NATARAJAN SITARAM, *NIMH*—Psychoactive drugs that alter the activity of cholinergic or catecholaminergic neurons can enhance or inhibit cognitive processes. Studies will be presented which contrast the effects of L-Dopa, amphetamine, choline chloride, physostigmine, arecoline, and scopolamine on the storage and retrieval of information in normal adults, children, and patient groups. Findings are used to help define a framework for describing a psychobiology of human learning and memory.

10:40-11:00 (52)

**Tonic Immobility and the Adrenergic System: Differential Effects of  $\alpha_1$  and  $\alpha_2$  Agonists.** WILLIAM P. DUNLAP, CHARLES W. HENNIG, CRAIG T. HARSTON, & ALLEN A. MACPHEE, *Tulane University*—Effects of adrenergic drugs on tonic immobility were investigated in chickens. Alpha<sub>1</sub> agonists (methoxamine, phenylephrine) decreased duration of immobility, while alpha<sub>2</sub> agonists (norepinephrine, methyl dopa, clonidine, epinephrine) increased immobility. Isoproterenol, a beta adrenergic antagonist, had little effect. Thus, tonic immobility apparently parallels the latest functional classification of alpha adrenergic receptors.

11:05-11:20 (53)

**Amnesia in Chicks and Mice Induced by L-Proline and Some Analogs.** JOEL L. DAVIS, V.A. *Hospital, Sepulveda*—Intracranial injections of L-proline and 3,4 dehydro-DL-proline induce retroactive amnesia of a one-trial passive avoidance task (without concomitant brain seizures or spreading depression) in chicks and mice. 4,5 dehydro-L-pipecolic acid has the same effect on chicks. Other analogs (e.g., D-proline) do not exhibit this effect.

11:25-11:35 (54)

**Lack of Response Inhibition in Rats Prenatally Exposed to Alcohol.** EDWARD P. RILEY, *SUNY, Albany* (sponsored by Gordon G. Gallup, Jr.)—Rats that were prenatally exposed to various amounts of ethanol were tested on two different passive avoidance tasks. In both cases, the ability to withhold responding was inversely related to the extent of alcohol exposure. When tested for spontaneous alternation in a T-maze, prenatally exposed animals showed less of a tendency to alternate than controls.

11:40-12:00 (55)

**Morphine Tolerance Is Due to the Anticipation of Morphine.** SHEPARD SIEGEL, *McMaster University*—Rats rapidly develop tolerance to the analgesic and hyperthermic effects of small doses of morphine. Results of a number of recent experiments suggest that such tolerance is entirely attributable to the acquisition of an association between predrug environmental cues and the systemic effects of the drug.

12:05-12:15 (56)

**Naloxone Effects on Morphine and Behavioral Analgesia in Rats.** MICHAEL T. BARDO, *Iowa State University* (sponsored by Richard A. Hughes)—Morphine- or saline-treated rats were given experience with a nonfunctional hot plate (HP) or not, and subsequently tested on the functional HP. Rats not experienced with the HP displayed behavioral analgesia independent of and additive with morphine analgesia. Naloxone reversed morphine but not behavioral analgesia.

12:20-12:35 (57)

**A Comparison of the Effects of Mescaline to Other Hallucinogenic and Nonhallucinogenic Structurally Similar Substances in Rats Exposed to Footshock.** ROBERT J. SBORDONE, JOSEPH A. WINGARD, & DAVID GORELICK, *UCLA* (sponsored by John Garcia)—The present study compared the effects of mescaline to three hallucinogenic (LSD, DMT, Psilocin) and two nonhallucinogenic, but structurally similar, substances (5-OHDA, DMPEA) in rats prior to placing them in a shock-elicited aggression situation. We found that only mescaline produced pathological aggression or near-lethal biting attacks.

(58)

(Read by title only)

**Concept Identification: Motivation and Failure with Doxepin and Chlordiazepoxide.** VLADIMIR PISHKIN, STEVEN M. FISHKIN, & JAY T. SHURLEY, V.A. *Hospital; University of Oklahoma Health Sciences Center*—Concept identification (CI) performance of 72 human male subjects was analyzed in order to evaluate the effects of motivation (monetary reward) and either antecedent success or failure after 15 days of double-blind regimen on doxepin, chlordiazepoxide, or placebo. Chlordiazepoxide and control subjects demonstrated significant deficit in performance after failure as compared to success conditions; doxepin produced no significant effect upon CI as a function of success-failure manipulation. CI of high-motivation subjects on chlordiazepoxide was significantly poorer than that of the controls, whereas doxepin groups performed at the same level and direction as controls.

(59)

(Read by title only)

**Interactive Effects of ACh-Affecting Treatments and Learning.** W. DOUGLAS GAMMON & ROGER K. THOMAS, *University of Georgia*—Following 6 weeks of exposure to a 12-h light/dark cycle, rats were trained in the dark or light phase following

a saline, physostigmine, or scopolamine injection, 4 or 48 h following ECS or sham ECS on one-way avoidance. Assigning +1 to variables known to elevate (ECS 4 h, physostigmine, dark), -1 to those known to reduce (ECS 48 h, scopolamine), and 0 to those with little effect on ACh activity, combined treatment weights were used to suggest high, intermediate, and low ACh activities. Among other findings, Deutsch's hypothesis that too much or too little ACh impairs learning/memory was supported by a correlation of .78 between predicted performance and trials to criterion.

(60)

(Read by title only)

**Morphine Analgesic Tolerance in Rats: A Search for Hyperalgesia.** RICHARD A. HUGHES & MICHAEL T. BARDO, *Iowa State University*—Morphine- (5 mg/kg) or saline-injected rats received hot-plate exposure (four injection exposures, 48-h intervals; plate either at room temperature—Experiments 1, 2, and 3—or hot—54°C, Experiment 2; 51.5°C, Experiment 3). Two days later, half the animals in each injection-exposure group received morphine or saline and were tested at 49° (Experiment 1), 54° (Experiment 2), or 51.5° (Experiment 3). In each experiment, regardless of exposure-session temperature, animals given morphine for the first time displayed analgesia, animals given morphine for the fifth time displayed tolerance, but morphine-tolerant animals given saline did not display hyperalgesia as predicted by Siegel's conditioning model of morphine analgesic tolerance.

(61)

(Read by title only)

**Abnormal Movements and Psychotropic Drug Experience.** VICTOR MILSTEIN, IVER F. SMALL, & JOYCE G. SMALL, *Indiana University School of Medicine*—Because of increasing concern for drug-induced involuntary movements, all adult and adolescent hospitalized psychiatric patients (n = 102) were examined using the Abnormal Involuntary Movement Scale (AIMS). Recently prescribed drugs were listed from the hospital charts, as were drug use and reactions. Fifty percent scored less than 2 and 91% less than 10 (maximum = 40). However, 22% had significant abnormalities in one or more of the 10 areas examined. Total AIMS score was not associated with reported drug usage ( $r = .038$ ), psychiatric diagnosis (which was associated with drug therapy), medication changes, or side effects. There were associations with polypharmacy and in treatment-resistant cases that received aggressive pharmacotherapy.

(62)

(Read by title only)

**Effects of Glucagon on Feeding in Intact and Vagotomized Rabbits.** PAULA J. GEISELMAN, *UCLA*, DENNIS A. VANDERWEELE, *Occidental College*, & DONALD NOVIN, *UCLA*—Following 0-, 4-, 8-, or 24-h food deprivation, intact and vagotomized female rabbits were infused via hepatic-portal cannulae with pancreatic glucagon (1.0 cc/min, 4 to 10 micrograms/kg BW) or an equal volume of isotonic saline. Food intake was measured at .5, 1, and 2 h postinfusion. Glucagon significantly suppressed feeding in only 0- and 4-h-deprived intact rabbits and was completely ineffective in vagotomized animals. Also, glucagon produced 10% liver glycogen depletion in 4-h-deprived intact animals. It is suggested that glucagon is not a "satiety hormone," but that it can suppress feeding through glycogenolysis.

(63)

(Read by title only)

**Experimental Obesity Syndromes in Rats: Influence of Diet Palatability on Maintenance Body Weights.** MARK W. GUNION, PAUL J. WELLMAN, & RONALD H. PETERS, *Iowa State University*—Female rats with ventral hypothalamic lesions (VMH), knife cuts (KC), or ventral noradrenergic bundle lesions (VNB) were fed successive maintenance diets of .2% quinine powder, .4% quinine powder, plain powder, pellets, mash, and high fat (15-45 days each). VMHs weighed and ate significantly more than KCs and same-diet controls on .2% quinine powder. VNBs weighed significantly more than controls on plain powder,

pellets, and mash, but did not differ from controls on quinine diets, or from KCs and VMHs on high fat. Thus, VMHs will overeat an unpalatable diet, KCs and VMHs respond differently to unpalatable diets, and VNBs may not overeat unpalatable diets.

## PSYCHOLINGUISTICS I

James J. Jenkins, University of Minnesota

Fiesta 4 Room, Thursday morning, 8:10-12:35

8:10-8:25 (64)

**The Semantic Differential as a Measure of Phonetic Symbolism.** ROBERT D. TARTE, *University of Nevada, Las Vegas*—In two experiments, subjects were asked to rate nine CVC nonsense syllables and nine pure tones by using 15 bipolar adjectives. It was found that high tones were rated as more active and less potent than low ones; and factor analyses indicated that monosyllables were rated similarly to pure tones.

8:30-8:45 (65)

**Rapid Shadowing of Syllables: Evidence for Symmetry of Speech Perceptual and Motor Systems.** ROBERT J. PORTER, JR., *University of New Orleans & Kresge Hearing Laboratory* (sponsored by Lawrence W. Dachowski)—Listeners can produce accurate imitations of CV, VV, and VCV syllables within 250 msec of the occurrence of distinctive cues in the stimuli. Comparison of these with various control conditions suggests that the behavior reflects a linking of early prephonetic phases of speech perception with quite late phases of speech motor control.

8:50-9:05 (66)

**The Interactive Nature of Phoneme Monitoring.** GARY S. DELL & JEAN E. NEWMAN, *University of Toronto* (sponsored by Robert S. Lockhart)—Latency to monitor for a target phoneme in a sentence is sensitive to a "top-down" word predictability variable (Morton & Long, 1976) and a "bottom-up" phonological similarity variable (Newman & Dell, 1978). Two experiments are reported demonstrating that these variables interact in a manner which suggests the action of two parallel processes in phoneme detection—one proceeding top-down from the word level and the other from direct analysis of the acoustic signal.

9:10-9:25 (67)

**Relation Between Perception and Production of the /w-r/ Contrast in Young Children.** WINIFRED STRANGE & PATRICIA BROEN, *University of Minnesota*—Twenty 3-year-olds identified a synthetic speech series that differentiated word initial /w/ and /r/. Functions for children who correctly articulated /r/ were comparable to adults' in both consistency and boundary location. Children who substituted /w/ for /r/ in production could differentiate /w/ and /r/ perceptually, but identification was less consistent.

9:30-9:45 (68)

**Segmental and Prosodic Perception Are Not Independent.** JAMES G. MARTIN, *University of Maryland*—In spoken nonsense strings (e.g., a DAS a LAS a GAS), one vowel duration are artificially changed ( $\pm 50$ -130 msec) to produce within-string tempo change. RT was compared to segment targets /b, d, or g/ in tempo-changed vs. intact (as spoken) strings. In general, vowel changes anywhere increased target RT despite practice. Processing-time effects decreased, whereas stimulus-expectancy effects increased with time into the string. The expected input to perception is the intact utterance.

9:50-10:10 (69)

**How to Read Visible Speech.** RONALD A. COLE, ALEXANDER I. RUDNICKY, *Carnegie-Mellon University*, & VICTOR ZUE, *Massachusetts Institute of Technology*—It is commonly believed that it is impossible to read a speech spectrogram of an unknown utterance and determine what was said. We will show a film of an expert who has learned to read visible speech. The expert is able to identify the phonetic content of an unknown utterance from the visual patterns displayed on a spectrogram, and then read off the words.

## BREAK

10:25-10:35 (70)

**Noun-Verb Relations in the Lexicon.** JOSEPH SCHMULLER, *Clark University* (sponsored by David A. Stevens)—Subjects named the related noun when a verb appeared, the related verb when a noun appeared, or simply reported the stimulus word. Half the words changed phonologically from verb to noun, half did not. Vocal latencies indicate that both nouns and verbs have entries in the lexicon, contrary to previous research.

10:40-10:55 (71)

**Some Interesting Differences Between Verbs and Nouns.** DEDRE GENTNER, *Bolt Beranek & Newman* (sponsored by Allan Collins)—Nouns and verbs differ from one another in a number of interesting ways. As compared to common nouns, common verbs are more slowly acquired, less well recalled and recognized, more altered in sentence paraphrase, less accurately translated between languages, and less easily defined. These and other differences are discussed in terms of a fundamental functional distinction between predicates and arguments.

11:00-11:15 (72)

**Conceptual Availability and the Problem of generic *he*.** DONALD G. MACKEY, *UCLA*—This study examines the claim that the word *he* has two equally available, contextually determined meanings: a specific meaning (*male person*) and a generic meaning (*he or she*). A series of reaction time experiments indicated that the *he or she* concept is highly unavailable for generic uses of *he* and that instead of simply "standing for" a noun, pronouns are powerful determinants of the interpretation of a referent.

11:20-11:30 (73)

**Syntactic Disambiguation of Homographs.** JUDITH F. KROLL, *Institute for Cognitive Studies, Rutgers University*, & JANELL M. SCHWEICKERT, *Swarthmore College* (sponsored by Allen Schneider)—Homographs with distinct pronunciations in noun and verb form (e.g., WIND) were preceded by a 200-msec nonpronounced prime consisting of the syntactically disambiguating words TO or THE, or nothing at all. The homographs were pronounced according to the category of the prime approximately 72% of the time, but equally often as nouns and verbs with no prime. The question of whether syntactic context biases lexical access or a later decision process is discussed.

11:35-11:50 (74)

**Comprehension Times for Ambiguous Words in Natural Language Contexts.** THOMAS W. HOGOBOAM, *Cornell University* (sponsored by George W. McConkie)—Three studies examined ambiguous word comprehension times in natural language contexts. In single sentences, *primary* senses are comprehended faster than secondary senses; in mildly constraining passages, differences disappeared; with strong contextual constraints, *secondary* senses are comprehended faster. Foregrounding and repetition do not influence this result. It is argued that comprehension times depend upon both meaning specificity and textual demands.

11:55-12:10 (75)

**The Effect of Word Frequency and Clausal Structure on the Processing of Lexically Ambiguous Sentences.** GREGORY L. DUNLAP, *University of Iowa* (sponsored by James V. Hinrichs)—Word frequency was found to be an important determinant of results obtained using the phoneme-monitoring task to test sentence processing strategies. With appropriate controls, the results of a phoneme-monitoring task and a sentence completion task indicated that the clause is a psychologically real unit of sentence processing.

12:15-12:30 (76)

**Text Structure and Reading Times for Sentences.** RANDOLPH K. CIRILO & DONALD J. FOSS (read by D. J. Foss)—Short stories were presented one line at a time on a CRT with a reader-paced presentation rate. Reading times for each line were collected. A set of experimental sentences each occurred in more than one story, their role in the text structure being the independent

variable. Reading times for the same sentence were systematically longer when it was "high" in the text structure.

## HUMAN PERFORMANCE AND REACTION TIME

Michael Posner, University of Oregon

Fiesta 6 Room, Thursday morning, 8:00-12:45

8:00-8:20 (77)

**Skilled Preattentive Processes in Radiologists' Visual Search.** RICHARD G. SWENSSON, SAMUEL J. HESSEL, & PETER G. HERMAN, *Harvard Medical School & Peter Bent Brigham Hospital*—When radiologists searched X-ray films for any abnormalities present, they discriminated abnormal and normal features better than when the test features were specified explicitly. Search ROC curves were fit from the nonsearch ROC by a two-stage model, assuming that search performance benefits from an initial perceptual filter which selects a refined subset of features for evaluation.

8:25-8:40 (78)

**Organization in Real Time.** DAVID J. OSTRY, *McGill University* (sponsored by D. Bindra)—Automatization and real-time structure are examined in a study where typists copy single words at varying delays following their presentation. The data indicate that preparation during the response-signal interval extends only to the first character in the word, suggesting a substantial real-time component in the organization of skill. The results are discussed in terms of hierarchic structure and adaptive control.

8:45-9:00 (79)

**Transfer Between Donder's b and c Reactions.** ROBERT E. HICKS, *University of Lethbridge*, & DEBORAH A. ALLEN, *Union College*—Subjects practiced a b reaction (two stimuli and two responses) or a c reaction (two stimuli and one response). Half of the subjects in each group were then switched to the other type of reaction. Transfer was superior from b to c as compared to the reverse.

9:05-9:25 (80)

**The Timing of Rapid Movement Sequences in Typewriting.** SAUL STERNBERG, RONALD L. KNOLL, & CHARLES E. WRIGHT, *Bell Laboratories*—Skilled typists produced short pre-specified stroke sequences (Procedure 1), and typed continuously from text (Procedure 2). We studied the timing of strokes as a function of sequence length, finger pattern, bigram frequency, and lexicality. The main theoretical issue is the existence and consequences of advance planning in the control of rapid movements.

9:30-9:50 (81)

**The Development and Utilization of Internal Models of Dynamic Systems: A Comparison of Monitoring and Controlling.** COLIN KESSEL, *University of Illinois* (sponsored by C. D. Wickens)—Development of internal models pertaining to detections of changes in dynamic systems was investigated. Evaluation of the relative contribution of proprioception and visual cues to the development and accuracy of internal models was made via a transfer of training technique. Proprioception acted as an attention focusing mechanism. Subjects were capable of achieving accurate performance when this cue was withdrawn.

9:55-10:05 (82)

**Chronometric Studies of Strategy Selection.** PETER DIXON & MARCEL ADAM JUST, *Carnegie-Mellon University* (read by M. A. Just)—Strategy selection in a CRT task was studied by surreptitiously measuring the time to initiate a trial after the onset of a cue. The cue indicated which one of several stimulus-response mappings should be used. Strategy selection time was decomposable into the times to select individual features of the strategy.

## BREAK

10:20-10:40 (83)

**Race Model of Choice Reaction Time Based on Variable Criterion Theory.** G. ROBERT GRICE, *University of New Mexico*—Choice reaction time is treated as a race between the growth

of excitatory strengths for the correct and incorrect responses. On any trial, the first response to reach its criterion occurs. The logic and mathematics of such a model are described and estimation equations are presented.

10:45-11:05 (84)

**Estimates of Decision and Residual Time in Psychophysical Tasks: Evidence for a Correlation.** DAVID BURNS, *McMaster University* (sponsored by S. W. Link)—A method based on a random-walk process is presented for estimating the decision and residual components of response time in psychophysical tasks. Experimental results indicate a correlation between decision and residual components when stimulus probability, time deadline, and response compatibility are varied.

11:10-11:20 (85)

**Selecting the Side of the Body, Limb, and Direction of Forthcoming Movements.** DAVID A. ROSENBAUM, *Bell Laboratories* (sponsored by E. Z. Rothkopf)—Subjects performed movements that differed orthogonally in side of the body (left or right), limb (arm or leg), and direction (toward or away from the frontal plane). Before a reaction signal indicating which movement was required, information was given about 0, 1, 2, or 3 features defining the required movement. The data suggest that after the reaction signal, side and limb were selected simultaneously before direction.

11:25-11:40 (86)

**The Time Course of Motor Preparation.** HARVEY G. SHULMAN, RICHARD J. JAGACINSKI, & MICHAEL W. BURKE, *Ohio State University*—The present experiments examined the relationship between two forms of preparation: general alertness and motor programming. The effects on RT of warning signals, informative or uninformative with regard to the nature of the response on each trial, were compared. By using several foreperiods and responses of different complexity levels, the time course of motor programming was revealed.

11:45-12:00 (87)

**Initiating Short Movements Without Target Preview.** BETH KERR, *University of Washington* (sponsored by Earl B. Hunt)—A joystick-controlled cursor (Fitts' task in one dimension) was moved to targets which were (1) visible with one possible choice, (2) visible with two possible choices, or (3) not visible prior to the signal to initiate movement. The time to initiate movements varied with target distance but not width when targets were not visible prior to signal onset but did not vary with either distance or width when targets were visible prior to signal onset.

12:05-12:20 (88)

**Velocity as a Factor in the Programming of Movements.** K. M. NEWELL & L. E. F. HOSHIZAKI, *University of Illinois*—The relative contribution of movement time (MT), amplitude, and average velocity to initiation time were examined across a range of MT (100-1,200 msec)-distance ( $\frac{1}{4}$ -30 cm) combinations. In both self-paced and rapid initiation paradigms, average velocity rather than MT was found to be the key determiner of initiation time. The results are contrary to recent notions on the role of timing to response programming (e.g., Klapp, 1977), and their implications for generalizations of the motor program are discussed.

12:25-12:40 (89)

**Application of the Slow Fourier Transform to One-Dimensional Visual Tracking.** HOWARD L. KAPLAN & DUANE H. ZILM, *Addition Research Foundation of Ontario* (sponsored by Bennet B. Murdock, Jr.)—Subjects track a sinusoidally oscillating CRT point, slowly increasing from .33 to 1 Hz. Dividing the stimulus into overlapping single cycles yields good approximate sine-wave periods. Computing the response energy uncorrelated with these cycles or their 90° phase shifts yields total harmonic distortion as a function of frequency.

## ATTENTION AND INFORMATION PROCESSING I

Dominic Massaro, University of Wisconsin  
River Room, Thursday morning, 8:00-12:45

8:00-8:15 (90)

**RT to Judge Number Equivalence: Utilization of Size and Density Information.** RICHARD PRINGLE, *Kansas State University* (sponsored by Thaddeus M. Cowan)—The study attempted to determine how size and density information are related to estimations of number equivalence. RT to decide if two dot arrays were approximately equivalent in number indicate that normalization of size-density is required when arrays differ in size and density, but not when arrays were equivalent in size or density.

8:20-8:30 (91)

**Symmetry Detection of Dot and Diagonal-Line Patterns.** FRED L. ROYER, *Cleveland VA Hospital*—Time was measured for detecting the presence of any of the seven possible symmetries of dot or diagonal-line patterns in 6 by 6 or 10 by 10 square fields occupying the same visual angle. Results clarify some issues raised by studies of pattern goodness.

8:35-8:50 (92)

**Retrieving Distance and Location Information from Mental Maps.** KATHRYN T. SPOEHR & BRONWEN E. WILLIAMS, *Brown University*—The nature of information representation in cognitive maps was explored using two reaction time tasks. Distance information retrieval was tapped by requiring subjects to make distance comparisons, while point information retrieval was assessed through judgments about the locations of places. Reaction times in both tasks were consistent with a retrieval mechanism that scans a memory representation that is structurally isomorphic to the real world.

8:55-9:10 (93)

**The Processing of Spatio-Temporal Structure.** JOHN BARRESI, *Dalhousie University*—A sequence of 80 seven-dot patterns was constructed in which each pattern was a distortion of the previous pattern. When presented for 300 msec each in this "natural" order, they appear as a continuously changing form. Surprisingly, recognition memory for individual patterns was unaffected by randomizing the order of presentation. Possible implications for event perception are considered.

9:15-9:35 (94)

**A Fleeting Glance is At Least a Memory—And a Quickly Addressable One At That.** IRVING BIEDERMAN, RICHARD C. TEITELBAUM, & ROBERT J. MEZZANOTTE, *SUNY, Buffalo*—Subjects attempted to decide whether an incongruity existed between an object and its context, e.g., a hydrant (object) on top of a mailbox in a street scene (context), in 100-msec exposures of real-world scenes. RTs for these judgments were shortened by the prior presentation over 30 trials earlier of the same context (but with a different object to be judged). This remarkable feat of accessing memory appears to be bottom-up in that it is unaffected by the presentation of a verbal prime which described the scene.

9:40-10:00 (95)

**On the Genesis of Abstract Representations for Real-World Scenes.** HOWARD S. HOCK & KAREN SCHMELZKOPF, *Florida Atlantic University*—Subjects learned to identify the camera locations for photographs of a downtown street scene. The identification of camera location was tested either immediately or 1 week after acquisition. Test stimuli were photographs from the acquisition set and novel photographs from the same locations. The results indicated that subjects abstracted a continuous, schematic representation from discrete photographic samples of the scene.

10:15-10:30 (96)

**Mental Rotation About Varied Axes.** RAYMOND KLEIN, *Dalhousie University*, & JAMES BEEBE, *University of Western Ontario*—Mental rotation of three-dimensional forms (Shepard

& Metzler, 1971) is significantly faster when the axis of rotation is "normal" (intersection of the medial, coronal, and horizontal planes) than when it is "tilted." Several explanations for this difference are explored.

#### BREAK

##### 10:35-10:50 (97)

**Intermodality Interference Is Not Symmetrical.** WILLIAM J. CODY & WILLIAM EPSTEIN, *University of Wisconsin-Madison* (read by W. Epstein)—In a two-choice RT task, keypress latency to a signaled invariant tone was slower when the alternative signal was proprioceptive than when visual. Variability of the alternative signal accounted for part of the effect, but a conclusion that potential proprioceptive input inhibits the alerting qualities of other inputs was unavoidable.

##### 10:55-11:10 (98)

**The Effect of Stimulus Probability on Naming Letters under Speed Stress.** ROBERT G. PACHELLA, *University of Michigan*, KEITH STANOVICH, *Oakland University*, & DAVID IRWIN, *University of Michigan*—Subjects were asked to name letters under speed stress in conditions that varied stimulus probability (equal vs. unequal). The resulting confusion matrices were fit using Luce's choice model and an informed guessing model. The effect of probability was limited to the response bias parameters in both cases.

##### 11:15-11:30 (99)

**Response Bias in Identification Experiments.** J. E. KEITH SMITH, *University of Michigan*—Response bias in identification experiments is usually attributed to presentation frequency or extraexperimental effects. It is shown, using the Luce choice model, that even when these considerations do not apply, using unequal biases can still improve percent correct identifications. The theory is applied to several perceptual and cognitive experiments.

##### 11:35-11:50 (100)

**Additive Factors and Parallel Processing in a Word/Nonword Task.** RICHARD SCHWEICKERT, *University of Michigan* (sponsored by Daniel Weintraub)—Sternberg's additive factor method was generalized mathematically to apply to mixtures of sequential and concurrent processing. Choice RTs in a dual word/nonword and tone discrimination task by Becker (1976) were analyzed. Word frequency and number of tone alternatives affected different sequential stages, and these were executed concurrently with other, as yet unidentified, processes.

##### 11:55-12:05 (101)

**Identification and Pronunciation Effects for Words, Pseudowords, and Letters.** PAUL G. ROSSMEISL, *University of Wisconsin* (sponsored by John Theios)—Three different response conditions were employed to separate identification and articulation process in a verbal reaction time task. It was found that different types of stimuli do differ in articulation time, making conclusions based upon simple voice R+ tenuous. The investigation of identification time indicated parallel processing of letters within a string and slower identification of words in comparison to pseudowords.

##### 12:10-12:20 (102)

**Independent Processing of Letter Location and Identity Information.** EDWARD LEITNER, *University of Texas, Austin* (sponsored by Dennis McFadden)—The relationship between the processing of letter location and identity information was investigated by briefly (35-65 msec) presenting four of eight letters in four of eight locations. These targets were immediately masked. The mask was followed by a test stimulus, containing one of eight letters and an indicator marking one of eight locations. Subjects gave two yes-or-no responses. A yes response for location meant that some letter in the target was positioned in the marked location. A yes response for identity meant that the letter occurred somewhere in the target. The processing of location and identity were independent for all exposure durations.

##### 12:25-12:40 (103)

**Analysis of Intercompletion Times in Multielement Processing.** DAVID A. TAYLOR, *University of Rochester*, JAMES T.

TOWNSEND, *Purdue University*, & P. SUDEVAN, *University of Rochester*—This study approached the problem of serial vs. parallel processing by examining the nature of the intercompletion times, the series of intervals which separate the completion of successive elements. These times were examined using a detection task, and they were found to be constant. This result refutes all parallel models except those designed to mimic serial processing. We conclude that processing in this task is effectively serial in nature.

#### HUMAN LEARNING AND MEMORY II

William F. Battig, *University of Colorado*  
Fiesta 1 Room, Thursday afternoon, 1:00-6:00

##### 1:00-1:10 (104)

**Memory for Verbal Prototypes Following Presentation of Variations.** PHILIP TOLIN, *Central Washington University*—Subjects viewed a list of variations of either high-meaningful (M) or low-M prototype disyllables. In a recognition test (Experiment 1), previously unseen low-M prototypes were falsely recognized more often than previously seen variations were correctly recognized. Rate of list presentation affected discrimination of old and new variations, while prototype recognition was unaffected. In Experiments 2 and 3, free recall of previously unseen prototypes was comparable to that for presented variations; prototypes that had been previously seen were recalled more often, suggesting that the effect of presenting the variations was comparable to providing more exposure to the prototypes.

##### 1:15-1:30 (105)

**Abstraction of Style as a Function of Experience.** JEFF HARTLEY, *Arizona State University* (sponsored by Donald Homa)—The acquisition of artistic style was investigated in a category abstraction paradigm. Naive subjects classified 18 different paintings into a three-, six-, or nine-member category, each representing a different artist (Matisse, Manet, Renoir). Transfer accuracy to new paintings was measured immediately and 2 weeks later. Multidimensional scaling of these artists by control, artwise, and abstraction subjects was compared.

##### 1:35-1:50 (106)

**Learning Fuzzy Perceptual Categories: Is Feedback Necessary?** LISBETH S. FRIED & KEITH J. HOLYOAK, *University of Michigan* (read by K. J. Holyoak)—Current theories of perceptual category learning assume that subjects are given immediate feedback. This study examines visual category learning with and without feedback on each trial. Classification decisions demonstrate that the central tendency and degree of variability of perceptual categories can be learned without immediate feedback. Visual similarity among exemplars is a sufficient basis for learning ill-defined perceptual categories.

##### 1:55-2:10 (107)

**Memory for High- and Low-Relevant Information in Pictures.** GAIL S. GOODMAN, *University of Denver* (sponsored by George R. Potts)—Adults viewed pictures depicting details of high- and low-relevance to an action theme. Recognition of the physical appearance of low-relevant details surpassed that of high-relevant details. In contrast, recall of the presence of high-relevant details surpassed that of low-relevant details. The antithetical relation is discussed in terms of representational structure and schema theories of picture memory.

##### 2:15-2:35 (108)

**Time-Course of Priming Effects in Picture Naming.** JANET L. LACHMAN, ROY LACHMAN, DON W. TAYLOR, & CARROLL THRONESBERRY, *University of Houston*—Objects, calibrated on name diversity, can be named faster the second time. This latency drop may reflect transient changes in system sensitivity to potentially more probable events. Without additional repetition, how long should the lexical mapping system take to return to its preactivated state? Data are presented.

##### 2:40-2:55 (109)

**Context Effects in Picture Recognition Memory.** KATHY PEZDEK, *California State College, San Bernardino* (sponsored by

George Marsh)—This study addressed the role of context effects in recognition memory for pictures, and further, how context effects are influenced by the appropriateness of the provided context. Stimulus pictures included a central item in a background context. In the study phase, central items were presented in appropriate, inappropriate, or no context. Factorially combined with these conditions were test conditions including appropriate, inappropriate, and no context. The mean hit rate in central item recognition was higher when the context was the same at study and test (.90) than when the context was changed (.68), regardless of the appropriateness of the context at study or test. This strong support for context effects in picture recognition memory was observed with 7-year-olds, 10-year-olds, and adults.

3:00-3:15 (110)

**Recognition Memory for Typical and Unusual Faces.** LEAH LIGHT, *Pitzer College*, FORTUNEE KAYRA-STUART, *Stanford University*, & STEVEN HOLLANDER, *Claremont Graduate School*—Recognition memory is better for unusual than for typical faces under incidental and intentional learning conditions at a variety of presentation rates and retention intervals. Facial typicality correlates highly with similarity to other faces. The structural basis of the typicality effect in recognition memory appears to be interitem similarity.

BREAK

3:30-3:50 (111)

**Spatial Knowledge Acquisition from Maps and Navigation.** PERRY W. THORNDYKE & BARBARA HAYES-ROTH, *Rand Corporation*—Knowledge of a large-scale space may be acquired from study of a map or from navigational experience. Map study induces a survey representation of the space encoding superior knowledge of implicit global properties. These include spatial relationships and euclidean distances among objects in the space. Limited navigational experiences induce superior knowledge of relationships between self and objects in the space (orientation) and detailed local knowledge, but inferior knowledge of global properties. However, repeated navigational experiences induce survey knowledge, but repeated map study experience does not improve orientation performance.

3:55-4:10 (112)

**Visual Recognition of Real-World Scenes.** SANDOR WISEMAN, *University of Toronto*—In two experiments, subjects were required to remember photographs of real-world scenes and were either provided with additional nonpictorial information about those photographs or not. The improvement in picture recognition following the provision of such information suggests that aspects of general knowledge may be incorporated into the representations of pictures in memory.

4:15-4:30 (113)

**Recall and Recognition After Very Long Storage.** S. DAVID LEONARD, G. WILLIAM HILL IV, & E. MICHAEL SANFORD, *University of Georgia*—Subjects were asked how frequently and how recently they had played Monopoly. They were then asked to recall or recognize the properties from the Monopoly board. Recall was significantly affected by recency but not frequency, while recognition was significantly affected by both. Relationships with other tasks used in the laboratory will be discussed.

4:35-4:55 (114)

**Conditional Search: A General Model of Recognition.** GEORGE MANDLER, *University of California, San Diego*—Diverse old and new evidence for a recognition model will be presented from a variety of experiments. The model postulates an automatic judgment of familiarity (sometimes called occurrence information or degree of integration), augmented by a search process whenever the familiarity judgment fails to reach some criterial value.

5:00-5:15 (115)

**A Nonmetric Approach to the Investigation of Spatial Memory.** SETH CHAIKLIN & THOMAS O. NELSON, *University of Washington* (read by T. O. Nelson)—Our goal is to characterize the internal (cognitive) conception of physical space. Using only ordinal-

scale assumptions, we discovered that MEMORY subjects (who immediately reproduce the spatial location of a briefly presented dot stimulus) make systematic distortions of recall that are not made by CONTROL subjects (who reproduce the spatial location of a continuously available dot stimulus).

5:20-5:40 (116)

**Memory Metaphors.** HENRY L. ROEDIGER III, *Purdue University*—More than 30 metaphors used to explain memory phenomena are listed and classified. The most popular embody two common assumptions: (1) Traces are distributed in a hypothetical mental space, and (2) trace utilization involves a search for these traces. Few alternatives to the dominant spatial storage and search metaphors are currently available.

5:45-5:55 (117)

**Memory for Beethoven Quartets: Effects of Excerpt Length and Structure.** W. J. DOWLING & JAMES BARTLETT, *University of Texas, Dallas*—Subjects heard lists of 5- or 20-sec excerpts, composed either of brief chunks or longer melodies. Subjects were tested with the final 5 sec of each excerpt. Memory was best for short-chunk compositions, and unaffected by excerpt length. Implications for the nature of memory representations of music are discussed.

(118)

(Read by title only)

**Frequency of Occurrence of Superordinates and their Role in Reconstruction.** LYNN HASHER, WALTER CHROMIAK, JOSEPH ALBA, & MARY S. ATTIG, *Temple University*—Earlier research in various laboratories has shown that adults are profoundly sensitive to the frequency of occurrence of units (e.g., words, occupations, mortality rates) and subunits (e.g., letters, pairs of letters, syllables) of general experience. The present research confirms that adults are sensitive to the covert frequency of occurrence of the superordinate referents (here, the category labels) of instances in a list. Further research demonstrates that this information can then serve as a schema, rule, or cue upon which to reconstruct one's memory of a categorized list.

## PERCEPTION I

Robert Fox, *Vanderbilt University*  
Room 31, Thursday afternoon, 1:00-6:05

1:00-1:10 (119)

**Assimilation Theory and the Poggendorff Illusion: Mark II.** ALEXANDER PRESSEY, *University of Manitoba*—The assimilation theory is applied to the Poggendorff illusion in a slightly different manner from the previous application. The new version focuses on apparent orientation (and not length) of the subjective extension of the oblique lines. In the new version, the attentive field is considered a modifying factor and not a necessary condition for the illusion. Empirical data from Velinsky (1925) are predicted.

1:15-1:30 (120)

**Effect of Brightness Contrast on Colored Mueller-Lyer Illusions.** R. H. POLLACK & TED JAEGER, *University of Georgia*—Mueller-Lyer figures formed by either a hue or brightness and hue difference from their ground were viewed either foveally or parafoveally by two trained observers. Initial results are consistent with Pollack's (1978) hypothesis that the presence of a rod component in the visual system response enhances contour resolution and therefore illusion magnitude.

1:35-1:45 (121)

**Reversal of the Continuous-Discontinuous Time Illusion.** W. H. TEDFORD, JR., *Southern Methodist University*, & PHILLIP PURDY, *Columbia School of Medicine*—Continuous (empty) intervals were compared to discontinuous (filled) ones of equal duration by 600 undergraduates. For durations of 5 sec or less, the discontinuous interval was perceived as longer. With increased durations, the illusion reversed. Results parallel those of a visual illusion of length, and suggest that brief time intervals are perceived as units.

**1:50-2:05 (122)**

**Programmed Aftereffects in the Oculomotor System.** BRIAN CRASKE, *Memorial University of Newfoundland*—Typical aftereffects show monotonic decay to zero through time. This holds for the aftereffect on eye centering subsequent to deviation of the eyes, which show bias towards previous eye posture. The present experiments show that when the subject is asked to hold the eyes in each of two positions (e.g., left and middle) for  $x$  seconds at each position for 20 cycles, the observed aftereffects on the resting position of the eye is that it describes damped, left-to-middle, sinusoidal movements. A comparable effect is shown after an up-and-middle exposure condition, and left-middle-up exposures produce spiral-type aftereffects, since the two sinusoids are out of phase.

**2:10-2:25 (123)**

**Effect of Alternating and Repeating Hall-Hand or Hall-Hall Exposure on Visual Adaptation to Optical Tilt.** GORDON M. REDDING, *Illinois State University*—Repeated exposure to hall-way exploration, alternated with periods of either watching the active hand or exploring a different set of hallways, seems to maintain increasing adaptation beyond the point in time where previous studies using homogeneous exposure procedures have found adaptation to be asymptotic. This study established that this alternation-repetition effect does not depend upon an actual change in task (hall-to-hand), but also occurs when the task context alone is changed (hall-to-hall).

**2:30-2:40 (124)**

**Reliability and Individual Differences Factors in Prism Adaptation.** LAWRENCE E. MELAMED & LEE SENGUSCH, *Kent State University*—The reliability of prism adaptation measures was estimated for a terminal-exposure paradigm. Retesting occurred at either 2 or 4 weeks. Reliability was predominantly low for both the measures and for calculations based on the additive model of prism adaptation. Savings in adaptation were evidenced at both the 2- and 4-week adaptation sessions.

**2:45-3:00 (125)**

**Perceptual Adaptation and the Additivity of Intermanual and Interocular Transfer.** BENJAMIN WALLACE, *Cleveland State University*—Total prism adaptation as measured by a negative aftereffect (NA) can be described as an additive function of a proprioceptive shift (PS) and a visual shift (VS), or  $NA = PS + VS$ . When the intermanual transfer of PS and the interocular transfer of VS are achieved, can total transfer be described in an additive fashion such that transferable  $NA = transferable PS + transferable VS$ ? The answer appears to be "yes."

**BREAK****3:15-3:30 (126)**

**Decisional Factors in Right-Left Differences in Visual Perception.** BILL JONES, *Carleton University*—Differences in perceptual accuracy when information is presented in the right and left visual hemifields have been attributed to differences in hemispheric specialization. Recent data suggest that the nature of such specializations may lie deeper than differences in perceptual sensitivity and may be reflected more clearly in decision functions (e.g., optimization in detection and discrimination tasks).

**3:35-3:50 (127)**

**Size, Contour, and Interposition Effects on Perceived Rotation in Depth.** MYRON L. BRAUNSTEIN & KENNETH R. STERN, *University of California, Irvine*—The effects of relative size, contour angles, and interposition on judgments of direction of rotation were examined using computer-generated displays of overlapping rectangles and of outline rectangles and trapezoids, rotating about a vertical axis. The effects of relative size and contour angles were difficult to separate, but interposition had a clear effect in determining perceived direction of rotation.

**3:55-4:10 (128)**

**Sufficient Conditions for Detection of Structure and Motion in Three Dimensions.** JOSEPH S. LAPPIN, JON DONER, *Vanderbilt University*, BRIAN L. KOTTAS, *Army Institute for Research,*

*Ft. Knox*, & CHARLES S. HARRIS, *Bell Laboratories*—Observers viewed two-frame "movies" of rotating randomly dotted spheres and of two randomly dotted planes moving in opposite directions. Degree of correlation in positions of dots in the two frames was varied. Accuracy in detecting changes in correlation differed strikingly for correlated spheres, indicating that coherent 3D structure can be perceived in the global relationship between two frames.

**4:15-4:30 (129)**

**Vernier Acuity with Dot Test Objects.** JACOB BECK & TERENCE SCHWARTZ, *University of Oregon*—Vernier acuity with dot targets was studied as a function of dot number, dot arrangement, and dot separation. The experiments support the hypothesis that vernier judgments of dot stimuli are based primarily on orientation information rather than alignment information.

**4:35-4:50 (130)**

**Illusory Pauses of Moving Dots.** CHARLES S. HARRIS, BARRY J. SCHWARTZ, OREN PATASHNIK, *Bell Laboratories*, & JOSEPH S. LAPPIN, *Vanderbilt University*—Two identical arrays of dots, moving at constant velocity in different directions, often appear to slow down or even stop momentarily when the dots coincide. The illusory pauses can be nullified by briefly speeding up the movement; they can be matched by briefly slowing down noncoincident arrays.

**4:55-5:10 (131)**

**Aftereffects of Multistable Moving Images.** JAMES R. POMERANTZ, *SUNY, Buffalo*—A display is described that yields apparent motion whose direction is ambiguous and is influenced (but not determined) by the direction of eye movements. The perceived direction of motion affects both the direction of the motion aftereffect when the display stops and the direction of the afterimage trailing the moving image.

**5:15-5:25 (132)**

**Mental Analogues to Visual Feedback.** RONALD A. FINKE, *M.I.T.* (sponsored by Richard Held)—Mental imagery for pointing errors during unobserved movements, which simulated changes in visual feedback recorded during prism adaptation, produced corresponding changes in visual-motor coordination and pointing aftereffects. These findings argue that imagined feedback and visual feedback are functionally similar in their effects on the visual-motor system.

**5:30-5:45 (133)**

**Outline Depiction of Motion by the Blind.** JOHN M. KENNEDY, B. GARBOLL, & M.-A. HEYWOOD, *Scarborough College, University of Toronto*—Blind adults depicted movement by: (a) postures specific to a moving object, (b) metaphoric (non-literal) changes in the object's shape, (c) literal contexts suitable for a moving object, and (d) trailing lines and other nonliteral graphic devices. Both early and late blind invented the techniques. Young deaf subjects are handicapped on metaphoric devices in comparison to the blind.

**5:50-6:00 (134)**

**Information for Age in Human Faces.** JOHN B. PITTEGER, *University of Arkansas at Little Rock*, LEONARD S. MARK, & ROBERT E. SHAW, *University of Connecticut*—Head shape and skin wrinkling were evaluated as sources of information for the age of human faces. Results showed observers to be sensitive to both sources of age information and to their temporal coordination. Conflicting information lead to perceived facial abnormality and to increased variation in perceived age.

**(135)**

(Read by title only)

**The Egocentric Determination of Perceived Size.** LEONARD BROSGOLE & HANAN YANIV, *St. John's University*—Size perception experiments were run in several articulated settings. Subjects viewed visual targets that moved toward and away from them and reported continuously upon apparent changes in their size. Some targets were taller than the observers and others were shorter. We found that while the taller objects were seen to shrink with increasing distance, the shorter ones appeared to grow. It

was reasoned that the top of each object, tall or short, would approach eye level with increasing distance, resulting in a perceived decrease in the height of a tall object and an increase in the height of a short one. Thus, size perception would seem to be egocentrically determined to some extent.

**ANIMAL LEARNING AND CONDITIONING II**  
**M. R. D'Amato, Rutgers University, Busch Campus**  
 Mission Room, Thursday afternoon, 1:00-5:25

**1:00-1:10 (136)**

**Choice of Predictable Over Controllable Events.** CYNTHIA SCHEUER, *Florida Atlantic University* (sponsored by Allan J. Nash)—Rats were permitted to choose to remain in either a predictable but uncontrollable situation (CER) or a controllable but unpredictable situation (VI punishment). Although shock parameters were equivalent in both components, a clear preference for predictability was found, with subjects spending up to 85% of their time in changeover.

**1:15-1:30 (137)**

**Should Instant Lotteries Delay Payments? Evidence from an Appetitive "Observing Response" Experiment with Rats.** HELEN B. DALY, *SUNY, Oswego*—Delay of food reinforcement and discrimination complexity were varied in an "observing response" experiment. Results showed that subjects in the no-delay condition initially showed a strong preference for the uncorrelated condition, but in the simpler nonconfigural discrimination condition no-delay subjects eventually preferred the correlated condition. This finding may partially reconcile the discrepancy between the results of Wagner, Logan, Haberlandt, and Price (1968) and "observing response" experiments. The possibility that "surprise" based on smaller than expected rewards can also be the basis for conditioning within the Rescorla-Wagner model will be discussed as it relates to analysis of "observing response" acquisition.

**1:35-1:45 (138)**

**The Role of Generalization in Autoshaping and Omission.** R. G. OBERDIECK, R. A. STRONG, & C. D. CHENEY, *Utah State University*—The generalization-operant reinforcement hypothesis of autoshaped keypecking was examined by exposing pigeons to both autoshaping and omission procedures with the hopper light continuously illuminated. Although there was a noticeable sequence effect, keypecking emerged under both conditions, contrary to the generalization account.

**1:50-2:10 (139)**

**Autocontingencies: Effects of Unsignaled Shock During a Progressively Degraded Conditioned Suppression Procedure.** HANK DAVIS & DONALD SHATTUCK, *University of Guelph*—Davis, Memmott, and Hurwitz (1975) demonstrated that unsignaled shock deliveries could signal "safety" and accelerate baseline responding. Such control by an *autocontingency* (if shock, then no shock) did not occur, however, if a traditional tone-shock contingency was simultaneously available. The present experiment examines the degree to which autocontingency control occurs when the simultaneously available tone-shock contingency is progressively degraded by having an increasing proportion of shocks occur in an unsignaled manner.

**2:15-2:30 (140)**

**Autoshaping and Positive Behavioral Contrast: An Empirical Test of Additivity Theory.** ROBERT W. POWELL & LINDA PALM, *University of South Florida*—The present experiment was conducted to determine whether autoshaping and positive behavioral contrast are correlated phenomena as is suggested by the additivity theory of contrast. Common crows and White Carneaux pigeons were first exposed to an autoshaping procedure for 20 sessions. The birds were then given baseline training on an equal-valued multiple VI VI schedule. When this schedule was subsequently changed to multiple VI extinction, all birds showed positive behavioral contrast. There was no relationship between the number of responses which had occurred during autoshaping

and the amount of positive contrast. These results cast doubt upon autoshaped responses as contributors to positive behavioral contrast.

**2:35-2:50 (141)**

**Failure to Associate S<sub>2</sub> and S<sub>1</sub> During Serial Autoshaping.** CHRISTOPHER L. CUNNINGHAM, *University of Oregon Health Sciences Center*—Pigeons received each of two types of trials on which a keylight (blue or yellow) preceded a sound (tone or clicker) and, finally, access to grain. The sounds were then differentially reinforced. A test of the visual stimuli alone showed that the hue paired with the subsequently nonreinforced sound elicited no less pecking than the hue paired with the still reinforced sound.

**BREAK**

**3:05-3:20 (142)**

**Acquisition of a Simple Operant Without Experimenter Assistance.** LAURENCE MILLER, DANIEL C. LINWICK, & VALERIA MURPHY, *Western Washington University*—Procedures for promoting response acquisition vary from those providing maximum assistance to those providing no assistance to the learner. This latter procedure was examined with acquisition of a simple operant (barpress or keypeck). Different species (young and mature rats, pigeons, guinea pigs, monkeys), reinforcement schedules (CRF, interval, ratio, DRL), and reinforcers (food, shock) were studied.

**3:25-3:45 (143)**

**Response-Reinforcer Independence Interferes with Subsequent Acquisition of Stimulus-Reinforcer Contingencies: Learned Helplessness?** LAUREN B. ALLOY & RONALD EHRMAN, *University of Pennsylvania* (sponsored by Richard L. Solomon)—In two experiments, rats which had previously experienced controllable, uncontrollable, or no shocks were subsequently exposed to one of a variety of Pavlovian conditioning contingencies also involving shock. In a CER test, rats pretreated with inescapable shocks showed significantly less fear to the Pavlovian CS than rats previously exposed to escapable or no shocks. The implications of these results with regard to learned helplessness and the nature of instrumental learning are discussed.

**3:50-4:00 (144)**

**The Effects of d-Amphetamine on Rats Previously Exposed to Inescapable Shock.** STEPHEN L. WOODHEAD, CYNTHIA SCHEUER, & DAVID L. WOLGIN, *Florida Atlantic University* (sponsored by Robert E. Adamson)—The adequacy of learned helplessness and learned inactivity interpretations of a long-term interference effect were tested. Artificially increasing motor activity by administration of several levels of d-amphetamine failed to attenuate the interference effect, although the same dose levels were shown to substantially increase motor activity in a separate task. The results support a cognitive rather than learned inactivity interpretation.

**4:05-4:20 (145)**

**Learned Helpfulness: You Can Lead a Rat to a Bar and Make Him Press.** ROBERT T. BROWN, *University of North Carolina at Wilmington*, & JUDITH W. RHUE, *Ohio University*—Groups of rats were exposed to an operant chamber with a bar either absent or present with no reinforcement for barpressing for 1-10 h. A control group was not exposed. Rats were later tested in the chamber for 2 h for self-acquisition of food-reinforced barpressing. In testing, most bar-absent rats reached a 50-barpress criterion within a few minutes, whereas no controls reached criterion. Bar-present rats were intermediate. A discrepancy interpretation is offered.

**4:25-4:35 (146)**

**Interactions in Second-Order Schedules: An Analysis of Conditioned Reinforcement.** RICHARD HUDIBURG & STEPHEN WINOKUR, *Texas Christian University* (read by S. Winokur)—Second-order schedules were used in multiple schedules to investigate conditioned reinforcement. Results showed that brief stimuli in second-order schedules functioned as conditioned reinforcers



during certain schedule conditions. The brief stimuli showed reduced effectiveness as conditioned reinforcers when presented in a chain schedule. Positive behavioral contrast was observed during certain portions of the study. The "information hypothesis" proposed by Egger and Miller was invoked to interpret the results.

4:40-5:00 (147)

**Adult Operant Behavior After Differential Infant Experience in Beagle Dogs.** WALTER C. STANLEY, *National Institute of Mental Health*—Six puppies were permanently removed from the dam when 5-7 days old and six were removed when 15-16 days old. In each removal group, four received ratio or interval operant conditioning, extinction, and reconditioning until they were 23-25 days old, while two were only manually fed. As adults, later vs. earlier removed dogs behaved competently sooner.

5:05-5:20 (148)

**Generalization of Inhibition and Excitation in Weanling and Adult Rats.** ALVIN M. BERK & RALPH R. MILLER, *Brooklyn College of CUNY* (read by R. R. Miller)—Nineteen-day-old weanling and adult rats received tone-footshock pairings to produce equal lick suppression 48 h later and infantile amnesia after 8 days. Tested at 48 h, weanlings were more susceptible than adults to retroactive interference produced by off-baseline presentations of the CS or different frequency tones. The possibility that weanlings are more prone to latent extinction because of a failure to discriminate frequencies was tested by examining excitatory generalization gradients. Weanlings and adults generalized equally, suggesting that weanlings are fundamentally more susceptible to extinction.

(149)

(Read by title only)

**Effects of Type of Motivation in a Learned Helplessness Procedure.** PHILLIP GOLDSTEIN, *Adelphi University*, & R. CHRIS MARTIN, *University of Missouri, Kansas City*—In a 2 by 5 factorial design, 120 rats were given two-lever visual discrimination trials under either appetitive or aversive motivation after having received either contingent, noncontingent (either appetitively or aversively motivated), or no experience on a single-lever acquisition task. Dependent variables measured included latency, correct-incorrect, total number of responses, and number of responses per block of nine trials. The overall findings were that noncontingent experience with appetitive motivation did not render subjects "helpless" whether tested in appetitive or aversive conditions, while experience with noncontingent aversive motivation affected both appetitive and aversive test behavior, but differentially. The results are interpreted as further support for the need for a motivational factor split.

#### HEMISPHERIC DOMINANCE

Herbert Weingartner, *National Institute of Mental Health*  
Room 25, Thursday afternoon, 1:00-3:15

1:00-1:20 (150)

**Visual Lateralization Effects in Reading Chinese Characters.** OVID J. L. TZENG, DAISY L. HUNG, & BILL COTTON, *University of California, Riverside*—Two experiments were conducted to examine the visual lateralization effect in reading non-alphabetic scripts such as Chinese characters. Chinese subjects in the first experiment were exposed to brief tachistoscopic presentation of a single character, and their task was to name the character as soon and as accurately as possible. A left-visual-field (right hemisphere) superiority effect was found. In the second experiment, the stimuli were two or three vertically arranged characters, and the subjects' task was to decide whether these characters were correct semantic terms. A right-visual-field (left-hemisphere) superiority effect was found. A visual information processing model was proposed to handle these two seemingly conflicting results.

1:25-1:40 (151)

**Lexical Decisions for Left and Right Visual Fields: Where is the "FC/LVF Effect"?** ELIZABETH B. GARDNER, JAMES M. KONDZIELA, & KIM M. CARDOSI, *Fairfield University*—

Previous studies of the processing of different types of words have reported accuracy or response latency differences favoring familiar concrete (FC) words in the left visual field. In the present experiment, 49 right-handed subjects were tachistoscopically presented five-letter words and nonwords bilaterally. Although discriminability varied with visual field and with word type, for neither discriminability nor response latency did these factors interact.

1:45-2:00 (152)

**Differences in Prerecognition Visual Processing by Left and Right Hemispheres.** LLOYD L. AVANT & JAMES A. PUFFER, *Iowa State University*—Differences in the judged duration of 10-msec pre- and postmasked presentations of upright, inverted, and mirror-image letters suggest that each hemisphere tests stimulus input for familiarity or good form before extraction of graphic features can be completed. Criteria for the initial familiarity or good form test may differ for the two hemispheres.

2:05-2:25 (153)

**Stroop Interference and Hemispheric Asymmetry.** JOSEPH J. DALEZMAN, ALBERT BEULIG, ANDREA MARTZ, & AMY WEINSTEIN, *New College*—Using a color-matching reaction time paradigm, the effects of visual presentations to the right and left visual fields on Stroop interference were examined. Results indicated a mitigation of Stroop interference when stimuli were presented to the right hemisphere but not when presented to the left.

2:30-2:45 (154)

**Reaction Time Correlates of Cerebral Dominance.** LESLIE ANN WHITAKER, *University of Missouri, St. Louis* (sponsored by Lloyd L. Avant)—Response time to left and right directional signs was measured. It was found that latencies were significantly slower for word than for symbol signs for both left- and right-handed subjects. However, subjects diagnosed as right hemispheric dominant showed less "slow down" than did the left hemispheric dominant subjects.

2:50-3:10 (155)

**Hemispheric Differences in Controlled and Automatic Processing.** CAROLYN B. JOHNSON, *University of Delaware* (sponsored by Fred A. Masterson)—Laterality of memory scanning was investigated under consistent and varied mapping conditions. Subjects were faster and more accurate when the visual field was contralateral to the response hand on positive trials, ipsilateral to the response hand on negative trials. Under low levels of practice, varied mapping positive responses were facilitated by presenting probes in the left visual field. It was suggested that preparation of a response interfered with the ability to generate expectancies.

#### SOCIAL-PERSONALITY PROCESSES

Janet T. Spence, *University of Texas, Austin*  
Fiesta 4 Room, Thursday afternoon, 1:00-5:25

1:00-1:15 (156)

**Estimation of Likelihoods of Events as a Function of Impact and Reliability of Predictors.** ANTHONY J. RUCCI, *Bowling Green State University* (now at *Lifson, Wilson, Ferguson & Winick, Inc., Dallas*), & LOWELL M. SCHIPPER, *Bowling Green State University* (read by L. M. Schipper)—Degrees of personal impact of events appear to have an effect on the subjective estimates of the probabilities that these events will occur. This finding seems to be a replicate of an earlier finding of ours. Additionally, we present data to show the effect of differential reliability of predictors of these events.

1:20-1:35 (157)

**Factors in Transportation Choice and Use.** LARRY G. RICHARDS, *University of Virginia*—Several models have been proposed to describe transportation choice by the individual. The results of both surveys and experiments are discussed and used to differentiate between the models. Certain previously neglected factors (e.g., perceived security) are shown to play a major role in transportation choice, while more conventional factors (cost, time) seem to be of minor importance.

**1:40-1:50 (158)**

**How People Assess Validity: Source Independence and Frequency of Exposure.** GEORGE M. ROBINSON, *Duke University*—Hasher, Goldstein, and Toppino recently demonstrated that people use frequency of occurrence to assess the validity of plausible statements. The believability of a statement increases with repetition. A new experiment demonstrates that repetition per se is not adequate: people judge recurring statements as more valid only when they think the recurrences are from independent sources. When told the recurrences are from the same source, they become more skeptical of repeated statements.

**1:55-2:10 (159)**

**Effects of the Carrot and the Stick on Perception of Psychopathology.** DON FITZ, *University of Missouri, St. Louis* (sponsored by James T. Walker)—Use of rewards to encourage close attention may weaken stereotypes of mental illness. Varying psychopathology (paranoid, manic, traumatic neurosis, obsessive, non-ill) was portrayed on videotape for 118 undergraduates. Anticipated reward (extra test points) and punishment (lost test points) for correct classification were manipulated independently. Reward, but not punishment, increased differentiation of non-ill and disturbed behavior.

**2:15-2:25 (160)**

**Perceptual Stability and Self-Perception.** BRUCE O. BERGUM & JUDITH E. BERGUM, *Texas A&M University*—The hypothesis that self-perceived visual creativity is associated with relatively high perceptual instability was tested. Observed reversals of ambiguous figures were compared for Architecture and Business undergraduates, as were biographical and adjective check-list measures of self-perception. The results supported the hypothesis, and an explanatory mechanism is proposed.

**2:30-2:45 (161)**

**Student Perceptions About Experiments that Deceive.** B. L. KINTZ & ROBIN C. SLAFKES, *Western Washington University*—Eighty students (40 female, 40 male), half of whom had never participated in psychological experiments and half of whom had, responded to four questionnaires: (1) The Psychological Research Survey, (2) an "Attitudes about Deception" form, (3) the Mach V Scale, and (4) a "Personal Values" scale. Analyses of variance were computed to detect differences and interactions. The results showed differences between the sexes, differences depending upon experience as subjects, and interactions with specific questionnaire values.

**BREAK****3:00-3:20 (162)**

**Courtship Behaviors in Public: Different Age/Sex Roles.** JOAN S. LOCKARD, *University of Washington*, & ROBERT M. ADAMS, *Fort Hays State University*—Courtship is a traditional topic in animal behavior but has been largely ignored as an area of objective study in human behavior. An ethogram of courtship behaviors was determined by observing mixed-sex dyads (ages 12-30 years) in public places. Subsequently, the frequency of each behavior was ascertained as evinced by mixed-sex and same-sex (control groups) pairs as they passed along a definable path in recreational settings. A binomial model of expected frequencies was compared by chi-square statistics to the observed frequencies. Hypotheses as to different sex roles in courtship displays were generated. (This research was supported by the Harry Frank Guggenheim Foundation.)

**3:25-3:35 (163)**

**Sex-Role Stereotyping and Self-Reports of Fear and Anxiety.** BETSEY BENSON RANDS & KATHLEEN A. BREHONY, *Virginia Polytechnic Institute and State University* (sponsored by Charles D. Noblin)—Male and female college students (N = 344) completed the Bem Sex Role Inventory, the Fear Survey Schedule, the S-R Inventory of Anxiousness, and an agoraphobia scale.

Results indicated that masculinity has an inoculating effect against the experience of fear and anxiety, and that androgyny does not mitigate against anxiety in certain situations.

**3:40-3:55 (164)**

**Psychological Dimensions of Femininity: Perceptions by Adolescent Females.** LYNETTE FRIEDRICH-COFER, CAROLYN J. TUCKER, & CAROL ANN HORD, *University of Houston*—The relationships among agentic characteristics (M), communal characteristics (F), and emotional vulnerability (M-F) were assessed by examining judgments of the ideal woman and three television heroines on the Personal Attributes Questionnaire. The results support a distinction between communal attributes and emotional vulnerability as separate components of femininity as well as the dualistic conception of masculinity and femininity.

**4:00-4:10 (165)**

**Reciprocity or Social Status: Which is an Appropriate Model for Altruism?** HARVEY J. GINSBURG, *Southwest Texas State University*—Male elementary school children were unobtrusively videotaped (60 h) during unstructured playground activity. During dyadic fights, a third child sometimes intervened on behalf of the one under attack. This form of aid-giving occurred primarily among children at the upper end of the social hierarchy. Recipients of aid failed to reciprocate in the context of immediate or later playground behavior.

**4:15-4:25 (166)**

**Reinforcement-Affect Model of Attitudes Toward Groups.** JOHN M. DAVIS & MARY KAYE BROWN, *Southwest Texas State University* (sponsored by Harvey J. Ginsburg)—The reinforcement-affect model of attraction was extended to the formation of attraction or dislike toward groups. It was hypothesized that attraction toward a group is a function of attitude similarity and spacial contiguity. Subjects evaluated groups described as attitudinally similar or dissimilar and geographically near, intermediate, or distant. Attraction toward groups was a function of attitude similarity but not of geographic distance.

**4:30-4:45 (167)**

**Social Influence and Selective Exposure to Information.** ELLIOTT MCGINNIES, *The American University*, RICHARD WELLINS, *Army Institute of Research*, & STEPHEN NEEDEL, *University of Connecticut*—Subjects in attitudinally similar groups revealed a striking conformity effect when they believed other subjects were listening to a nonsupportive in preference to a supportive argument. In attitudinally dissimilar groups, however, an inverted-U function related extent of group consensus and preference of the subject for a counterattitudinal message.

**4:50-5:05 (168)**

**Social Class Differences in Children's Comprehension of Adult Language.** SUSAN M. JAY, *University of North Carolina, Chapel Hill*, DONALD K. ROUTH, *University of Iowa*, & JOHN M. BRANTLEY, *University of North Carolina, Chapel Hill* (read by D. K. Routh)—Mothers of different social class levels told tape-recorded stories based on cartoon sequences. Children of different social class levels listened to the stories and answered comprehension questions. Significant effects of speaker and listener social class were found, the former mediated by information content and use of nonstandard grammar.

**5:10-5:20 (169)**

**Categorical and Dimensional Representations of the Social Milieu.** V. A. BATTISTICH & E. THOMPSEN, *Michigan State University* (sponsored by Hiram E. Fitzgerald)—One hundred and nine college undergraduates rated the similarity of all pairs of 30 representative social situations. Subjects also rated the situations according to typical behavior and feelings, and global characteristics (e.g., task-oriented vs. social). Multidimensional scaling, factor analysis, and related techniques were used to elucidate representations of cognitive structure. Alternative representations were compared in relation to subjects' behavior, feeling, and situation-descriptive ratings.

**DEVELOPMENTAL PROCESSES I**

Lyle E. Bourne, Jr., University of Colorado  
Fiesta 6 Room, Thursday afternoon, 1:00-5:20

1:00-1:10 (170)

**Factors Influencing Preschool Children's Hypothetical Reference.** STAN A. KUCZAJ II, *Southern Methodist University* (sponsored by Michael Best)—Sixty 3- to 6-year-old children were asked past and future hypothetical questions concerning the child's parents or fantasy characters. The younger children were better at future than at past hypothetical reference and at hypothetical reference involving fantasy characters rather than family members, suggesting that young children find it more difficult to contrast actual and nonactual events/objects than two nonactual events/objects.

1:15-1:30 (171)

**Developmental Changes in Latency Patterns for Access to the Alphabet.** DAVID KLAHR & WILLIAM G. CHASE, *Carnegie-Mellon University*—Subjects from 5 to 25 years old were asked to name the successor or predecessor of visually presented letters of the alphabet. For age 6 and beyond, error rates were near zero in all conditions. Reaction time patterns suggest segmentation of the alphabet into three major groups for all ages (A-G, H-P, Q-Z), with individual variation in the preferred subgroup boundaries.

1:35-1:50 (172)

**The Child's Concept of "Animal."** SUSAN CAREY, *M.I.T.* (sponsored by Mary Potter)—Our results indicate that 4- to 7-year-old children generate answers to such questions as "Do bees breathe?" by comparing the animal in question to people. By age 10, knowledge of animal properties is no longer organized in the same way. Implications for "exemplar"-based models of children's concepts will be discussed.

1:55-2:15 (173)

**Young Children's Counting and Understanding of Principles.** JAMES G. GREENO, *University of Pittsburgh*, ROCHEL GELMAN, *University of Pennsylvania*, & MARY S. RILEY, *University of Pittsburgh*—Preschool children can count the objects in a set, but do they understand what they are doing? Gelman and Gallistel have argued that young children understand general principles related to counting, such as cardinality and one-to-one correspondence. We have developed a model that simulates performance that constitutes evidence for understanding. The knowledge structures incorporated in the model represent a hypothesis about what it means to understand these principles.

2:20-2:40 (174)

**The Development of Speed, Time, and Distance Concepts.** ROBERT S. SIEGLER & D. DEAN RICHARDS, *Carnegie-Mellon University*—An attempt was made to assess 5-, 8-, 11-, and 20-year-olds' understanding of time, speed, and distance. It was found that the youngest children understood all three concepts in the same way—in terms of spatial end points. Twenty-year-olds, not surprisingly, possessed fully differentiated understanding of the three notions. The transition period was marked by quite regular confusions; both time and speed were frequently confused with distance, and distance was often confused with time. The study illustrated how the combined use of rule assessments and multiple regression analyses can yield a detailed description of the growth of children's knowledge.

**BREAK**

3:00-3:20 (175)

**Acquisition of the Suppositional Structure of Nominal Ellipses.** MEREDITH M. RICHARDS & BARBARA CALLAHAN, *University of Louisville*—Five- and 6-year-olds' understanding of the presuppositions in elliptical sentences (e.g., "I have just used my large green triangle. Hand me yours.") is investigated. Data are

discussed in terms of Halliday's rules for presupposing the head noun and sequentially omitted qualifying information, and adults' tendencies to presuppose more than is formally required.

3:25-3:40 (176)

**The Child's Conception of Wordlikeness Revealed in Lexical Decisions.** L. HENDERSON & M. J. CHARD, *The Hatfield Polytechnic*—Children of grades 2 and 4 performed a lexical decision task. Nonword rejection latencies were sensitive to orthographic structure. For grade 2 children, vowel presence and high letter positional frequency had additive retarding effects on RT. For grade 4 children, vowel presence was only effective in high positional frequency arrays. Perhaps with nonwords only the older children restrict lexical search to pronounceable items.

3:45-4:05 (177)

**Additivity of Labeling and Overlearning.** TRACY S. KENDLER, *University of California, Santa Barbara*—Labeling the relevant attributes and overtraining on the initial discrimination, when taken separately, facilitate selective encoding of the immediately relevant dimension. When combined into one experimental condition, the facilitation of labeling and overtraining is roughly equal to the sum of their separate effects. All of this facilitation decreases monotonically over age up to young adulthood, where it more or less disappears. A theoretical framework is proposed to account for the results.

4:10-4:25 (178)

**Elaboration and Recognition Memory in Young Children.** HAYNE W. REESE, *West Virginia University*—Preschoolers were shown elaborated and unelaborated drawings of animal-object pairs, each presented with an elaborated or unelaborated description; then a delayed multiple-choice recognition test was given. Pictorial and verbal elaboration were equally facilitative, and did not interact with age. Error rates suggested that the induced strategy involved elaborative imagery.

4:30-4:45 (179)

**The Use of Perceptual Set in Picture Identification by Children and Adults.** MARY CAROL DAY, *University of Houston*, & C. ADDISON STONE, *Northwestern University* (sponsored by Roy Lachman)—The use of perceptual set by 5- and 8-year-olds and adults was examined. A picture set facilitated target identification by children as well as adults both when the target was briefly presented alone and when it was presented in sequential visual noise, i.e., in a series of rapidly presented pictures. These data suggest important continuities throughout development in the mechanisms of selective attention.

4:50-5:00 (180)

**Span of Apprehension in Learning-Disabled Boys.** CURTIS W. MCINTYRE, MICHAEL E. MURRAY, CARMODY M. CRONIN, *Southern Methodist University*, & SCOTT L. BLACKWELL, *University of Texas Health Science Center, Dallas*—The spans of apprehension of learning-disabled and normal boys were compared. In Experiment 1, the span size was found to be the same for both groups when visual "noise" was absent. In the presence of noise, span size for the learning-disabled boys was reduced. In Experiment 2, the influence of variations in the amount of physical similarity between signal and noise letters upon the spans of both groups were compared to determine whether noise letters act as more potent distractors for the learning-disabled boys. No evidence of increased distractibility was obtained.

5:05-5:15 (181)

**Life-Span Age Trends in Laterality.** STANLEY COREN, *University of British Columbia*, CLARE PORAC, & PAM DUNCAN, *University of Victoria*—Lateral preference of hand, foot, eye, and ear were measured in 1,067 observers ranging in age from 6 to 85 years. Hand and foot preference show a continuing trend toward dextrality. A considerably weaker trend in eye preference is found, while ear preference becomes more left over the life span.

**ATTENTION AND INFORMATION PROCESSING II**

Charles A. Perfetti, University of Pittsburgh  
River Room, Thursday afternoon, 1:00-5:45

1:00-1:10 (182)

**From Print to Sound in Mature Readers as a Function of Reading Ability.** MILDRED MASON, *Iowa State University*—Highly skilled college readers are superior to less skilled college readers in naming nonwords and common words. However, both groups of readers derive the names of printed words from visual access of the lexicon rather than by phonological recoding. Differential effects of array length and orthographic structure suggest encoding differences between the two reading groups.

1:15-1:25 (183)

**Where Do We Read?** GEORGE W. McCONKIE, *University of Illinois*—A technique is described for identifying the fixation on which a reader acquires information from a particular letter in a word. It involves eye-movement-contingent display control during normal reading. Data from 12 college students indicate that reading typically occurs to the right of the center of vision.

1:30-1:50 (184)

**Does Silent Reading Involve Articulation? Evidence from Tongue Twisters.** LYN R. HABER & RALPH NORMAN HABER, *University of Rochester* (read by R. N. Haber)—If silent reading requires preparation of an articulatory program, then reading silently tongue twisters should be slower than reading syntactically comparable but untwisted sentences. The time to read twisters silently was longer, supporting an articulatory programming model of reading. However, the silent-time difference was not nearly as great as the difference for orally read sentences, suggesting modification in the theory as needed.

1:55-2:05 (185)

**Making Letters Distinctive.** G. R. LOCKHEAD & WILLIAM B. CRIST, *Duke University*—Those letters young children confuse most are rated as most similar by adults. We made some of the letters less similar with small graphic changes. Both adults and young children classified the altered letters more readily than normal letters. It is shown that distinctive features do not account for the results.

2:10-2:20 (186)

**Selective Attention in Good and Poor Readers.** JANE CONNOR & RONA MILCH, *SUNY, Binghamton*—Fifth graders were given passages to read with or without adjacent verbal material presented in a different color. The error pattern of poor readers was not affected by this manipulation, while the pattern of the good readers was affected.

2:25-2:45 (187)

**Text Difficulty and Reading Ability Affect the Processing of Foveal and Nonfoveal Information.** THOMAS S. WALLSTEN, *University of North Carolina, Chapel Hill*, & ROBERT M. LAMBERT, *Concordia University*—In general, easy text is read faster than hard text because of differences in the use of foveal, rather than of nonfoveal, information. However, very fast readers use nonfoveal information differentially as a function of text difficulty, whereas very slow readers do not. Two experiments and theoretical implications will be discussed.

BREAK

3:00-3:15 (188)

**A Letter By Any Other Name.** JOHN S. MONAHAN, *Central Michigan University*—Subjects sorted lowercase, sideways ps, bs, ds, and qs with short, medium, or long tails, identified as letters or figures, as integral stimuli. Short-tailed, unletter-like stimuli were sorted faster as figures; longer tailed, faster as letters. Stimulus-response compatibility affects the speed, not the form, of processing.

3:20-3:30 (189)

**Effects of Visual Similarity on Encoding Processes.** JEFF MILLER, *University of California, San Diego*—It is faster to classify a given letter if a visually similar letter is assigned to

the same response than if a visually similar letter is assigned to a different response. This effect is larger when the stimulus presentation is visually degraded than when it is not. Implications of the effect for models of the encoding process are discussed.

3:35-3:50 (190)

**Evidence for Feature Perturbations.** GEORGE WOLFORD & KIT HING SHUM, *Dartmouth College*—The first author previously proposed a model of visual information processing based on the concept of feature perturbations. An experiment was carried out using an artificial character set. The results of the experiment provided some fairly direct evidence for the concept of feature perturbations.

3:55-4:10 (191)

**Searching Through Words and Nonwords.** ALEXANDER POLLATSEK, ARNOLD WELL, & RALPH GOTT, *University of Massachusetts*—Subjects searched for animal names through arrays of one to four letter strings. Blocks were presented in which distractors were either words or nonwords that were orthographically illegal but differed from words by one or two letters. Search times increased monotonically with set size, but interestingly, performance was virtually the same for both classes of distractors. Thus, in this task, the decision about category membership can apparently be made at least as rapidly as the decisions about lexicality and orthographic legality.

4:15-4:35 (192)

**Preliminary Results in Assessing the Independence of Visual Feature Sampling.** JAMES T. TOWNSEND, GARY HU, & F. GREGORY ASHBY, *Purdue University*—All current mathematical models of alphabetic confusion based on feature extraction assume that the features are sampled in stochastically independent fashion. At higher levels, prior to a letter decision, this assumption may be inappropriate. Ghost features and knowledge of the alphabet may play a role here. However, it appears in some recent experiments that (a) when the stimuli are very simple, and (b) all possible feature combinations are possible, feature sampling dependencies can be at a low level.

4:40-5:00 (193)

**Sequential Decision Processes During Spoken Word Recognition.** W. D. MARSLER-WILSON, *Max-Planck-Gesellschaft*—Phoneme-monitoring and auditory lexical-decision tasks were used to investigate access processes during spoken word recognition. The results support the hypothesis that word recognition involves a phoneme-by-phoneme sequential decision process, and that the decision at each phoneme takes into account the relationship of the word being heard to other words in the language (known to the listener) that begin with the same initial sound sequence.

5:05-5:20 (194)

**Visual Search Through Orthographically Matched Words and Pseudowords.** ROBERT J. CHABOT, ROBERT C. SCHWALM, GREGORY O. HILL, & PETER LAUTENBACH, *Kent State University* (sponsored by James F. Juola)—Subjects searched for single target letters in word and pseudoword displays equated for summed spatial or bigram frequency. Four display durations were used to vary response accuracy between 65% and 95%. RT, percent correct,  $d'$ , and beta were used as dependent measures with the results discussed in terms of unitization and inference theories of word perception.

5:25-5:40 (195)

**Effects of Target-Foil Similarity on Strategy Changes in Same-Different Judgments Using Words, Nonwords, and Single Letters.** GEORGE W. MILLER & LLOYD L. AVANT, *Iowa State University* (read by L. L. Avant)—The present investigation, designed to discourage auditory encoding, indicates that RT is directly related to target-foil similarity. While this finding is generally congruent with those from other studies, other aspects of the data disclose a basic inadequacy in current accounts of the strategies used in matching experiments involving verbal materials.

(196)

(Read by title only)

**The Role of Letters in Word Identification.** NEAL F. JOHNSON, *Ohio State University*—Subjects can ascertain whether

a displayed word conforms to a predesignated target word faster than they can determine whether it contains a predesignated target letter. The technique has been justifiably criticized because word-level decisions can be made on the basis of the first letter processed (and usually be correct), while the letter task requires the identification of one specific letter and would entail a more complete search. Experiments are reported that eliminate the problem by comparing the letter-search task to one in which subjects determine whether a displayed word belongs to a predesignated semantic class. The results indicate that the word-level decisions were the fastest, and again raise a question regarding the precise role of letter information in word identification.

(197)

(Read by title only)

**Salient Properties Facilitate Lexical Decisions.** MARK H. ASHCRAFT, *Cleveland State University*—Related word pairs in a lexical decision task consisted of concept names of varying typicality in their superordinate categories, and properties of those concepts for which property dominance (production frequency) norms are available. For related word pairs, extra facilitation beyond the relatedness effect and the Typicality by Dominance interaction depended on presenting the property first (top position)—this magnified the typicality and dominance effects, and suggested that priming can be focused by salient properties in lexical search/decision. Typicality also affected RT to unrelated word pairs. Multiple regression analyses revealed word frequency, length, and typicality effects on unrelated pairs, but no word-frequency effects on related word pairs.

### HUMAN LEARNING AND MEMORY III

Delos D. Wickens, Ohio State University

Fiesta 1 Room, Friday morning, 8:05-12:35

8:05-8:15 (198)

**Verbal Learning While Blindfolded.** RICHARD DOLINSKY, *University of Toledo*—Auditorially presented word lists were learned while subjects were either blindfolded or normally sighted and immediately recalled in the same or different context. The "same" context conditions produced best recall; worst performance occurred in the "learn blindfolded/recall normal" condition. This extends earlier findings which have used drugs in state-dependent retrieval.

8:20-8:35 (199)

**Variability in Encoding and Its Effects on Recall Performance.** FRANCIS S. BELLEZZA & DANIEL R. YOUNG, *Ohio University*—Theoretical positions such as encoding variability and levels of processing indicate that changing the encoding procedures on each presentation of an item or changing the context of encoding results in recall superior to that following constant encoding conditions. The results of a series of experiments involving free and cued recall indicate that constant presentation conditions result in superior recall performance.

8:40-9:00 (200)

**How Investigations of the Semantic Code Confound Trace Representation with Episodic Representation.** SHANNON DAWN MOESER, *Memorial University of Newfoundland*—It is proposed that the episodic system represents an interaction of two different patterns of organization, one based on temporal-spatial properties of events and the other on semantic properties of units within an event. A number of recent experiments in verbal memory have confounded these two variables and thus drawn unwarranted conclusions about the nature of the semantic code.

9:05-9:20 (201)

**Additive Effects of Stimulus Structure and Processing Task.** R. REED HUNT, *University of North Carolina, Greensboro*—The qualitative nature of the orienting task and associative meaningfulness of the stimulus were varied in free and cued recall. The orienting tasks were orthographic, phonemic, associative, and intentional. The *m* effects were consistently reliable across all tasks, and semantic tasks produced best performance at both levels of *m*.

9:25-9:40 (202)

**A Within-Instruction-Condition Levels-of-Processing Effect.** DONALD A. SCHUMSKY, DAVID RICHTER, MICHELE PANFIL, & PATRICIA BALL, *University of Cincinnati*—To demonstrate a within-instruction-condition "levels-of-processing effect," 48 subjects described each of 24 Vanderplas and Garvin figures. Latency and rated "goodness" of interpretation were recorded. Later recognition was significantly correlated to rating and latency but not to Vanderplas and Garvin's scales. Experiment 2 replicated findings with "imagery" instructions.

9:45-10:05 (203)

**Depth and Consciousness in Word Recognition.** RONALD T. KELLOGG, *Stanford University* (sponsored by Bruce R. Ekstrand)—Three experiments examined the effects of sensory-semantic depth and conscious vs. automatic processing in an incidental recognition paradigm. Automatic encoding was operationally defined by converging evidence based on measures of interference, intention, and introspection. The results showed that depth and the consciousness factor exert independent effects on recognition performance, at least in a retrieval environment that reactivates the original encoding operations.

10:10-10:20 (204)

**Interaction Between Sentence Elaboration and Test Conditions.** RONALD P. FISHER, *Erindale College, University of Toronto* (sponsored by F. I. M. Craik)—The present study extended the levels-of-processing framework by examining the interactive roles of encoding elaboration and retrieval operations. In two experiments, target words were better remembered when embedded in elaborate rather than simple sentence frames. However, this occurred only when the test conditions allowed for a redintegration of the critical feature of the sentence frame.

BREAK

10:35-10:45 (205)

**Effects of Encoding Time and Extralist Retrieval Cues on Recall.** SLATER E. NEWMAN & PATRICK A. NELSON, *North Carolina State University*—Increased encoding time led to better recall when the same weak cues which had been present at encoding were also present at retrieval, but did not affect the amount of facilitation deriving from the presence at retrieval of strong extralist cues. Implications of these results for the encoding specificity hypothesis will be discussed.

10:50-11:05 (206)

**The Effect of Short-Term Memory Maintenance on Long-Term Recall.** RUTH H. MAKI & JENNIE SCHULER, *North Dakota State University*—Darley and Glass (1975) are often cited as evidence for increasing recall with increasing maintenance time in memory, while Craik and Watkins (1973) are often cited as evidence for no increase. In the present experiments, tasks similar to those used in the earlier studies both yielded higher recall with more maintenance time.

11:10-11:25 (207)

**Cued Recall for Four-Word Categories Presented in Separate Pairs.** G. A. WEIGEL (nonaffiliated), J. D. SCHENDEL, *U.S. Army Research Institute*, & H. HALFF, *Office of Naval Research* (read by H. Halff)—The experiment challenged Slamecka's (1972) conclusion that, in learning a categorized list, associations do not develop among items within a category. The logic was to create a situation in which associations would be likely to be established among some, but not all, category instances. Cued recall data indicated the formation of associations among selected instances.

11:30-11:45 (208)

**Why Does Modality Alter Immediate Free Recall?** DELBERT A. BRODIE, *Saint Mary's University*—People may remember verbal material better when they hear it rather than see it because evenness of presentation and ease of perception vary across modalities. By manipulating either ease of perception or perhaps evenness of presentation, one can either produce modality-like effects within a modality or eliminate the effect of modality on recall.

11:50-12:10 (209)

**Optimum Schedules of Rehearsal for Learning Names.** THOMAS K. LANDAUER, *Bell Laboratories*, & ROBERT A. BJORK, *UCLA*—If information, such as a name for a face, is given just once, what temporal pattern of subsequent rehearsals will maximize its long-term retention? We report and interpret experiments showing that, given a fixed number of recitations during a fixed period, a pattern of increasing intervals between successive recitations is best (and very good).

12:15-12:30 (210)

**Priming Effects in Long-Term Memory.** RONALD H. HOPKINS, *Washington State University*—Subjects were given titles and asked to recall the surname of each author. Target names which had been recently primed were better recalled than unprimed names. The magnitude of this priming effect was inversely related to the size of the primed set, but unrelated to information about priming given at the time of recall.

## PERCEPTION II

George Harker, *University of Louisville*  
Room 31, Friday morning, 8:10-12:40

8:10-8:25 (211)

**Is the Icon Stored in the Photoreceptors?** EDWARD H. ADELSON, *University of Michigan* (sponsored by John Jonides)—If rods or cones stored the icon, stimulus contrast and luminance would affect the time course of partial report decay in predictable ways. We found that significant changes of luminance and contrast had remarkably little effect—far smaller than predicted from a receptor model. Postreceptor storage appears to be essential in ordinary iconic persistence.

8:30-8:45 (212)

**Identification Related to Dissimilarity of Component Stimuli.** DONALD L. KING, *Howard University*—A drawing could be identified as consisting of different component pairs of lines. The two component lines that were recognized were rated as more dissimilar to each other than were other possible component line pairs. Symmetric forms were perceived as columns, asymmetric ones as background. Rated dissimilarity between columns was greater.

8:50-9:05 (213)

**Dwell Time Predicts Target Detection in Visual Search.** C. F. NODINE, *Temple University*, & H. L. KUNDEL, *Temple University School of Medicine*—How is searching for an abnormality in a chest x-ray film like searching for a NINA in an Al Hirschfeld drawing? In both cases, the eye-movement parameter dwell time predicts successful search. What is the implication of this finding? Dwell time reflects perceptual processes used to differentiate real targets from potential targets that serve as focal points of the search pattern.

9:10-9:25 (214)

**Judgmental Attitude and Size Constancy Scaling in Two-Dimensional Pictorial Arrays.** JOHN UHLARIK, RICHARD PRINGLE, KEVIN JORDAN, & JOHN MISCEO, *Kansas State University*—Effects of instructional sets (objective, phenomenal, projective, and retinal) on magnitude estimation of size of blocks in a pictorial array were examined. Judgmental results were consistent with previous studies of size constancy in three-dimensional arrays. Chronometric analyses indicated that reaction time increased linearly as a function of distal size, but no effect of distance.

9:30-9:45 (215)

**Right-Angle Constancy.** THADDEUS M. COWAN & GIOVANNI F. MISCEO, *Kansas State University*—Judgments of apparent right-angledness, made to figures of three-dimensional corners that varied in measured angle and viewing direction, revealed right-angle constancy over a narrow range of geometric angle. The study bears on the interpretability of possible and impossible figures by investigating when and under what conditions right-angle constancy fails.

9:50-10:05 (216)

**What Makes Triangles Point: Local and Global Factors in Perception of Ambiguous Triangles.** STEPHEN E. PALMER, *University of California, Berkeley*—Gestalt vs. structural theories of perception were tested by studying global and local factors in perceived pointing of equilateral triangles. Triangles were presented singly or as central elements in configurations, and subjects indicated direction of pointing. Both global structure and local element shape produced strong biases. Further study showed global and local factors to be differentially important for different configurations. The results suggest that both global-to-local and local-to-global processes are involved in perceiving these patterns.

10:10-10:20 (217)

**Visual Set and Anxiety in the Stroop Phenomenon.** CHRISTABEL B. JORGENSON, *Southwest Texas State University* (sponsored by Harvey Ginsburg)—The effects of a visual set, the Stroop phenomenon, and anxiety upon response latency were examined. Three variations of the set were presented and two response conditions were required. For all 60 subjects there was a significantly longer response latency when "reporting the color" as opposed to "reading the word." There was also a significant interaction between anxiety and the Stroop.

10:25-10:35 (218)

**Stroop Interference in the Left and Right Visual Fields.** YAO-CHUNG TSAO, TIMOTHY FEUSTEL, & CHRIS SOSEOS, *Rensselaer Polytechnic Institute* (sponsored by Larry D. Reid)—The Stroop Color-Word Test was employed to study the amount of interference in naming colors when stimuli were presented in either visual field. Each slide was presented for 150 msec preceded by a fixation dot. Subjects (right-handed) were asked to verbally report either the color words or the color names, depending upon the conditions. Significantly higher error rates were obtained when color words were presented in the right visual field under the Stroop interference condition.

## BREAK

10:50-11:00 (219)

**The Disappearance of Real and Subjective Contours.** JOEL S. WARM, DIANE F. HALPERN, & RICHARD K. MURPHY, *University of Cincinnati*—When presented as luminous figures in a dark room, geometric forms containing subjective contours disappeared more often than similar forms containing real contours. Among the real figures, most disappearances involved fragmentations of portions of the contours or a fading out of the entire figure. Among the subjective figures, most disappearances occurred in the inducing areas. Therefore, portions that were physically present disappeared while those not physically present remained visible.

11:05-11:25 (220)

**Orientation-Specific Brightness Aftereffects.** H. H. MIKAELIAN & MICHELLE PHILLIPS, *University of New Brunswick*—Changes in the brightness of grids as a function of their orientation were induced following 20 min of inspection of alternating orthogonal gratings. The orthogonally oriented inspection gratings varied only in their space-averaged luminances. Magnitude of the brightness aftereffect was a linear function of the contrast ratio of the averaged luminances of these gratings.

11:30-11:50 (221)

**Invariance and the Deep Structure of Events.** JAMES E. CUTTING, *Wesleyan University*—Although the surface structure of events reflects the diversity and richness of the world around us, many events appear to have an underlying similarity. These likenesses occur in what might be called their "deep structure." It is at this level that invariance can be found. Considered will be the perception of five different types of events: walking, rolling, aging, flying, and celestial navigation.

11:55-12:15 (222)

**Athletes Could Help Aviators by Clarifying the Nature of Visuomotor Coordination.** WAYNE L. SHEBILSKE & CLIFFORD M. KARMIOHL, *University of Virginia*—Asym-

metries of eye and head position alter the perception of direction both during and after the asymmetries. Experiments will be presented to suggest that this might disturb vision outside the laboratory in situations requiring precise perception of direction.

12:20-12:35 (223)

**Effects of Aircraft Noise on an Intelligibility Task.** MALCOLM D. ARNOULT & JAMES W. VOORHEES, *Texas Christian University*—Recorded sounds (at 50 to 92 dBA) of two types of helicopters and a propeller airplane flying at altitudes of 300 and 900 ft were compared with respect to their interference with an audiovisual task. Subjects viewed pictures and judged whether spoken descriptive labels (at 65 dBA) were "right," "wrong," or "unheard."

(224)

(Read by title only)

**The Effects of Time-Variation on Stroop Color Naming Performance.** ANGELA M. RIECK, GEORGE D. OGDEN, *University of Maryland*, & GLYNN D. COATES, *Old Dominion University*—The effects of continuous and time-varied 85-dBA auditory noise on the performance of a Stroop color-word test and a related word-reading task were studied. Ten subjects served in each of three experimental groups, receiving continuous, periodic, or aperiodic noise. The subjects performed in both low-noise (65 dBA) and high-noise (85 dBA) conditions on 80 trials of both word reading and Stroop color naming. Median RTs in the word-reading task were unaffected by either noise intensity or the time-varied aspects of the noise. However, median RTs in the Stroop task were significantly elevated in the 85-dBA-noise condition. Additionally, in the high-noise condition, RT for the periodic and aperiodic groups was reliably elevated in comparison to the continuous noise group. Results are discussed within the framework of arousal, filter, and information theories.

### ANIMAL LEARNING AND CONDITIONING III

Abram Amsel, *University of Texas, Austin*  
Mission Room, Friday morning, 8:10-12:50

8:10-8:25 (225)

**Acquisition Processes of First- and Second-Order Aversion Conditioning.** JERRY RUDY & MARTIN D. CHEATLE, *Princeton University*—Neonatal rats acquire a second-order conditioned odor aversion to  $S_2$  when given the two-stage training sequence  $S_1$ -US;  $S_2$ - $S_1$  (where  $S_1$  and  $S_2$  represent different odors and the US was lithium chloride). They also acquire a first-order aversion to  $S_2$  when given only the sequence  $S_2$ - $S_1$ -US. Given either the training sequence  $S_1$ -US;  $S_2$ - $S_1$ -US,  $S_1$ -US;  $S_2$ -US or US;  $S_2$ - $S_1$ -US, however, the subjects display no evidence of either a first- or second-order aversion to  $S_2$ . Implications of these data for understanding the acquisition process of first- and second-order conditioning will be discussed.

8:30-8:50 (226)

**Effects of LiCl Dosage, Acquisition Level, and Test Conditions on Taste Aversion Learning in Weanling and Adult Rats.** J. J. FRANCHINA, H. A. GRIESEMER, STEPHEN PERCONTE, DAVID BUTLER, & SARA SILBER, *Virginia Polytechnic Institute & State University*—The degree (Experiment 1) and rate (Experiment 2) of taste aversion learning related inversely to the rat's age during acquisition but directly to LiCl dosage for both age groups. Following equivalent acquisition (Experiment 2), extinction was faster for the younger rats, but Experiment 3 suggested that these results reflected the conditions of extinction testing.

8:55-9:10 (227)

**Conspecific Odors and the Partial Reinforcement Effect with Limited and Extended Acquisition.** RONALD D. TAYLOR & MARY NELL TRAVIS-NEIDIFFER, *Texas Christian University* (sponsored by H. Wayne Ludvigson)—Recently, various studies have suggested a role for conspecific odors in the partial reinforcement effect (PRE). Using limited and extended acquisition with rats, the PRE was examined under conditions where odors both

were allowed to accumulate and were removed. The relevance of olfactory cues for the PRE was considered.

9:15-9:35 (228)

**Influence of US-Alone Intensity on the Acquisition and Retention of a Taste Aversion.** STEPHEN B. KLEIN & PETER J. MIKULKA, *Old Dominion University*—Two studies investigated the influence of US-alone intensity on the development and retention of a taste aversion. Various doses of LiCl were administered either prior to or after the establishment of a sucrose aversion. The results showed that an increased interference was produced by higher intensities. These results support an associative model of US-alone effects.

9:40-9:55 (229)

**Odor-Mediated Runway Performance as a Function of Thorazine Injection.** ROBERT E. PRYTULA, *Middle Tennessee State University*, & STEPHEN F. DAVIS, *Austin Peay State University*—Two groups of runway-trained rats received a double-alternation sequence of reward-nonreward in a straight runway in the presence of odors exuded by startbox donors injected with Thorazine and saline, respectively. Appropriate start- and run-measure patterning was initially displayed only when the donors were saline injected. However, reversing the donor-injection condition resulted in the development of such patterning by the subjects having donors shifted from Thorazine to saline and the maintenance of patterning by the subjects having donors shifted from saline to Thorazine.

10:00-10:15 (230)

**Olfactory Control of Runway Performance as a Function of Liquid Reinforcement.** STEPHEN F. DAVIS, *Austin Peay State University*, RICHARD A. BURNS, *Georgia Southwestern College*, & A. JEAN HOWARD, *Austin Peay State University*—A double-alternation sequence of reward-nonreward was administered to three groups of rats in a two-phase experiment. During Phase 1, all groups received 1 ml of 32% sucrose on reward trials. "Non-reward" events for the three groups consisted of 1 ml of 3% sucrose, 1 ml of water, and nothing, respectively. During Phase 2, nonreward events were shifted. Appropriate patterning was shown during both phases only by subjects receiving nothing on non-reward trials.

BREAK

10:30-10:45 (231)

**The Effect of Conditioned Taste Aversions on Schedule-Induced Polydipsia.** ANTHONY L. RILEY, *American University*, & PAUL J. KULKOSKY, *NIAAA* (sponsored by Elliott M. McGinnies)—Conditioned taste aversions significantly suppressed schedule-induced polydipsia, although not as markedly or long-lastingly as aversions on deprivation baselines, suggesting that SIP is relatively insensitive to taste aversions. The maintenance of schedule-induced alcohol polydipsia at levels avoided under ad-lib conditions may be a result of this insensitivity.

10:50-11:05 (232)

**Characteristics of the Proximal US Preexposure Effect in Taste-Aversion Learning.** MICHAEL R. BEST, *Southern Methodist University*, & MICHAEL DOMJAN, *University of Texas, Austin*—Taste-aversion learning is severely attenuated if subjects are exposed to the US within 6 h before the conditioning trial but not if this preexposure occurs 24 h or more before conditioning. This phenomenon occurs in a wide variety of situations.

11:10-11:25 (233)

**Increased Drinking Elicited by Exposure to Lithium-Conditioned Taste Cues.** MICHAEL DOMJAN, DOUGLAS J. GILLAN, & GAIL A. GEMBERLING, *University of Texas, Austin*—In contrast to the suppression of ingestion which occurs during lithium distress and in the presence of lithium-conditioned stimuli, subjects consume unusually large quantities of fluid following exposure to lithium-conditioned cues. This effect occurs after as few as two conditioning trials and with both low and high drug doses. It is also observed if subjects are injected with the drug after exposure to the lithium CS on the test day.

11:30-11:40 (234)

**Do Constraints Exist on the Discriminative Use of Odors Resulting from Reward and Nonreward in the Rat?** PAUL J. ESLINGER & H. WAYNE LUDVIGSON, *Texas Christian University* (read by H. W. Ludvigson)—Discriminative use of odors following reward (R) and nonreward (N) was examined under runway conditions where the goal events between donor-test rat pairs were the same (R-R;N-N) or different (R-N;N-R). Both conditions produced significant discriminations that differed only slightly.

11:45-12:00 (235)

**Backward Conditioning of Taste Aversions: Problems for Contingency Theory.** LEWIS M. BARKER, *Baylor University*—Previous demonstrations of excitatory backward conditioning of taste aversions have employed single-trial methodologies. An exception is Green and Garcia (1971), who found a medicinal effect (backward inhibitory conditioning) following multiple US-CS trials. The present study reports multiple-trial excitatory backward conditioning at .5- but not 1.5-h US-CS intervals. Discussion centers around contingency vs. contiguity views of taste aversion conditioning.

12:05-12:25 (236)

**Effects of Different Reinforcers and Motivation States on the Topography of a Dry-Lick Operant.** BARBARA HERRING, *University of Toronto* (sponsored by G. C. Walters)—Films and videotapes were used to determine the exact topography of a dry-lick operant in rats that were hungry or thirsty, reinforced with sucrose, or both hungry and thirsty, reinforced with food or water. Some effects of deprivation state as well as reinforcer were noted.

12:30-12:45 (237)

**Effects of the Percentage of Goal-Punished Extinction Trials on Self-Punitive Responding.** S. J. KOSTYLA & H. BABB, *SUNY, Binghamton* (read by H. Babb)—After 20 shock-escape acquisition trials in a runway, groups of rats were punished in the goalbox on various percentages of trials during extinction. The results suggest that lower percentages of shock during extinction may be more facilitative than higher percentages, a finding inconsistent with current interpretations of self-punitive behavior.

(238)

(Read by title only)

**Reference Memory Effects of Distributed Practice on a Radial Maze.** DAVID G. ELMES, JOHN C. WILLHITE, & G. BRIAN BAUER, *Washington & Lee University*—Rats received 11 trials on five different problems that required them to learn which four arms on an eight-arm radial maze were baited. Half the rats had an intertrial interval of 45 sec (massed practice), and the other half had an intertrial interval of 10 min (distributed practice). Test trials allowed an examination of performance unconfounded by the length of the intertrial interval. Performance improved within a problem, but learning to learn was marginal. Distributed practice resulted in significantly fewer reference memory errors (extraproblem intrusions) than did massed practice, but the conditions of practice had no effect on working memory errors (repetitions of correct responses).

(239)

(Read by title only)

**The Effects of Context on Long-Delay Taste-Aversion Learning in Infant Rats.** PAMELA A. STEINERT, ROBERT N. INFURNA, ELLEN VAN AUKEN, & NORMAN E. SPEAR, *SUNY, Binghamton*—This study employed a semiinfusion technique to examine the influence of context (novel or familiar) on long-delay (1-min, 1-h, or 2-h) taste-aversion learning in 18-day-old rats. The taste aversion was less the longer the CS-US interval and occurred with the 2-h delay in the novel, but not the familiar, group. These results are of ontogenetic interest and also further clarify our previous evidence that taste-aversion in immature rats depends upon where the taste is experienced.

## BRAIN FUNCTIONS

Richard F. Thompson, *University of California, Irvine*  
Room 25, Friday morning, 8:00-12:50

8:00-8:15 (240)

**Cerebral Hyperthermia and the Visually Evoked Electrocortical Response.** VIRGINIA BRUCE-WOLFE, RICHARD HETSCHEL, DON R. JUSTESEN, & DENNIS REEVES, *V.A. Hospital, Kansas City* (read by D. R. Justesen)—Latencies of the N<sub>3</sub> component of the visually evoked electrocortical response (VER) were compared with subjective estimates of time in 22 young adult male subjects under normal and elevated brain temperatures ( $\Delta T \sim 1.3^\circ\text{C}$ ). A small, but highly significant, decrease in the mean of VER latencies was associated with altered perception of time as indexed by psychophysical methods. Subjective flow of time was quickened by the mild hyperthermia.

8:20-8:35 (241)

**EEG Correlates of Visual Information Processing in the Cat.** THOMAS L. BENNETT, *Colorado State University*—Within the context of EEG correlates of learning a go/no-go visual discrimination, evidence is presented that hippocampal theta is a correlate of attention to meaningful environmental stimuli. The EEG patterns of the visual cortex additionally vary according to the content of the message conveyed by the meaningful stimulus.

8:40-9:00 (242)

**Configurational Mapping of Brain Electrical Activity by Multidimensional scaling methods.** JACKSON BEATTY, *UCLA*—One of the most compelling, but difficult, problems in the analysis of event-related potentials (ERPs) is the determination of interareal relationships from simultaneously obtained averaged recordings. A new method based on multidimensional scaling procedures is proposed and applied. The resulting functional maps of cortical activity provide new insight into the patterning of regional cortical activity.

9:05-9:25 (243)

**Neural Mechanism of the Overtraining Reversal Effect.** MICHAEL GABRIEL, EDWARD ORONA, & KENT FOSTER, *University of Texas, Austin*—Multiple-unit activity was recorded from limbic cortex (LC) of rabbits during discriminative avoidance conditioning and reversal training. Pure tones served as discriminative stimuli (CS+ and CS-) and footshock served as the UCS. The response was locomotion in a rotating wheel apparatus. Rabbits given overtraining showed more rapid reversal than non-overtrained rabbits. Unit activity showed significant retention throughout reversal of the short-latency (25 msec) discriminative response appropriate to original training. This effect occurred only in nonovertrained rabbits. These results suggested that overtraining may facilitate reversal by attenuating in LC the neuronal discrimination appropriate to original learning.

9:30-9:45 (244)

**Brain Mechanisms of Pavlovian Inhibition.** JOHN W. MOORE, *University of Massachusetts*, CHRIS YEO, *University College London*, & NEIL E. BERTHIER, *University of Massachusetts*—Rabbits with massive ablation of neocortex are capable of acquisition and conditioned inhibition of the classically conditioned nictitating membrane response. Follow-up experimentation based on prior work in our laboratory by Mis suggests a mesencephalic basis for conditioned inhibition. Relevant behavioral and anatomical evidence is considered.

9:50-10:05 (245)

**Some Effects of Unilateral Motor Cortical Ablations on Ipsilateral Forelimb Control in Rats.** A. W. PRICE & S. C. FOWLER, *University of Mississippi* (read by S. C. Fowler)—Two force transducers were used as operant manipulanda to assess changes in force, duration, and rate of response produced by unilateral motor cortical lesions. Spatial arrangement of the manipulanda permitted a subject to respond on Transducer I exclusively with his left forepaw and on Transducer II exclusively with his right. Permanent response deficits were observed for the limb contra-



lateral to the lesion, while the ipsilateral limb exhibited a complex, but consistent, pattern of changes in response characteristics. These results suggest a role for hemispheric interaction in motor control in rats.

#### BREAK

10:20-10:30 (246)

**Psychic Ageusia in Rats Lacking Gustatory Neocortex.** J. JAY BRAUN, *Arizona State University*, LARRY R. LEACH, *University of Lethbridge*, & STEPHEN W. KIEFER, *UCLA*—While having little apparent involvement in reflexive hedonic responses to taste stimuli, the gustatory neocortex (GN) is substantially involved in taste memory. Memory disruptions of preoperative taste experiences following GN ablation appear to be specific to certain taste stimuli and to GN lesions. They are highly reminiscent of classic descriptions of "psychic blindness" following visual neocortex lesions.

10:35-10:45 (247)

**Recovery of Function After Brain Damage: Facilitation of the Process.** N. DAVIS & T. E. LeVERE, *North Carolina State University* (read by T. E. LeVere)—At the last meeting of this Society, we reported that the RNA antimetabolite, 8-azaguanine, had similar effects on the behavior of both normal and visual decorticate rats. In each case, this drug interfered with the acquisition of, but not the performance of, a two-choice brightness discrimination. Given this, we became interested in whether the drug would also interfere with the postoperative recovery of a brightness discrimination when the discrimination was disrupted by visual decortication. However, rather than interfere with recovery of function, the drug actually facilitated the process. We interpret this as support of the notions that: (a) postoperative recovery depends upon the sparing of the neural centers controlling the disrupted behavior, and (b) the process by which these spared centers are reactivated, or reaccessed, is not an acquisition process.

10:50-11:05 (248)

**Thyroid Hormone Changes in Rats with Hippocampal Lesions.** HELEN M. MURPHY & CYRILLA H. WIDEMAN, *John Carroll University* (sponsored by Thomas S. Brown)—Thyroxine ( $T_4$ ), triiodothyronine ( $T_3$ ), and  $T_3$  uptake were measured in rats with hippocampal lesions, neocortical control, and normal animals. Animals with hippocampal lesions were significantly different from controls in all three tests. These hormonal differences may account for many of the behavioral changes noted in animals with hippocampal lesions.

11:10-11:25 (249)

**Attenuation of Latent Inhibition by Electrical Stimulation of Hippocampus.** W. RONALD SALAFIA, ANDREA M. ALLAN, & GARY J. BORKOWSKI, *Fairfield University*—Electrical stimulation to hippocampus of rabbits during CS preexposure produced a marked attenuation of latent inhibition. Stimulation presented during conditioning similarly attenuated latent inhibition, but also disrupted conditioning of animals for which there had been no preexposure. These apparently contradictory effects can be reconciled if it is assumed that stimulation activates hippocampal functioning as opposed to creating a functional lesion.

11:30-11:45 (250)

**Plasticity in Speech Organization Following Callosotomy.** JOSEPH E. LeDOUX, BRUCE T. VOLPE, & CHARLOTTE S. SMYLIÉ, *Cornell Medical School* (sponsored by Michael S. Gazzaniga)—We have been studying linguistic processes in the separated hemispheres of case P.S., a split-brain patient. Shortly after surgery, he was observed to have extensive comprehension skills represented in his two hemispheres, but only the left could speak. Now, some 2½ years postoperatively, through a series of specially designed tests, we have observed that his right hemisphere is acquiring the capacity to speak.

11:50-12:05 (251)

**Induction of Reorganization of the Visual Functions of the Cerebral Cortex.** HARRY HOWARTH, DONALD R. MEYER,

& PATRICIA M. MEYER, *Ohio State University* (read by D. R. Meyer)—If rats are prepared with visual cortical ablations in early infancy or in adulthood, are trained on a simple visual habit in adulthood, and are finally prepared with second-stage ablations which destroy the rest of the cortex, performance of the habit is markedly affected if, and only if, the injuries to the visual cortex were sustained in infancy. Hence a perinatal visual cortical ablation induces a reorganization of the functions of the extra-visual systems of the cortex, and that effect is not producible by injuries to the visual cortex in adulthood.

12:10-12:25 (252)

**Role of N. Accumbens in Morphine-Induced Locomotor Hyperactivity.** HERMAN TEITELBAUM, G. ANDREW MICKLEY, & PAUL GIAMMATTEO, *Armed Forces Radiobiology Research Institute*—Mice of the C57BL/6J strain become hyperactive to increasing doses of morphine sulfate. The response is very similar to locomotor hyperactivity induced by amphetamine. Lesions and chemical blockade of posterior n. accumbens abolish amphetamine-induced hyperactivity and reduce, but do not abolish, the morphine response. These experiments demonstrate that the response to both drugs is mediated by overlapping, but noncongruent, neural systems.

12:30-12:45 (253)

**Effects of Reinforcement on Memory: Role of the Midbrain Periaqueductal Gray.** RAYMOND P. KESNER & LARRY CALDER, *University of Utah*—Rewarding levels of electrical stimulation of the midbrain periaqueductal gray (MPAG) applied immediately after, but not 3 h after, one-trial passive avoidance learning disrupt long-term retention of the training experience. Neutral levels of electrical stimulation of the MPAG have no effect, while aversive levels of stimulation facilitate long-term retention. Since rewarding levels of MPAG stimulation do not produce analgesia and posttrial intracranial injections of morphine into PAG have no effect on long-term retention of passive avoidance training, the observed retention deficit with rewarding MPAG stimulation does not appear to be due to release of endogenous pain-attenuating substances. Rather, it appears that the rewarding MPAG stimulation itself represents an experience which might compete with the passive avoidance training experience.

(254)

(Read by title only)

**Efficacy of Reminder Stimuli in the Attenuation of ECS-Induced Amnesia.** TERRY L. DeVIETTI & TIM K. WITTMAN, *Central Washington University*—Rats, unilaterally implanted in the mesencephalic reticular formation (MRF), were fear conditioned by pairing a tone with strong footshock and then given ECS. Other groups were given strong or weak footshock following the tone and were not given ECS. Another group was given strong footshock and ECS, but the footshock was not preceded by the tone. Reminder treatments consisted of the factorial combinations of situational cues and stimulation of the MRF given to subgroups of the four major groups. Additional subgroups received MRF stimulation preceding the exposure to situational cues. Autonomic reactivity, as indexed by heart rate, was recorded during reminder treatment and a behavioral test was given the day following reminder. Data are preliminary, but attempts will be made to correlate autonomic reactivity with behavioral performance.

(255)

(Read by title only)

**Effects of Hippocampal X-Irradiation on a Dominance Order in the Rat.** ROBERT B. WALLACE, *University of Hartford*, JACK WERBOFF, *University of Connecticut*, & ROBERT GRAZIADÉL, *University of Hartford*—The technique of focal x-irradiation of the rat hippocampus provides a selective lesion of the granular cells of the dentate gyrus. In an effort to study the effects of granule cell agenesis, the following dominance study was carried out. Five experimental animals (male Long-Evans hooded rats, random bred in our laboratories) were exposed to focal hippocampal x-irradiation, 150 R per day from 2 to 15 days post partum. Examination of hippocampal anatomy indicated an

80% reduction in granule cells. Five additional males served as nonirradiated sham animals and five served as controls. Results indicated that irradiated animals were submissive to control animals.

### DISCOURSE PROCESSING

Walter Kintsch, University of Colorado  
Fiesta 4 Room, Friday morning, 8:15-12:35

8:15-8:30 (256)

**How Readers Identify and Use Topics in Technical Prose.** DAVID E. KIERAS, *University of Arizona*—Readers in a topic choice experiment tended to choose the initially mentioned item in passages as the topic, apparently on the basis of the initial position, rather than content importance of the item. In a recall experiment, the topic specified by initial mention appeared to govern storage organization.

8:35-8:50 (257)

**Reading Eye Fixations and Text Structure.** PATRICIA CARPENTER & MARCEL ADAM JUST, *Carnegie-Mellon University*—When reading short paragraphs, subjects fixate longer on those parts of the text that other subjects have rated as more important. A chronometric analysis of the reading eye fixations reflects the reader's computation of intertext relations and inferences. The results suggest a model of how eye fixations are controlled during naturalistic reading tasks.

8:55-9:10 (258)

**Origins of Correlations Between Inspection Time and Recall in Self-Paced Study of Written Discourse.** E. Z. ROTHKOPF, *Bell Laboratories*—College students (N = 144) read prose guided by prememorized learning goals. Inspection was subject-controlled. A detection-processing account of positive correlations between inspection time and recall was rejected partially because recall failures were associated with longer inspection time than were successes. The difference between forgotten and recalled sentences in inspection time was greater for good than for poor learners.

9:15-9:30 (259)

**Story Structure vs. Content Effects on Children's Recall and Evaluative Inferences.** TERESA M. NEZWORSKI, *University of Minnesota*, NANCY L. STEIN, *University of Illinois*, & TOM TRABASSO, *University of Minnesota* (read by T. Trabasso)—The psychological validity of story grammars rests, in part, with the consistent finding that categorized propositions differ in salience, with internal responses being least well recalled. In order to unconfound propositional content from the form and location of the category, 5- and 8-year-old children rated characters and recalled stories in a moral judgment task. Across five conditions, two propositions were varied in category form and location. Their semantic content from which one could infer the character's motivation was held constant. Variations in setting, initiating event, internal response, consequence, or reaction categories did not result in either differential recall or in moral scale judgments when the semantic information was held constant.

9:35-9:45 (260)

**Effects of Advance Organizers on the Pattern of Recall Protocols.** RICHARD E. MAYER & BRUCE BROMAGE, *University of California, Santa Barbara*—One hundred and eight subjects received a familiarizing advance organizer before or after reading a technical text. Subsequent recall patterns differed with Before subjects higher on general concepts, novel inferences, and appropriate intrusions, and After subjects higher on technical facts, vague summaries, and inappropriate intrusions. An assimilation encoding theory was suggested.

9:50-10:05 (261)

**Models of Sentence Representation.** ERNEST T. GOETZ, RICHARD C. ANDERSON, *University of Illinois*, & DIANE L. SCHALLERT, *University of Arizona* (read by R. C. Anderson)—Three studies tested gestalt vs. atomistic representation of simple three-word sentences. Sentences were recalled completely or not

at all, supporting the holistic view. A final experiment investigated Kintsch's theory of propositional representation with sentences containing four content words. As the theory predicts, one-proposition sentences were better recalled than three-proposition sentences, and fragmentary recall of the latter preserved the integrity of component propositions.

10:10-10:25 (262)

**Text Generation and Recall in High-Knowledge and Low-Knowledge Individuals.** GOERGE SPILICH & JAMES F. VOSS, *University of Pittsburgh* (read by J. F. Voss)—Individuals with high or low knowledge of baseball generated a 250-300-word passage depicting a one-half inning of a baseball game. Two weeks later, the individuals were asked to recall the passage they had generated and were tested additionally on the material. The results are considered in terms of the utilization of one's knowledge of the game's goal structure in generating and retrieving information.

BREAK

10:40-10:55 (263)

**The Reader's Knowledge of the Conventions of Story Writing.** GARY M. OLSON, SUSAN DUFFY, & ROBERT MACK, *University of Michigan*—In addition to knowledge about overall story structure, the reader has a number of expectations about how a story will be told. We have been exploring these shared writer-reader conventions through the use of talking-out-loud protocols, reading time studies, and other methods. Examples of these conventions will be described, and their consequences for story comprehension will be discussed.

11:00-11:15 (264)

**Summaries from Structurally Equivalent Movie and Text Stories Are Not Distinguishable.** PATRICIA BAGGETT, *Florida International University* (sponsored by Walter Kintsch)—Subjects either watched the dialogueless movie or heard the structurally equivalent text *The Red Balloon* and summarized episodes they could remember. New subjects sorted summaries of the first episode into medium (movie vs. text) and delay in recall (0- vs. 7-day) at chance level, indicating that macropropositions were independent of input medium and delay.

11:20-11:35 (265)

**Top-Downing Upside Down Sentences.** LINDA S. SALA & MICHAEL E. J. MASSON, *University of Colorado* (sponsored by Lyle E. Bourne, Jr.)—The use of top-down processes during reading was studied using inverted typography. Memory for meaning, wording, and typography was tested immediately, after 2 days, and after 7 days. The results of the new study deal with the way in which the memorial representations of meaning, wording, and typography are interrelated as a result of interactive processing.

11:40-11:50 (266)

**Listening to Time-Compressed Speech: The Effects of Prior Listening Experience and Listening Rate Preference.** PAUL A. GADE, *U.S. Army Research Institute for the Behavioral and Social Sciences* (sponsored by Donald O. Weitzman)—When asked to indicate their listening rate preference, 31 of 33 participants chose time-compressed speech. Nearly all participants found time-expanded speech to be the least desirable. Prior experience with time-compressed speech did not influence preferred listening rates, however it did influence induced listening rates. When asked to listen to speech as rapidly as possible (induced rate), participants with prior experience usually selected higher rates than participants with no prior experience. Experience and preference had an additive effect on induced listening rates.

11:55-12:10 (267)

**Comprehension Processes in Oral Reading.** JOSEPH H. DANKS, RAMONA FEARS, LISA BOHN, & GREGORY O. HILL, *Kent State University*—How are components of the comprehension process organized in reading? Lexical, syntactic, semantic, and textual (factual) inconsistencies produced disruptions in oral reading performance. The temporal pattern of the

disruptions indicate that both serial, bottom-up and parallel, top-down processes operate in different sectors of the comprehension process.

12:15-12:30 (268)

**Artificial Set Inclusions are Easy if the Phrasing is Right.** KIRK H. SMITH & BARBEE T. MYNATT, *Bowling Green State University*—The proportion of individual subjects who achieved nearly perfect performance on set inclusion materials like Frase's (1969) was influenced by complexity of set structure, sentence wording and order, and the presence of a logical framework. Under optimal conditions, 86% gave logically correct answers and a consistent pattern of study and verification times.

(269)

(Read by title only)

**Processing Sentences in Discourse.** DAVID J. TOWNSEND, *Montclair State College*—This paper outlines a model of how sentences are processed in discourse. It is based on recent studies of (a) how semantic relations between clauses modify the role of structural variables in sentence processing and (b) how successive sentences in discourse are semantically connected. It is proposed that similar semantic relations obtain between the clauses of a sentence and between the sentences of a discourse, and further, that these semantic relations modify the role of structural variables in clause and sentence processing in similar ways. In both cases, the nature of this modification is the construction of hypotheses about how successive clauses or sentences are semantically related and the organization of the clauses or sentences into a preferred causal or temporal order.

### ATTENTION AND INFORMATION PROCESSING III

Irving Biederman, SUNY, Buffalo

River Room, Friday morning, 8:00-12:50

8:00-8:20 (270)

**On the Relationship Between the Positive Set Size Effect and Stimulus Probability in Item Recognition.** DEBORAH J. KENNETT & MARIANNE W. KRISTOFFERSON, *McMaster University* (read by M. W. Kristofferson)—A confounding has been present in nearly all item recognition studies: the frequency of presentation of each positive item varies inversely with increases in positive set size. We attempted to find the separate contributions of these two variables within the context of the classic item recognition experiment and over prolonged practice. The results of this and related experiments will be reported.

8:25-8:40 (271)

**The Effect of Set on the Category Effect in Visual Search.** JOHN JONIDES, *University of Michigan*, & HENRY GLEITMAN, *University of Pennsylvania*—The very same unambiguous visual stimuli are shown to either produce or not produce a category effect, depending upon the mental set of the subjects. The results of two experiments indicate that set for the category of the target is necessary to produce the effect, while set for the category of the background items is not.

8:45-9:00 (272)

**Automatic Processing for Conjunctions of Features.** WALTER SCHNEIDER, *University of Illinois* (sponsored by Harold Hake)—These experiments demonstrate automatic conjunction processing of color and shape features in visual search. After 3,180 trials, comparison times per item were 2.55 msec for color search, 10.5 msec for shape, 14.0 msec for conjunction color and shape. Texture segregation experiments suggest automatic field separation based on a conjunction of features.

9:05-9:20 (273)

**Comparison of Automated Processing Paradigms.** EARL HUNT, COLENE MCKEE, & STEVEN YANTIS, *University of Washington*—The *stimulus identification* paradigm has been used as an example of a task that relies partly upon automatic, involuntary information processing. The *constant mapping* visual

scanning paradigm has similarly been said to involve automatic information processing. We have compared individual performance in the two tasks, and compared performance in each task to performance in variable mapping tasks and to performance on psychometric measures of aptitude.

9:25-9:40 (274)

**Automaticity: On the Hidden Costs of Letter Encoding.** PEDER J. JOHNSON, JOHN FORESTER, *University of New Mexico*, & WARD RODRIGUEZ, *Highlands University*—Using a letter-match/probe RT paradigm, it was found that the mere expectancy of a probe stimulus was sufficient to increase letter match RTs over a control condition not expecting a probe. Magnitude of the cost was inversely related to the ISI between the two letters. It was also found that occurrence of a letter increased probe RTs over a probe-only control. The results suggest that subjects may be delaying first-letter encoding; however, when the first letter was unexpectedly masked after a brief exposure, letter identification was not impaired by probe expectancy.

9:45-10:05 (275)

**Automatic and Attentional Effects of Priming on Choice-Reaction Times.** JAMES M. RAFFERTY, *Bemidji State University*, ELIZABETH LIGON BJORK, & J. THOMAS MURRAY, *UCLA* (read by E. L. Bjork)—The effects of priming in a choice reaction time task were observed when (a) the prime carried no stimulus or response information, (b) the prime directed the subject's attention to a target other than itself, and (c) the level of identity between the prime and target were manipulated. The results have implications for the operational loci and possible interaction of automatic activation and attentional processes.

### BREAK

10:20-10:40 (276)

**When Does Noise Affect Fast Serial Addition?** MARY ANNE BAKER, *Indiana University*, MICHEL LOEB, & DENNIS H. HOLDING, *University of Louisville* (read by D. H. Holding)—Males and females were tested in noise or quiet, before 11 a.m. or after 5 p.m. on 2 practice days, at two rates of fast, running addition. These variables tend to interact in determining error scores, latencies, and addition strategies, providing implications for the subvocal rehearsal version of arousal theory.

10:45-11:00 (277)

**Dual Task Method: Passive Displacement or Active Allocation?** DAVID W. MARTIN & WILLIAM C. OGDEN, *New Mexico State University*—The results of Experiment 1 supported an active allocation model of dual task performance in that secondary task reaction times reflected primary task load only when subjects had prior load information. However, Experiments 2-5 were best explained by a passive displacement model, suggesting that the original result was an expectancy artifact.

11:05-11:20 (278)

**Attentional Resource Allocation in Dynamic Environments.** CHRISTOPHER D. WICKENS & PAMELA TSANG, *University of Illinois*—Subjects performed a tracking task of time-varying difficulty under single task conditions, and concurrently with a second tracking task of constant difficulty. The resulting time-varying performance measures are employed to model the properties of the operator's attentional resource allocation system in evaluating and responding to task resource demands imposed in dynamic environments.

11:25-11:40 (279)

**Relationships Between Attention Shifts and Saccadic Eye Movements.** MARY JO NISSEN, *Florida State University*, MICHAEL I. POSNER, & CHARLES R. R. SNYDER, *University of Oregon* (read by M. I. Posner)—How do attention shifts relate to saccadic eye movements? Studies show that attention tends to move to the target in advance of the eyes. However, the degree and direction of visual attention shifts also relate to the probability of a target's presence, indicating considerable independence between the two systems.

## 11:45-12:05 (280)

**The Effect of Certainty on Smooth Eye Movements Produced by Expectations.** EILEEN KOWLER, *New York University* (sponsored by Robert M. Steinman)—Involuntary anticipatory drifts in the direction of expected target steps are known to occur when simple highly predictable patterns of target steps are tracked. More complex patterns also produce anticipatory drifts, but these drifts are less prominent and tend to disappear when subjects are uncertain about the pattern of steps. Thus, the smooth oculomotor subsystem is influenced by expectations, but the degree of this influence depends on the certainty of the expectation.

## 12:10-12:25 (281)

**Familiarity, Redundancy, and the Spatial Control of Visual Attention.** JOHN H. FLOWERS, MICHAEL L. POLANSKY, & SHARI S. KERL, *University of Nebraska*—In contrast to the widely observed facilitative effects of familiarity on search and recognition, highly familiar letter sequences in noncued portions of a tachistoscopic display substantially *reduce* accuracy of partial report. Little or no such attentional capture is caused by repeated letter sequences, suggesting a momentary resource limitation imposed by word encoding, but not by processing other forms of structural redundancy.

## 12:30-12:45 (282)

**Prediction of Need and the Allocation of Attention.** ERVIN R. HAFTER, NANCY M. BUCHER, & RAYMOND H. DYE, *University of California, Berkeley*—We have a model of attention that (1) relates the quality of perceptual search to the bandwidths of adjustable sensory filters and (2) argues that effort depends upon the number of bands processed. Of interest here is the role of predictability of need in the allocation of attention. Subjects listened for tones presented in aperiodic bursts of noise while playing video games designed to vary attentional demands systematically. Slow games strongly affected auditory performance, producing wide variations in the  $d$ 's, according to the needs of visual tracking. With fast games, however,  $d$ 's were more constant, implying a limitation on the speed of attentional switching.

## HUMAN LEARNING AND MEMORY IV

George Mandler, *University of California, San Diego*  
Fiesta 1 Room, Friday afternoon, 1:00-5:30

## 1:00-1:10 (283)

**Proactive vs. Retroactive Interference in Recognition Memory Within a Single List.** CHIZUKO IZAWA, *Tulane University*—By manipulating sublists, proactive and retroactive events were varied, employing three lists each, in the two experiments (120 subjects). Proactive study events generated only negligible effects, but retroactive study and test events effectively controlled recognition performance differentially, depending on stage of acquisition. Earlier inconsistencies in this area can now be accommodated by the retention interval model.

## 1:15-1:30 (284)

**Release from Proactive Interference in Bilingual Children.** DONALD J. TYRRELL, *Franklin & Marshall College*—Bilingual Hispanic children experienced release from proactive interference following a change in category with either Spanish or English input. Release followed a change in language from English to Spanish with or without a simultaneous category change, whereas a switch from Spanish to English produced release only if the category changed.

## 1:35-1:50 (285)

**An Examination of Proactive Interference in Short-Term Memory.** MICHAEL L. MACHT, *SUNY, Oswego* (sponsored by Norman E. Spear)—A modification of the Brown-Peterson paradigm was used to investigate proactive interference in short-term memory. Subjects studied two sets of categorized items on a trial (from either the same or different categories). Each set was separated by a distractor interval. Following a second distractor interval, the subjects attempted to recall one of the sets. The results

indicated that within-category recall was depressed in both double-set conditions (same and different categories) relative to a single set control condition. These results are discussed in relation to the principle of cue overload.

## 1:55-2:15 (286)

**The Nature and Timing of the Retrieval Process and the Locus of Interference Effects.** DELOS D. WICKENS, MARK MOODY, & ROGER DOW, *Ohio State University*—Locus of proactive interference and its release was investigated with the Sternberg paradigm. In primary and secondary memory situations, RTs were measured under high and low semantic interference. Slope functions were identical in all conditions, but intercepts differed. Interference effects occurred only in secondary memory, eliminating an encoding interpretation. There was clear support for a list- rather than an item-retrieval process.

## 2:20-2:40 (287)

**Storage Losses: Time and/or Item Dependent?** R. A. CHECHILE & K. WASHBURN, *Tufts University*—The Chechile and Meyer (1976) procedure for separating storage and retrieval processes was employed to investigate if the storage changes that occur in the Brown-Peterson paradigm were time or item dependent. The results showed that the storage losses can be attributed solely to the effect of the interpolated items.

## 2:45-3:00 (288)

**Echoic Persistence.** OLGA C. WATKINS & MICHAEL J. WATKINS, *Princeton University* (read by M. J. Watkins)—The common assumption of echoic decay within 2 sec or so owes much to research on the stimulus suffix and modality effects. Our own studies of these effects, however, indicate a modality-specific mode of retention for many seconds. Thus, a suffix effect was found with a 4-sec suffix delay, and the modality effect in delayed recall was virtually eliminated with auditory distraction, but not with visual distraction.

## (289)

(Read by title only)

**Short-Term Memory Due to Competitive Feedback is Absolutely Stable.** STEPHEN GROSSBERG, *Boston University*—The transformation and short-term storage of input patterns by shunting interactions in recurrent on-center off-surround anatomies is absolutely stable. That is, every competitive system induces a decision scheme, and the decisions in the networks  $\dot{x}_i = -A_i x_i + (B_i - x_i)[f_i(x_i) + I_i] - (x_i + C_i)[g_i(x_i) + J_i]$ ,  $i = 1, 2, \dots, n$ , store a pattern  $\{x_i(\infty)\}$  in response to every initial pattern  $\{x_i(0)\}$  given arbitrary parameters and signals. Moreover, every competition with an adaptation level  $c(x)$ ,  $x = (x_1, x_2, \dots, x_n)$ , viz,  $\dot{x}_i = a_i(x)[b_i(x_i) - c(x)]$ , is absolutely stable. System collective properties are analogous to sensory and cognitive data, invisible to single-cell recording, and opaque to heuristic arguments.

## BREAK

## 3:15-3:30 (290)

**Inhibitory Processes in Directed Forgetting.** RALPH E. GEISELMAN & ROBERT A. BJORK, *UCLA* (read by R. A. Bjork)—When incidental and intentional items are interlaced, a forget instruction has the same consequences on the recall of both item types: Items presented before or after the instruction suffer or profit, respectively. The notion that a forget instruction operates on a space of time, affecting everything in it, is contrasted with other possible explanations of the results.

## 3:35-3:50 (291)

**A Working Model of Reality Monitoring.** MARCIA K. JOHNSON, *SUNY, Stony Brook*, & CAROL L. RAYE, *Barnard College*—A general framework will be described for research on the problem of how people distinguish between memories generated primarily from external sources (perception) and memories generated primarily from internal sources (thought).

## 3:55-4:10 (292)

**Accuracy of Subjective Readiness to Recite in a Learning Task.** EDWIN MARTIN & PATRICK D. NALLY, *University of Kansas*—Subjects in a learning task were interrupted at various

stages to report readiness to recite perfectly, a magnitude estimation of sorts. The typical psychophysical regression phenomenon occurred. But when estimated percent was conditionalized on recitation performance, no regression occurred. Certain experimental conditions produced a reverse regression phenomenon.

4:15-4:30 (293)

**Confidence-Judgment Accuracy as a Predictor of Examination Performance and as Influenced by Opportunities for Retrieval Practice.** JOHN J. SHAUGHNESSY, *Hope College*, EUGENE B. ZECHMEISTER, & JOSEPH F. KING, *Loyola University of Chicago*—Students provided confidence judgments along with their answers to multiple-choice items on classroom examinations. Even the poorest students showed nonzero confidence-judgment accuracy; but, more importantly, confidence-judgment accuracy was positively correlated with test performance. The bases of this confidence-judgment accuracy were then examined in a multiple-list, paired-associate learning experiment. Accuracy increased across lists, but only when test trials were included during acquisition.

4:35-4:50 (294)

**Knowing That You Don't Know: Rapid Decisions About Ignorance.** SAM GLUCKSBERG, *Princeton University*, & MICHAEL McCLOSKEY, *Johns Hopkins University*—People learned sets of simple facts, e.g., *John is not a lawyer; Kevin has a typewriter*, etc. They then decided whether probe sentences were true, false, or unanswerable on the basis of the facts they had learned (e.g., "don't know" to the sentence *John has a typewriter*). Fewest errors and fastest decisions were made to "don't know" items. This suggests that fact retrieval involves two stages: a rapid first stage to determine whether one knows anything about a test item, and a second stage to determine just what it is that one does know.

4:55-5:10 (295)

**In Search of Metamemory-Memory "Connections."** JOHN G. BORKOWSKI, *University of Notre Dame* & JOHN C. CANANAUGH, *University of Minnesota*—Three studies will be presented that relate children's awareness of their memories (metamemory) to subsequent use of strategic skills and recall accuracy. Metamemory predicts the maintenance and generalization of experimenter-trained strategies and undergoes striking developmental changes. Different components of metamemory predict strategy use for children of different ages (5 to 12) learning identical tasks.

5:15-5:25 (296)

**Prediction of Later Recall During Study: Effects of Tests and Multiple Study Trials.** EUGENE A. LOVELACE, *University of Virginia*—College students were asked to rate during study their success in later recall of paired associates. Total presentation time per pair was constant, but occurred during 1, 2, or 4 study trials, with ratings made on the last study trial. Proportion correctly recalled was strongly related to ratings, but not differentially for varying numbers of presentations or occurrence of a test trial during the study phase.

## SENSORY PROCESSES AND PSYCHOPHYSICS

Eleanor R. Adair, J. B. Pierce Foundation  
Room 31, Friday afternoon, 1:00-5:45

1:00-1:10 (297)

**Is the Kinesthetic Gibson Effect a Contingent Aftereffect?** ROBERT H. CORMACK, *New Mexico Institute of Mining & Technology*—Subjects reliably experienced the kinesthetic Gibson effect with a circularly curved inspection stimulus. Only a small proportion reported any aftereffect with an S-curve inspection stimulus, and those reports indicate a very small and transient effect. It is concluded that the kinesthetic Gibson effect is not primarily a contingent one, dependent on hand position.

1:15-1:30 (298)

**Finger Localization Following Total Joint Arthroplasty.** J. A. SCOTT KELSO, *University of Iowa*—Joint capsular afferents are commonly thought to provide a principal source of kinesthetic information. Using techniques similar to previous work (Kelso, 1977), finger localization was examined in a patient population ( $N = 14$ ) in which the joint capsule was surgically released and removed during total metacarpophalangeal joint arthroplasty. Programmed movement reproduction was superior to exploratory and passive conditions (Experiment 1). Location accuracy was much better than distance (Experiment 2). Both results were well within normal ranges of performance. Alternative neurophysiological mechanisms are discussed and the theoretical role of joint receptors in movement control reevaluated.

1:35-1:50 (299)

**The Cutaneous "Rabbit" and Human Dermatomes.** FRANK A. GELDARD, *Princeton University*—Several proofs having established that sensory saltatory effects are not peripheral in origin, the possibility was explored that lower centers play a crucial role. Limits of the illusion, in arms, legs, and trunk, were determined and were compared with human dermatomal maps.

1:55-2:10 (300)

**An Instance of Tactile Hyperacuity.** JACK M. LOOMIS, *University of California, Santa Barbara*, & CARTER C. COLLINS, *Smith-Kettlewell Institute*—The sensitivity of the tactile sense to shifts in the position of a point stimulus was determined at four body loci. Shift thresholds were found to be on the order of 10 to 30 times finer than the corresponding static two-point limens. A physiological model will be presented which accounts for this difference between relative localization and spatial resolution.

2:15-2:30 (301)

**Temperature-Touch Interaction: Weber's Phenomenon Revisited.** JOSEPH C. STEVENS & BARRY G. GREEN, *John B. Pierce Foundation Laboratory*—Magnitude estimations of the apparent force of touch stimulation revealed that (1) concomitant cooling greatly intensifies touch sensation on the forehead and forearm (first reported by Weber in 1846); (2) concomitant warming moderately intensifies touch sensation on the forearm but little or none on the forehead.

2:35-2:50 (302)

**Effect of Adaptation on Spatial Summation for Vibrotactile Stimuli.** MARK F. YAMA, *Indiana University* (sponsored by James C. Craig)—Vibrotactile thresholds were measured as a function of contactor area both before and after adaptation to vibratory stimuli. Test and adapting stimuli were sinusoidal vibrations of either 25 or 250 Hz. The amount of spatial summation was found to be inversely related to the amount of threshold shift produced by adaptation. The implications of these results for the duplex mechanoreceptor hypothesis are discussed.

BREAK

3:05-3:20 (303)

**Self-Motion Magnitude Estimation During Linear Oscillation: Changes with Head Orientation and Following Fatigue.** D. E. PARKER, W. L. GULLEDGE, & D. L. WOOD, *Miami University*—Experiment 1, which examined changes in magnitude estimation performance as a function of direction of applied linear oscillation with respect to the subject's head, indicated that power law exponents varied with head orientation and were greatest when the head was 45° off-vertical. Experiment 2 demonstrated that power law exponents increased following exposure to a fatigue-inducing stimulus (5 min oscillation at 0.5 G).

3:25-3:40 (304)

**Thermal Pain, Aspirin, and a Psychophysical Law.** W. CRAWFORD CLARK, *New York State Psychiatric Institute*, & NATHAN MOSKOWITZ, *City College, CUNY*—Magnitude estimation responses obtained to noxious thermal stimuli were analyzed using the general form of the power function with a correction for pain threshold. Result:

Group (n = 45)	Exponent	Log k	Threshold (mcal · sec <sup>-1</sup> · cm <sup>-2</sup> )
No Capsule	.27	2.2	251
Placebo Capsules	.33	2.0	256
Aspirin (1920 mg)	.43	1.2*	238

Only the log y-intercept was significantly affected.

3:45-4:00 (305)

**Variability and Sequential Effects in Cross Modal Matching of Area and Loudness.** JOHN C. BAIRD, *Dartmouth College*, DAVID M. GREEN, & R. DUNCAN LUCE, *Harvard University*—For loudness and area, high (low) correlations are known to occur between and low (high) relative variability to exist for ratios of successive magnitude estimates when the signals are near (far). These two functions are studied for cross-modal matches of loudness and area; their relation to estimation is explored.

4:05-4:25 (306)

**Reflex Modulation: An Objective Behavioral Test of Sensory Function.** JAMES R. ISON, *University of Rochester*—Reflexes are modified by initial stimuli from diverse modalities, and the degree of modification is an index of stimulus reception. The clinical and laboratory value of this procedure is described in its depicting a variety of sensory phenomena in the acoustic and cutaneous modalities for normal and impaired humans and animals, both adult and young.

4:30-4:45 (307)

**The Effects of Interstimulus Onset Interval on Tactile Perception of Traced Patterns.** BARRY RICHARDSON, *University of Toronto* (sponsored by J. M. Kennedy)—A 3 by 3 vibrotactile display was used to present subjects with sequentially "traced" patterns whose elements were temporally separated by interstimulus onset intervals that varied between 200 and 1,000 msec. Position and number of vibratory points were accurately reported at the slower rate of presentation. At the higher rate, neither the number nor locations of vibratory points could be reported, but the patterns were successfully discriminated.

4:50-5:05 (308)

**Magnitude Estimation Functions for Individuals.** EUGENE GALANTER, GLORIA M. KARSTEN, & NANCY L. HABER, *Columbia University*—Over 100 experiments show that magnitude estimation functions from a few subjects (ca. 10 each) yield neat power functions with slopes predictable for the modality. Such functions for individuals with 10× the observations are usually more ragged (Green & Luce, 1974). We report how to do the individual experiments to get neat functions.

5:10-5:20 (309)

**Bouncing Beta and Rocking ROC.** W. A. GIBSON, *Queens College, CUNY*—In signal detection, each criterion condition provides two comparable estimates of criterion location. This paper solves for the  $d_0$  (alias  $d'$ ,  $d_e'$ ,  $d_s$  or  $\Delta m$ ) and for the ratio of dispersion in the signal-plus-noise distribution to that for noise alone that minimize the disparity between these two estimates across all conditions.

5:25-5:40 (310)

**New Results on Three-Choice Theory.** STEPHEN W. LINK, *McMaster University*—Early successes in the application of paired comparison theory overshadowed psychophysical analysis based on three responses, such as smaller, equal, and greater. Recent theoretical extensions of relative judgment theory to three responses provide random walk predictions relating response probability and response time. The psychometric function will be examined by application of these new results.

## ANIMAL LEARNING AND CONDITIONING IV

Harry Fowler, University of Pittsburgh

Mission Room, Friday afternoon, 1:00-5:45

1:00-1:20 (311)

**The Role of Fear Extinction in Mediating the Effects of Flooding a Shuttlebox Avoidance Response.** SUSAN MINEKA, *University*

*of Wisconsin, Madison*—The results of two experiments indicate that fear extinction is not a necessary part of the flooding (response-prevention) process that hastens avoidance response extinction, although it may well occur during flooding. Additional results from CS time control groups indicate that the dynamics of fear extinction are not identical during flooding and during conventional nonreinforced exposure to the CS such as occurs during standard avoidance extinction procedures.

1:25-1:35 (312)

**Is Fear Present to the CS Following Short-Latency Avoidance Responding?** DONALD J. LEVIS, JANE E. SMITH, & WENDY EPSTEIN, *SUNY, Binghamton*—A critical issue between fear and cognitive interpretations of avoidance responding is whether fear is present to the CS following avoidance acquisition. During Phase 1, 72 rats were exposed to a discrete-trial avoidance procedure and trained to a criterion of 5, 25, or 50 consecutive short-latency avoidance responses (4 sec or less). In Phase 2, fear to the CS was tested by using a CER procedure. Half the subjects were exposed to the CS used in training and half to a different stimulus. The data support the interpretation that fear is still being elicited by the CS following each of the training criteria.

1:40-1:55 (313)

**Discriminated Avoidance Acquisition in Goldfish: A Simultaneous Presentation Paradigm.** DOMINIC J. ZERBOLIO, JR., & LINDA L. WICKSTRA, *University of Missouri, St. Louis*—With  $S^d$  associated with US omission, goldfish acquire a discriminated avoidance response when  $S^d$  and  $S^A$  are presented simultaneously in a Y-maze. With cue termination varied,  $S^d$  termination debilitates whereas  $S^A$  termination does not affect acquisition. An instrumental interpretation of these results is made.

2:00-2:20 (314)

**Avoidance Conditioning Based Upon Shock-Duration Reduction.** PHILIP J. BERSH, *Temple University*, & LAUREN B. ALLOY, *University of Pennsylvania*—Rats exposed to random shocks with an average density of one/10 sec learned to leverpress at a rate of at least one response/15 sec to avoid 1-sec shocks in favor of .3-sec shocks. Shock onset and termination were response-independent. Five of six animals attained better than 90% avoidance for the last hour of 100-min sessions.

2:25-2:35 (315)

**Vicious Circle: Persistence of Running as a Function of Number and Location of Extinction Shocks.** SANFORD J. DEAN, *Northern Illinois University*, M. RAY DENNY, *Michigan State University*, & THOMAS BLAKEMORE, *Northern Illinois University*—Following escape training, rats were given extinction trials containing no shock; midsegment shock on the first, the first four, or all trials; or startbox shock on the first four trials. Significant differences in resistance to extinction were as follows: 100% > four midsegment > one midsegment, zero, or four startbox shocks.

BREAK

2:50-3:05 (316)

**Temporal Factors in CER Conditioning.** ALEXIS C. COLLIER, *Ohio State University* (sponsored by W. B. Pavlik)—Temporal conditioning was studied using a CER paradigm in which time (intertrial interval) was used as the discriminandum in one experiment, and CS duration was varied in a second. Results show that rats use such information, but that more direct time-dependent effects interact with the learned effects.

3:10-3:20 (317)

**A Developmental Analysis of Conditional Suppression.** RODNEY PETERS, *Christian Brothers College*, & A. JOHN ERNST, *Washington State University* (read by A. J. Ernst)—This study used two levels of motivation (high and low), two conditioned-stimulus/unconditioned stimulus pairing conditions (1 vs. 8), and two ages of rats to investigate developmental differences in conditional suppression. After training to lick, the subjects received four baseline sessions. This was followed by one conditioning session where a tone was paired with shock. The subjects were given two more sessions to recover baseline and were

then tested for extinction over four sessions. The dependent measures consisted of suppression ratios and recovery latencies. Results showed that young rats suppressed more than the adults under most conditions and that both maturation and number of pairings influenced the degree of suppression.

3:25-3:40 (318)

**Sequential (Non)Effects in Pavlovian (CER) Conditioning.** W. B. PAVLIK, K. L. HERRING, *University of Georgia*, J. R. HART, & L. J. MILLER, *Virginia Polytechnic Institute and State University*—Three CER experiments with rats involved manipulations of sequences of reinforced and nonreinforced trials known to produce large effects in instrumental conditioning situations. The manipulations failed to produce either single-alternation patterning or modulation of the partial reinforcement effect with Pavlovian procedures.

3:45-4:00 (319)

**Escape-Avoidance Deficits and Neurochemical Changes Following High and Low Shock Pretreatment.** BETTY R. SUTTON & CARLTON E. LINTS, *Northern Illinois University* (sponsored by Gary D. Coover)—Rats pretreated with short-duration (2 sec), high-intensity footshocks (3/min for 1 h) exhibited escape-avoidance deficits and lowered diencephalic norepinephrine 30 min later if they exhibited motor debilitation following pretreatment. Nondebilitated rats showed escape avoidance deficits 72 h after pretreatment with inescapable, high-intensity footshocks. Long-duration (6 sec), low-intensity footshocks (1/min for 1 h) had no effects.

4:05-4:15 (320)

**The Influence of Prior Fear Conditioning on Avoidance Performance.** WALLACE R. McALLISTER, DOROTHY E. McALLISTER, MICHAEL T. SCOLES, *Northern Illinois University*, & JAMES H. JAMES, *Yale University*—Prior classical fear conditioning typically interferes with two-way avoidance performance. Such results, considered antithetical to two-factor theory, are predicted by effective reinforcement theory which emphasizes the negative role of situational-cues fear. Relevant research will be presented.

4:20-4:35 (321)

**Epinephrine-Induced Mediation of a Shock-Cue Association.** JAMES T. CONCANNON, DEBORAH LIGORE, & GARY DAVID, *Kent State University* (sponsored by David C. Riccio)—Adult rats were administered an epinephrine or saline injection 24 h after noncontingent footshock (NCFS) but 20 min prior to (nonshock) cue exposure. In two studies, only NCFS-epinephrine animals showed reliable avoidance of previously neutral cues. Thus, epinephrine mediated acquisition of new associations, apparently by re-arousing the memorial attributes of prior shock.

4:40-5:00 (322)

**Effects of Prior Exposure to the UCS on the Conditioned Emotional Response.** ALAN RANDICH, *Yale University*, & VINCENT LoLORDO, *Dalhousie University* (read by V. LoLordo)—Several experiments manipulated the conditions of exposure to electric shock prior to conditioning of an emotional response. The intensity, predictability, controllability, and number of prior exposures to shock were manipulated. In general, prior exposure to shock attenuated the formation of the CER, and this outcome appears to be nonassociative.

5:05-5:20 (323)

**Freezing as an Index of Fear Conditioning.** ROBERT C. BOLLES & MARK E. BOUTON, *University of Washington*—What is the rat doing in the conditioned suppression situation when it is not making the baseline response? Direct observation of rats barpressing, licking, or exploring revealed that in each case the CS causes freezing. Freezing scores correlate both within groups and across conditions, and account for more variance than the customary indirect indices of fear.

5:25-5:40 (324)

**Latent Inhibition with Sequentially Preexposed Stimuli: More Data.** GARY A. SZAKMARY, *Case Western Reserve University* (sponsored by Stephen K. Reed)—Rats were pre-exposed to a two-

stimulus sequence, S1-S2, or to the same stimuli unpaired. All animals then received CER conditioning to the sequence. Sequentially exposed subjects displayed greater latent inhibition to S2 than did unpaired exposure animals. This effect does not appear when S2 is tested by itself, and is not much diminished by "extinction" of S1 following S1-S2 pairings.

(325)

(Read by title only)

**Classical Conditioning in "Old" and "Young" Rabbits.** D. A. POWELL, SHIRLEY BUCHANAN, & LINDA HERNANDEZ, *V.A. Hospital, Columbia, South Carolina*—Rabbits of differing ages (mean age 6 and 40 months) were administered classical conditioning training. Corneoretinal potential (CRP), heart rate (HR), and electromyographic (EMG) CRs were assessed. At the end of conditioning, (a) free field activity, (b) paraorbital shock thresholds, and (c) HR UCRs were all determined. Regional CNS monoamine concentrations were also determined. Although the CRP discrimination was not affected by age, CRP acquisition and level of performance in the old subjects was inferior to that of young subjects. The HR CR was also greater in the old subjects. Other experiments suggested that old males were more impaired on the CRP response than females. Activity and the UCRs were not affected by age. Regional differences in CNS monoamine distribution were found, but were not systematically correlated with the behavioral differences.

## ANIMAL BEHAVIOR I

David R. Thomas, *University of Colorado*  
Room 25, Friday afternoon, 1:00-5:45

1:00-1:10 (326)

**The Ontogeny of Play Fighting in Domesticated Male Rats.** GEORGE T. TAYLOR, *University of Missouri-St. Louis*—A pair of experiments were performed to examine the relationship between the play fighting of sexually immature rats and the agonistic behavior of the adult animal. Groups of male rats were observed from the time their eyes opened at Postnatal Day 14 into adulthood. The animals exhibited individual differences in their play fighting that were consistent throughout the juvenile period. In addition, the individual differences remained relatively constant into the rats' adult agonistic interactions. These data suggest a strong relationship between play and adult social interactions.

1:15-1:35 (327)

**Do Genetically Selected Winner and Loser Rats Display Increased Aggression?** RICHARD E. MUSTY, *University of Vermont*, JOAO P. NETO, & JANDIRA MASUR, *Escola Paulista de Medicina, Sao Paulo*—Fifth- and sixth-generation offspring of rats bred to win or lose in runway competition for food were tested on: (1) intraspecific aggression when food deprived, (2) muricidal behavior, (3) drug-induced aggressiveness, and (4) irritability. None of these behaviors correlated with winning or losing in runway competition, suggesting that highly specific behavioral selection had occurred through breeding.

1:40-1:50 (328)

**Aggressive Attack by Rats on Mice as a Function of Level of REM Sleep Deprivation.** ROBERT A. HICKS, JOHN D. MOORE, & JAMES HAWKINS, *San Jose State University*—The effects of periods of 2 and 4 days of REM sleep deprivation and the frequency of aggressive attacks by rats on mice were measured and compared with data derived from three control groups. REM deprivation was found to increase, in a "dose-related" fashion, both the frequency of aggressive attacks and the muricide rate. Further, to a degree, these changes in aggression were still apparent after a 21-day recovery period.

1:55-2:15 (329)

**Reproductive Aggression Toward a Conspecific Intruder in White King Pigeons (*Columba livia*).** PERRIN S. COHEN, ROHE V. PENNINGTON, & BYRON C. YOBURN, *Northeastern University*—Intrusion of a two-dimensional conspecific image into

the reproductive situation released aggressive behavior in the male pigeon over months of daily testing. There was a transient increase in aggressive contacts within  $\pm 2$  days of the occurrence of the second egg, and that increase did not occur with extended daily testing of the male alone.

2:20-2:35 (330)

**Gastric Secretion in Rats Subjected to Aggressive Attack.** GEORGE P. VINCENT & WILLIAM P. PARÉ, *V.A. Hospital, Perry Point, Maryland* (read by W. P. Paré)—Pylorus ligated rats were: attacked by a dominant male and mate, placed with a non-aggressive male-female pair, or put in a home cage. Gastric juice of aggressed rats was less acidic and had a higher pH value as compared to home cage animals or rats which were not attacked. Thus, rats subjected to attack by dominant animals demonstrate an inhibition of gastric secretion.

2:40-2:55 (331)

**Permanent Behavioral Effects of Social Isolation Upon the Rat But Not the Mouse.** DOROTHY F. EINON & MICHAEL J. MORGAN, *University of Durham* (sponsored by Ralph R. Miller)—In the rat, isolation before 50 days of age has permanent effects upon behavior. Rats may be protected from these isolation effects by short daily periods of social contact between 25 and 45 days of age, if during these contact periods intense play occurs. Thus, it appears that many of the effects of early isolation are produced by social play deprivation. If true, early isolation should not have permanent effects upon species devoid of play behavior. Our research indicates that mice, which do not normally engage in play, do not show permanent deficits if isolated prior to 50 days.

BREAK

3:10-3:30 (332)

**Acquisition of Tool Use by a Colony of the Japanese Snow Monkey.** DOUGLAS K. CANDLAND, *Bucknell University*—Within a colony of *Macaca fuscata*, a young male learned to fashion a steel rod into a swing, making it serviceable by bending and placing it on a tree. This paper reports the acquisition and habituation of fashioning and using the swing by the colony.

3:35-3:50 (333)

**An Attempt to Assess Self-Recognition in Mother-Infant and Infant-Infant Rhesus Monkey Pairs.** GORDON G. GALLUP, JR., *SUNY, Albany*, LARRY B. WALLNAU, *SUNY, Brockport*, & SUSAN D. SUAREZ, *SUNY, Albany*—Chimpanzees, orangutans, and humans can recognize themselves in mirrors. To date, however, all attempts to demonstrate self-recognition in other primates have failed. We report two additional long-term attempts to show self-recognition in rhesus monkeys, using procedures designed to make the identity of the reflection more explicit.

3:55-4:10 (334)

**The Bioenergetics of Death Feigning in Fowl.** CAROLYN K. ROVEE-COLLIER & LINDA O'BRIEN, *Rutgers University*—Death feigning is an antipredator behavior which increases the probability of survival of organisms which exhibit it. The behavior is also characterized by temporary hypothermia, and as such may be viewed as an energy-conservation measure. The relations between death feigning and body-temperature changes are discussed.

4:15-4:25 (335)

**Seasonal Specificity in the Structure of Spring vs. Fall Mockingbird Song.** CHERYL A. LOGAN, *University of North Carolina, Greensboro*, LANI BURNETT, *Davidson College*, & KEITH R. FULK, *University of North Carolina, Greensboro* (sponsored by David R. Soderquist)—Spectrographic analyses of spring vs. fall mockingbird song indicate substantially larger song repertoires in the fall. Measures of syllable pattern overlap across seasons further reveal that less than 2% of the acoustical patterns sung are present during both seasons. These data suggest a clear seasonal separation of function in mockingbird song.

4:30-4:45 (336)

**Foraging Search Strategies in the Ferret.** GEORGE COLLIER & LYNN KAUFMAN, *Rutgers University*—Animals foraging in

patchy environments face three problems: (1) using a search pattern maximizing encounter rate, (2) whether to exploit a patch encountered, and (3) when to leave a patch. The present experiment simulates 2 and shows, for ferrets, that whether or not a patch is exploited depends upon the cost of obtaining it.

4:50-5:00 (337)

**Sand Digging by Rats: Compared Across Apparatus, with Burrowing, and Under Reinforcement Contingencies.** ROBERT BOICE, *SUNY, Albany*, & MONICA M. MOORE, *University of Missouri, Columbia*—Sand digging of laboratory rats was compared in three kinds of apparatus: Stone (1937), King and Weisman (1964), and Wong et al. (1975); each represents "progress" toward smaller, more automated chambers. The second proved most effective, but all three showed that females dug more than males, deprived rats dug more than undeprieved, and digging did not change over days. When rats were allowed to dig burrows in dirt, they later showed no interest in digging sand in one of these chambers. In another experiment, sand digging was increased with food rewards, but only to a point; when longer bouts were required for reinforcement, digging fell off.

5:05-5:20 (338)

**Spatial Memory Deficits in Senescent Rats.** C. A. BARNES, LYNN NADEL, & W. K. HONIG, *Dalhousie University*—Tests of performance on two tasks requiring remembrance of a specific place (radial eight-arm maze and circular platform) and tests of strategy preference in a discrimination problem were given to senescent (29 months) and middle-aged (14 months) rats. Senescent rats showed poorer spatial memory and a tendency to use a response-based rather than a place strategy.

5:25-5:40 (339)

**Conceptual Number Discriminations by Squirrel Monkeys.** ROGER K. THOMAS & DAVID FOWLKES, *University of Georgia*—With area, pattern, and position cues controlled, responses to the side with the smaller number of circles are being rewarded. Proceeding in the order 2 vs. 7, 2 vs. 6, etc., to 3 vs. 7, etc., until the limits of discrimination (e.g., 6 vs. 7, 7 vs. 8) are reached, the best of four monkeys is presently on 4 vs. 7, and the poorest is on 2 vs. 3.

## PSYCHOLINGUISTICS II

John R. Frederiksen, *Brandeis University*  
Fiesta 4 Room, Friday afternoon, 1:00-5:15

1:00-1:10 (340)

**Effects of Test Procedure on Memory for Linear Orderings.** WILLIAM O. SHAFFER & GARY BURRESON, *University of Arkansas* (sponsored by Joel S. Freund)—Sentence recognition studies often find erroneous recognition of true inferences. Lawson's (1977) test procedure combined recognition and truth judgments, and found that some inferences were rejected while others were not. We replicated his results, eliminated several procedural confoundings, and established that the test procedure alone was responsible for the different pattern of results. These more sensitive test procedures reveal better memory for individual sentences than previous studies indicate.

1:15-1:35 (341)

**The Many Faces of Logical Reasoning.** RACHEL JOFFE FALMAGNE & JOYCE SINGER, *Clark University*—A theoretical framework emphasizing modality as well as form in logical reasoning is discussed, with two illustrative studies of conditional inferences varying imagery value of clauses and temporal structure of events. Interaction patterns indicate that content factors affected the deductive process, not simply comprehension. Speculations about this interplay are discussed.

1:40-1:55 (342)

**Comprehension and Computation: The Role of Sentence Encoding in Verbal Arithmetic.** CHARLES PERFETTI, MARY RILEY, & JAMES GREENO, *University of Pittsburgh*—Two components of comprehension, propositional encoding (PE) and



semantic representation (SR), are examined in simple verbal arithmetic problems. It is hypothesized that even for simple problems with common structures, PE is a major component of problem comprehension. Two experiments varied lexical items, which affect PE difficulty, and problem types, which determine the underlying SR. For both children and adults, lexical variation and problem type proved to be factors in solution times. For children, performance was related to individual reading skill, not to numerical arithmetic skill. When encoding and memory factors were manipulated by presenting one sentence at a time, results suggested that integration of information from two sentences was a particular problem for the less-skilled reader.

2:00-2:15 (343)

**Verification of Quantified Categorical Expressions.** RUSSELL REVLIN, *University of California, Santa Barbara*—Students were asked to verify whether Euler diagrams were true of quantified categorical expressions. The decisions support the hypothesis that a conversion operation participates in the encoding of quantified propositions and that previous measures of decision and decision latencies reflect degrees of processing complexity.

2:20-2:40 (344)

**A Sequential Feature-Testing Model of Categorization.** ALFONSO CARAMAZZA & RANDI MARTIN, *Johns Hopkins University*—Probabilistic and similarity models of categorization were compared in experiments using artificial categories having criterial features or a family resemblance structure. While some models had high correlations with reaction times and typicality judgments, subjects' behavior could best be described in terms of a sequence of feature tests in both types of structure.

2:45-3:05 (345)

**Modification of Cognitive Structure via Metaphor.** ROBERT J. STERNBERG, *Yale University*, & BETH ADELSON, *Harvard University*—Metaphors, similes, and literal statements were compared to each other and to words in a no-context control condition (a) to test a theory of metaphoric understanding and (b) to assess their relative abilities to modify cognitive structures. Results of the experiment supported the theory, and revealed differential effects of context upon cognitive structure.

BREAK

3:20-3:30 (346)

**How to Evaluate Language as a Nonrandom Variable.** WILLIAM F. BATTIG, *University of Colorado*—Clark's (1973) arguments for analysis of language as a random variable, and subsequent criticisms by others, have produced serious confusion and inconsistency concerning statistical evaluation of language effects. Such language generality can be assessed more effectively by appropriate selection of materials, which also avoids such problems with Clark's min-F' procedure as biased evaluation of interactions.

3:35-3:50 (347)

**Kin Search: Answering Questions About Relations Among Relatives.** GREGG C. ODEN & LOLA L. LOPES, *University of Wisconsin*—Can my uncle be my grandmother's son? The time required to answer questions of this sort indicates that subjects check specific features as well as search through semantic memory for the relationship between the kin. The response times for questions requiring search provide information about subjects' organization of kinship knowledge.

3:55-4:15 (348)

**Reading Time for Lexical Categories.** DORIS AARONSON & STEVEN FERRES, *New York University*—Subjects read the same sentences for comprehension (Yes-No questions) or for memory (verbatim recall). Relative reading times, RRTs (ratios and differences), were obtained by comparing word-by-word RTs for a particular content or function word to the average RT for its sentence. For lexical categories that primarily signal structural organization of the sentence, RRTs are greater for memory than

for comprehension. But for categories that primarily convey semantic content, memory RRTs are less than comprehension.

4:20-4:30 (349)

**Readings by Church Lectors and Drama Students.** DANIEL C. O'CONNELL, *University of Kansas*, EDWARD J. CLEMMER, & WAYNE LOUI, *St. Louis University*—Church lectors, beginning drama students, and advanced drama students read a passage from St. Paul's "First Letter to the Corinthians." Skilled dramatic artists use both a faster articulation rate and speech rate than ordinary church lectors. The dramatic artists also used fewer, but longer, silent pauses, a pattern which both expert and ordinary listeners judge to be optimal.

4:35-4:45 (350)

**Contextual Cues and Accessing Meaning from the Mental Lexicon.** PAMELA L. COKER, STEPHEN CRAIN, & STEVEN HOLLANDER, *Claremont Graduate School* (sponsored by Leah L. Light)—Using ambiguous words, this research examined how the mental lexicon functions in relationship to other linguistic systems during auditory sentence processing. The results support an "interactive" view of sentence processing in which lexical access is influenced by prior semantic and syntactic context. An "ordered search" model of meaning access was shown to be inadequate.

4:50-5:10 (351)

**Modality and Probability in the Lexicon: The Effects of Context and Negation on Meaning.** VALERIE F. REYNA, *Rockefeller University* (sponsored by George A. Miller)—Subjective meanings of modal and probabilistic adjectives were investigated using sorting and probability ranking techniques. Multidimensional scaling analyses indicate that these adjectives express degrees of qualification and context alters the degree to which propositions are qualified. Also, affixal negation ("improbable") was found to be generally more negative than lexical negation ("not probable").

## PROBLEM SOLVING AND INDIVIDUAL DIFFERENCES

James Greeno, Learning Research and Development Center  
University of Pittsburgh

Fiesta 6 Room, Friday afternoon, 1:00-5:05

1:00-1:20 (352)

**The Relationship Between Vocabulary Size and Memory.** DOUGLAS K. DETTERMAN & PAULINE RAMIG, *Case Western Reserve University*—Experiments with college students examined the relationship between vocabulary size and other variables, including primary, secondary, and long-term memory, socioeconomic status, and language experience. Data were analyzed using a statistical approach which captures both subject and task variation. Primary memory capacity was the best single predictor of vocabulary size.

1:25-1:40 (353)

**Perceptual Grouping and Individual Differences in Recall.** HENRY C. ELLIS, *University of New Mexico*—A series of experiments involving perceptual grouping of letter strings will be described. In general, varied grouping led to better recall than repetition of letter sequences. Marked individual differences involving anxiety, cognitive flexibility, and mood states were found.

1:45-1:55 (354)

**A Scale for Assessing Individual Differences in Learning Processes.** RONALD R. SCHMECK, *Southern Illinois University*—The Inventory of Learning Processes is a "paper and pencil" self-report inventory designed to assess individual differences in some of the processes currently investigated in the areas of human information processing, verbal learning, and memory. Experimental and correlational data indicate that the instrument has promise for both laboratory and guidance purposes.

2:00-2:10 (355)

**Practice Effects with Traditional Mental Test Items.** HILDA WING, *U.S. Civil Service Commission*—A counterbalanced design was incorporated into a nationwide employment selection program

to evaluate the effects of practice in a multiple-abilities test battery. The differing effects of practice were small, but consistent. Effects appeared greater for item types tapping reasoning abilities.

2:15-2:35 (356)

**Ability Differences and the Processing of Quantitative Information.** JAMES W. PELLEGRINO, MICHELENE CHI, & DENNIS MAJETIC, *University of Pittsburgh*—The speed of inferring, testing, and applying quantitative operations (relations) was evaluated in the context of solving simple numeric analogy problems. The quantitative ability of college students was related to differences in both the speed and sequence of processing activities. Performance differences will be discussed in terms of models and parameters of solution processes.

2:40-3:00 (357)

**Multiple-Data Memory Searches in Hypothesis Generation.** STANLEY FISHER, CHARLES F. GETTYS, & THOMAS MEHLE, *University of Oklahoma* (read by C. F. Gettys)—A hypotheses generation task is described where subjects made memory searches for hypotheses using one, three, or six data as retrieval cues. A memory-tagging model was developed which successfully predicted multiple-data hypothesis retrieval probabilities from single-datum retrieval probabilities, suggesting that hypotheses need not be generated from each cue.

BREAK

3:15-3:35 (358)

**The Generation and Execution of Subgoals in Problem Solving.** JOHN KARAT, PETER G. POLSON, ROBIN JEFFRIES, & LYDIA RAZRAN, *University of Colorado* (read by P. G. Polson)—A problem consisting of two obvious subproblems is used to develop a theory of how individuals set up and manipulate subgoals in the process of solving transformation problems. Perceived interactions between subproblems cause large differences in the solution plan constructed. A generalization of the model of Jeffries, Polson, Razran, and Atwood (1977) is shown to describe these results.

3:40-4:00 (359)

**"Opportunism" in the Planning Process.** BARBARA HAYES-ROTH & FREDERICK HAYES-ROTH, *Rand Corporation*—Planning is the predetermination of a course of action aimed at achieving a goal. The planning process requires the formulation of many distinct decisions for incorporation into the tentative plan in progress. Planners do not formulate these decisions systematically. They formulate them opportunistically as promising opportunities arise.

4:05-4:20 (360)

**The Role of Disconfirmatory Evidence in a Rule Discovery Task.** RYAN D. TWENEY, MICHAEL E. DOHERTY, DAN PLISKE, & CLIFFORD R. MYNATT, *Bowling Green State University*—Wason first reported that subjects seek primarily confirmatory evidence in tasks requiring discovery of a rule which generates number triples. We sought to alter this tendency and found that eliminating it does not by itself, improve performance. Instead, subjects appear to improve only if both confirmatory and disconfirmatory evidence can be made to seem relevant to the inference task.

4:25-4:40 (361)

**The Effect of Diagnostic Data and Knowledge of Results on Pseudodiagnosticity.** MICHAEL E. DOHERTY, MICHAEL SCHIAVO, RYAN D. TWENEY, & C. R. MYNATT, *Bowling Green State University*—We have previously shown that people, given the opportunity to select data relevant to two hypotheses, will select data which are formally worthless (pseudodiagnostic). This study shows that people who behave pseudodiagnostically are likely to change to a normative choice strategy if they are wrong and are required to observe properly diagnostic data.

4:45-5:00 (362)

**Daniel Berlyne and Psychonomy: The Beat of a Different Drum.** JOHN J. FUREDY, *University of Toronto*, & CHRISTINE P.

FUREDY, *York University*—Dan Berlyne's work influences many members of the Society, yet in many respects he was not a typical Psychonome. We are researching a biography of Berlyne and wish to present some early working hypotheses for the comment and criticisms of Psychonomes who knew him or his work.

(363)

(Read by title only)

**Cognitive Paths and Problem-Solving.** WILLIAM C. HOFFMAN, *Oakland University*—Categories and functors were invented about 30 years ago by Ehresmann and independently by Eilenberg and MacLane to express the most general sort of equivalence transformations. When invertible, such categories constitute groupoids. Categories and groupoids subsume such thought-process models as Piaget's *groupements*, Bruner's developmental equivalence transformations, Berlyne's transformation groups and digraphs, and Pribram's partitioning of sets, as well as the author's own vector bundle theory. In Piagetian terms, the "real" vs. the "possible" constrained by the "necessary" amounts to certain quotient categories and groupoids. Problem-solving then consists of finding a path (a composition of morphisms or sentences) through a groupoid and its opposite, subject to the constraints that are known.

#### ATTENTION AND INFORMATION PROCESSING IV

Saul Sternberg, Bell Labs

River Room, Friday afternoon, 1:00-5:30

1:00-1:15 (364)

**Orthographic Structure—Knowledge of Positional Frequency or Positional Regularity?** GLEN A. TAYLOR, *Texas A&M University* (sponsored by Carl McFarland, Jr.)—Mason (1975) demonstrated that perceptibility of a letter string is a function of the sum of the individual letters' positional frequencies. Katz (1978) tested overt knowledge of positional frequency by asking subjects to discriminate the most frequent position from the least frequent position in five-letter "word frames" for every letter of the alphabet. This study extended Katz' investigation by requiring discriminations for all possible pairs of positions for every letter. The resulting preferences were examined for an answer to the following question. Were the preferences based upon knowledge of positional frequency or orthographic knowledge of where letters can and cannot occur? Implications for the perceptual role of the variables are discussed.

1:20-1:40 (365)

**Proofreading Errors on the Word *The*: New Evidence on Reading Units.** ALICE F. HEALY, *Yale University & Haskins Laboratories*—Proofreading tasks were compared to letter detection tasks. Subjects made a disproportionately large number of errors on the word *the* in detection but not in proofreading. These results provide evidence that common words are normally read in units larger than letters but are read in letter units when they are misspelled.

1:45-2:00 (366)

**Context Effects in a Lexical-Decision Task.** RICHARD E. SCHUBERTH, *Rice University* (sponsored by William C. Howell)—Subjects classified briefly presented letter strings as words or nonwords following the presentation of context. A signal-detection analysis of the classification data revealed a greater sensitivity to semantically appropriate words but no difference in response bias in classifying the two word types. Differential effects of context are limited to perceptual stages of word processing.

2:05-2:20 (367)

**On the Nature of Perceptual Information During Letter Perception.** STEPHEN J. LUPKER, *University of Western Ontario*, & JOHN THEIOS, *University of Wisconsin* (read by J. Theios)—Traditional theories view letter perception as a process in which individual features are accumulated over time. This idea was explicitly tested in a masking experiment employing a specially designed stimulus set. Few predictions of feature accumulation

theories were upheld. It appears that letter perception is better viewed as a global-to-local process in which in initial perceptual blur becomes more focused over time.

2:25-2:40 (368)

**Lexical and Object Decisions: Accessing Memory for Words and Things.** MARY C. POTTER, *M.I.T.*, & JUDITH F. KROLL, *Rutgers University*—In a new task, subjects judged whether a pictured object was real. Speed and accuracy of object decisions were similar to lexical decisions using the object names. In other conditions, pictures and words were mixed to test whether lexical and object decisions are based on amodal or on modality-specific memory representations. The results suggest the latter.

2:45-3:00 (369)

**Automatic Detection: Target Accentuation or Distractor Inhibition?** SUSAN T. DUMAIS & RICHARD M. SHIFFRIN, *Indiana University* (read by R. M. Shiffrin)—A transfer design was used to examine the mechanisms which underlie the development of automatic detection of characters in a visual search task. By consistent mapping of target to background sets, subjects were trained to automatically detect the target characters. They were then transferred to conditions in which: (1) old targets were paired with new background items, (2) old background items were paired with new targets, (3) old targets became background items and were paired with new targets, and (4) old background items became targets and were paired with new background items. Performance in these transfer conditions was used to assess the relative importance of target accentuation and distractor inhibition in automatic detection.

#### BREAK

3:15-3:30 (370)

**Interaction Between Local and Global Levels of a Form.** JAMES E. HOFFMAN, *University of Delaware* (sponsored by Fred Masterson)—Subjects viewed a display in which a large character was composed of small characters. They were instructed to attend to the large or small character only or to both. The principle of global precedence predicts that interference should occur only from the global to the local level. Results indicated strong interference in both directions. The data is consistent with a parallel extraction of information from both global and local levels of a form.

3:35-3:45 (371)

**Does Memory for Words Following a LDT Depend upon the Nature of the Nonwords?** L. H. THEODOR, *York University*, M. C. SMITH, *Scarborough College, University of Toronto*, & P. FRANKLIN, *York University*—Previous research has demonstrated that a decision as to whether a letter string is a word or nonword is faster when the nonwords are random strings than when they are pseudowords. To test the hypothesis that this faster RT results from shallower processing, recognition memory for words was examined as a function of the type of nonwords employed: random letter strings, pseudowords, or a string of Xs.

3:50-4:05 (372)

**Memory for Primes in a LDT as a Function of Predictive Value.** M. C. SMITH, *Scarborough College, University of Toronto*, L. H. THEODOR, & P. FRANKLIN, *York University*—The extent to which a preceding word primes a lexical decision about a related word has been shown to depend upon the proportion of related word pairs employed. This may result from differential processing of the prime as a function of its predictive value—a hypothesis which predicts better memory for primes when they have high predictive value.

4:10-4:20 (373)

**Repetition Priming and Encoding Strategy.** SCOTT W. PAINTON & LARRY HOCHHAUS, *Oklahoma State University* (read by L. Hochhaus)—Repetition priming was examined in a lexical-decision task. Blocks of trials containing pronounceable nonwords (e.g., WIRD) produced significantly slower times for word items than blocks containing consonant-string distractors (e.g., WSRD). The priming produced by repeated words, however,

was not affected by nonword pronounceability. The results are interpreted, with some difficulty, in the context of prior research concerning semantic and repetition priming.

4:25-4:45 (374)

**Letter Information and Orthographic Context in Word Perception.** DOMINIC W. MASSARO, *University of Wisconsin*—Does a word's context modify feature analysis of its component letters? Theories assume either that a word context directly modifies feature analysis or that feature analysis is independent of word context. Qualitative and quantitative tests of these two classes of theories are provided by the independent variation of letter information and orthographic context in a letter recognition task.

4:50-5:05 (375)

**The Costs and Benefits of Semantic Context in Visual Word Recognition.** CURTIS A. BECKER, *University of Minnesota*—Two lexical-decision experiments examined the costs and benefits of (1) synonym and antonym relationships and (2) semantic category relationships. In Experiment 1, benefits for related word pairings were substantial, and costs for unrelated word pairings were minimal. In Experiment 2, benefits were small, and costs were substantial. Further studies explore the source of this difference.

5:10-5:25 (376)

**The Influence of Semantic Context on Detecting Missing Features.** ROGER SCHVANEVELDT & JAMES E. McDONALD, *New Mexico State University*—We are investigating the effects of semantic context on the detection of a missing feature in one letter of a word. The initial results point to a decision bias in semantically related contexts. A model involving multiple criteria on a dimension of similarity between stored words and the sensory information can account for these and other, related findings.

5:30-5:45 (377)

**Perceptual Organization of Sequential Patterns.** RICHARD E. CHRIST, *New Mexico State University*—The relative difficulty of identifying and organizing sequentially continuous six-element visual patterns was shown to vary as a function of three completely redundant pattern features used in making the descriptions. These results support the position that there is an interaction among modality, information complexity, and response factors.

#### HUMAN LEARNING AND MEMORY V

Henry C. Ellis, *University of New Mexico*

*Fiesta 1 Room, Saturday morning, 8:00-12:45*

8:00-8:15 (378)

**Recognizing and Recalling Linguistic Ideas.** MICHAEL L. KAMIL, *Purdue University*, & MICHAEL P. TOGLIA, *SUNY, Cortland* (sponsored by Devendra Singh)—In two experiments, presentation format (blocked/random) and retention interval were manipulated in a Bransford and Franks (1971) paradigm. Accurate noncase rejection and inaccurate discrimination of old from new test sentences were observed in recognition. However, with delay, thematic blocking reduced the linear effect compared to nonblocked presentation. Thematic recall tests clarified these results. Implications for an integrationist view of sentence memory were discussed.

8:20-8:40 (379)

**A Resolution of the Paradox of the SDEs in Terms of Retrieval.** JESSE W. WHITLOW, JR., *Rockefeller University* (sponsored by W. K. Estes)—The semantic distance effect and the symbolic distance effect are generalizations about the relation between memory structure and reaction time that appear to be contradictory. A new resolution is proposed based on an analysis of retrieval demands. This analysis is supported by evidence that a common memory representation yields either a semantic or a symbolic distance effect, depending on the test question.

8:45-9:05 (380)

**Semantic Effects in Recall and Recognition.** DEBORAH BURKE, *Pomona College*, & JANELLEN HUTTENLOCHER, *University of Chicago* (read by J. Huttenlocher)—The effects of semantic relatedness on retention of order and item information

was examined in recognition and recall tasks. There was no effect on item recognition with related or unrelated distractors, but there were large facilitatory effects in recall. There was no effect on order in either recall or recognition.

9:10-9:30 (381)

**Priming of the Categorical Decision Task.** DAVID S. GORFEIN, *Adelphi University*, & ELIZABETH L. GLISKY, *University of Toronto*—Categorical decisions were investigated employing multi-dimensional scalings of semantic categories utilizing a priming paradigm. Decision times are related to type of decision (positive or negative) and context of decision (primed and unprimed).

9:35-9:45 (382)

**Evoked Potential Correlates of Recognition Memory.** LINDA R. WARREN, *University of Alabama, Birmingham*—A list of common words was presented tachistoscopically for three study trials. During a subsequent recognition test, significant differences in the stimulus evoked potential, as a function of stimulus type (old, new) and recording site (parietal, frontal), were found. The results suggest that evoked potentials may be a useful adjunct to reaction time data in understanding recognition processes.

9:50-10:10 (383)

**Priming Effects in Semantic Memory Search and Retrieval.** ALAN S. BROWN, *Southern Methodist University*—Six studies examined the influence of prior presentation of semantically related, orthographically related, and unrelated prime on word retrieval. Performance was generally best after orthographic, intermediate after unrelated, and poorest after semantic primes. This indication of semantic inhibition is contrasted with current models of memory activation.

### BREAK

10:25-10:40 (384)

**Constructive vs. Direct Access Processing in the Multiple Choice Test Situation.** CAMERON CAMP, *University of Houston* (sponsored by Janet L. Lachman)—Multiple choice alternatives seem to be selected via direct access processing—referring to the retrieval of answers stored in memory due to specific instances of personal history—or through a constructive process—referring to the utilization of conceptual information to construct the correct answer. Convergent validation of these constructs was provided through the use of both an RT task and introspective reporting. Methods of question construction to ensure the initiation of either type of processing are discussed.

10:45-11:00 (385)

**When Recognition Memory for High-Frequency and Low-Frequency Words is the Same.** EUGENE B. ZECHMEISTER & JULIE A. SEBASTIAN, *Loyola University of Chicago*—When expecting a memory test but required to identify number of syllables (Experiment 1) or to rate pronounceability (Experiment 2), recognition memory is equivalent for HF and LF words. The effect of rating pronounceability interacts with the kind of study list, mixed or unmixed frequencies (Experiment 3). Implications for a theory of the word-frequency effect are discussed.

11:05-11:20 (386)

**Information Stored While Studying for Recall or for Recognition.** JANET MAURIELLO LEONARD & WILLIAM B. WHITTEN II, *SUNY, Albany* (read by W. B. Whitten II; sponsored by Robert A. Bjork)—Three experiments were performed to discover differences in information stored by subjects preparing for recall or for recognition. Subjects expecting recall knew more order information and falsely recognized fewer semantically related recognition distractors than subjects expecting recognition, but recognition accuracy of both groups was equally disrupted by testing items in an order differing from the presentation order.

11:25-11:35 (387)

**Informative and Motivational Effects of Reinforcement and Punishment.** JUDY COONEY, *Austin Independent School District*, & SANDRA MERRYMAN, *Southwest Texas State Uni-*

*versity* (read by S. Merryman; sponsored by Coleman Merryman)—College students learned two recognition lists. On the first, they were told "right" for correct responses and "wrong" for incorrect, with no difference in errors to criterion. No feedback was given on the second list, but previously "rewarded" subjects made fewer errors on the second list than previously "punished" subjects.

11:40-11:50 (388)

**Work and Rest Variables in the Acquisition of Psychomotor Tracking Skill.** CLYDE E. NOBLE & OMAR GONZALEZ SALAZAR, *University of Georgia*—To determine whether the decay rate of  $I_t$  depends on its growth level, 150 collegians practiced rotary pursuit for 30 min by work/rest cycles of 20/20, 30/30, 60/60, 90/90, or 120/120 sec ( $n = 30$ ). For TOT scores at equal intervals, practice and Practice by Conditions had significant effects ( $p < .001$ ), but not cycle length. Because no systematic intergroup differences arose from equivalent work/rest ratios, independence is indicated. Postrest residual  $I_t$  is proportional to pretest accumulation.

11:55-12:15 (389a)

**Training and Performance Effects of Team-Training Loads.** BEN B. MORGAN, JR., & EARL A. ALLUISI, *Performance Assessment Laboratory, Old Dominion University*—Results are summarized from a series of studies of the effects of team-training load (i.e., the percentage of team members who are untrained) on the effectiveness of team training. In each of 10 studies, five subjects worked as a team for 8 h per day over 6 consecutive days; during this 48 h, they were trained to perform the six tasks that constitute the synthetic work presented with the Multiple-Task Performance Battery. The data of the 10 teams were combined to permit analysis of the effects of team training loads on both the training and performance effectiveness of the teams. The results indicate that the substitution of untrained personnel into a trained team reduced the performance effectiveness of the team in direct proportion to the percentage of untrained team personnel. Following this disruption of performance, however, performance of all teams recovered to baseline levels after a constant amount of team training, regardless of team-training load. Implications of these results for optimizing team-training strategies and maintenance of high levels of team-performance effectiveness are discussed.

12:20-12:40 (389b)

**Persistence of Memory Activation in Immediate Recognition and Lexical Decision.** STEPHEN MONSELL, *University of Chicago* (sponsored by Saul Sternberg)—In short-term recognition, RT and error rate for negative decisions increase if the probe is a recently presented item. The time-course of this involuntary persistence of event occurrence information is explored and contrasted with that of the persisting facilitatory effect of a prior presentation in the lexical decision task.

### PERCEPTION III

Robert H. Pollack, *University of Georgia*  
Room 31, Saturday morning, 8:20-11:20

8:20-8:40 (390)

**The Ear Is Not Phase-Deaf.** MICHAEL KUBOVY, *Yale University*—Current theories assume that the single ear is phase-deaf. A counterexample: 12 tones (300, 400, . . . , 1,300, 1,400 Hz) are played in phase. Each of these is perceptually segregated in turn by shifting its phase relative to the rest. Interesting theoretical implications will be discussed.

8:45-9:00 (391)

**Some Contingent Aftereffects of Temporal Duration.** JAMES T. WALKER & ARTHUR L. IRION, *University of Missouri-St. Louis*—A low-pitched inspection tone of long duration alternates with a short high-pitched tone. A high test tone of intermediate length then sounds longer than a low tone of equal length. Thus, the perceived duration of a test tone is *contingent*—depen-

dent—on the relationship between its pitch and the pitch and length of the inspection tones.

9:05-9:20 (392)

**Discrimination of Serials of the Pentatonic Scale.** W. A. WILBANKS & MICHAEL PATE, *University of Georgia*—A basic aspect of music is the scale or set of tones which is used to generate melodic and rhythmic patterns. There is one scale which has a prominent place in the folk music of many cultures. This scale, the pentatonic scale, dates back as far as 1300 B.C., and extends to the present. Data will be presented on the discrimination of "melodies" randomly generated from different serials of the pentatonic scale. The question is: Does the part of the pentatonic scale used to generate a melody give a distinct quality to the melody? The results will be related to theories of tonality, consonance-dissonance, and to stage-discrete theories of the development of music perception.

9:25-9:40 (393)

**Detection and Discrimination in Non-Gaussian Noise.** ROBERT D. SORKIN, DAVID D. WOODS, & GEORGE J. BOGGS, *Purdue University*—Brief bursts of noise were generated using amplitude samples derived from two greatly different probability distributions. Human observers performed tasks which assessed (a) the discriminability of the noise bursts and (b) the detectability of sinusoid and pulse train signals in the noise bursts. No differences between the noise conditions were evident for any of the sampling rates employed. The results are relevant to theoretical models of detection and to practical questions concerning the effects of quantization noise and periodicities in the generation of auditory signals in the laboratory.

9:45-10:00 (394)

**Auditory Segregation and Timbre.** ALBERT S. BREGMAN, *McGill University*, STEPHEN McADAMS, & LYNN HALPERN, *Northwestern University*—(1) Adding a harmonic to alternate members of a pure tone stream causes the formation of two substreams. (2) Frequency modulating a subset of synchronous pure-tone components in parallel causes these components to fuse, have a coherent timbre over time, and segregate from other simultaneous components. These and other results are interpreted as resulting from an auditory "parsing" mechanism.

BREAK

10:15-10:30 (395)

**The Psychological Representation of Musical Pitch in a Tonal Context.** CAROL L. KRUMHANSL, *Rockefeller University* (sponsored by Roger N. Shepard)—Multidimensional scaling of tones in an explicit tonal context yielded a highly structured three-dimensional conical configuration, called the *chroma cone*. In addition, the data contained a regular pattern of asymmetries, with tones less related to the tonality judged more similar to tones closely related to the tonality than the reverse temporal order. These asymmetries were also found in a recognition memory task.

10:35-10:55 (396)

**Vowels and the Perception of Gesture.** ROBERT R. VERBRUGGE, *University of Connecticut & Haskins Laboratories*—Treating the vocal tract as a complex vibratory system provides a dynamic articulatory rationale for speech perception. Phonemes may be defined by concurrent articulatory resonances, rather than by successive (and theoretically static) acoustic resonances. Exploratory experiments on vowel perception, syllable timing, and consonantal context will be discussed.

11:00-11:15 (397)

**Inhibition of Tap-Elicited Eyeblink by Acoustic Signals (One Ear is Better than Two).** HOWARD S. HOFFMAN, *Bryn Mawr College*—In adult humans, the eyeblink elicited by a tap to the glabella (the patch of skin between the eyebrows) is inhibited when an acoustic signal precedes the tap by about 100 msec. More inhibition occurs when the acoustic signal is delivered to only one ear than when it is presented binaurally.

## REINFORCEMENT

Frank A. Logan, *University of New Mexico*  
Mission Room, Saturday morning, 8:15-12:50

8:15-8:30 (398)

**Reinforcement Schedules: Derivation of Variable-Interval Performance from Retroactive and Proactive Inhibitory Effects of Fixed-Interval Reinforcers.** A. CHARLES CATANIA & KENNETH KELLER, *University of Maryland*—Experimental analysis shows that retroactive inhibitory effects in schedules are reinforcer effects, whereas proactive inhibitory effects are discriminative effects. Discrimination on the basis of time since a reinforcer can be eliminated in variable-interval schedules, thereby permitting a quantitative derivation of schedule performance based on empirical properties of such inhibitory effects.

8:35-8:55 (399)

**Effects of the Following Schedule of Reinforcement: Search for the Mechanism.** BEN A. WILLIAMS, *University of California, San Diego*—Components followed by periods of extinction produce higher response rates than similar components followed by periods of positive reinforcement. The effect does not appear to be attributable to conditioned frustration. An alternative interpretation based on inhibition by reinforcement is tested by several experiments.

9:00-9:15 (400)

**Schedule of Reinforcement Preferences in Humans and Pigeons.** ROBERT W. SCHAEFFER, *Auburn University*—Pigeons and humans were tested to determine each species' preference for concurrently available FI and FR reinforcement schedules. Both species preferred to respond to FI schedules, even when the rate of reinforcement on the FR schedules exceeded the rate of reinforcement on the FI schedules.

9:20-9:40 (401)

**Relational Principle of Reinforcement: Further Implications.** JOHN W. DONAHOE & KENNETH STICKNEY, *University of Massachusetts*—Experimental work is presented which indicates that a relational principle of reinforcement may provide an integrated analysis of the behavioral changes produced by classical and instrumental procedures. Implications for an appropriate metric for temporally defined responses, for biological constraints on learning, and for certain transfer effects (e.g., learned helplessness) are discussed.

9:45-10:05 (402)

**Demand Economics and Conservation in Ratio and Interval Schedules.** JAMES ALLISON, *Indiana University*—In the marketplace, total consumption falls as the price of the commodity rises. This demand law of economics is also evident in experiments with various ratio and interval schedules which hold session duration constant but allow total consumption to vary. The results generally agree with conservation models for such schedules.

BREAK

10:20-10:30 (403)

**A withdrawal-Related Reinforcing Effect of Alcohol.** MILTON A. TRAPOLD & HENRY L. SULLIVAN, *University of Minnesota*—Rats were induced to consume large quantities of alcohol. Periodically, they were withdrawn from alcohol, then tested for alcohol consumption. Across 12-h withdrawal tests, drinking latency progressively declined and consumption remained high. After 120 h, latencies were longer and consumption was low. This suggests that reinforcement via withdrawal-discomfort reduction may be involved in maintaining alcohol consumption.

10:35-10:45 (404)

**Unusual Effect of Reinforcement in an Auditory Discrimination.** J. M. HARRISON, *Boston University*—Rats were trained to press one lever when one speaker sounded and a second lever when a second speaker sounded. Each lever was mounted contiguously with a speaker. When responding on the lever remote from the

sounding speaker was reinforced, the behavior of approaching the sounding speaker (nonreinforced response) was strengthened.

10:50-11:00 (405)

**Uncontrollability, Rate of Reinforcement, and Helplessness.** PAUL T. P. WONG, *Trent University*—Under the same condition of uncontrollability where  $P(RF/R) = P(RF/\bar{R})$ , different rates of food reinforcement produce different behavioral effects. Helplessness occurs only when rates of reinforcement approach zero.

11:05-11:20 (406)

**Response Shaping on a Continuous Spatial Dimension.** ERIC R. DAVIS, *McMaster University* (sponsored by J. R. Platt)—Rats obtained food by operating a vertical joystick suspended from the ceiling of a standard operant chamber. When reinforcement was delivered independently of the direction of responses, direction was highly variable. Differential reinforcement (targeted percentile schedules) controlled the modal response direction and reduced the variability in direction, even though the probability of reinforcement per response was held constant.

11:25-11:40 (407)

**Effects of Altering Outcome Expectancies on Pigeons' Choice Behavior.** GAIL B. PETERSON & MILTON A. TRAPOLD, *University of Minnesota*—Pigeons learned a conditional discrimination where correct choices following one cue yielded food while correct choices following another cue yielded tone. The cues alone were then paired with these outcomes in the same or opposite relation. Transfer tests indicated that outcome expectancies, rather than nominal stimulus dimensions, controlled choice behavior.

11:45-12:05 (408)

**The Interaction of Stimulus Compounds in Extinction.** VICTOR DUCH, *Johns Hopkins Medical Institute*, & DENNIS COGAN, *Texas Tech University* (read by D. Cogan)—Several experiments were run to assess the contribution of  $S^N$ ,  $S^R$ , and  $S^I$ , alone and in combination, to resistance to extinction in the rat. Results indicated that  $S^N$  was the major determiner of RTE, and that the effects of  $S^I$  were to increase RTE when combined with  $S^R$ , and decrease RTE when combined with  $S^N$ .

12:10-12:25 (409)

**Peak Shift Under Conditions of Positive and Negative Reinforcement.** STANLEY J. WEISS & CHARLES W. SCHINDLER, *American University*—Rat's barpressing was reinforced during one click frequency ( $S+$ ) by food, and had no consequences during a second frequency ( $S-$ ). Another group of rats had free-operant shock avoidance operating in  $S+$  and extinction in  $S-$ . All rats showed peak shift on a click frequency generalization test. This is the first demonstration of that phenomenon in the rat under conditions of negative reinforcement.

12:30-12:45 (410)

**Establishing Stimulus Control with Trace Stimuli.** HENRY MARCUCCELLA, *Boston University*—Pigeons' responses to a white key were either intermittently reinforced or extinguished for 1-min periods. When 1.5-sec signals presented at the beginning of each component differentially predicted reinforcement, the pigeons differentially responded to the signals but not to the white key.

## ANIMAL BEHAVIOR II

Charles P. Shimp, University of Utah  
Room 25, Saturday morning, 8:30-12:20

8:30-8:45 (411)

**Seizing and Serum Changes in Gerbils Depleted for Magnesium and/or Other Minerals.** ARTHUR E. HARRIMAN, *Oklahoma State University*, & RITA MAUREEN KOLLER, *University of Cincinnati*—Open-field tests more readily trigger "spontaneous" seizures among Mg-depleted than among Mg-repleted Mongolian gerbils. Possibly, such seizures may simply exemplify "magnesium tetany." Effects from depletions for other important minerals upon serum values and upon seizure rates during open-field tests were recorded in concert with, and in contrast to, both Mg depletion and Mg repletion.

8:50-9:00 (412)

**Development of Open-Field Behavior Following Septal Lesions in Infant Rats Housed in Group or Single Cages.** DAVID A. JOHNSON & MARTHA L. STREET, *Ohio University*—Septal lesioned and normal rats were raised with littermates or as isolates. Rats from each of the four groups were tested in the open field daily from 45 to 60 days of age. Lesioned rats showed significantly greater contact time than normal rats, and isolates showed the greatest for all groups.

9:05-9:15 (413)

**Sex Differences in Open-Field Behavior Prior to Puberty.** FRED P. VALLE & BORIS GORZALKA, *University of British Columbia*—Sex differences in open-field locomotion (females more active) were observed in Wistar rats several days prior to both the opening of the vaginal introitus and the appearance of typical male-female body-weight differences. Hence, sex-typical levels of activity can antedate the onset of puberty in female rats.

9:20-9:40 (414)

**Dominance Status in *Betta splendens*: Cause or Effect of Visual Reinforcement Performance?** RONALD BAENNINGER, *Temple University*—Male Siamese fighting fish fought in paired encounters and were scored as dominant or subordinate. After visual reinforcement experience of different kinds, most pairs retained the status initially established. Differences emerged between dominant and subordinate fish in visual reinforcement performance, regardless of whether threat displays to the reinforcing mirror were permitted.

9:45-10:00 (415)

**A Comparison of Schedule-Induced Polydipsia in Domesticated vs. Wild Norway Rats.** RICHARD A. HOPPMANN & JOSEPH D. ALLEN, *University of Georgia* (read by J. D. Allen)—When 45-mg pellets were delivered to domesticated and to wild-caught Norway rats at 1-min intervals, all five domesticated rats readily acquired SIP. However, only one of five wild rats exceeded baseline water intake, and for it acquisition was greatly retarded and intake reduced. Microanalysis revealed that wild rats were deficient only in initiating a postpellet drinking bout.

## BREAK

10:15-10:30 (416)

**Rats' Reactions to Conspecifics that Predict Food.** WILLIAM TIMBERLAKE, *Indiana University*—Adult female rats increased social interaction with another adult, but not with a subadult, that predicted response-independent delivery of food. Subadults interacted with both adults and subadults but, given a choice, preferred adults. These results support a behavior system analysis, and not explanations from stimulus substitution or evoked approach.

10:35-10:55 (417)

**Adjunctive Wheel Running: Comparisons Among Rats, Guinea Pigs, Hamsters, and Gerbils.** JOSEPH H. PORTER & WILSON E. BRYANT, JR., *Virginia Commonwealth University*—Three of five rats, two of two guinea pigs, three of five hamsters, and five of five gerbils displayed an increase in wheel running on an FT 1-min food schedule as compared to the initial baseline condition (all pellets given at beginning of session). The postpellet pattern, which is typical of adjunctive behaviors, was best seen with the guinea pigs. Wheel running occurred throughout most of the 1-min intervals for the other animals. These data will be discussed in terms of Penny and Schull's (1977) suggestion that adjunctive wheel running is neither schedule-induced nor food-bound.

11:00-11:15 (418)

**Behavioral and Physiological Comparisons of Rare Male and Female Wild-Caught Black (Non-Agouti) *Rattus norvegicus* to Gray and Domesticated Varieties.** CARROLL W. HUGHES & JOE SAFRON, *University of Missouri, Rolla*—Activity-wheel, open-field, water consumption, and adrenal gland measures suggest that the black gene animal is more comparable to the wild gray counterpart than to the domestic albino. Other anatomical comparisons reveal basic similarities among the groups. Previous

reports linking the black gene to "domestic-like" behaviors do not appear to be supported by this study of rare wild-caught black Norway rats.

**11:20-11:35 (419a)**

**The Nature of Learning in Imprinting.** LEONARD A. EISERER, *Franklin & Marshall College*—In a "latent inhibition" test of the classical conditioning interpretation of how static aspects of an imprinting object (the presumed CS) acquire control over filial behavior after being paired with visual movement (the presumed US), preexposure of the CS facilitated rather than retarded subsequent development of behavioral control. This result is consistent with an exposure learning interpretation of imprinting.

**11:40-11:55 (419b)**

**Methoxamine and Retrieved Reflex in Young Rats.** DANIEL C. HATTON, DANIEL REINSTEIN, & MERLE E. MEYER, *University of Florida* (read by M. E. Meyer)—The effect of methoxamine on the retrieved reflex in young rats was investigated developmentally. Cisternal injections of methoxamine increased the duration of behavioral inhibition and produced prolonged periods of apnea, while peripheral administration had little effect. The apnea was most pronounced on Postnatal Days 12 and 13 as compared with younger or older rats. The results are discussed relative to the interaction of behavioral inhibition, autonomic depression, and experimentally induced SIDS.

**12:00-12:15 (419c)**

**Baitshyness: Potentiation Rather than Overshadowing of Odor by Taste in Adult and Weanling Rats.** KENNETH W. RUSINIAK, *UCLA* (sponsored by Donald Novin)—For both adult and weanling rats, strong taste cues potentiated a weak almond odor after one delayed-illness compound conditioning trial. Novel or intense tastes were more effective than familiar or weak tastes as potentiating agents. This is opposite to the overshadowing of weak by strong stimuli during compound conditioning.

### PSYCHOLINGUISTICS III

Marcel Just, Carnegie-Mellon University  
Fiesta 4 Room, Saturday morning, 8:30-12:10

**8:30-8:50 (420)**

**Space, Time, and the Acquisition of Before and After.** LINDA HAWPE, *University of Louisville* (sponsored by Meredith M. Richards)—Three tasks with *before* and *after* test children's comprehension of these terms in reference to relationships (a) in time, (b) in space, and (c) between time and space. The hypothesis that reference to time is acquired as a spatial metaphor is not supported.

**8:55-9:05 (421)**

**Motor Imagery in the Recall of Sentences Containing Gross- vs. Fine-Motor Verbs.** SANDRA PORTKO & ELI SALTZ, *Wayne State University* (read by E. Saltz)—Motor enactment of sentences facilitated recall for first graders. Recall was compared after enactment of gross-motor verbs (e.g., recall of "boy-puddle" given the verb "jumped") vs. enactment of fine-motor verbs (e.g., recall of "boy-sweater" given the verb "buttoned"). Enactment had greater effect on recall of gross-motor than on fine-motor verbs. Theoretical implications are discussed.

**9:10-9:25 (422)**

**Information Structure and the Form of Referring Expressions.** J. KATHRYN BOCK, *Michigan State University*, & DAVID E. IRWIN, *University of Michigan*—The relationship between the referring expressions in a sentence and those in the previous discourse context (given new information structure) determines whether subjects correctly reproduce or modify the syntactic structure of sentences. This is true both when definite descriptions of the same referent are identical across occurrences and when they are different but semantically related.

**9:30-9:50 (423)**

**Monolingual and Bilingual Development.** TERESA H. JOHNSON & DANIEL C. O'CONNELL, *St. Louis University* (read by D. C. O'Connell)—Ideographic study of three young females (monolingual, English; monolingual, Spanish; bilingual,

English-Spanish) to assess similarities and differences in language acquisition and variations in patterns of language dominance in the bilingual child. Several measures were used: auditory comprehension, syntax and morphology, and temporal analysis (speech rate, pauses, hesitation phenomena). Formal testing supplemented observation of children's speech in natural settings.

**9:55-10:05 (424)**

**A Test of the Single-Store Model for Linguistic Storage in Bilinguals.** DENNIS BLAIR, *Kansas State University* (sponsored by Richard J. Harris)—Spanish-English bilinguals and English monolinguals performed a phoneme-monitoring task on sentences spoken in English. The critical sentences contained Spanish syntax or literal translations of Spanish idioms. A single-store model for bilingual memory was supported, because bilinguals' reaction times to detect phonemes were faster for critical items.

### BREAK

**10:20-10:30 (425)**

**It Goes Without Saying.** SAMUEL FILLENBAUM, *University of North Carolina, Chapel Hill*—What happens when what is said amounts to an occasion-specific assertion that should not need saying because it may be supposed to involve something characteristically true? The "generic truth" is often undermined. Some implications of this phenomenon are considered for an account of understanding as requiring both world knowledge and assumptions about conversation.

**10:35-10:50 (426)**

**Longitudinal Data on Development of Verbal Coding Facility in Children Learning How to Read.** ALAN M. LESGOLD, LAUREN B. RESNICK, & ISABEL L. BECK, *Learning R&D Center, University of Pittsburgh*—The development of reading skill in primary-school children is related to development of verbal code processing efficiency, as measured by speed of processing in word vocalization, scanning, visual matching, and semantic categorization tasks. Purely visual word processing tasks do not seem to follow the same developmental pattern as reading.

**10:55-11:05 (427)**

**The Role of Orthographic Images in Learning to Read.** LINNEA C. EHRI, *University of California, Davis*—Evidence obtained in memory tasks with first and second graders is interpreted to show that (1) spellings facilitate memory for sounds because they induce readers to form orthographic images symbolizing and preserving the sounds; (2) this process is used by successful beginning readers to store familiar printed words in lexical memory.

**11:10-11:25 (428)**

**Development of Attentional Habits in Reading.** ROBERT M. SCHINDLER, *Rutgers University* (sponsored by Keith Rayner)—New and skilled readers circled occurrences of target letters in prose and four variations of prose. Both groups missed more target letters in function words than in content words of prose, but this difference was larger for the skilled readers. Skilled readers also showed this difference in several of the variations of prose, while the new readers did not.

**11:30-11:45 (429)**

**Word Recognition in the Presence of Semantically Constraining Contexts.** JOHN R. FREDERIKSEN, *Bolt Beranek & Newman Inc.*—Readers of high and low ability pronounced target words that were either tightly or loosely constrained by a prior sentential context. While latencies for reporting target words generally depended on their orthographic structure, inclusion of a prior context led to a reduction in times required for processing of orthographic information and depended on the degree of semantic constraint.

**11:50-12:05 (430)**

**Rapid Reading and the Transparency of Language.** BRUCE L. BROWN, *Brigham Young University*—Researchers are still split on the question of whether rapid reading (at rates above 900 wpm) is possible. Evidence will be given of reading at least 1,800 wpm without loss of comprehension. A method will also be presented measuring comprehension without recall.

(431)

(Read by title only)

**Comprehension of Inferred Relations in "Good" and "Poor" Readers.** BERNICE WONG, *Simon Fraser University*, & RODERICK WONG, *University of British Columbia*—The ability of "good" and "poor" readers in grades 3 and 5 to comprehend and remember relationships was investigated with a cued recall procedure. Older children recalled more implicit sentences than younger children. Only good readers in grade 5 recalled more implicit sentences than poor readers in the same grade. The results are discussed in terms of two alternative interpretations.

## DEVELOPMENTAL PROCESSES II

Tracy S. Kendler, *University of California, Santa Barbara*  
Fiesta 6 Room, Saturday morning, 8:30-10:15

8:30-8:45 (432)

**Stereopsis in Human Infants.** ROBERT FOX, SANDRA L. SHEA, *Vanderbilt University*, RICHARD ASLIN, & SUSAN DUMAIS, *Indiana University*—While prior efforts to test stereopsis in infants have been equivocal, we used a new rapid testing method (moving random-element stereo contours plus forced-choice preferential looking) and found that stereopsis emerges at approximately 3-4 months, a result consistent with the hypothesis of a critical period governing binocular development.

8:50-9:05 (433)

**Sensitivity to Structural Information: A Developmental Perspective.** MARY ANN SKOWRONSKI, *Lafayette College* (sponsored by David C. Edwards)—Sensitivity to pattern structure is evident as early as 4 years of age, with the locus of these effects apparent after the perception stage of visual processing. Preschoolers manipulated six-block symmetrical and asymmetrical designs. Accuracy of block placement showed no performance differences in copying the patterns, while reproduction scores were better for the symmetrical than for the asymmetrical displays. Conclusion supported by reaction time data.

9:10-9:25 (434)

**Selective Processing in Visual Search.** KAREN M. COHEN, *University of Denver* (sponsored by Richard K. Olson)—Ability to use systematically varied information in the visual periphery to direct eye fixations was studied in subjects who quickly matched a centrally located standard with a peripherally located target. Effective use of featural information to guide search declined with increased "foveal load" and distance of peripheral alternatives. Scanning was selective, not exhaustive. Developmental findings, implications for developmental trends in visual scanning, and the relation between perception and action are discussed.

9:30-9:50 (435)

**Identifying Errors in a Perceptual Matching Task.** STEPHEN K. REED, *Case Western Reserve University*—Kindergarten and first-grade children participated in a perceptual learning task. They then transferred to one of four tasks, differentiated by whether the standard and distinctive features remained the same or changed. A simple mathematical model was used to partition errors into attention errors and discrimination errors in order to determine how each would be influenced by developmental and training variables.

9:55-10:10 (436)

**Mueller-Lyer and Poggendorff Illusions: Difference Between Children and Adults.** MARY O'ROURKE & COLEMAN MERRYMAN, *Southwestern University* (read by C. Merryman)—To test some implications of Piaget's developmental theory of illusions, children and adults responded to Mueller-Lyer and Poggendorff figures. More adults than children perceived the Poggendorff illusion, but there was no difference in susceptibility to the Mueller-Lyer illusion.

## VISION II

Randolph Blake, *Northwestern University*  
Fiesta 6 Room, Saturday morning, 10:25-11:40

10:25-10:35 (437)

**Comparison by Dark Adaptation of Visual Thresholds in White and Black Observers.** A. M. PRESTRUDE & CARL F. LARSON, *Virginia Polytechnic Institute & State University*—The alleged lack of color vocabulary for short wavelength discriminations among primitive groups with darker skin pigmentation has been thought to be due to increased melanin pigmentation in the ocular media. We tested this idea by comparing the dark adaptation processes of 16 white and 12 black observers to white, red, green, and blue lights. There were no significant differences between the white and black observers for any of the test lights.

10:40-10:50 (438)

**Adaptation Effects on the Brightness and Darkness of Brief Luminance Changes.** THOMAS R. CORWIN, *University of Rochester*, & MARC A. GREEN, *UCLA*—Using a free magnitude-estimation procedure, brightness- and darkness-vs.-duration curves were measured for luminance increments or decrements from three adaptation levels (58, 120, and 240 c/m<sup>2</sup>). Brightness judgments increased systematically with increases in adaptation level, but adaptation had no systematic effect on darkness judgments. All curves exhibited temporal enhancement effects at 30-50 msec.

10:55-11:10 (439)

**Visual Persistence Depends on Spatial Frequency and Retinal Locus.** BRUNO G. BREITMEYER & MICHAEL HALPERN, *University of Houston*—Using several measures of visual persistence, we found not only that persistence is directly proportional to spatial frequency, but also that it tends to be longer in the fovea than in the parafovea. These results are discussed in the framework of visual information processing characterized by serial foveations separated by abrupt saccades.

11:15-11:35 (440)

**Discriminability in Embedded Target Displays.** JOHN R. BLOOMFIELD, *Honeywell Systems & Research Center*, JERRY WALD, & DEBORAH A. SMITH, *University of Minnesota & Honeywell Systems & Research Center*—Target stimuli were embedded amongst background stimuli. The targets differed from the nontargets in color mixture. Their discriminability was measured by systematically degrading the observer's view by (1) optical blurring, and (2) using neutral density filters. The discriminability measurements are related to data from subjective rating, peripheral visual acuity and visual search experiments.

## ATTENTION AND INFORMATION PROCESSING V

G. Robert Grice, *University of New Mexico*  
River Room, Saturday morning, 8:00-12:35

8:00-8:20 (441)

**Selective Information Processing: Limits on Processing Capacity or Strategies in Decision Making?** MARILYN L. SHAW & JULIA KINCHLA, *Rutgers University*—The issue of whether limitations on processing capacity are implied by either visual or auditory detection data has a long, unresolved history. This paper presents a classification of theories of selective information processing, each class characterizing a different view on this issue. Each theory assumes that the subject bases his response on the information provided by a set of independent random variables. Two classes assume that each random variable provides an independent opportunity for a detection response and two assume that an integration of these random variables determines the subject's response. Models in each class have two parameters: one reflecting capacity limitations and one reflecting response selection processes. Consequences derived from these classes are described and shown to provide a



general method for distinguishing between the viewpoints represented by them. The method is applied to data from a yes-no visual detection paradigm.

**8:25-8:40 (442)**

**Acquisition of a Mnemonic System for Digit Span.** WILLIAM G. CHASE & K. ANDERS ERICSSON, *Carnegie-Mellon University*—A single subject increased his digit span from 7 digits to about 18 digits over a 2-month period and over 2,000 trials. Retrospective reports were used to analyze his mnemonic system and his control processes, and experiments were conducted on the subject to test a model of his mnemonic system.

**8:45-9:00 (443)**

**Temporal Processing of Auditory Pulse Trains.** GARY B. ROLLMAN & LAURAIN MILLS, *University of Western Ontario*—Observers responded to the offset of auditory trains varying in stimulus onset asynchrony and number of pulses, presented to the left or the right ear. Response latencies decreased as a function of both rate and number of clicks. A right-ear advantage was found for rapid rates. The data support a limited-storage-capacity neural timing model. Implications for theories of sensory coding, temporal summation, and cerebral laterality will be discussed.

**9:05-9:25 (444)**

**Visual Search: A Continuous Flow Model.** CHARLES W. ERIKSEN & DEREK W. SCHULTZ, *University of Illinois*—In visual display, effects of noise stimuli upon target RT varied as a function of response compatibility, size, contrast, and target noise onset asynchrony. These effects were well predicted by a continuous flow model that emphasizes the temporally distributed accumulation of information in the visual system and the concurrent, but increasingly selective, priming of responses.

**9:30-9:50 (445)**

**Attention and Intention in the Encoding of Complex Stimuli.** FRANK G. HALASZ & MARY J. NAUS, *Haverford College* (read by M. J. Naus)—Several recent two-process models of memory and attention have divided memory processing into limited-capacity, strategic mnemonic processes and less capacity constrained, involuntary automatic processes. While these dual-process views have restricted automatic processing to perceptual tasks, the present experiment demonstrates automatic processing during the complex encoding of meaningful stimuli.

**9:55-10:10 (446)**

**Short-Term Retrieval from Spatially and Temporally Partitioned Sets.** MICHAEL J. HACKER, *Rockefeller University* (sponsored by Catherine L. Lee)—Visually presented letter sets were spatially or temporally partitioned in a varied-set, varied-mapping paradigm. In each case, increases in the two positive subset sizes produced additive increases in probe RT. Consistent with an extension of Naus' random access model to nonsemantic, short-term structures, probed subset size produced twice the effect of irrelevant subset size on RT.

**BREAK**

**10:25-10:45 (447)**

**Order, Context-Sensitive Coding, and Procedural Knowledge.** WAYNE A. WICKELGREN, *University of Oregon*—What is the mental representation of completely and partially ordered sets? This question is considered, beginning with the perception of spoken and written words as ordered sets of phonemes and letters,

continuing through nonverbal auditory and visual form perception, and finally considering motor skills and cognitive operations.

**10:50-11:10 (448)**

**On the Time Relations of Cognitive Processes: Theoretical Explorations of Systems of Processes in Cascade.** JAMES L. McCLELLAND, *University of California, San Diego*—The effects of assuming that different levels of processing occur in parallel-contingent (as opposed to successive) fashion are explored. The assumption permits a homogeneous account of the results of masking, speed-accuracy tradeoff, and additive-factors reaction time experiments, and suggests reinterpretation of some conclusions reached on the basis of the assumption of strictly successive stages of processing.

**11:15-11:25 (449)**

**Comparison of Methods for Analyzing Bilinear (Multiplicative) Data.** JAMES SHANTEAU, *Kansas State University*—Theories predicting bilinearity can be found in many areas of psychology, e.g., decision making, reaction time, motivation, and perception. Several ordinal and interval techniques have been proposed for testing bilinearity. These techniques were compared on both logical and empirical grounds. Generally, bivariate trend analyses were found superior for testing bilinearity.

**11:30-11:40 (450)**

**Selective Backward Masking and Processing Order.** MICHAEL F. SHERRICK & J. KEVIN KEATING, *Memorial University of Newfoundland* (sponsored by E. J. Rowe)—Seven-letter rows were followed at several ISIs by a mask or no-mask and a bar-marker partial report cue. The relationship between the obtained mask and no-mask serial position curves varied with ISI, indicating that the arrays were processed ends first and then from both ends towards the middle.

**11:45-12:00 (451)**

**The Suffix Effect is not Evidence for Precategorical Acoustic Store.** THOMAS J. AYRES, JOHN JONIDES, & JUDITH S. REITMAN, *University of Michigan* (read by J. S. Reitman)—In a serial recall task, the way in which subjects categorized an ambiguous stimulus (the verbal-musical "wa" of a plunger-muted trumpet) altered the amount of interference it produced as a suffix to a list. We therefore conclude that the suffix effect cannot be attributed exclusively to a precategorical acoustic store.

**12:05-12:15 (452)**

**Effects of "Set" and Phonemic Similarity on Temporal Order Retention.** DIANE T. FELDMAN & RICHARD G. BURRIGHT, *SUNY, Binghamton* (sponsored by C. James Scheirer)—Letters were shown in uncorrelated temporal and spatial orders. Phonemically similar letters were used on the last trials. A temporal order recall decrement was not found on these last trials unless similar sets were also seen initially. This finding illustrates that coding temporal order is both flexible and context dependent.

**12:20-12:30 (453)**

**The Role of Probe-Stimulus Modality in Secondary-Task Measures of Attentional Capacity.** ROBERT W. PROCTOR & JANET D. PROCTOR, *Auburn University*—Previous studies have obtained conflicting results regarding the importance of probe modality in secondary-task measures of the attentional-capacity requirements of a primary visual matching task. Two experiments were conducted that eliminated procedural problems present in the previous studies. Visual and auditory probes produced similar reaction time functions.