

PROGRAM

for The Psychonomic Society

Twenty-second Annual Meeting

THE PHILADELPHIA SHERATON HOTEL
Philadelphia, Pennsylvania

Thursday, Friday, Saturday
November 12, 13, 14, 1981

GENERAL INFORMATION

Hotel Accommodations

Philadelphia Sheraton Hotel, 1725 Kennedy Boulevard, Philadelphia, Pennsylvania 19103.
Phone: (215) 568-3300. This hotel will house participants and provide all meeting space.

Reservations

A Reservation Card for the hotel is enclosed with this Program. PLEASE MAKE YOUR RESERVATIONS PROMPTLY by returning the completed card to the hotel. Availability of rooms is guaranteed only to those whose cards are received by the hotel before October 20, 1981.

Registration

A registration desk will be available beginning late Wednesday afternoon. Please do register.

Programs

Please bring your Program with you. Additional Programs may be purchased at the registration desk for \$3.00 or by mail from the Secretary-Treasurer for \$3.50 (\$4.00 outside of North America).

OFFICERS

Chairman, 1981, Lyle E. Bourne
Secretary-Treasurer, 1981-1983, J. Bruce Overmier

GOVERNING BOARD

Lyle Bourne (1976-1981)	M. R. D'Amato (1979-1984)
Tracy Kendler (1976-1981)	Walter Kintsch (1979-1984)
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Saul Sternberg (1977-1982)	Fergus Craik (1980-1985)
George Mandler (1978-1983)	Robert Crowder (1981-1986)
Janet Spence (1978-1983)	Isadore Gormezano (1981-1986)

Donald S. Blough and Jean M. Mandler have been elected to the Governing Board for 1982-1987

NOTE TO MEMBERS

The Program

This year the program contains 399 papers drawn from some 475 submitted abstracts, an 11% increase over 1980. All papers submitted by Members and properly sponsored papers by Associates were included in the program. Only a very few sponsored papers to be given by other than Associates were accommodated. This is in contrast to 10 years ago when virtually all papers submitted were included in the program. This history is presented in the table:

	1981	1980	1979	1978	1977	1976	1975	1974	1973	1972	1971	1970
Submissions	475	428										291
Accepted (Sponsored)	399 (40)	370 (60)	397 (67)	456	454	435	393	334	310	333	271	291

The decrease in number of accepted papers in recent years is attributable to two factors: (1) the incorporation of a mandatory 5-minute discussion period following *each* paper and (2) an increase in the average amount of time requested for presentation.

Because adherence to the guidelines for abstract length was sometimes poor (i.e., abstracts running to >150 words rather than the 50 specified), some abstracts were edited.

Special Symposium Thursday Evening

The federal budget figures for the current (and future) fiscal years are just now being worked out at the program levels in agencies. Program officers from several of these will share with us the most recent information and their insights into the implications of these figures for psychological research. This information is of importance to all of us. This special symposium, entitled "Federal Support of Research: Current Status Report and Analysis," is sponsored as part of the Psychonomic Society program by the Federation of Behavioral, Psychological, and Cognitive Sciences, of which the Psychonomic Society is a Charter Member.

Smoking

We would very much appreciate no smoking in rooms when papers are being given.

J. Bruce Overmier
Secretary-Treasurer

CONDENSED SCHEDULE A

Thursday Morning

Vision (1-13).....	8:00-12:15, Pennsylvania West
Performance (14-27).....	8:00-12:25, Pennsylvania East
Perception of Rhythm and Music (28-34).....	8:00-10:25, Cafe Careme
Human Conditioning (35-39).....	10:40-12:20, Cafe Careme
Concept Identification and Decision Making (40-51B).....	8:00-12:00, Grand Ballroom East
General Conditioning Processes and Toxiphobias (52-64).....	8:00-12:15, Constitution/Independence
Reading and Story Comprehension (65-75).....	8:00-12:05, Grand Ballroom West

Thursday Afternoon

Tactile Perception and Sensitivity (76-84).....	1:00-3:55, Cafe Careme
Lateralization of Function (85-90).....	4:10-5:50, Cafe Careme
Aversively Based Behavior (91-99).....	1:00-3:55, Constitution/Independence
Reinforcement (100-104).....	4:10-5:50, Constitution/Independence
Speech Production and Perception (105-111).....	1:00-3:15, Grand Ballroom East
Language Development (112-119).....	3:30-6:10, Grand Ballroom East
Individual Differences and Social-Personality Processes (120-134).....	1:00-5:55, Pennsylvania East
Intersensory Processes (135-148).....	1:00-5:45, Pennsylvania West
Human Learning and Memory I (149-164).....	1:00-5:55, Grand Ballroom West

Thursday Evening

Symposium on Federal Support of Research: Current Status Reports and Analysis.....	8:00-10:00, Pennsylvania West
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Friday Morning

Human Learning and Memory II (165-176)	8:00-12:20, Grand Ballroom West
Motor Skills and Performance (177-190)	8:00-12:30, Cafe Careme
Discourse Processing (191-204)	8:00-12:20, Grand Ballroom East
Timing and Contingency (205-217).....	8:00-12:10, Pennsylvania East
Problem Solving (218-230)	8:00-12:20, Constitution/Independence
Picture Perception and Kinematic Information (231-243)	8:00-12:20, Pennsylvania West

Friday Afternoon

Attention and Information Processing (244-257)	1:00-5:35, Constitution/Independence
Brain Mechanisms (258-265)	1:00-3:20, Cafe Careme
Stress and Endogenous Opioids (266-271)	3:30-5:40, Cafe Careme
Concept Learning and Memory in Animals (272-285)	1:00-5:45, Pennsylvania East
Memory for Events and Ideas (286-299).....	1:00-5:35, Grand Ballroom East
Visual Perception (300-314)	1:00-5:40, Pennsylvania West
Letter and Word Processing I (315-326)	1:00-5:30, Grand Ballroom West

Saturday Morning

Letter and Word Processing II (327-337).....	8:00-12:10, Grand Ballroom West
Development of Problem Solving and Perception (338-350)	8:00-12:30, Grand Ballroom East
Psycholinguistics (351-362).....	8:00-12:15, Pennsylvania West
Animal Behavior (363-375)	8:00-12:15, Constitution/Independence
Psychophysics and Scaling (376-387)	8:00-12:10, Pennsylvania East
Neurochemistry and Psychopharmacology (388-394).....	8:00-10:05, Cafe Careme
Human Learning and Memory in Altered States (395-399).....	10:30-12:00, Cafe Careme

BUSINESS MEETING
Lyle Bourne, Chairman
Grand Ballroom
Friday, 6:00-7:00 p.m.

HOSPITALITY
Cafe Careme
Wednesday, Thursday, and Friday, 6:00 p.m. on

CONDENSED SCHEDULE B

		Constitution/ Independence	Grand Ballroom East	Grand Ballroom West	Pennsylvania East	Pennsylvania West
Cafe Careme		General Conditioning & Toxiphobias 8:00-12:15	Concept Identification & Decision Making 8:00-12:15	Reading & Story Comprehension 8:00-12:05	Performance 8:00-12:25	Vision 8:00-12:15
Thursday Morning	Perception of Rhythm 8:00-10:25 Human Conditioning 10:40-12:20	Tactile Perception 1:00-3:55 Lateralization 4:10-5:50	Aversive Behavior 1:00-3:55 Reinforcement 4:10-5:50	Human Learning & Memory I 1:00-5:55	Individual Differences & Social-Personality Processes 1:00-5:55	Intersensory Processes 1:00-5:45
Thursday Evening					Symposium on Federal Support of Research 8:00-10:00	
Friday Morning	Motor Skills & Performance 8:00-12:30	Problem Solving 8:00-12:20	Discourse Processing 8:00-12:20	Human Learning & Memory II 8:00-12:20	Timing & Contingency 8:00-12:10	Picture Perception & Kinematics 8:00-12:20
Friday Afternoon	Brain Mechanisms 1:00-3:20 Stress & Opioids 3:30-5:40	Attention & Information Processing 1:00-5:35	Memory for Events & Ideas 1:00-5:35	Letter & Word Processing I 1:00-5:30	Concept Learning & Memory in Animals 1:00-5:45	Visual Perception 1:00-5:40
Friday Evening			Business Meeting 6:00-7:00			
Saturday Morning	Neurochemistry & Pharmacology 8:00-10:05 Memory in Altered States 10:30-12:00	Animal Behavior 8:00-12:15	Development of Problem Solving & Perception 8:00-12:30	Letter & Word Processing II 8:00-12:10	Psychophysics & Scaling 8:00-12:10	Psycholinguistics 8:00-12:15

CONDENSED SCHEDULE C

THURSDAY MORNING

Vision (1-13), Pennsylvania West

8:00-8:15	Doner & Lappin (1)
8:20-8:40	Ebenholtz & Fisher (2)
8:45-9:00	Michaels (3)
9:05-9:20	Patterson & Fox (4)
9:25-9:40	Cormack (5)
9:45-10:00	Breitmeyer (6)
10:05-10:15	Corwin (7)
10:30-10:45	Cogan, Silverman, & Sekuler (8)
10:50-11:05	Long & Beaton (9)
11:10-11:20	Baker & Russell (10)
11:25-11:40	Thoms & Matin (11)
11:45-12:00	Matteson, Marx, & Ronderos (12)
12:05-12:15	Meyer, Vanderburgh, & Coleman (13)

Performance (14-27), Pennsylvania East

8:00-8:10	Bilenas & Gibson (14)
8:15-8:30	Yates (15)
8:35-8:45	Link (16)
8:50-9:10	Townsend & Piatrowsky (17)
9:15-9:35	Kohfeld (18)
9:40-9:55	Kerr, Davidson, Nelson, & Haley (19)
10:10-10:25	Halasz & Biederman (20)
10:30-10:45	Lansman & Farr (sp. Hunt) (21)
10:50-11:05	Harris (sp. Shaw) (22)
11:10-11:20	Noble & Su (23)
11:25-11:35	Bertelson & Mousty (24)
11:40-11:50	Holding, Baker, & Loeb (25)
11:55-12:05	Hartley, Hartley, & Jackson (26)
12:10-12:25	Gould, Conti, & Hovanyec (27)

Perception of Rhythm & Music (28-34), Cafe Careme

8:00-8:20	Jones & Boltz (28)
8:25-8:45	Shaw, Masakowski, & Johnson (29)
8:50-9:05	Dowling & Bartlett (30)
9:10-9:30	Krumhansl (31)
9:35-9:50	Hulse (32)
9:55-10:10	D'Amato & Salmon (33)
10:15-10:25	Polzella & Biers (34)

Human Conditioning (35-39), Cafe Careme

10:40-10:55	Wasserman & Shaklee (35)
11:00-11:20	Harzem (36)
11:25-11:35	Saltz, Campbell, & Skotko (37)
11:40-11:55	Eisenberger, Masterson, & McDermitt (38)
12:00-12:20	Shimoff, Matthews, & Catania (39)

Concept Identification & Decision Making (40-51B), Grand Ballroom East

8:00-8:20	Dulaney & Dupree (40)
8:25-8:40	Getty & Huggins (41)
8:45-8:55	Friendly (42)
9:00-9:10	Dominowski (43)
9:15-9:30	Flannagan, Fried, & Holyoak (44)
9:35-9:50	Kellogg & Dowdy (45)
9:55-10:10	Hemenway & Tversky (46)
10:25-10:35	Shanteau & O'Reilly (47)

10:40-10:55	Lopes (48)
11:00-11:20	Birnbaum & Mellers (49)
11:25-11:40	King (50)
11:45-12:00	Maki & McCaul (51A)
12:05-12:15	Baron (51B)

General Conditioning Processes & Toxiphobias (52-64), Constitution/Independence

8:00-8:15	Salafia, Cardosi, & Salafia (52)
8:20-8:35	O'Connell & Rashotte (53)
8:40-8:55	Bitterman & Couvillon (54)
9:00-9:10	Balsam (sp. Gibbon) (55)
9:15-9:30	Rosellini, DeCola, & Lashley (56)
9:35-9:50	Riley, Dacanay, & Zellner (57)
9:55-10:15	Franchina (58)
10:30-10:45	Spector, Smith, & Hollander (59)
10:50-11:10	Robbins (60)
11:15-11:25	Revusky (61)
11:30-11:45	Stewart, Reidinger, & Geyer (62)
11:50-12:00	Martin (sp. Anderson) (63)
12:05-12:15	Mason & Reidinger (sp. Stevens)(64)

Reading & Story Comprehension (65-75), Grand Ballroom West

8:00-8:20	Anderson, Shirey, & Mason (65)
8:25-8:45	Frederiksen & Weaver (66)
8:50-9:10	Rothkopf & Fisher (67)
9:15-9:35	Britton & Tesser (68)
9:40-9:55	Trabasso (69)
10:00-10:20	Graesser (70)
10:35-10:50	Stein & Kilgore (71)
10:55-11:10	Leighbody, Schweigert, & Tsao (72)
11:15-11:30	Olson, Duffy, Mack, Vincent, & Eaton (73)
11:35-11:50	Haberlandt & Kennard (74)
11:55-12:05	Goldman & Varnhagen (sp. Pellegrino) (75)

THURSDAY AFTERNOON

Tactile Perception & Sensitivity (76-84), Cafe Careme

1:00-1:15	Sherrick (76)
1:20-1:35	Craig (77)
1:40-1:50	Fucci, Petrosino, Cantrell, & Sloane (78)
1:55-2:10	Geldard (79)
2:15-2:30	Green, Wilson, & Craig (80)
2:35-2:55	Cholewiak (81)
3:00-3:15	Verrillo, Gescheider, & Calman (82)
3:20-3:35	Gescheider, Verrillo, & Van Doren (83)
3:40-3:55	Lederman, Loomis, & Williams (84)

Lateralization of Function (85-90), Cafe Careme

4:10-4:25	Hellige & Wong (85)
4:30-4:40	Miller (86)
4:45-4:55	Lehman & Rose (87)
5:00-5:15	Whitaker & Sanders (88)
5:20-5:35	McKeever (89)
5:40-5:50	Ferguson (90)

Aversively Based Learning (91-99), Constitution/Independence

1:00-1:20	Bersh, Alloy, Whitehouse, & Laurence (91)
1:25-1:40	Williams (92)
1:45-2:05	Davis (93)
2:10-2:25	Miller, Kasprow, Balaz, & Cacheiro (94)
2:30-2:45	Riccio, Richardson, & Cabosky (95)
2:50-3:05	Emmerson & DeVietti (96)
3:10-3:20	Ayers & Vigorito (97)
3:25-3:40	Hurwitz & Davis (98)
3:45-3:55	Marlin (sp. Kellogg) (99)

Reinforcement (100-104), Constitution/Independence

4:10-4:30	Perkins (100)
4:35-4:50	Sperling, Anthony, Chetney, & Geller (101)
4:55-5:10	Terry (102)
5:15-5:30	Dachowski, Piazza, & Dunlap (103)
5:35-5:50	Hall (104)

Speech Production & Perception (105-111), Grand Ballroom East

1:00-1:20	Cole & Rudnick (105)
1:25-1:40	Remez & Rubin (106)
1:45-2:00	Strange & Dittmann (107)
2:05-2:20	Jenkins & Franklin (108)
2:25-2:40	Sawusch & Nusbaum (109)
2:45-3:00	Repp (110)
3:05-3:15	Tartter & Fischer (sp. Landauer) (111)

Language Development (112-119), Grand Ballroom East

3:30-3:50	Haber (112)
3:55-4:15	Siegel (113)
4:20-4:35	Keil (114)
4:40-5:00	Falmagne, Sherwood-Forbes, & Clement (115)
5:05-5:15	Ledger & Ryan (116)
5:20-5:30	Becker (117)
5:35-5:50	Marks & Hammeal (118)
5:55-6:10	Weist (119)

Individual Differences & Social-Personality Processes (120-134), Pennsylvania East

1:00-1:15	Weitzman (120)
1:20-1:35	Ellis & Franklin (121)
1:40-1:55	Hunt & Davidson (122)
2:00-2:15	Katz (123)
2:20-2:35	Pellegrino, Cantoni, & Solter (124)
2:40-2:50	Senter, Richter, & Piatka (125)
2:55-3:10	Dugan & Martin (126)
3:25-3:45	Routh (127)
3:50-4:05	Bernstein, Abadzi, McClellan, & Lin (128)
4:10-4:25	Devine & Malpass (129)
4:30-4:45	Shanab & O'Neill (130)
4:50-5:05	Paulus, McCain, & Cox (131)
5:10-5:20	Percival & Smith (132)
5:25-5:40	Johnson, Kahan, & Raye (133)
5:45-5:55	Pettinati & Evans (134)

Intersensory Processes (135-148), Pennsylvania West

1:00-1:15	Welch, Warren, & Ahrens (135)
1:20-1:35	Appelle, Davidson, & Calhoun (136)
1:40-1:55	Cowan & Kostelnik (137)
2:00-2:15	Warren & Strelow (138)
2:20-2:35	Newman, Sawyer, Hall, & Hill (139)
2:40-3:00	Kennedy & Domander (140)
3:15-3:35	Haber (141)
3:40-3:55	Cheyney, Miller, & Rees (142)

4:00-4:10	Parker, Poston, & Gulleedge (143)
4:15-4:35	Shebilske & Karmiohl (144)
4:40-4:55	Wallace & Hoyenga (145)
5:00-5:10	Bricker & Julesz (146)
5:15-5:25	Easton & Basala (147)
5:30-5:45	Pezdek (148)

Human Learning & Memory I (150-164), Grand Ballroom West

1:00-1:20	Kolers (150)
1:25-1:35	Goss (151)
1:40-2:00	Bjork, Hofacker, & Burns (152)
2:05-2:20	Nelson, Landwehr, Leonesio, Raley, Weisman, & Naren (153)
2:25-2:40	Ozier & Blennerhassett (154)
2:45-3:00	Hintzman, Nozawa, & Irmscher (155)
3:05-3:20	Flexser (156)
3:35-3:50	Penney (157)
3:55-4:05	Manning (158)
4:10-4:25	Greenberg & Engle (159)
4:30-4:40	Ley (160)
4:45-4:55	Ericsson & Karat (161)
5:00-5:20	Neely & Payne (162)
5:25-5:40	Roediger, Neely, & Blaxton (163)
5:45-5:55	Brown & Bean (164)

THURSDAY EVENING**Symposium on Federal Support of Research: Current Status Reports and Analysis, Pennsylvania West**

8:00-10:00	Haddad, Sasmor, Farr, Chipman, Young, Kelty, Bernick, & Schneider
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FRIDAY MORNING**Human Learning & Memory II (165-176), Grant Ballroom West**

8:00-8:15	Greenwald, Banaji, Pratkanis, & Breckler (165)
8:20-8:35	Izawa (166)
8:40-8:55	Burrows & Okada (167)
9:00-9:20	Nelson & McEvoy (168)
9:25-9:45	Wickens, Moody, & Vidulich (169)
9:50-10:05	Hunt (170)
10:10-10:25	Hodge (171)
10:40-10:55	Weisberg & Chromiak (172)
11:00-11:20	Gorfein & Viviani (173)
11:25-11:40	Kanak, Nixon, Greenleaf, & Stratton (174)
11:45-12:00	Gardiner, Gathercole, & Gregg (175)
12:05-12:20	Block, Saggau, & Martin (176)

Motor Skills & Performance (177-190), Cafe Careme

8:00-8:20	Kelso (177)
8:25-8:35	Craske (178)
8:40-8:55	Goodman (sp. Kelso) (179)
9:00-9:15	Gentner (sp. Norman) (180)
9:20-9:35	Newell, Carlton, & Carlton (181)
9:40-9:55	Jagacinski, Johnson, & Miller (182)
10:00-10:15	Mather (sp. Roberts) (183)
10:30-10:40	Zelaznik & Hawkins (sp. Newell) (184)
10:45-10:55	Wood (sp. Fleming) (185)
11:00-11:10	Hagen & Kennedy (186)
11:15-11:30	Kowler & Martins (sp. Steinman) (187)
11:35-11:50	Zukofsky (sp. Sternberg) (188)
11:55-12:10	MacKay (189)
12:15-12:30	Baars & Motley (190)

Discourse Processing (191-204), Grand Ballroom East

8:00-8:15	Kieras & Johnson (191)
8:20-8:35	Masson (sp. May) (192)
8:40-8:55	Jones & Anderson (193)
9:00-9:15	Miller (sp. Kintsch) (194)
9:20-9:30	Barclay, Toglia, & Chevalier (sp. Berger) (195)
9:35-9:45	Daneman (sp. Carpenter) (196)
9:50-10:00	Singer (197)
10:15-10:25	Black, Robertson, & Johnson (sp. Crowder) (198)
10:30-10:45	Greenspan & Segal (199)
10:50-11:00	Hughes, Langdon, & Kim (200)
11:05-11:15	de Haan (201)
11:20-11:30	Eddy & Glass (202)
11:35-11:55	Landauer, Furnas, Gomez, & Dumais (203)
12:00-12:20	Day (204)

Timing & Contingency (205-217), Pennsylvania East

8:00-8:20	Gibbon & Fairhurst (205)
8:25-8:35	Meck, Komeily-Zadeh, & Church (206)
8:40-8:55	Logue (207)
9:00-9:10	Rodewald (208)
9:15-9:35	Donahoe, Palmer, & Stickney (209)
9:40-9:55	Nevin (210)
10:10-10:20	Weiss (211)
10:25-10:40	Powell & Palm (212)
10:45-11:05	Williams (213)
11:10-11:30	Peters & Kamil (214)
11:35-11:50	Allison (215)
11:55-12:10	Birch (216)
	Stanley (title only) (217)

Problem Solving (218-230), Constitution/Independence

8:00-8:15	Voss, Tyler, & Yengo (218)
8:20-8:40	Tweney (219)
8:45-8:55	Mayer & Bayman (220)
9:00-9:15	Groen, Dauphinee, & McQueen (221)
9:20-9:35	Larkin (sp. Simon) (222)
9:40-10:00	Wallsten, Forsyth, & Budescu (223)
10:15-10:35	Collins & Michalski (224)
10:40-10:50	Dillon (225)
10:55-11:10	McCloskey, Kohl, & Washburn (226)
11:15-11:30	Jeffries (sp. Simon) (227)
11:35-11:45	Dixon (sp. Rothkopf) (228)
11:50-12:05	Revlin & Kallio (229)
12:10-12:20	Morris & Riley (sp. Schoeffler) (230)

Picture Perception & Kinematic Information (231-243), Pennsylvania West

8:00-8:15	Hochberg & Brooks (231)
8:20-8:35	Warren, Owen, & Hettinger (232)
8:40-8:55	Pomerantz & Toth (233)
9:00-9:15	Cutting (234)
9:20-9:35	Proffitt (235)
9:40-9:50	Bertenthal (sp. Proffitt) (236)
9:55-10:10	Todd (237)
10:25-10:45	Jonides, Irwin, & Yantis (238)
10:50-11:00	Shepard & Zare (239)
11:05-11:20	Pollatsek, Rayner, & Collins (240)
11:25-11:40	Fisher, Karsh, Breitenbach, & Barnette (241)
11:45-12:00	Antes, Mann, & Penland (242)
12:05-12:20	Royer (243)

FRIDAY AFTERNOON**Attention & Information Processing (244-257), Constitution/Independence**

1:00-1:15	Kahneman (sp. Treisman) (244)
1:20-1:35	Treisman & Kahneman (245)
1:40-1:55	Hoffman & Nelson (246)
2:00-2:10	Meyer & Irwin (247)
2:15-2:35	Loftus, Johnson, & Williamson (248)
2:40-2:50	Dark & Johnston (249)
2:55-3:05	Navon & Margalit (250)
3:10-3:20	Warm, Sprague, & Dember (251)
3:35-3:50	Hayes (252)
3:55-4:15	Fisk & Schneider (253)
4:20-4:35	Goolkasian (254)
4:40-4:55	Intraub (255)
5:00-5:15	Redding (256)
5:20-5:35	Mericle (257)

Brain Mechanisms (258-265), Cafe Careme

1:00-1:15	Moore & Desmond (258)
1:20-1:30	Patterson, Steinmetz, & Beggs (259)
1:35-1:45	McCormick, Lavond, Clark, & Thompson (260)
1:50-2:00	Jarrard & Elmes (261)
2:05-2:15	Hankey, Davis, & LeVere (262)
2:20-2:35	Eisman & Hayes (263)
2:40-3:00	Grossberg (264)
3:05-3:20	Eason, Oakley, & Flowers (265)

Stress & Endogenous Opioids (266-271), Cafe Careme

3:30-3:45	Paré & Vincent (266)
3:50-4:05	Rollman & Coderre (267)
4:10-4:25	Galizio & Sanderson (268)
4:30-4:50	Maier, Grau, Hyson, Madden, & Barchas (269)
4:55-5:15	Kelly, Colurso, Krieger, & Glusman (270)
5:20-5:40	Gardner (271)

Concept Learning & Memory in Animals (272-285), Pennsylvania East

1:00-1:20	Sands, Lincoln, & Wright (272)
1:25-1:45	Zentall, Edwards, & Jagielo (273)
1:50-2:10	Urcuoli, Santiago, Wright, & Sands (274)
2:15-2:25	Thomas & Frost (275)
2:30-2:40	Parker (276)
2:45-3:05	Weisman, Gibson, & Rochford (277)
3:10-3:25	Shimp (278)
3:40-3:50	Honig & Dodd (279)
3:55-4:10	Olson & Maki (280)
4:15-4:25	Stonebraker & Rilling (281)
4:30-4:50	Fields & Dempsky (282)
4:55-5:05	Steele & Bauer (283)
5:10-5:25	Hill, Collier, & Routtenberg (284)
5:30-5:45	Devine & Salo (285)

Memory for Events & Ideas (286-299), Grand Ballroom East

1:00-1:15	Macht & Buschke (286)
1:20-1:35	Fisher, Bixby, & Oliver (287)
1:40-1:50	Robinson (288)
1:55-2:10	Brewer & Dupree (289)
2:15-2:30	Rubin (290)
2:35-2:50	Bjork, Gold, & White (291)
2:55-3:10	Bernbach, Roediger, & Payne (292)
3:25-3:40	Pratt & Higbee (293)

3:45-3:55	Park, Puglisi, & Sovacool (294)	11:05-11:15	Liben & Newcombe (346)
4:00-4:15	Hoffman, Fenning, & Kaplan (sp. Jenkins) (295)	11:20-11:35	Rader, Leaper, & Welsh (347)
4:20-4:30	Loftus & Burns (296)	11:40-11:55	Pollack & Schwartz (348)
4:35-4:50	Shaughnessy & Mand (297)	12:00-12:15	Starkey & Spelke (sp. Gelman) (349)
4:55-5:10	Bruce & Clemons (298)	12:20-12:30	Wilkinson (sp. Glenberg) (350)
5:15-5:35	Potts & Peterson (299)		
Visual Perception (300-314), Pennsylvania West			
1:00-1:15	Lumsden (300)	8:00-8:15	Schvaneveldt & Durso (351)
1:20-1:30	Coren & Porac (301)	8:20-8:40	McNamara & Sternberg (352)
1:35-1:50	Pasnak & Tyer (302)	8:45-9:00	Toglia & Kamil (sp. Berger) (353)
1:55-2:05	Pritchard, Schwartz, Honeck, & Warm (303)	9:05-9:25	Gentner (354)
2:10-2:25	Lanze, Weisstein, & Harris (304)	9:30-9:50	Gildea & Glucksberg (355)
2:30-2:45	Earhard (305)	9:55-10:10	Reder (356)
3:00-3:20	Leibowitz, Post, Shupert, & Dichgans (306)	10:25-10:40	Schustack (sp. Anderson) (357)
3:25-3:40	Keuss & Boer (307)	10:45-11:00	Swinney (358)
3:45-4:00	Ceraso, Lascaris, & Velk (308)	11:05-11:15	Potter (359)
4:05-4:15	Walker (309)	11:20-11:35	Watkins & Peynircioğlu (360)
4:20-4:35	Porac & Coren (310)	11:40-11:55	Danks & Kurcz (361)
4:40-5:00	Weintraub & Brown (311)	12:00-12:15	Feldman (sp. Kelso) (362)
5:05-5:15	Purcell & Stewart (312)		
5:20-5:40	Kubovy, Turock, & Best (313)		
	Jolicoeur & Kosslyn (title only) (314)		
Letter & Word Processing I (315-326), Grand Ballroom West			
1:00-1:15	Monahan (315)	8:00-8:20	Brown (363)
1:20-1:40	Grice, Canham, & Schafer (316)	8:25-8:40	Gallup (364)
1:45-2:00	Gasquoine, Kietzman, Kuslansky, Gallup, & Kass (317)	8:45-8:55	Candland (365)
2:05-2:20	Carr & Brown (318)	9:00-9:10	Thor & Holloway (366)
2:25-2:40	Santee & Egeth (319)	9:15-9:30	Zamble & Mitchell (367)
2:45-3:05	Paap & Newsome (320)	9:35-9:50	Bronstein (368)
3:20-3:40	Tzeng, Hung, Malley, & Dreher (321)	9:55-10:05	Pettijohn, Shirley, & Paterson (369)
3:45-4:05	Avant & Woods (322)	10:20-10:35	DeSantis & Tobach (370)
4:10-4:30	Stanovich & West (323)	10:40-10:55	Miller (371)
4:35-4:50	Rossmeissl & Theios (324)	11:00-11:15	Eiserer (372)
4:55-5:10	Flowers & Wilcox (325)	11:20-11:30	Ewig, Barton, Reyes, & Hicks (373)
5:15-5:30	Robertson (sp. Rosch) (326)	11:35-11:50	Pinel, Gorzalka, & Ladak (374)
11:55-12:15	Porter, Johnson, & Granger (375)		
SATURDAY MORNING			
Letter & Word Processing II (327-337), Grand Ballroom West			
8:00-8:20	Ferres & Aaronson (327)	8:00-8:20	Ward (376)
8:25-8:45	Healy & Drawnoski (328)	8:25-8:40	Larkin (377)
8:50-9:10	Johnston (329)	8:45-9:00	Smith, May, & Lyman (378)
9:15-9:30	Wolford & Chambers (330)	9:05-9:20	Kristofferson, Allan, & Campbell (379)
9:35-9:50	Perfetti & Bell (331)	9:25-9:35	Lockhead & King (380)
9:55-10:10	Schadler & Jordan (332)	9:40-9:50	Wandell & Welsh (sp. Loftus) (381)
10:25-10:40	Mewhort, Gurnsey, & Campbell (333)	10:05-10:20	Schurman & Hritz (382)
10:45-11:00	Samuel & van Santen (sp. Johnston) (334)	10:25-10:45	Swensson & Judy (383)
11:05-11:20	Mason (335)	10:50-11:05	Zwischlocki (384)
11:25-11:45	Ratcliff (336)	11:10-11:25	Huang & Jones (385)
11:50-12:10	Bellezza & Day (337)	11:30-11:45	Keren (sp. Hellige) (386)
		11:50-12:10	Furnas (sp. Carroll) (387)
Development of Problem Solving & Perception (338-350), Grand Ballroom East			
8:00-8:15	Ashcraft & Hamann (338)	8:00-8:15	Levy, Carron, & Young (388)
8:20-8:40	Beilin & Klein (339)	8:20-8:35	Hughes (389)
8:45-9:00	Robinson & Klahr (340)	8:40-8:50	Sessions, Leu, & Bunnell (390)
9:05-9:20	Caplan, Scarr, & Ferdman (sp. Overmier) (341)	8:55-9:10	Cole & Wells (391)
9:25-9:45	Smith (342)	9:15-9:30	Branch (392)
9:50-10:05	Kendler (343)	9:35-9:50	Siegel (393)
10:20-10:35	Marschark & Azmitia (344)	9:55-10:05	Kilbey & Moore (sp. Prytula) (394)
10:40-11:00	Herman (sp. Green) (345)		
Human Learning & Memory in Altered States (395-399), Cafe Careme			
10:30-10:50	Hueting, Deboeck, Michiels, & Soetens (395)		
10:55-11:05	Mueller & Lisman (sp. Spear) (396)		
11:10-11:20	Hinrichs, Mewaldt, Ghoneim, & Berie (397)		
11:25-11:35	Hashtroodi, Parker, Yablick, DeLisi, & Wyatt (398)		
11:40-12:00	Baddeley, Harris, & Sunderland (399)		

Papers read at the 22nd Annual Meeting of the Psychonomic Society

Philadelphia Sheraton Hotel, Philadelphia

November 12, 13, 14, 1981

VISION

Pennsylvania West, Thursday morning, 8:00-12:15

Chaired by James T. Walker, University of Missouri

8:00-8:15 (1)

Geometric Factors in Visual Acuity. JONATHAN F. DONER & JOSEPH S. LAPPIN, *Vanderbilt University* (read by J. S. Lappin)—What is the smallest detectable displacement of a point from a set of points arranged in a curved line? This acuity for curvilinearity is within the "hyperacuity" range and is approximately invariant with degree of curvature. Acuity is systematically dependent, however, on the global geometric organization.

8:20-8:40 (2)

Oculomotor Plasticity and Distance Adaptation. SHELDON M. EBENHOLTZ & SHERRY K. FISHER, *University of Wisconsin, Madison*—Experiments were performed in a full-cue context (conventional adaptation paradigm) and with no secondary distance cues present (induction paradigm). Both showed a marked dependence of change in distance perception on an induced lateral phoria. The latter, along with distance aftereffects, were modulated by varying the magnitude of accommodative convergence in force during the exposure period.

8:45-9:00 (3)

The Perception of Absolute Distance in Stereograms. CLAIRE F. MICHAELS, *Lake Forest College*—On the assumption of homogeneous distribution of texture on surfaces, the optical patterns to the two eyes uniquely specify the shapes, sizes, and distances of environmental surfaces. In two experiments, observers demonstrated a sensitivity to such information in computer-generated stereograms by making accurate verbal judgments of and reachings to the absolute, not merely relative, positions of surfaces.

9:05-9:20 (4)

Information Processing in Global Stereoscopic Displays. ROBERT PATTERSON & ROBERT FOX, *Vanderbilt University* (read by R. Fox)—Forced-choice recognition thresholds for a briefly presented target formed from a dynamic random-element stereogram were obtained from 98 naive observers to test the hypotheses that (1) eye movements are essential for resolution of random-element stereograms with large disparities, and that (2) stereoanomalies are due to deficits in neural mechanisms sensitive to the direction of disparity. Results showed that eye movements are not essential and that stereoanomalies reflect more the method of testing than underlying neurophysiological deficits.

9:25-9:40 (5)

Apparent Distance and Depth in Stereoscopic Afterimages. ROBERT H. CORMACK, *New Mexico Tech*—A new law is proposed which states that given a stereoscopic afterimage, apparent depth will vary proportionately with the square of apparent distance. Results confirm this over a wide range. The law breaks down at extreme distance where the image is predicted to be at paradoxical locations. The stereo-afterimage technique offers a fruitful approach to problems of apparent size, depth constancy, and the metrics of visual space.

9:45-10:00 (6)

Masking and Stroboscopic Motion Depend on Background Wavelength. BRUNO G. BREITMEYER, *University of Houston*—Disk-ring metacontrast, Crawford-type masking, and stroboscopic motion were investigated against red, green, and white background fields. For all these measures, white and green back-

grounds yielded the strongest effects, whereas the red background produced significantly attenuated effects.

10:05-10:15 (7)

Crawford Masking by Weak Luminance Impulses and Steps. THOMAS CORWIN, *University of Rochester*—The detectability of brief test flashes was measured as a function of their SOA relative to weak impulses or step masks. Test and mask flashes were spatially congruent, uniform 15-deg fields. A linear model accounts for the following results: (1) maximal masking occurs after mask offset and before mask onset, (2) impulse masks produce bimodal masking functions, and (3) facilitation effects occur for certain SOAs.

Chaired by Ernest A. Lumsden
University of North Carolina, Greensboro

10:30-10:45 (8)

Binocular Summation in Detection of Contrast Flashes. A. I. COGAN, G. SILVERMAN, *Smith-Kettlewell Institute of Visual Sciences*, & R. SEKULER, *Northwestern University*—We studied monocular and binocular detection of foveally presented test flashes as a function of flash contrast. Background contours were always fused, except in a control condition. With fused contours, the average amount of binocular improvement in detection was a factor of 2; it varied from true facilitation observed with weak flashes to less than full summation obtained with strong flashes. For the control condition, average binocular improvement was 41.5%. Background luminance summation during contour fusion, and an interaction between the fused channel and a flash-stimulated monocular channel are considered necessary to account for the results.

10:50-11:05 (9)

Luminance Effects on a Partial-Report Task: The Case for a Retinal Persistence. GERALD M. LONG & ROBERT J. BEATON, *Villanova University*—Target and background luminances are manipulated in a partial-report task of iconic memory. Increasing target luminance results in significantly longer iconic storage. However, this luminance effect is systematically attenuated as background luminance increases over a standard tachistoscopic range. Reasons for discrepancies with other studies are noted, and parallels between these results and known photoreceptor processes are discussed.

11:10-11:20 (10)

Background Size and Duration Influence the Magnitude of the "Edge Effect." PATRICIA A. BAKER & EDWARD M. BRUSSELL, *Concordia University* (read by E. M. Brussell)—We have previously determined that the increment threshold "edge effect" is dependent upon the choice of relative background field and test flash sizes. This talk will examine the effect of manipulating the duration of variable-diameter backgrounds.

11:25-11:40 (11)

The Oblique Effect and Short-Term Memory for Orientation. JAMES THOMS & ETHEL MATIN, *C. W. Post College* (read by E. Matin)—Memory for the orientation of a 3.8-cpd sinusoidal grating was measured at 45 and 90 deg. In all observers, a decay in discriminability occurred over the .35- to 2.8-sec period studied, with a greater rate of loss at 90 deg than at 45 deg. This manifestation of the "oblique effect" will be related to current neurophysiological models of meridional differences in sensitivity to orientation by assuming that the rate of decay of memory is

proportional to the number of orientation-tuned neurons that are firing.

11:45-12:00 (12)

Effects of Spatial Frequency, Duration, and Adapting Luminance on Flash and Pattern Thresholds. HALSEY H. MATTESON, MARCY S. MARX, & ALVARO G. RONDEROS, *Tulane University*—Flash thresholds and pattern thresholds (grating bar resolution) were determined for 1.4- to 11-cpd sinusoidal gratings with durations of 5-500 msec flashed on blank 70-7,000 Td adapting fields. Flash-pattern intervals were large only above 4 cpd, and they were smaller with the high adapting luminance. These results are consistent with sustained-transient theory.

12:05-12:15 (13)

Utopicular Discrimination of Color. GLENN E. MEYER, K. VANDERBURGH, & A. COLEMAN, *Lewis and Clark College*—Sixteen subjects viewed either a .5-deg-diam dot or a 1-cpd sine-wave grating for 100 msec. In a dichoptic mode, one eye viewed a green target and the other a red target. Subjects reported which eye received the red and which the green. Half the subjects discriminated above chance, but there were no differences between grating and dot conditions. The results seem to be related to color's "weak interocular connections."

PERFORMANCE

Pennsylvania East, Thursday morning, 8:00-12:25

Chaired by David Burrows, Skidmore College

8:00-8:10 (14)

Iterative Regression. J. V. BILENAS & W. A. GIBSON, *Queens College of CUNY* (read by W. A. Gibson)—Earlier work by Gibson is further streamlined to provide, with minor preliminary calculations, an $n+1 \times n+1$ matrix (for n predictors) whose first characteristic root is 1 and whose first characteristic vector, when scaled to have a last value of 1, has the beta weights as its first n values. Hotelling iterations, without rescaling, then solve the regression problem—often essentially within n iterations.

8:15-8:30 (15)

Forecasting Performance: A Covariance Decomposition of the Mean Probability Score. J. FRANK YATES, *University of Michigan*—A "covariance decomposition" of the mean probability (Brier) score for probabilistic forecasts is introduced and interpreted. The components of the decomposition are shown to index important aspects of forecasting performance. The relationships between this decomposition and those derived by Sanders and Murphy are explicated. The decomposition is illustrated with data from an empirical study of forecasting behavior.

8:35-8:45 (16)

Correcting Response Measures for Guessing and Partial Information. STEPHEN W. LINK, *McMaster University*—The traditional methods of correcting for guessing are extended to measures of response confidence, time, and frequency, using a method that permits estimation of both the proportion of guesses and the amount of response bias. It is now possible to estimate both parameters from data of a single experimental condition when response times are measured. Thus, false-alarm data are not necessary to correct for biased guessing.

8:50-9:10 (17)

Parallel Systems and Factorial Additivity of Mean Reaction Time. JAMES T. TOWNSEND & SUSAN PIATROWSKY, *Purdue University*—Serially arranged subsystems with stochastically independent processing times, separately affected by distinct experimental factors, produce mean reaction times which are an additive function of the factors. However, the behavior of most nonserial systems in factorial experiments has remained obscure. A class of parallel systems which predict nonadditivity in mean reaction times is presented. The statistical falsifiability of models of such systems relative to alternative serial models is explored.

9:15-9:35 (18)

Stages of Reaction Time in Adults and Children. DAVID L. KOHFELD, *Southern Illinois University, Edwardsville*—Discrim-

ination (t_D), attention switching (t_{sw}), and response (t_r) components were deconvolved from RT distributions obtained from four highly practiced operators, aged 9, 12, 21, and 30 years. Although the children had slightly longer latencies for t_r , the shapes of t_D , t_{sw} , and t_r were similar across operators. Age differences in the RT process are sharply reduced when practice and attention are controlled.

9:40-9:55 (19)

Stimulus and Response Contributions to the Children's Reaction-Time Repetition Effect. BETH KERR, JANET DAVIDSON, JUDY NELSON, & STEVEN HALEY, *University of Washington*—Children and adults completed a serial reaction-time task with two stimuli mapped to each response and 100-, 500-, and 1,000-msec response stimulus intervals. The response contribution to the repetition effect was negative for younger children and near zero for older performers. The stimulus contribution was positive for all ages and decreased in magnitude (500- and 1,000-msec intervals) as age increased.

Chaired by Richard E. Mayer
University of California, Santa Barbara

10:10-10:25 (20)

Processing Conjunctions of Nonintegral Dimensions. FRANK G. HALASZ, *Stanford University*, & IRVING BIEDERMAN, *SUNY at Buffalo* (read by I. Biederman)—RTs for classification of the conjunction of two nonintegral visual dimensions of unequal discriminability were studied. RT distributions for the classification of the individual dimensions had little overlap. RTs to the conjunctions did not increase with reduction in the discriminability on the faster dimension. These results rule out serial processing of dimensions, supporting some form of parallel processing. However, even after thousands of trials, there was a time cost involved in conjoining dimensions, since classification of the conjunctions was slower than would be predicted by unlimited-capacity parallel processing.

10:30-10:45 (21)

The Effect of Priority on Probe RT. MARCY LANSMAN & SIMON FARR, *University of Washington* (sponsored by Earl Hunt)—What is the source of delay in responding to a probe signal that occurs during an ongoing task? To answer this question, we varied the priority of the probe task both within and between blocks. The resulting tradeoff functions suggested that expectancy was the principal source of interference between the two tasks.

10:50-11:05 (22)

Serial Position Curves for Multicharacter Displays: Is Processing Serial, Parallel, or Overlapping? JUDITH RICH HARRIS, *New Providence, New Jersey* (sponsored by Marilyn L. Shaw)—Overlapping models are a plausible alternative to serial and parallel models. An overlapping model (Harris, Shaw, & Bates, *Perception & Psychophysics*, 1979) was used to generate predicted reaction-time serial position curves. Obtained curves, from 10-letter displays, correspond remarkably well to the model's predictions.

11:10-11:20 (23)

A Comparison of Noncorrection and Modified-Correction Practice Methods During Extended Training on a Complex Reaction-Time Task. CLYDE E. NOBLE & Y. YVETTE SU, *University of Georgia*—We trained 96 collegians on the DRT apparatus for 6 days (1,440 total trials), half by the noncorrection (NC) method and half by the modified-correction (MC) method. Speed scores reflected significant main effects of practice, sex, and method, and a practice \times method interaction. Men were faster than women, and MC > NC. Error scores reflected significant main effects of practice and method, and a practice \times method interaction. The sexes were equal in errors, but the "second-guessing" MC mode produced a higher initial error rate than the "one-and-only-one-choice" NC mode.

11:25-11:35 (24)

Patterns of Hand Movements in Braille Reading. PAUL BERTELSON & PHILIPPE MOUSTY, *Université libre de Bruxelles*—Patterns of two-handed reading vary widely across

readers in the extent to which they resort to two different principles of hand collaboration: *conjoint exploration*, where both hands examine the same passage at a short interval, and *disjoint exploration*, where they deal, successively or simultaneously, with the same passage. Both principles allow faster two-handed than one-handed reading, but the locus of the gain is different in the two operating modes.

11:40-11:50 (25)

Work, Noise, Risk, and Effort. DENNIS H. HOLDING, *University of Louisville*, MARY ANNE BAKER, *Indiana University Southeast*, & MICHEL LOEB, *University of Louisville*—Holding has demonstrated that fatigue produces a tendency to choose tasks requiring less effort but with increased risk of failure. We have since reported that noise during work increases this tendency, measuring task choice during and after noise. The present paper compares these effects with those of noise alone, and confirms the aftereffects of noise.

11:55-12:05 (26)

Telling Time from Clockfaces. ALAN A. HARTLEY, *Scripps College*, JOELLEN T. HARTLEY, *California State University, Long Beach*, & JENNIFER L. JACKSON, *Scripps College*—Reaction times to tell the hour or minute from a clockface suggested an analog process that used times on the horizontal and vertical as anchors. Results using a 24-h clock support the possibility that it is a rapid counting process. Users of digital timepieces were slower than others at identifying nonanchor times, but not anchor times.

12:10-12:25 (27)

Comparing Letters with a Listening Typewriter Before One Exists. JOHN D. GOULD, JOHN CONTI, & TODD HOVANYECZ, *IBM Research Center*—Would a listening typewriter, especially an imperfect one, be useful in composing letters? Using a simulator, the authors composed letters, and what they said was displayed on a computer-controlled display in front of them. The effects of vocabulary size (1,000, 5,000, and unlimited) and speech mode (isolated word and continuous speech) were studied. Results suggest that some versions of the listening typewriter may be as good as traditional methods.

PERCEPTION OF RHYTHM AND MUSIC Cafe Careme, Thursday morning, 8:00-10:25

Chaired by Robert L. Welker, Mt. Holyoak College

8:00-8:20 (28)

Temporal Context: What Is It and What Does It Do For You? MARI RIESS JONES & MARILYN BOLTZ, *Ohio State University*—Some implications of using rhythm as an experimental variable are considered and several ways of manipulating temporal context through variations in rhythm are illustrated. These are shown to be useful in the study of dynamic attending. Sample experiments are cited which support the hypothesis that dynamic context has large effects upon pattern recognition judgments with auditory sequences.

8:25-8:45 (29)

A Hierarchical Representation of Perceived Structure in Musical Rhythm. MARILYN L. SHAW, *Rutgers University & Bell Laboratories*, YVONNE MASAKOWSKI, *Rutgers University*, & CAROL JOHNSON, *Princeton University*—A hierarchical model of the perceived structure of rhythmic patterns in music is proposed to account for similarity judgments among a set of musical rhythms. These rhythmic patterns varied along four dimensions: meter (duple vs. triple), simple vs. compound, diversity, and degree of regularity. A hierarchical clustering analysis of subjects' similarity judgments gave an excellent account of the data and provided a test of the model.

8:50-9:05 (30)

Assimilation of Brief Atonal Melodies to Tonal Prototypes: Asymmetrical Effects on Judgment. W. JAY DOWLING & JAMES C. BARTLETT, *University of Texas, Dallas*—Listeners heard melody pairs (ISI = 5 sec) in which the second melody re-

peated the first with one pitch changed. The change made tonal melodies atonal, or vice versa. The tonal-atonal change was more noticeable than the atonal-tonal change. We suggest that initial atonal melodies become assimilated to a tonal scale schema, minimizing perceived differences from tonal comparison melodies.

9:10-9:30 (31)

Tracing the Developing and Changing Key Sense in Music Perception. CAROL L. KRUMHANSL, *Cornell University*—Two experiments investigated the perception of tonality in music, the system of organized relationships between tones, chords, and keys. Scaling of probe tone judgments yielded a toroidal representation of the 24 major and minor keys. Similar probe tone judgments were used to trace in this representation the developing and changing key sense during modulating chord sequences.

9:35-9:50 (32)

Pitch and Rhythm Perception by Birds. STEWART H. HULSE, *Johns Hopkins University*—Starlings, a mimicking species of bird, were tested for their ability to discriminate among serial patterns of sound stimuli varying in melodic pitch and rhythm. Operant procedures were used. I report data from the initial discriminations, together with results obtained when the birds responded to the serial patterns transposed along pitch and tempo dimensions.

9:55-10:10 (33)

Tune Discrimination in Monkeys (*Cebus apella*) and Rats. M. R. D'AMATO & DAVID SALMON, *Rutgers University*—Monkeys, known to have considerable difficulty discriminating simple auditory stimuli, were trained with structured tunes as discriminative stimuli. They acquired the tune discrimination, which generalized across intensity and octave transformations. Rats, however, learned the same discrimination much faster than the monkeys, and they also showed intensity and octave generalization.

10:15-10:25 (34)

Validating Chromesthetic Responses by Measuring the Correspondence Between Independent Judgments of Color Names and Musical Excerpts. DONALD J. POLZELLA & DAVID W. BIERS, *University of Dayton*—A large group of subjects (N = 126) reported the predominant color (red, yellow, green, or blue) of visual images evoked by musical excerpts varying in tonality. In a subsequent experiment, different subjects rated either the color names or the excerpts on 10 semantic differential scales. The correspondence between these two sets of ratings reflected the pattern of results obtained in the previous experiment.

HUMAN CONDITIONING

Cafe Careme, Thursday morning, 10:40-12:20

Chaired by David Birch, *University of Illinois*

10:40-10:55 (35)

Perceiving the Relationship Between Responses and Outcomes. E. A. WASSERMAN & HARRIET SHAKLEE, *University of Iowa*—Human subjects judged the degree of relationship between tapping a particular wire and the occurrence of a brief buzzing sound from a malfunctioning radio. Subjects' judgments varied as a function of the tap-buzz contingency, the overall probability of the buzzing sound, and the conditions of information presentation.

11:00-11:20 (36)

Speech-Action Interactions in Operant Performance. PETER HARZEM, *Auburn University*—Responding was sensitive in different ways to what the subject said about his/her performance, depending on the origin of such statements. Effective factors were: (1) whether the statements were directly related to any experimental consequence, and where so related, whether they were manipulated by (2) contingencies in the experiment, and (3) verbal instructions. The findings indicate new lines of inquiry into the interaction of speech and action.

11:25-11:35 (37)

Verbal Control of Behavior: The Effects of Shouting. ELI SALTZ, SARAH CAMPBELL, *Wayne State University*, & DAVID SKOTKO, *Central Arkansas University*—The present study

examined A. R. Luria's theory concerning development of verbal control over behavior. Consistent with Luria, we found that, for children over 5 years of age, shouting "don't" (e.g., "Don't clap your hands!") decreased the likelihood of the response. For children under 5, shouting actually increased response likelihood.

11:40-11:55 (38)

Dimensional Control of Generalized Effort. ROBERT EISENBERGER, FRED A. MASTERSON, & MAUREEN McDERMITT, *University of Delaware*—One group of learning-disabled children was rewarded for reading quickly, and another group was rewarded for reading accurately. On subsequent picture-copying and story-telling tasks, speed was greater for the group rewarded on the previous task for speed and accuracy was greater for the group previously rewarded for accuracy.

12:00-12:20 (39)

Contingency-Shaped and Rule-Governed Verbal Behavior: Differential Interactions with Nonverbal Responding. ELIOT SHIMOFF, BYRON A. MATTHEWS, & A. CHARLES CATANIA, *University of Maryland Baltimore County* (read by A. C. Catania)—Verbal behavior controlled subsequent nonverbal responding when shaped but not when instructed. Multiple VR VI schedules arranged points worth money for button pressing. Shaping guesses about pressing, also with points, produced guess-consistent pressing even if performances opposed those characteristic of these contingencies; instructed guesses were inconsistently related to pressing.

CONCEPT IDENTIFICATION AND DECISION MAKING

Grand Ballroom East, Thursday morning, 8:00-12:15

Chaired by Ronna F. Dillon, *Southern Illinois University*

8:00-8:20 (40)

A Common Judgment Process in Consciousness for Different Category Representations in Memory. DON E. DULANY & DAVID A. DUPREE, *University of Illinois, Urbana-Champaign*—After examining a complex rule, best example, or two ordinary examples, subjects classified schematic faces and reported confidence in classification, in memorial representation, and in relation of current instance to memorial representation (satisfaction of rule or similarity to exemplar). Values of reports varied with representations and trials, while the same judgment function closely fitted interrelations among reports, for all three representations.

8:25-8:40 (41)

Identifying Faces of Rotated Cubes. DAVID J. GETTY & A. W. F. HUGGINS, *Bolt Beranek and Newman*—Observers viewed three-dimensional virtual images of an outline cube at varying orientations in a true volumetric display (SpaceGraph). In a choice reaction-time task, they identified which of five faces of the cube was marked (the sixth face always contained an orientation cue). Functions relating decision time to amount of rotation of the cube about principal axes suggest that decision strategies involve both mental rotation and propositional coding.

8:45-8:55 (42)

Learning the Structure of Cognitive Psychology. MICHAEL FRIENDLY, *York University*—We attempted to monitor the cognitive structure acquired by students learning cognitive psychology. Students sorted concepts from the course syllabus into subjective clusters at the beginning, middle, and end of the semester. An INDSCAL analysis of the sorting data was used to construct spatial representations of the knowledge structures of the students and of reference groups of faculty and graduate students. The students' sorting structures became increasingly similar to the reference groups', with the students' weights on the INDSCAL dimensions predicting grade in the course.

9:00-9:10 (43)

Sources of Fuzziness Regarding Natural Categories. ROGER L. DOMINOWSKI, *University of Illinois, Chicago Circle*—In each of two separate sessions, college students made yes-no cate-

gory decisions for 223 words. Instructions emphasized using one's personal understanding of a category to make decisions, and respondents dealt with one category at a time. Analyses focus on the degree of within-subject consistency and reasons for uncertainty regarding category membership.

9:15-9:30 (44)

Perceptual Category Learning and Distributional Structure. MICHAEL FLANNAGAN, LISBETH S. FRIED, & KEITH J. HOLYOAK, *University of Michigan* (read by K. J. Holyoak)—Subjects viewed a sequence of abstract visual patterns drawn from a category defined by either a normal or a U-shaped density function over a feature space. The normal distribution was learned more readily, and subjects exposed to the nonnormal category showed an initial bias toward viewing it as normal. The results are interpreted in terms of a category density model of classification learning.

9:35-9:50 (45)

A New Hypothesis About the Need for Hypothesis Testing in Schema Acquisition. RONALD T. KELLOGG & JAMES DOWDY, *University of Missouri, Rolla*—Letter stimuli were presented to college students with instructions to treat them as instances of a schema (intentional condition) or as anagrams (incidental condition). The results showed that both conditions learned the schema by processing feature frequencies. In support of a dual factor theory of schema acquisition, we conclude that hypothesis testing is unnecessary for learning.

9:55-10:10 (46)

What's Basic About the Basic Level? KATHLEEN HEMENWAY, *Bell Laboratories, Piscataway*, & BARBARA TVERSKY, *Stanford University* (read by B. Tversky)—Content analysis of attribute norms collected for taxonomies of objects and organisms revealed that: (1) basic categories are the most general sharing parts, (2) distinctive features of contrasting basic categories are parts, and (3) distinctive features of subordinate categories are other attributes. Parts contribute to the utility of basic categories in perception, communication, and conceptual organization.

Chaired by Donald L. Schurman, ASA

10:25-10:35 (47)

Beyond Linearity in Decision Making: The Impact of Synergisms with Representative Designs. JAMES SHANTEAU, *Kansas State University*, & MICHAEL O'REILLY, *University of Colorado*—The influence of synergisms (multiplicative processes) on non-orthogonal experimental designs was investigated by simulation analyses of: (1) stimulus cue relations, (2) subject response strategies, and (3) experimenter research techniques. The results revealed that linear (additive) models are incapable of describing synergistic data, that traditional analytic techniques are frequently misleading, and that synergisms can have unanticipated consequences for nonorthogonal designs.

10:40-10:55 (48)

Subjective Risk and Cumulative Welfare. LOLA L. LOPEZ, *University of Wisconsin*—The subjective dimension of risk has been difficult to pin down experimentally. Some researchers have analyzed risk in terms of gamble moments such as variance. Others have used surface attributes of gambles such as probability of winning. Neither approach has been completely successful. This paper presents experimental and theoretical arguments that perceived risk is related to a cumulative distribution on gambles that is similar to the Lorenz functions of classical welfare economics.

11:00-11:20 (49)

Credibility of Sources and Base Rates in Judgment. MICHAEL H. BIRNBAUM, *University of Illinois, Urbana-Champaign*, & BARBARA A. MELLERS, *University of California, Berkeley*—This paper challenges the generality of the claim that people disregard base rates when making Bayesian judgments. The effect of base rates is minimal when studied in between-subjects designs using instructions in which the normative analysis is uncertain. Subjects in within-subjects designs appear to average the prior with the source's report.

11:25-11:40 (50)

Anchor Effects on Decisions on Simultaneous Intermediate Stimuli. DONALD L. KING, *Howard University*—Trials with tiny and huge circles decreased the time to decide that unexpected small-small and large-large pairs are identical and increased errors. However, slower times and fewer errors occur for small-large decisions. The similarity of neural representations of stimuli may mediate perceptual decisions, and this similarity may be influenced memorially.

11:45-12:00 (51A)

The Self and Categorization in a Comparative Judgment Task. RUTH H. MAKI & KEVIN D. McCaul, *North Dakota State University*—In a comparative judgment task with names, the center name was the subject's name, Jimmy Carter's name, or Jim. Pairs on either side of the center produced a symbolic distance effect, but pairs that spanned the center name in the self and Jimmy conditions did not, indicating that categorization had occurred.

12:05-12:15 (51B)

An Analysis of "Confirmation Bias." JONATHAN BARON, *University of Pennsylvania*—Some have suggested that we are biased toward tests that would only confirm our favored hypotheses. The evidence for such bias is inadequate. The real issue is: What is the most informative test, and do people make it? I present a normative model that allows us to answer these questions.

GENERAL CONDITIONING PROCESSES AND TOXIPHOBIAS

Constitution/Independence, Thursday morning, 8:00-12:15

Chaired by Nancy A. Marlin, *University of Missouri, Rolla*

8:00-8:15 (52)

Nictitating Membrane Conditioning with Gradual and Abrupt Shifts in ISI. W. RONALD SALAFIA, KIM M. CARDOSI, & ANN BAKER SALAFIA, *Fairfield University*—Rabbits were conditioned at 250-msec ISI, then shifted either abruptly (A) or gradually (G) to 50 msec. Group A extinguished rapidly and completely, while Group G showed a reduction, but not a cessation, of responding. A further shift to 40 msec eliminated CRs in Group G. Discussed in terms of temporal limits for conditioning.

8:20-8:35 (53)

Some Properties of Inhibitory Aftereffects. JEFFREY M. O'CONNELL & MICHAEL E. RASHOTTE, *Florida State University* (read by M. E. Rashotte)—Pigeons were trained with keylight-food and tone-keylight sequences. Pecking to the keylight following the tone decreased across training, suggesting a conditioned inhibitory aftereffect of tone. A subsequent series of tests indicated that the aftereffect was easily disrupted by a variety of changes in the posttone event, but otherwise it decayed gradually during the posttone period.

8:40-8:55 (54)

Analysis of Overshadowing in Honeybees. M. E. BITTERMAN & P. A. COUVILLON, *University of Hawaii*—In conventional tests with components after conditioning with a color-odor compound, color seems entirely overshadowed by odor, although color alone is somewhat more salient than odor alone and potentiates it in conditioning with the compound. These results and those of different tests are explained in terms of compound-uniqueness and within-compound association, with no recourse to competition for associative strength or attention.

9:00-9:10 (55)

Tones Paired with Food Block Keylights But Not Backgrounds. PETER D. BALSAM, *Barnard College* (sponsored by John Gibbon)—Four experiments are described in which pigeons are exposed to tone-food pairings. In the first two experiments, it is shown that tones can block acquisition of keypecking but the tone-food association does not detract from the context-food association. A third experiment shows that signaling feeders with tones does not prevent or retard the context from acquiring asso-

ciative value; and in a fourth experiment, the effects of extensive pretraining with the tone on the acquisition of associative value by the context are evaluated.

9:15-9:30 (56)

Overshadowing and Potentiation of Odor by Taste: The Role of Stimulus Saliency. ROBERT A. ROSELLINI, JOSEPH P. DeCOLA, & ROBIN L. LASLEY, *SUNY, Albany*—A stronger aversion is acquired to an odor element conditioned in compound with a taste than one conditioned in isolation. Experiments are reported which investigate the role of the intensity of the odor stimulus in the modulation of this potentiation phenomenon.

9:35-9:50 (57)

The UCS Preexposure Effect in Food Aversion Learning: Tolerance and Blocking are Drug Specific. ANTHONY L. RILEY, ROBERT J. DACANAY, & DEBRA ZELLNER, *The American University*—While both LiCl and morphine preexposures attenuated the acquisition of conditioned taste aversions, only the LiCl-induced attenuation was dependent upon the similarity of the pre-exposure and conditioning environments, suggesting that the mechanism underlying the UCS preexposure effect is drug specific, e.g., blocking for emetics and tolerance for addictive drugs.

9:55-10:15 (58)

Taste Aversion Following Backward Conditioning Procedures: Effects of Training Flavor and Interpolated Taste Cues. JOSEPH J. FRANCHINA, *Virginia Polytechnic Institute and State University*—Backward conditioning procedures with 30- and 60-m in toxicosis-flavor intervals yielded reliably greater aversion effects for casein than for sucrose training flavors. Aversion magnitude depended upon flavor cues interpolated between toxicosis and the training flavor; interpolated casein increased sucrose aversion, but not vice versa; interpolated distilled water increased casein aversion.

Chaired by Edward Zamble, *Queen's University*

10:30-10:45 (59)

The Effect of Postconditioning CS-Only Experience on Recovery From Taste Aversion. ALAN C. SPECTOR, JAMES C. SMITH, & GLEE R. HOLLANDER, *Florida State University* (read by J. C. Smith)—On the day after saccharin was paired with either a 100R or sham radiation exposure, rats received a 0-, 3-, 6-, 12-, 24-, or 48-h saccharin presentation followed by a series of 24-h two-bottle preference tests. Generally, faster recovery from the aversion was observed in animals receiving longer postconditioning CS-only presentations.

10:50-11:10 (60)

LiCl and Free Dietary Selection by Rodents. ROBERT J. ROBBINS, *Michigan State University*—To determine the effect of LiCl-treated foods upon free dietary selection, rodents were offered safe water, safe saccharin plus NaCl (S+N), and toxic saccharin plus LiCl (S+L) ad lib. The presence of S+L had no effect upon S+N consumption by animals with prior exposure to S+N and only a transitory effect upon naive animals. Subsequent tests indicated that the distinction was not being made on the basis of position or visual cues.

11:15-11:25 (61)

Avoid as a Learned Antisickness Response that can Reduce Lethality. SAM REVUSKY, *Memorial University of Newfoundland*—Experimental rats were subjected to pentobarbital sedation 30 min prior to lithium sickness on five occasions. Controls received the same injections in the opposite sequence. In a test phase, when pentobarbital was injected prior to a dose of lithium in the lethal range, more experimental rats than control rats survived for 7 h.

11:30-11:45 (62)

Contextual Factors Operate Differentially in Flavor Aversion and Neophobia. CHARLES N. STEWART, *Franklin & Marshall College*, RUSSELL F. REIDINGER, JR., & LYNETTE A. GEYER, *Monell Chemical Senses Center*—Taste aversions could be induced in rats and mice via ingestions of tastants from their fur, and, furthermore, grooming of a tastant in rats was attenuated if a flavor aversion had been induced. (Pine voles showed neither of

these effects). Yet, grooming experience with a tastant did not reduce neophobia effects in rats or mice.

11:50-12:00 (63)

Loss of Color Aversions by Chickens when the Medium Is Changed at the Time of Test. GERARD M. MARTIN, *Memorial University of Newfoundland* (sponsored by Rita Anderson)—Chickens' color aversions, but not their taste aversions, are specific to the conditioning medium. Their difficulty in transferring color aversions cannot be attributed to artifacts such as (1) failure to recognize the colors in the new medium or (2) the fragile nature of the color → sickness association. The data are consistent with Garcia's position that taste aversions differ from the aversions obtained by other stimuli that are paired with sickness.

12:05-12:15 (64)

Conspecific Individual Recognition by Starlings (*Sturnus vulgaris*) Following Methiocarb-Induced Sickness. J. RUSSELL MASON & RUSSELL F. REIDINGER, *Monell Chemical Senses Center* (sponsored by David A. Stevens)—In laboratory trials, male starlings selectively avoided conspecifics present during sickness [$F(1,14) = 4.8$, $p < .05$]. Thus, (1) individual recognition among birds can be conditioned, and (2) social variables may be influential. Furthermore, the results did not depend on auditory cues, generally regarded as important for individual recognition and social organization in birds, since few vocalizations were noted.

READING AND STORY COMPREHENSION Grand Ballroom West, Thursday morning, 8:00-12:05

Chaired by Alice Healy, *University of Colorado*

8:00-8:20 (65)

Aspects of Teaching Method, Materials, and Child Characteristics that Make a Difference in Round Robin Reading. RICHARD C. ANDERSON, LARRY L. SHIREY, & JANA M. MASON, *University of Illinois*—Every school morning 10,000,000 children gather in groups with their teachers to take turns reading aloud from the day's story. Though this practice, called "round robin reading," is the predominant mode for reading instruction in the United States, it has never been subjected to systematic, experimental analysis. A study involving most of the third graders in Urbana, Illinois, produced several strong findings that have social policy implications, and might pique the interest of experimental psychologists.

8:25-8:45 (66)

Text-Based Inferential Processing in Readers of Varying Ability. JOHN R. FREDERIKSEN, *Bolt Beranek and Newman*, & PHYLLIS A. WEAVER, *Harvard University*—By manipulating discourse characteristics thought to control the ease of reference and inference, we studied inference-making as an ongoing process in reading. Results supported a model in which propositions co-residing in immediate memory are automatically integrated, while those in LTM are retrieved only when conjunctions marking a causal or logical relation are present in the text.

8:50-9:10 (67)

Evidence for Individual Reading Styles: A Challenge for General Models of Reading. E. Z. ROTHKOPF & D. G. FISHER, *Bell Laboratories, Murray Hill*—Eye movements were analyzed for six reading activities ranging from searches to more interpretative tasks. Approximately 70,000 events were recorded for each subject in two sessions separated by 1 week. We found (1) reader characteristics that were stable between sessions and across tasks and (2) distinctive task × reader interaction patterns that were interpreted as individual processing styles for various task demands.

9:15-9:35 (68)

Catastrophe Model of Information Processing. BRUCE K. BRITTON & ABRAHAM TESSER, *University of Georgia*—Information processing overloads were induced in 66 skilled undergraduate readers. Breakdowns (abrupt and discontinuous changes in learning performance) were observed, along with hysteresis. A model based on catastrophe theory fit the data,

consistent with the hypothesis that skilled reading is an equilibrium system that is seeking a maximum potential.

9:40-9:55 (69)

Causal Cohesion in Story Comprehension. TOM TRABASSO, *University of Chicago*—A model of discourse comprehension that leads to a cohesive text representation via causal prediction, expectation, and backward inference is described, quantified as a bidirectional graph of the events in a story, and tested on recall, importance judgments, and comprehension of four stories by 5th grade children. The average distance of focal events in the network representation correlates with recall within and between stories, and with importance judgments. The links predict answers to why questions.

10:00-10:20 (70)

How Do Schemas Pass Information to Passage Structures? ARTHUR C. GRAESSER, *California State University, Fullerton*—During comprehension, the comprehender identifies generic schemas. These schemas guide the construction of inferences and expectations. This study explored symbolic mechanisms which are invoked when narrative structures are constructed during comprehension. A question-answering methodology was used to expose implicit knowledge and to examine the on-line construction of narrative structures.

Chaired by James R. Miller, *Texas Instruments*

10:35-10:50 (71)

The Concept of a Story: A Test of the Grammars. NANCY L. STEIN & KARL KILGORE, *University of Chicago*—Descriptive adequacy of recent story grammars was assessed, as were the developmental changes in conceptual organizations of knowledge about stories. Both adults and children accepted sequences as described in current grammars as belonging to the story category. Contrary to criticisms raised about the necessity for a more detailed description of stories, the data indicated that in many instances fewer features were necessary to include a passage in the story category. Using the best-example theory of category organization, there was a consistent ranking of passages according to the number of features contained in the passage.

10:55-11:10 (72)

Contextual Framework: Its Effects Upon Listening Comprehension. GLENN LEIGHBODY, *Rensselaer Polytechnic Institute*, WENDY SCHWEIGERT, *St. Lawrence University*, & YAO-CHUNG TSAO, *Rensselaer Polytechnic Institute* (read by Y.-C. Tsao)—The effects of an auditory contextual frame, reading ability and word rate, on prose comprehension were investigated. Subjects' listening comprehension was assessed using both recall and recognition tasks. Subjects' performance on both comprehension tasks suggests that context and reading ability facilitate listening comprehension, although high-reading-ability individuals can better utilize a contextual frame.

11:15-11:30 (73)

Cognitive Processes During Text Understanding. GARY M. OLSON, SUSAN A. DUFFY, *University of Michigan*, ROBERT MACK, *IBM Watson Research Center*, PATRICIA VINCENT, & MARY EATON, *University of Michigan*—We have used a number of empirical methods to reveal the processes used by readers who are processing simple texts. We have focused on the problem-solving nature of text comprehension. Results from these investigations allow us to characterize the higher level cognitive processes used in understanding texts.

11:35-11:50 (74)

Causal and Adversative Connectives Facilitate Text Comprehension. KARL HABERLANDT, *Carnegie-Mellon University*, & MARSHALL KENNARD, *Combustion Engineering, Inc.*—Readers were presented with brief passages containing target sentences with connectives such as *so*, *therefore*, *consequently*, *however*, *instead*, and *but*, or target sentences without connectives. Sentences with connectives were read faster than those without, indicating that connectives guide reader expectations across adjacent sentences as claimed by instructors of writing.

11:55-12:05 (75)

Comprehension of Multi-Episode Stories: Memory for Embedded vs. Sequential Episodes. SUSAN R. GOLDMAN & CONNIE K. VARNHAGEN, *University of California, Santa Barbara* (sponsored by James W. Pellegrino)—Multi-episode stories that portrayed embedded or sequential goals were presented to college students, 5th graders, and 3rd graders in either a listening or reading comprehension task. Comprehension was assessed through recall and why probe questions. Results are discussed in terms of developmental and individual differences in problem-solving strategies for processing and recalling text.

TACTILE PERCEPTION AND SENSITIVITY Cafe Careme, Thursday afternoon, 1:00-3:55

Chaired by Gary Rollman, *University of Western Ontario*

1:00-1:15 (76)

The Absolute Judgment of Vibrotactile Rate. CARL E. SHERRICK, *Princeton University*—Subjects first made direct estimations of vibrotactile rate, generating a power function from which 10 values were selected for production of a scale of absolute judgment of rate. In addition, intensity was varied redundantly with rate to increase transmitted information. Results are discussed in relation to both theory and application to aids for the handicapped.

1:20-1:35 (77)

Temporal Integration of Vibrotactile Patterns. JAMES C. CRAIG, *Indiana University*—Subjects identified tactile patterns (letters of the alphabet) presented to their fingertips using a 6×24 array of vibrating pins. With several different tasks, it could be shown that separating parts of the patterns temporally by as little as 4-8 msec produced significant changes in performance (temporal resolution), but that patterns still showed temporal integration when parts of the patterns were separated by gaps of 25-50 msec.

1:40-1:50 (78)

Sources of Variation on Lingual Vibrotactile Thresholds: The Influence of Experimenter Training on Threshold Acquisition. DONALD FUCCI, LINDA PETROSINO, JIM CANTRELL, *Ohio University*, & NEAL SLOWNE, *Syracuse University*—Three different experimenters obtained lingual vibrotactile thresholds from the tongues of three different groups of normal-speaking adults. Results revealed that different thresholds were obtained for each group, depending on the testing experience of the experimenter. The experimenter with the least testing experience obtained the poorest thresholds. Further calculated practice by the least experienced experimenter led to threshold values similar to those of the other experimenters employed in this study.

1:55-2:10 (79)

Saltatory Areas of the Skin: What Determines Their Limits? FRANK A. GELDARD, *Princeton University*—Several competing conceptions are relevant, some calling for peripheral mechanisms (dermatomes, cutaneous nerve distributions, receptive field size), some requiring central determinants (convergence and dispersion in ascending tracts, extent of cortical field). The currently available data from explorations of the body surface are brought to bear on these hypotheses.

2:15-2:30 (80)

Tactile Identification of Speech-Derived Patterns Presented to the Finger. BARRY G. GREEN, AMY M. WILSON, & JAMES C. CRAIG, *Indiana University*—Digitized CVs were displayed on the vibrotactile matrix of an Optacon in two ways: (1) a spectral waveform covering 136-3,200 Hz in 24 channels, with seven steps of intensity, and (2) a vocal tract area function derived from seven parameters. The spectral display proved superior (90.5%-81.0% correct identifications). Confusions among stimuli reflected auditory vowel confusions, although relative ease of identification of the eight stimuli differed among displays (Spearman $r = -.31$).

Manipulations involving "filled" vs. "empty" spectral waveforms, number of spectral channels, and tactile pattern size revealed a surprising robustness of tactile identifications.

2:35-2:55 (81)

Spatiotemporal Interactions in the Perception of Tactile Distance. ROGER W. CHOLEWIAK, *Princeton University*—The apparent distance between two transient taps presented to the skin by vibrotactile arrays was judged by the method of magnitude estimation. The pairs of taps varied in their physical extent, temporal separation, body locus, and orientation. Estimates of distance increased with physical spans greater than the two-point limen for each body site and with increasing temporal separation. The data are discussed in the context of several tactile spatio-temporal illusions.

3:00-3:15 (82)

Vibrotactile Masking from a Remote Site. RONALD T. VERRILLO, *Syracuse University*, GEORGE A. GESCHEIDER, *Hamilton College*, & BRUCE CALMAN, *Syracuse University*—Masking of vibrotactile signals on the fingertip by stimuli on the thenar was produced within the Pacinian system but not within the non-Pacinian system. Apparent cross-channel masking was shown to be caused by the spread of vibrations and a masker intensity sufficiently high to excite both systems.

3:20-3:35 (83)

Predictions of Vibrotactile Masking Functions. GEORGE A. GESCHEIDER, *Hamilton College*, RONALD T. VERRILLO, & CLAYTON L. VAN DOREN, *Syracuse University*—Vibrotactile thresholds were measured in the presence of a masker at a single site on the thenar eminence. The masker, either random noise or a sinusoid, was presented simultaneously with test stimuli of different frequencies. Threshold shifts as a function of masker intensity were predicted from a duplex model of absolute thresholds.

3:40-3:55 (84)

The Role of Vibration in the Tactual Perception of Roughness. SUSAN LEDERMAN, *Queen's University*, JACK LOOMIS, & DEBORAH WILLIAMS, *University of California, Santa Barbara*—Katz (1925) argued that the sense of vibration underlies the tactual perception of roughness. However, Taylor and Lederman (1975) argue that vibration serves only to prevent the cessation of mechanoreceptor activity. To evaluate these positions experimentally, it was shown that the perceived magnitude of supraliminal vibrotactile signals was strongly affected by prior vibrotactile adaptation of the fingertip; however, the perceived roughness of metal gratings remained relatively unaffected. The results favor the Taylor and Lederman interpretation.

LATERALIZATION OF FUNCTION Cafe Careme, Thursday afternoon, 4:10-5:50

Chaired by Ethel Matin, *C. W. Post College*

4:10-4:25 (85)

Concurrent Activity and Dichotic Listening. JOSEPH B. HELLIGE & TONY M. WONG, *University of Southern California*—Identification of dichotically presented consonant-vowel syllables was examined in the presence of different concurrent memory loads. Overall, a large right-ear advantage was obtained. Concurrent word memory reduced overall performance, but did not reliably change the ear advantage. Concurrent memory for nonsense shapes neither reduced overall performance nor changed the ear advantage. Results are compared with those of corresponding studies of visual laterality and lateralized motor activity.

4:30-4:40 (86)

Hemifield Interaction in Vision. LEON K. MILLER, *University of Illinois, Chicago Circle*—Flashed words and letters were shown under conditions designed to assess the extent to which stimuli presented to one hemifield are affected by stimuli projected to the other. Hemifield interactions were found to be more common for words than for letters, in adults than in children, and in certain types of left-handers.

4:45-4:55 (87)

Floor Plan and Apartment Preference as a Function of Cerebral Lateralization. RICHARD S. LEHMAN & GILBERT P. ROSE, *Franklin & Marshall College*—Dextral and sinistral subjects, screened for cerebral lateralization, were shown pairs of mirror-image slides of four apartment floor plans and a pair of actual apartments. They were asked to rate each apartment on a series of scales and express a preference in each pair. In contrast to previous data, results showed no consistent pattern as a function of lateralization.

5:00-5:15 (88)

Effects of Cerebral Dominance on Left-Right Response Latencies. LESLIE A. WHITAKER & CAROL SANDERS, *University of Missouri, St. Louis*—Directional stimuli were presented in left or right visual half-field. Response latencies were measured for a group of left- and a group of right-handed subjects. Auditory diagnosed cerebral dominance (REA) did not predict half-field advantage; however, this dominance measure did predict the pattern of response latencies.

5:20-5:35 (89)

A Potent Laterality Effect for Forward vs. Backward Digital Movements in the Disjunctive RT Paradigm. WALTER F. McKEEVER, *Bowling Green State University*—A potent and essentially invariant effect is described for a dot detection (dot vs. blank) task. Responses are faster to homolateral-visual-field/response-hand conditions for dot trials when detection is signaled by forward (extension) movements; responses are faster to heterolateral conditions for backward (flexion) movements.

5:40-5:50 (90)

Effects of Motivation, Word Characteristics, and Hemispheric L laterality on Tachistoscopic Recognition. EVA DREIKURS FERGUSON, *Southern Illinois University, Edwardsville*—Emotional connotation of words shows a tradeoff with subjects' motivational state when words are processed initially by one hemisphere rather than two. Tachistoscopic lateral visual field (VF) viewing revealed VF and word category interacted significantly, but hunger vs. satiation had no significant effect. In Experiment 2 under foveal viewing, however, drive had a facilitating effect.

ADVERSIVELY BASED LEARNING

Constitution/Independence, Thursday afternoon, 1:00-3:55

Chaired by Susan Mineka, *University of Wisconsin*

1:00-1:20 (91)

Predictability and Learned Helplessness. PHILIP J. BERSH, *Temple University*, LAUREN B. ALLOY, *Northwestern University*, WAYNE G. WHITEHOUSE, *Temple University*, & MICHAEL T. LAURENCE, *U.S. Army Research Institute for the Behavioral and Social Sciences*—Rats preexposed to uncontrollable shocks whose aversiveness was predictable showed major interference with shuttlebox escape acquisition. Rats preexposed to uncontrollable shocks whose aversiveness was unpredictable showed no interference relative to naive rats or rats which, during pretraining, could control the aversiveness, but not the occurrence, of shocks. In Experiment 2, rats preexposed to predictable, inescapable shock showed significantly more interference with shuttlebox escape acquisition than those preexposed to unpredictable, inescapable shock. Rats preexposed to escapable shock, whether predictable or not, showed no interference relative to naive rats.

1:25-1:40 (92)

Attack and Defensive Behaviors in Dominant Rats Following Inescapable Shock. JON L. WILLIAMS, *Kenyon College*—Dominant male (alpha) rats in each of 30 established colonies were given escape training, yoked shock, or no shock. Subsequent short- and long-term resident-intruder tests indicated a striking decrease in attack and an increase in defensive responses for the alpha rats, whereas their nonalpha colony partners showed the opposite changes.

1:45-2:05 (93)

Can Rats Count to Three? HANK DAVIS, *University of Guelph*—Using a modified conditioned suppression procedure, rats were exposed to exactly three unsignaled shocks per session. Once shock No. 3 had become a safety signal, response rate increases following the third shock far exceeded baseline rate, which itself tended to increase within the session. Additional controls underscored the role of counting, *per se*, as opposed to control by temporal factors. As demonstrated in our previous *auto-contingency* research, the addition of a signal prior to each shock virtually eliminated evidence of counting.

2:10-2:25 (94)

Retrieval Failure as a Source of Overshadowing, Blocking, and Latent Inhibition. RALPH R. MILLER, WESLEY J. KASPROW, MARY ANN BALAZ, HAYDEE CACHEIRO, *SUNY, Binghamton*—Using conditioned associations to footshock to obtain lick suppression in rats, overshadowing, blocking, and latent inhibition were obtained. When stimuli from the training situation were presented during the retention interval, all three types of performance deficits were decreased despite the presentations' being designed to prevent new associative learning. Appropriate control groups established that the restored suppression was associative in nature. Apparently all three deficits are due at least in part to a retrieval failure rather than an acquisition failure as is commonly assumed.

2:30-2:45 (95)

Malleability of Reactivated Memory in Rats. DAVID C. RICCIO, RICK RICHARDSON, & JEFFREY CABOSKY, *Kent State University*—Three experiments used a "counterconditioning" manipulation to investigate the malleability of old memory in rats. The tendency to avoid previously established conditioned fear stimuli was reduced when subjects received a highly preferred substance (maltose solution) following brief exposure to the fear cues. This attenuation of fear was time-dependent, diminishing as the delay between cuing and maltose presentation increased, suggesting that memory has to be in an active state to be modified.

2:50-3:05 (96)

Presentation of a Flashing Light Following Training Enhances Retention. RITA Y. EMMERSON & TERRY L. DeVIETTI, *Central Washington University* (read by T. L. DeVitt)—Rats given exposure to a flashing light following one-trial fear conditioning showed superior retention relative to controls not given the flashing light experience. Further, a gradient of enhancement was demonstrated. In view of additional data indicating that the flashing light is not aversive, these findings suggest that the presentation of an exteroceptive stimulus may enhance retention.

3:10-3:20 (97)

Blocking, Surprise, and Post-US Suppression in the Conditioned Suppression Procedure. JOHN J. B. AYRES & MICHAEL VIGORITO, *University of Massachusetts, Amherst*—Can the omission of an expected shock be aversive? In a study of blocking in the conditioned suppression procedure, shock USs were omitted on a random half of the savings test trials. Post-CS suppression was greater when an expected US was omitted than when it was presented.

3:25-3:40 (98)

Can Conditioned Suppression be Measured? HARRY M. B. HURWITZ & HANK DAVIS, *University of Guelph*—This paper examines the validity of the conventional A/(A + B) ratio as a measure of conditioned suppression which assumes that the ratio denominator will be uninfluenced by experimental variables, i.e., that the baseline rate of response is unaffected except during the CS-US period. Our experimental evidence shows otherwise: Changes in the baseline rate of response are substantial and turn out to be far more sensitive to critical variables than suppression ratio values. We propose that the session response baseline may itself be meaningfully evaluated against each subject's "prime rate," i.e., preshock rate of response.

3:45-3:55 (99)

Extinction of the Contextual Element of a Compound Stimulus. NANCY A. MARLIN, *University of Missouri, Rolla* (sponsored

by Ronald T. Kellogg)—Rats were given tone-footshock pairings. Following training, half of the subjects were given exposure to the training context; no tones or shocks were presented. As measured by a lick suppression test administered in a different context, the group that received the contextual exposure was less fearful of the tone. Nonreinforced presentation of the contextual element of the compound stimulus decreased responding to the nominal CS.

REINFORCEMENT

Constitution/Independence, Thursday afternoon, 4:10-5:50

Chaired by A. Charles Catania
University of Maryland, Baltimore County

4:10-4:30 (100)

Conditioned (Secondary) Reinforcement and Delayed Reward Learning. CHARLES C. PERKINS, *Kansas State University*—Selected experiments on delay of reward in discrimination learning and of conditioned (secondary) reinforcement are reviewed. It is concluded that (1) conditioned reinforcement may be quite context specific and that the context consists of aftereffect cues from antecedent events as well as of prevailing environmental stimuli, and (2) if analyzed in terms of cue patterns, all delayed reward learning is based on immediate differential reinforcement.

4:35-4:50 (101)

Reducing Self-Defeating Responses. SALLY E. SPERLING, LYNN ANTHONY, JUDITH CHETNEY, & JEANINE GELLER, *University of California, Riverside*—A new feedback procedure reduces or eliminates pigeons' keypecking during the DRO component of an omission schedule and so increases the number of reinforcements received during training. Birds trained without the feedback continue to peck on about half the trials, even though pecking cancels scheduled reinforcement.

4:55-5:10 (102)

Priming Effects on Instrumental Acquisition and Performance. WILLIAM S. TERRY, *University of North Carolina, Charlotte*—In within-subject designs, pretrial food or water facilitated or inhibited rats' runway performance, depending on whether the prime was the same as or different from the goal reinforcer, and on the prime-to-trial interval. In a between-groups experiment, prefeeding just prior to the trials retarded acquisition of food-rewarded running.

5:15-5:30 (103)

Effects of Motivation and 78-Day Vacation on Negative Contrast. LAWRENCE DACHOWSKI, CATHLEEN PIAZZA, & WILLIAM P. DUNLAP, *Tulane University*—A negative contrast effect (NCE) was exhibited by 1-year-old ad-lib rats shifted from 32% to 4% sucrose, relative to a control group getting 4% on all days. The NCE was durable for 10 days, and reappeared after a 78-day retention interval. Reducing all rats to 80% of ad-lib weights eliminated the NCE. Similar effects were found for rats alternating between 4% and 32%.

5:35-5:50 (104)

Variables Affecting Choice Sequences in Radial Mazes. ROBERT D. HALL, *Worcester Foundation for Experimental Biology*—In two experiments, nonrandom choice sequences in 8- and 12-arm radial mazes were determined in part by the spacing—and presumably the discriminability—of the arms. In a third experiment using a maze with evenly spaced arms, similar nonrandom choice sequences were associated with particular patterns of extramaze stimuli.

SPEECH PRODUCTION AND PERCEPTION

Grand Ballroom East, Thursday afternoon, 1:00-3:15

Chaired by Joseph B. Hellige, *University of Southern California*

1:00-1:20 (105)

Good-Bye to the Phoneme, and Good Riddance. RONALD A. COLE, *Carnegie-Mellon University*, & ALEX I. RUDNICKY, *Uni-*

versity of Toronto—Most models of speech perception assume that speech is transformed into a sequence of phonemes during the recognition process. Some models hold that listeners transform speech into a phonemic code before recognizing words, while others hold that phonemes are generated as a result of recognizing words. We argue that (1) phonemes are not involved in speech perception and (2) experiments that purport to show such involvement are subject to alternative explanations. We describe an alternative model in which there is no intervening stage between acoustic analysis and lexical access.

1:25-1:40 (106)

Phonetic Perception of Sinusoidal Signals: Effects of Temporal Variation. ROBERT E. REMEZ, *Barnard College*, & PHILIP E. RUBIN, *Haskins Laboratories*—Why does the assortment of acoustic elements in the speech signal cohere perceptually? Cue theory suggests that the perceiver establishes the coherence by ascribing a phonetic value to a succession of individually registered acoustic elements. The present experiments warrant an alternative explanation. Our listeners were sensitive within a range of temporal variants to second-order time-varying properties of phonetic signals that lacked acoustic elements characteristic of speech. Ordinary phonetic perception may therefore result from attention to both short-time and time-varying properties of speech signals.

1:45-2:00 (107)

Effects of Discrimination Training on the Perception of /r-l/ by Japanese Adults. WINIFRED STRANGE & SIBYLLA DITTMANN, *University of Minnesota*—Eight Japanese women whose pretests showed noncategorical perception of a synthetic /r-l/ speech series were given intensive training in a same-different discrimination task with feedback. After 17 training sessions, all but one subject showed categorical perception of the training series on posttests. Three of seven subjects showed transfer of training to a different /r-l/ synthetic series.

2:05-2:20 (108)

Recall of Passages of Synthetic Speech. JAMES J. JENKINS & LYNNE D. FRANKLIN, *University of Minnesota*—Passages of grade-school-level text in synthetic speech were presented to college student listeners for recall. Synthetic speech varied in the manner of assignment of stress and pitch and in the rule system used for its generation. For these simple texts, synthetic speech was recalled virtually as well as natural speech.

2:25-2:40 (109)

Auditory and Phonetic Processes in Speech. JAMES R. SAWUSCH & HOWARD C. NUSBAUM, *SUNY, Buffalo*—Using a selective adaptation technique, the roles of auditory and phonetic processes in speech perception were explored. Adapting syllables with an acoustic structure that matched one end of a test series and a phonetic identity matching the other end were used to probe the level(s) of processing involved in speech.

2:45-3:00 (110)

Phonetic and Auditory Trading Relations Between Acoustic Cues in Speech Perception. BRUNO H. REPP, *Haskins Laboratories*—When two different acoustic cues contribute to the perception of a phonetic distinction, a trading relation between them can be demonstrated if the speech stimuli are phonetically ambiguous. Do such trading relations hold also for unambiguous stimuli? Using a fixed-standard AX discrimination task with stimuli either at, or far from, a phonetic category boundary, I found that certain trading relations (presumably of auditory origin) hold in both conditions while others appear to be tied to the perception of phonetic contrasts.

3:05-3:15 (111)

Perceiving Minimal Distinctions in ASL under Normal and Point-Light Display Conditions. VIVIEN C. TARTTER, *Rutgers University, Camden*, & Bell Labs, Murray Hill, & SUSAN D. FISCHER, *National Technical Institute for the Deaf* (sponsored by Thomas K. Landauer)—The efficacy of using 27 moving lights to display ASL was assessed by highly fluent signers' forced-choice identifications of minimally distinctive signs in sentence contexts, under normal and moving-light conditions. The two conditions showed similar error patterns and high accuracy. Results indicate

greater perceptual salience of certain formation parameters and feature values.

LANGUAGE DEVELOPMENT

Grand Ballroom East, Thursday afternoon, 3:30-6:10

Chaired by Susan R. Goldman
University of California, Santa Barbara

3:30-3:50 (112)

Factors of Language Impairment in Children. LYN HABER, *University of Illinois, Chicago Circle*—A repetition task (KAT) was used to identify 56 children as language impaired ($N=26$) or nonimpaired. A second test to explore factors underlying impairment involved ability to (1) recognize and name single items, (2) reproduce sequences of unrelated items, (3) structure nonverbal information, and (4) comprehend sentences. Canonical correlations among these factors and impairment was .84. A KYST analysis showed two components to impairment: memory, or cognitive, factors and linguistic and sequencing factors. Implications are discussed.

3:55-4:15 (113)

Deep Dyslexia in Childhood. LINDA S. SIEGEL, *McMaster University*—The paper is a report of three cases of deep dyslexia, previously noted only in brain-damaged adults. In a manner similar to that of adults with acquired dyslexia, these children made semantic substitutions in single-word readings (e.g., *chicken* was read as *duck*) and showed other characteristics of adult deep dyslexia. Therefore, severe impairment of phonological processing has similar consequences for reading in children and adults, but phonemic coding is not necessary for word recognition.

4:20-4:35 (114)

Semantic Fields and the Acquisition of Metaphor. FRANK C. KEIL, *Cornell University*—Diachronically, terms appear to be metaphorically extended as groups according to their memberships in common semantic fields. An analogous pattern was observed in the development of children's abilities to comprehend metaphors. The development of the fields themselves is also examined, as are the extensions of some fields at earlier ages than others.

4:40-5:00 (115)

Semantic Factors in Acquisition of Deductive Inferences in Children. RACHEL JOFFE FALMAGNE, VIRGINIA SHERWOOD-FORBES, & CATHERINE CLEMENT, *Clark University*—This study compared 2nd graders' ability to abstract the structure of a conditional inference (Modus Tollens) from alternative instantiations of it, including, respectively, "if-then" connectives vs. "when-then" connectives. Abstraction occurred with "if-then," but, surprisingly, not with "when-then." It is speculated that, in contrast to "if-then," the semantic representation of "when-then" is content bound and therefore unfit to sustain the acquisition of the general concept required.

5:05-5:15 (116)

Effects of Enaction, Imagery, and Sentence Training on Pre-readers' Recall of Pictograph Sentences. GEORGE W. LEDGER, *University of Rhode Island*, & ELLEN BOUCHARD RYAN, *University of Notre Dame* (read by E. B. Ryan)—Kindergartners were trained to semantically integrate pictograph sequences via imagery, enaction, and sentence repetition strategies. Enaction outperformed imagery immediately after training but not 2 weeks later. Imagery was slightly better generalized than the other strategies. Results indicate that kindergartners can effectively utilize an imagery strategy without the active manipulation of objects.

5:20-5:30 (117)

Semantic Context Effects in Beginning and Fluent Readers. CURTIS A. BECKER, *Bell Laboratories, Holmdel*—Recently, I described two forms of semantic context effects. Using related, neutral, and unrelated primes for words in a lexical decision task, I found that related-prime facilitation sometimes accounted for nearly all of the effects of context. Under other conditions, unrelated prime interference dominated the effects of context. A

more recent experiment finds identical effects for 3rd and 5th grade subjects. The implications of these results for "automaticity" theories of beginning reading are considered.

5:35-5:50 (118)

Does Brightness Mean Loudness or Pitch to Children? LAWRENCE E. MARKS & ROBIN HAMMEAL, *John B. Pierce Foundation Laboratory*—When children (ages 5-10) judge literal and metaphorical phrases describing sensory experience, brightness (visual) is more closely associated with pitch than with loudness. The children's sound-light matches yield the same outcome. Children behave much like adults on these tasks, evidencing the associations commonly found in synesthesia.

5:55-6:10 (119)

The Word Order Myth. RICHARD M. WEIST, *SUNY, Fredonia*—Two- and 3-year-old Polish children were required to act out sentences with toys. The sentences were either inflected or uninflected. Inflected sentences were ordered SVO or OVS. Context sentences established given information which was in initial or final position. Inflectional processing strategies dominated comprehension. Order information was relevant.

INDIVIDUAL DIFFERENCES AND SOCIAL-PERSONALITY PROCESSES

Pennsylvania East, Thursday afternoon, 1:00-5:55

Chaired by Helen Pettinati, *Carrier Foundation*

1:00-1:15 (120)

Individual Differences in Spatial Memory: Thinking Backwards. DONALD O. WEITZMAN, *Army Research Institute*—Marked individual differences were found in backward recall of spatial locations along a route and in a haptically presented spatial display. These differences are attributed to subjects emphasizing either a quasi-visual scanning strategy or a sequential verbal/haptic strategy. The results show that (1) strategies covary with cognitive mapping abilities, (2) visual strategies have limited capacity, and (3) subjects can modify their sequential strategies.

1:20-1:35 (121)

Locus of Control and Memory. HENRY C. ELLIS & JAMES B. FRANKLIN, *University of New Mexico*—This research concerns the effects of superficial information and locus-of-control predisposition on semantic processing of word lists. Subjects with an external orientation showed poorer recall and less semantic clustering than those with an internal orientation.

1:40-1:55 (122)

Age Effects on Sentence Verification Strategies. EARL HUNT, *University of Washington*, & JANET DAVIDSON, *Yale University*—Previous studies have shown that people may adopt either a verbally oriented or a visual-image-oriented strategy in verifying statements about pictures. College students can shift back and forth between strategies. University alumni (ages 25-60) were tested. The ability to adopt a visual-image strategy decreased with age.

2:00-2:15 (123)

Stylistic Variations in Responding to Tests of Creativity. ALBERT N. KATZ, *University of Western Ontario*—A sequential classification strategy isolated five replicable stylistic variations in the performance of 100 college students across a battery of standard creativity tests. Performance data, as well as subsequent personality data, indicated that these test-style types were analogous to work-style types found previously with eminent creators.

2:20-2:35 (124)

Speed, Accuracy, and Strategy Differences in Spatial Processing. JAMES W. PELLEGRINO, VALERIE CANTONI, & ALETHA SOLTER, *University of California, Santa Barbara*—Adults differing in spatial ability were tested on laboratory versions of a form-board (piece assembly) task. The individual items varied in complexity and specific processing demands and were administered under a same-different decision format. A verification format with advanced information about trial type was also used. Patterns of

speed, accuracy, and strategy differences will be discussed relative to high and low spatial aptitude.

2:40-2:50 (125)

Some Differences Among Students Volunteering as Research Subjects: II. R. J. SENTER, D. O. RICHTER, & ALEX PIATKA, *University of Cincinnati*—A repetition of an earlier study demonstrating that experimental subjects may show significant performance differences in the absence of differential treatment variables failed to show replication of these earlier findings. This is interpreted as lending further evidence to the notion that "statistical equivalence" of samples of experimental subjects taken from student populations may be influenced by undefined, and perhaps whimsical, variables.

2:55-3:10 (126)

Motivation and Menstrual Cycles. MICHELLE DUGAN & R. CHRIS MARTIN, *University of Missouri, Kansas City* (read by R. C. Martin)—Most investigations of emotional fluctuations during menstrual cycles have not included the possibility of positive emotional changes. Seventy-one females were grouped by their scores on the Martin Motivation Profile, and each subject reported both positive and negative emotional states for 35 consecutive days. Results showed that positive motivational changes also occur and that personality variables are important predictors of direction and amount of fluctuation.

Chaired by Ruth Maki, North Dakota State University

3:25-3:45 (127)

Correlates and Noncorrelates of Eminence Among Psychologists. DONALD K. ROUTH, *University of Iowa*—A Guttman Scale of Eminence was devised as a criterion measure in a study of 770 PhD psychology graduates. Multiple regression analysis identified nine correlates of eminence, but neither the sex of the individual nor the area of psychology in which the PhD was received was among these.

3:50-4:05 (128)

Chinese vs. White Judgments of Attractiveness. IRA H. BERNSTEIN, HELEN ABADZI, PAMELA McCLELLAN, & TSAI-DING LIN, *University of Texas, Arlington*—A group of Chinese and a group of Americans judged a series of white Americans' yearbook pictures. The interjudge reliabilities of both groups were essentially equal despite their use of different criteria. Thus, the Chinese subjects formulated equally coherent rules; this would not be the case if whites "all looked alike."

4:10-4:25 (129)

Differential Face Recognition: A Less Than Convincing Explanation. PATRICIA G. DEVINE, *Ohio State University*, & ROY S. MALPASS, *SUNY, Plattsburgh* (read by R. S. Malpass)—Subjects made recognition judgments for own and other-race faces following no special instructions, deep processing instructions, or shallow processing instructions. If differential processing strategies to own vs. other race faces explains the differential face recognition effect, this effect should be reduced when processing strategies are experimentally constrained. No support was found for this hypothesis. Differential recognition was of similar magnitude under all conditions.

4:30-4:45 (130)

The Effects of Self-Perception and Perceptual Contrast upon Compliance with Socially Undesirable Requests. MITRI E. SHANAB & PAMELA J. O'NEILL, *California State University, Fresno*—The relative effects of self-perception and perceptual contrast upon rate of compliance with socially undesirable requests were studied in a $2 \times 2 \times 2$ factorial design in which the initial request induced either consent or refusal, while magnitude of the initial request was either moderate or extreme and the perceived authority of the requester was either high or low. Significant compliance with a second moderate request was either small or very large, but not when it was either very small or merely large. Authority apparently had no significant effects.

4:50-5:05 (131)

Some Physical Features Which Reduce the Effects of Crowding. PAUL PAULUS, GARVIN McCAIN, & VERNE COX, *University of Texas, Arlington*—Research over the past 11 years has indicated that privacy screens or bays in living units reduce a number of the effects of crowding. Smaller institutions also diminish the long-term effects of crowding. A variety of measures, including illness complaints, perceived crowding, room evaluation, suicides, and psychiatric commitments were used.

5:10-5:20 (132)

The Connotative Structure of Boredom. LYNN PERCIVAL & RICHARD SMITH, *University of Louisville* (read by R. Smith)—A sample of 217 college students were given the Jenkins Activity Survey, the Eysenck Personality Inventory, and a questionnaire designed to measure nine possible connotative meanings of the boredom concept. The responses of the entire group as well as of neurotics, extroverts, introverts, Type A coronary prone, Type B, and normal were analyzed and compared.

5:25-5:40 (133)

Dreams and Reality Monitoring. MARCIA K. JOHNSON, TRACEY L. KAHAN, *SUNY, Stony Brook*, & CAROL L. RAYE, *Bell Laboratories*—Pairs of people reported "dreams" to each other and later attempted to identify the origin (self or other) of the reports. Three conditions were compared: real dreams, dreams subjects read, and dreams subjects made up. The findings will be discussed in relation to Johnson and Raye's (1981) reality monitoring model.

5:45-5:55 (134)

Qualitative Analysis of the Memories Reported During Posthypnotic Amnesia. HELEN M. PETTINATI & FREDERICK J. EVANS, *Carrier Foundation* (read by F. J. Evans)—Although posthypnotic amnesia has been described quantitatively, qualitative aspects of memory reporting can clarify cognitive processes involved. This study ($N = 204$) found that raters used description of distortion in judging whether or not a subject was amnesic. However, no relationship appeared between remembering distortion material and eventual recovery of memories.

INTERSENSORY PROCESSES

Pennsylvania West, Thursday afternoon, 1:00-5:45

Chaired by Paul Bertelson, Free University, Brussels

1:00-1:15 (135)

Width Perception: The Contributions of Vision and the Haptic Sense. ROBERT B. WELCH, *University of Kansas*, DAVID H. WARREN, *University of California, Riverside*, & JULIA A. AHRENS, *University of Kansas*—The implications of the Welch-Warren (1980) view of intersensory bias for normal (i.e., non-discrepant) perception were examined. Study 1 demonstrated that rated confidence in one's estimates may be used to assess the unique contributions of the visual and haptic senses to the perception of width. Using this "tag," Study 2 confirmed the hypothesis that when visual and haptic sources of information about width are available simultaneously, vision "dominates" the percept.

1:20-1:35 (136)

Visual and Tactile-Kinesthetic Training of Spatial Orientation and the Oblique Effect. STUART APPELLE, *SUNY, Brockport*, PHILIP DAVIDSON, *University of Rochester School of Medicine*, & ROBERT O. CALHOUN, *SUNY, Brockport*—The ability to set bars to vertical, horizontal, and oblique positions in space was determined both visually and tactile-kinesthetically. Subjects made judgments before and after either visual or tactile-kinesthetic training designed to improve performance on the generally poorer oblique positions. Bidirectional transfer of training was found.

1:40-1:55 (137)

Haptic and Visual Capture of Rhombic Forms. THADDEUS M. COWAN & BARBARA KOSTELNIK, *Kansas State University*—

At the previous two meetings, we reported that (1) rhombohedra exhibit a strong right-angle constancy which renders them cubic in appearance, and (2) strong haptic capture but weak visual capture was found when subjects looked at one form and felt another (possibly similar) form. At these meetings, we wish to report on the results of the third experiment, in which judgments were made of a form that was held and viewed simultaneously.

2:00-2:15 (138)

Parameters of Human Learning with the Trinaural Sensory Aid. DAVID H. WARREN & EDWARD R. STRELOW, *University of California, Riverside*—The Trinaural Sensory Aid is an experimental form of the Sonicguide, a sonar-based mobility device for the blind. The research explores factors that affect humans' facility at learning to use the aid, such as number of stimulus values on a dimension, active vs. passive movement, and knowledge of results.

2:20-2:35 (139)

Braille Learning: One Modality is Sometimes Better Than Two. SLATER E. NEWMAN, WILSON E. SAWYER, ANTHONY D. HALL, & LAUREL G. J. HILL, *North Carolina State University*—Subjects learned the names for braille symbols presented for examination visually (V), haptically (H), visually or haptically (VOH), or visually and haptically (VAH), and were then tested for haptic recall. The order of the means was V > VOH = VAH > H. Implications for the modality adeptness and encoding specificity hypotheses will be discussed.

2:40-3:00 (140)

Blind Depict Pain, Wind, Smell, and Noise by Devices Including Metaphor. JOHN M. KENNEDY & RAMONA J. DOMANDER, *University of Toronto*—Blind people were asked to depict states involving pain, wind, smell, and noise. Devices used by the blind were classified as using (1) the object itself and its implications, (2) context, and (3) metaphor. Drawing tasks elicited all three types of devices, and both early blind and later blind used all three types of devices. The results fit a nativist theory of depiction and also call for a mentalist theory of depiction in which the concept of intention is crucial.

Chaired by Daniel Weintraub, Ames Research Center

3:15-3:35 (141)

Testing Theories of Space Perception by Simulating Space. RALPH NORMAN HABER, *University of Illinois, Chicago Circle*—Flight simulators use computer-generated displays of the ground programmed to change in correspondence with the changing position of the plane under the control of the pilot. Binocular displays which account for the pilot's eye and head movements and motion platforms to produce the appropriate gravitational changes are available too. Such interactive systems provide opportunities to describe simultaneously both the sources of visual information available and the processing strategies used to perceive the layout of space. Demonstrations of the power of this realistic laboratory will be provided to disprove some hallowed theories before your very eyes.

3:40-3:55 (142)

Eye Movements and Mental Imagery. SARA CHEYNEY, LAURENCE MILLER, & ROD REES, *Western Washington University* (read by L. Miller)—Bandler and Grinder (1979) proposed that eye-movement direction indicates sensory modality of imagery. To test this model, subjects were asked questions which evoked imagery in six sensory modalities. The subjects reported images in the modes intended by the questions, but no relationship between imagery and direction of eye movement was found.

4:00-4:10 (143)

Vestibular and Neck Receptor Compensation for Visual Orientation Disturbance. DONALD E. PARKER, RICK L. POSTON, & WILLIAM L. GULLEDGE, *Miami University*—Observers oriented a luminous line to their longitudinal body axis while seated upright or lying horizontally. Disturbance was produced

by tilting the head and/or by moving stripes in the peripheral visual field. Response difference was noted when the upright observers used both vestibular and neck receptor compensation vs. when the horizontal observers used only neck signals.

4:15-4:35 (144)

Ecological Approach Reveals Major Implications of Minor Motor Anomalies. WAYNE L. SHEBILSKE & CLIFFORD KARMIOHL, *University of Virginia*—Several experiments (1) provide additional evidence that everyday conditions induce minor motor anomalies which cause visual illusions during naturalistic responses in fully structured environments and (2) suggest that people adaptively compensate for these anomalies by means of central visual learning.

4:40-4:55 (145)

Illusory Changes in a Sound Source. BENJAMIN WALLACE, *Cleveland State University*, & KATHARINE BLICK HOYENGA, *Western Illinois University*—The possibility of illusory movement of a sound source, analogous to autokinetic movement (AKM) of a stationary light source, was considered. Various factors and methodologies which can produce or retard this illusion will be described. In addition, our error signal and noise analysis of AKM will be discussed.

5:00-5:10 (146)

Sound Localization in the Presence of the Talker's Image. PETER D. BRICKER & BELA JULESZ, *Bell Laboratories*—Three experiments investigated the effect of an accompanying image of the talker on stereophonic speech sound localization. A small, consistent displacement toward the lips was found for synchronized images, whether upright, inverted, or tilted 90 deg. Aspects of the data bear on the response- vs. perceptual-process issue.

5:15-5:25 (147)

Perceptual Dominance During Lip Reading. RANDOLPH D. EASTON & MARYLU BASALA, *Boston College*—An investigation was performed to assess the effects of discordant auditory speech information ("dubs") on lip-reading accuracy. Substantial auditory dominance that was dependent on the relation between competing visual and auditory phonetic compositions was demonstrated. Results are discussed in terms of current models of perceptual bias effects as well as the technology of film editing.

5:30-5:45 (148)

Memory for Visual and Auditory Information on Television. KATHY PEZDEK, *Claremont Graduate School*—Two experiments probed the relationship between children's cognitive processing of video and audio information on television. The first experiment suggests that when children "watch television" they utilize a fairly sophisticated cognitive processing strategy that allows them to effectively distribute their attention between watching and listening to television and participating in other activities. The second experiment concludes that video information is better retained than audio information on television because the video channel is more compelling than the audio channel, rather than because the video channel interferes with processing the audio channel.

(No 149)

HUMAN LEARNING AND MEMORY I Grand Ballroom West, Thursday afternoon, 1:00-5:55

Chaired by Anthony Greenwald, Ohio State University

1:00-1:20 (150)

When is Learning? PAUL A. KOLERS, *University of Toronto*—A customary assumption is that cognitive skills are acquired in the practice of a task. Studies of reading reveal, to the contrary, that performance does not improve during a practice session; improvement is measured only from session to session. The improvement in performance seems to be based on a "silent" reorganization of task components occurring between sessions.

1:25-1:35 (151)

Mind and Behavior in Diagram: The Episode. ALBERT E. GOSS, *Rutgers University, New Brunswick*—Diagrams of mental activity or behavior, particularly those of episodes of learning and memory, are presented, explained, classified, compared, and criticized.

1:40-2:00 (152)

An "Effectiveness-Ratio" Measure of Tests as Learning Events. ROBERT A. BJORK, CHARLES HOFACKER, *UCLA*, & MICHAEL J. BURNS, *Bell Laboratories*—Although apparently a straightforward matter, measuring the extent to which an initial retrieval of an item from memory facilitates the later retrieval of that item is a formidable problem. The measure presented herein is relatively free of the unattractive properties that afflict certain more obvious measures.

2:05-2:20 (153)

Predictive Validity of Feeling-of-Knowing Judgments for the Recognition of Nonrecalled General-Information Facts. THOMAS O. NELSON, ROBERT F. LANDWEHR, R. JACOB LEONESIO, JOY L. RALEY, ADAM M. WEISMAN, *University of Washington*, & LOUIS NARENS, *University of California, Irvine*—Following a recall test on general-information facts from the Nelson-Narens norms (1980), each subject ranked the incorrectly answered questions in terms of his/her likelihood of recognizing the correct answer (i.e., feeling of knowing) and then received a 4-AFC recognition test for the answer to each question. A major finding was that an individual's recognition performance on the nonrecalled items was predicted more accurately by actuarial recall probabilities from the norms than by the individual's own feeling-of-knowing predictions.

2:25-2:40 (154)

Frequency Estimates After Incongruent Frequency Judgments. MARCIA OZIER & ADELE BLENNERHASSETT, *Dalhousie University*—Subjects preclassified as high or low subjective organizers made estimates of frequencies of repetition of items in a long series of English words in which each item had been judged for category membership. The relation between estimates of frequency and lag between repetitions depended upon whether the repeated item had been congruent or incongruent with respect to the category in question. This has implications for the structure of the episodic memory trace after verification of category membership.

2:45-3:00 (155)

Frequency as a Nonassociative Attribute of Memory. D. L. HINTZMAN, G. NOZAWA, & M. IRMSCHER, *University of Oregon*—If frequency information is retrieved from a privileged memory format, as multiple-trace theories assume, then memory for frequency should be immune to associative interference from other, similar information. Two experiments designed to maximize potential interference between frequency-judgment and digit-recall tasks showed mutual intrusions only when frequency information had been "propositionalized" first. The results suggest that while frequency can be represented propositionally, it is normally encoded in analogue form.

3:05-3:20 (156)

Frequency Judgments under Conditions Precluding the Use of Familiarity Information. ARTHUR J. FLEXSER, *Florida International University*—Subjects were read lists of three-word phrases and were asked for frequency judgments of two-word phrase fragments that had appeared in various phrases. For a critical set of items, frequencies of individual words comprising the fragments were fixed, so that familiarity (strength) information pertaining to single words could not aid judgments of two-word co-occurrence frequency. Accuracy and reaction-time results are discussed in relation to theories of frequency representation and retrieval dynamics.

Chaired by Jack Kanak, *University of Oklahoma*

3:35-3:50 (157)

The Effects of Probe Modality and a Stimulus Suffix on Probed Recall. CATHERINE G. PENNEY, *Memorial University of Newfoundland*—The effects of the modality of the probe item and the presence or absence of a stimulus suffix were examined in a probed recall task. The stimulus suffix reduced recall of the last few list items, and the auditory probe produced a similar effect. In addition, an analysis of intrusion errors was also carried out. The results are discussed in connection with Crowder and Morton's precategorical acoustic storage model of sensory memory.

3:55-4:05 (158)

The Effects of Different Suffixes on Forward and Backward Recall of Rhymed and Nonrhymed Stimuli Presented Auditorily. SUSAN KARP MANNING, *Hunter College of CUNY*—An experiment using auditory stimuli compared the effects of three types of suffixes on forward or backward sequential recall of letters of the alphabet which rhymed (e.g., B, C, T) or did not rhyme. The results indicated different effects for recall order and rhyming vs. nonrhyming lists, but not for type of suffix. Explanations are proposed.

4:10-4:25 (159)

Distinguishing Between Two Effects Produced by the Voice Quality of a Recall Signal (Suffix). SETH N. GREENBERG, *Union College*, & RANDALL W. ENGLE, *University of South Carolina* (read by R. W. Engle)—Half of the subjects discriminated between two suffixes presented in same or different voice; differences due to voice occurred at terminal positions only. Nondiscriminating subjects showed a voice effect at terminal and preterminal positions. Masking and attention demands of the suffix word were assumed to affect terminal and preterminal recall performance, respectively.

4:30-4:40 (160)

A Test of Recognition Memory Free of Distractor Items. RONALD LEY, *SUNY, Albany*—Do distractor items in tests of recognition memory keep the subject honest? Tests of recognition of both high- and low-frequency words showed that recognition scores were the same whether the test contained distractors or not. Although these results imply that the subject is honest to begin with, false-recognition scores suggest that distractors may lure the subject into dishonesty.

4:45-4:55 (161)

Memory Span for Words in a Sentence. K. ANDERS ERICSSON & JOHN KARAT, *University of Colorado*—This research attempts to explore how memory span in sentences can be several times larger than memory span for unrelated words. Errors and verbal reports are analyzed to uncover the representation and cognitive processes underlying recall. Reliable individual differences were related to linguistic competence and memory span for unrelated words.

5:00-5:20 (162)

A Direct Test of Recognition Failure of Recallable Words in Episodic and Semantic Memory. JAMES H. NEELY & DAVID G. PAYNE, *Purdue University*—Recognition failure of recallable words was compared for episodic and semantic memory. Subjects studied related and unrelated word pairs and related (historical) and unrelated (fictitious) first and last names. For related, but not for unrelated, words and names in an episodic recognition task, data fell on the Tulving-Wiseman (1975) function. In a historical vs. fictitious name discrimination task (semantic memory), data fell on the Tulving-Wiseman function whether the historical name had been studied or not (cf. Muter, 1978). Discussion focuses on the episodic-semantic memory distinction.

5:25-5:40 (163)

Inhibitory Effects of Related Primes in Retrieval from Semantic Memory: A Reappraisal. HENRY L. ROEDIGER III, *University of Toronto*, JAMES H. NEELY, *Purdue University*, & TERESA

A. BLAXTON, Purdue University—A. S. Brown (1979) found that a semantically related prime slowed retrieval from semantic memory under conditions in which the memory target itself sometimes served as a prime. We replicate this inhibition effect, but obtain facilitation rather than inhibition with related primes when the memory target itself never served as a prime. We conclude that the inhibition effect is not strong evidence for automatic spreading inhibition.

5:45-5:55 (164)

Self-Cued Prime Inhibition in Semantic Memory Retrieval. ALAN S. BROWN & ALICE D. BEAN, *Southern Methodist University*—Prior, nonrestricted (free-associated) retrievals from conceptual memory interfered with subsequent object naming. A latency increase was linearly related to the number of prior retrievals from that category (0, 1, and 3) (Experiment 1) and did not occur with an unrelated category (Experiment 2). Self-cued retrievals are apparently inhibitory in a manner similar to experimenter-cued retrievals.

SYMPOSIUM
FEDERAL SUPPORT OF RESEARCH:
CURRENT STATUS REPORTS AND ANALYSIS
Pennsylvania West, Thursday evening, 8:00-10:00

Chaired by Fred Stollnitz, National Science Foundation

Participants: GENEVIEVE HADDAD, *Air Force Office of Scientific Research*; ROBERT M. SASMOR, *Army Research Institute for Behavioral and Social Sciences*; MARSHALL J. FARR, *Office of Naval Research*; SUSAN E. F. CHIPMAN, *National Institute of Education*; JOSEPH L. YOUNG, *National Science Foundation*; MIRIAM F. KELTY, *National Institutes of Health*; NILES BERNICK, *National Institute of Mental Health*; and STANLEY F. SCHNEIDER, *National Institute of Mental Health (Research Training)*.

HUMAN LEARNING & MEMORY II
Grand Ballroom West, Friday morning, 8:00-12:20

Chaired by Marcia Ozier, Dalhousie University

8:00-8:15 (165)

A Centrality Effect in Recall. ANTHONY G. GREENWALD, MAHZARIN R. BANAJI, ANTHONY R. PRATKANIS, & STEVEN J. BRECKLER, *Ohio State University*—Subjects generated names of friends and then constructed sentences linking these names, and ones produced by other subjects, with concrete objects. Subsequent, unexpected recall was much better for objects linked to self-generated names. A possible explanation is based on self-generated names' being more centrally located in the subject's memory structure.

8:20-8:35 (166)

Direct Evidence for the Premise of the Retention Interval Model. CHIZUKO IZAWA, *Tulane University*—This model explains performance differences between anticipation and study-test methods in paired-associate and verbal-discrimination learning utilizing filled retention intervals of different lengths. Innovative experiments with retention intervals of the same mean length led to equivalent performance with both methods. The new evidence on comparing methods further underlines the fundamental role of retention interval effects for the model.

8:40-8:55 (167)

Retrieving Temporal Information from Memory. DAVID BURROWS, *Skidmore College*, & RONALD OKADA, *Atkinson College, York University*—Subjects in a two-choice RT task were required to discriminate recently presented memory items from memory items presented earlier. RTs were several hundred milliseconds slower than in control conditions not requiring temporal discrimination. Adding structural information cues to the memory

items reduced RTs. Temporal discriminations may be based on information other than the passage of time.

9:00-9:20 (168)

Recognition and the Retrieval of Sensory Information. DOUGLAS L. NELSON & CATHY McEVOY, *University of South Florida*—Does recognition performance vary with the size of the search set implicitly encoded during study? This question provided the impetus for an experiment in which rhyme set size of the target was varied. The results appear to be clear and to have implications for models of cued recall and for Mandler's theory of recognition.

9:25-9:45 (169)

Retrieval Time: Its Independence of Memory Set Size and Search Rate. DELOS D. WICKENS, *Ohio State University*, MARK J. MOODY, *Quaker Oats*, & MICHAEL VIDULICH, *University of Illinois*—Wickens, Moody, and Dow used the Sternberg paradigm in primary memory (PM) and secondary memory (SM) for two- and four-word sets. Subtraction of PM from SM values gave retrieval times (Donders). Slopes were parallel, indicating that retrieval was by set as a whole, not word by word. Experiment 1 extends the finding with two- and four-item and critical one-item sets. Experiment 2 compares retrieval times across conditions producing slope differences. Data support a chunking and independence view of retrieval.

9:50-10:05 (170)

Relational and Item-Specific Information in Memory for Large and Small Categories. R. REED HUNT, *University of North Carolina, Greensboro*—Memory for instances from various sized categories varied as a function of whether attention was focused on category information. Large categories were better remembered when attention was directed to individual item information, and small categories were better remembered when attention was directed to category information. Both relational and item-specific information seem to be important in event memory.

10:10-10:25 (171)

Some Proactive Inhibition Effects in Recognition Memory of Word Lists. MILTON H. HODGE, *University of Georgia*—In tests of Schulman's (1974) PI hypothesis about the declining course of recognition memory, it was found that performance became worse with increasing list length (60, 100, and 140) and with successive blocks of words. A second experiment suggested that output PI is not an important determinant of the decline.

*Chaired by Alan Baddeley
MRC Applied Psychology Unit, Cambridge*

10:40-10:55 (172)

The Retrieval of Items "Lost" During PI. ROBERT WEISBERG, *Temple University*, & WALTER CHROMIAK, *Dickinson College*—Subjects were given four Brown-Peterson trials with items from one general class (e.g., "foods"), with the class name as a cue. PI was found, but on a final recall test, a more specific cue (e.g., "vegetables") retrieved items which had not been recalled initially. Initial recall failure, and PI, were attributed to "overload" of the class cue.

11:00-11:20 (173)

What is PI Release the Release of? DAVIS S. GORFEIN & JEANNE M. VIVIANI, *Adelphi University*—Researchers of human performance in the distractor paradigm have identified two major variables as sources of PI release. Both shifts of taxonomic category and prolonged intertrial intervals produce dramatic improvements in performance. Traditional theorists have tended to attribute these effects to different processes. The present research presents evidence that implicates a single factor, the "set principle," as the source of both effects.

11:25-11:40 (174)

Role of Environmental Context Cues in Transfer and Memory Phenomena. N. JACK KANAK, SARA J. NIXON, ROBERT GREENLEAF, & MONTE STRATTON, *University of Oklahoma*—Theory and data are presented to account for some significant inadequacies of previous theoretical explanations regarding degree

of transfer and resultant retroactive inhibition effects in classical negative transfer paradigms. The theory and experiments stress the role of associations formed between list items and the environmental contextual cues operating during acquisition and tests of retention and have implications for many classical and contemporary memory phenomena and theories.

11:45-12:00 (175)

Lipreading and Auditory Memory. JOHN M. GARDINER, SUSAN E. GATHERCOLE, *The City University, London*, & VERNON H. GREGG, *Birkbeck College, University of London*—Having to lipread a sequence of distractor items interferes with auditory recency in free recall—either when the distractors occur directly after list presentation or after an unfilled retention interval—and eliminates the modality effect. Prevailing echoic memory interpretations of the modality effect cannot readily account for these findings.

12:05-12:20 (176)

Chronopsychology of Imagery Tasks and Memory. RICHARD A. BLOCK, JOHN L. SAGGAU, & JANET D. MARTIN, *Montana State University*—Two experiments investigated a contextual-change hypothesis on remembered duration. Contrary to the prediction, an imagery task that involves sampling environmental context information is remembered as being shorter than one that does not. Recognition, list membership, and position judgments clarify this finding.

MOTOR SKILLS AND PERFORMANCE Cafe Careme, Friday morning, 8:00-12:30

Chaired by John D. Gould, IBM Research Center

8:00-8:20 (177)

On the Oscillatory Basis of Movement. J. A. S. KELSO, *Haskins Laboratories & University of Connecticut*—There is reason to believe that nonlinear oscillatory processes provide a basis for the control and coordination of movement. Experiments on inter-limb coordination and between speech and manual gesture in combination reveal the following features consistent with a limit cycle design: (1) structural stability in the face of unpredictable perturbations, (2) mutual and subharmonic entrainment, and (3) qualitatively new modes of behavior in the form of phase transitions.

8:25-8:35 (178)

Evidence for Endogenous Oscillators in the Human Motor System. BRIAN CRASKE, *Memorial University of Newfoundland*—After voluntary straining of a limb against an immobile surface, the subsequent involuntary muscular aftercontraction causes initially high-amplitude decaying oscillations of the limb, which may last 20 min (not the simple up-and-then-down effect normally reported). Using a simple procedure, the oscillatory AE can be transferred to untreated limbs at any time.

8:40-8:55 (179)

Exploring the Functional Significance of Physiological Tremor. DAVID GOODMAN, *Haskins Laboratories and Simon Fraser University* (sponsored by J. A. S. Kelso)—Physiological tremor is a high-frequency (≥ 10 Hz), low-amplitude oscillation present when one maintains the steady posture of a limb. In a series of experiments, we show a strong tendency for rapid voluntary movements to be initiated in phase with the tremor cycle. Instead of being viewed as a nuisance variable or as unwanted noise, tremor may be exploited in movement initiation.

9:00-9:15 (180)

Evidence Against Central Control of Timing in Typing. DONALD R. GENTNER, *University of California, San Diego* (sponsored by Donald A. Norman)—Terzuolo and Viviani, in a widely cited model, propose that timing in typing is determined by a centrally stored pattern for each word. Evidence cited includes: (1) word-specific differences in digraph latencies, (2) times that expand proportionally when words are typed more slowly, (3) variances

that do not increase for successive letters in a word. The studies show that (1) surrounding context is sufficient to explain differences in digraph latencies, (2) times do not expand proportionally, and (3) apparent constancy of variance was artifactual.

9:20-9:35 (181)

The Relationship of Impulse to Response Timing Error. K. M. NEWELL, *University of Illinois*, L. G. CARLTON, *University of Houston*, & M. J. CARLTON, *Rice University*—Variable timing error of discrete responses decreased as both movement velocity and mass of the system to be moved increased. The variability of force proportional to force decreased curvilinearly as force output increased. In spite of these relationships, it is premature to argue that impulse variability is a causal agent of timing error.

9:40-9:55 (182)

Quantifying the Cognitive Trajectories of Extrapolated Movements. RICHARD J. JAGACINSKI, WALTER W. JOHNSON, & RICHARD A. MILLER, *Ohio State University*—Subjects' extrapolations of a constant acceleration trajectory were mapped out over a sequence of experimental trials that required only a buttonpress response. Withdrawal of performance feedback and the presence of irrelevant slower or faster movements shifted the entire extrapolated trajectory. These shifts can be described as parametric perturbations of a cognitive representation of the movement pattern.

10:00-10:15 (183)

Parallel Continuous Ocular and Manual Tracking. J. A. MATHER, *University of Western Ontario* (sponsored by William Roberts)—Ocular and manual tracking of a sinusoidal visual target are strikingly similar when measured by average error and lag. Hand affected eye movement in subsystem adjustment, not overall error. Gain differed for the two systems; the movements are not copies of one another, but parallel responses from a suprasystem strategy.

Chaired by Beth Kerr, University of Washington

10:30-10:40 (184)

Visual Feedback Processing in Aiming Movements is not Determined by Average Velocity. HOWARD N. ZELAZNIK, *Purdue University*, & BRIAN HAWKINS, *University of Southern California* (sponsored by Karl M. Newell)—This experiment examined the effects of concurrent visual feedback for single aiming movements as a function of movement time and movement amplitude. Visual feedback processing was affected only by movement time, not by movement amplitude or the average velocity of the movement.

10:45-10:55 (185)

Automatization of Perceptual Motor Skills. LARRY E. WOOD, *Brigham Young University* (sponsored by Donovan E. Fleming)—A memory task was combined with a laboratory version of TV paddle-ball to investigate automatization of a fine, bimanual perceptual-motor skill. Compared with a memory-only condition, performance of the concurrent memory task provided evidence for automatization of the motor task. Contrary to expectation, however, performance of the concurrent memory task was not differentially affected by the difficulty of the motor task.

11:00-11:10 (186)

Development in Drawing: Perceptual or Motoric? MARGARET A. HAGEN & NANCY KENNEDY, *Boston University*—The development of drawing in children and adults was examined in people with little or no artistic training. Subjects drew single common objects and a scene. Pictures were categorized by the type of geometry most descriptive of the image: orthogonal, affine, or projective. Changes in motor control were more evident than were changes in geometrical mode of drawing.

11:15-11:30 (187)

Oculomotor Development Is Not Complete by 5 Years of Age. EILEEN KOWLER, *Rutgers University*, & ALBERT J. MARTINS, *University of Maryland* (read by A. J. Martins; sponsored by Robert M. Steinman)—We report the first precise measurements

(noise level = .5 min) of eye movements of preschool children. During maintained fixation, (1) saccades were 10 times larger than the microsaccades adults make during fixation, and (2) smooth eye movement speeds were twice as high as adult speeds. Saccadic latencies were highly variable during tracking of periodic target steps. These characteristics will limit a child's ability to use eye movements to acquire visual information.

11:35-11:50 (188)

Arm Movements in Skilled Violin Playing. PAUL ZUKOFSKY, *Center for Contemporary Performance Practice, Musical Observations, Inc.* (sponsored by Saul Sternberg)—Ultrasonic transducers attached to a violin and bow were used to measure bow position vs. time. Whereas changes of "tempo" are associated with differently shaped functions, $v(t)$, relating velocity to time, changes of "dynamics" are approximated by invariant shapes, $kv(t)$, related by multiplicative constants, k .

11:55-12:10 (189)

A General Theory of Serial Order in Behavior. DONALD G. MacKAY, *UCLA*—This paper develops a new theory to explain how we generate sequences of behavior in proper serial order when we do and improper serial order when we make errors. Under the theory, a hierarchy of nodes represents the components of a preplanned action but independently stored serial order rules determine sequence in the final output.

12:15-12:30 (190)

Evidence for Anticipatory Editing in Speech Production. BERNARD J. BAARS, *SUNY, Stony Brook*, & MICHAEL T. MOTLEY, *Ohio State University*—How do speakers weed out errors before they are spoken? Errors that are successfully avoided cannot be observed, but we can induce matched rule-violating and rule-governed slips and observe different slip rates. Two classes of models explain the results, and evidence is cited for each.

DISCOURSE PROCESSING

Grand Ballroom East, Friday morning, 8:00-12:20

Chaired by Elizabeth L. Bjork, *UCLA*

8:00-8:15 (191)

Prior Knowledge in Comprehending Simple Technical Prose. DAVID KIERAS & WALTER JOHNSON, *University of Arizona*—That familiar information should be easy to understand and remember is a simple, but poorly documented, intuition. The role of prior knowledge as a predictor of reading time and level of recall was studied by both varying the content familiarity of passage information and taking into account individual subjects' knowledge.

8:20-8:35 (192)

Skimming and Rapid Sequential Reading of Text: Searching for and Remembering Information. MICHAEL E. J. MASSON, *University of Victoria* (sponsored by Richard B. May)—Skimming strategies are shown to be more effective than reading under conditions of rapid sequential visual presentation (RSVP). This difference holds when searching a text for predesignated information and when answering questions about or summarizing a text. These results help define qualitative differences between the two reading methods and highlight certain general limitations of speeded reading processes.

8:40-8:55 (193)

The Use of Thematic Relatedness in Visual and Memory Scanning. WILLIAM P. JONES & JOHN R. ANDERSON, *Carnegie-Mellon University* (read by J. R. Anderson)—Set-size effects in a Sternberg task are attenuated when memory items are thematically related (e.g., "plane, altitude, mountains") and foils are unrelated (e.g., "disease"). Thematic relations among targets and foils also strongly affect performance in a visual scanning task. Such thematic scanning may be involved in cognitive processes such as sentence verification and text processing.

9:00-9:15 (194)

Effects of Semantic and Syntactic Focus on Text Production and Comprehension. JAMES R. MILLER, *University of Colorado* (sponsored by Walter Kintsch)—Recent functionalist discussions of language have described linguistic structures that, through their ability to specify a text's focus, might provide useful constraints on comprehension processes. This paper presents a set of experiments that examine these constraints, and describes a comprehension model that uses them to help derive a text's macrostructure.

9:20-9:30 (195)

Levels of Processing and Pragmatic Inferences. CRAIG R. BARCLAY, *University of Michigan*, MICHAEL P. TOGLIA, & DOLORES S. CHEVALIER, *SUNY, Cortland* (sponsored by David F. Berger)—Sentence memory and pragmatic inferences were examined in a cued recall paradigm. Level of processing and type of modifier (positive, negative, neutral) were varied. Semantic processing produced both greater recall accuracy and more inferences than nonsemantic processing. The results also suggested that inferences were more likely when the modifier was consistent with the action associated with the subject noun. Automatic processing of pragmatic inferences is discussed.

9:35-9:45 (196)

The Functional Role of Working Memory in Text Integration. MEREDYTH DANEMAN, *University of Waterloo* (sponsored by Patricia A. Carpenter)—Individual differences in working memory capacity affect the probability of resolving apparent inconsistencies as in *There was a sewer near our home who made terrific suits*. Resolution was less likely for readers with small working memories (as assessed by a span measure). This was particularly marked when a sentence boundary intervened, suggesting that end-of-sentence processes taxed the poor reader's capacity more. Reading times were used to model the time course of integration.

9:50-10:00 (197)

Answering Wh- Questions. MURRAY SINGER, *University of Manitoba*—Answers to questions that asked *who*, *what*, or *how*, in relation to antecedent sentences were registered vocally or with response switches. In contrast with yes-no questions, correct "don't know" response latencies were longer than other correct answers. The results are discussed in the context of a process model of question answering.

Chaired by Curtis A. Becker, *Bell Labs*

10:15-10:25 (198)

Understanding Conversations. JOHN B. BLACK, SCOTT P. ROBERTSON, & PETER N. JOHNSON, *Yale University* (sponsored by Robert Crowder)—Understanding conversations involved inferring the goals of the conversants. Conversation statements took longer to read and were better remembered when they involved multiple conversational goals than when they involved single goals. The results varied with the point of view from which the conversation was read.

10:30-10:45 (199)

Repetition in a Sentence-Picture Verification Task. STEVEN L. GREENSPAN & ERWIN M. SEGAL, *SUNY, Buffalo* (read by E. M. Segal)—Sentence-picture verification is facilitated when the sentence partially repeats lexical information that had been presented in a preceding sentence-picture verification trial. This facilitation is due to the mappings between words in specific syntactic locations and their referents. Lexical repetition alone does not facilitate verification.

10:50-11:00 (200)

Comprehension of Discourse at High Rates with Redundant Pictures. LAWSON H. HUGHES, CAROL A. LANGDON, & YOUNGSOO KIM, *Indiana University*—Redundant adjunct pictures have been shown to facilitate comprehension of tape-recorded discourse. Loss of language redundancy is presumed to be responsible in part for a decrease in comprehension of discourse

presented at high word-per-minute rates. In three experiments, adding redundant adjunct pictures appeared to offset loss of language redundancy, although not reliably so.

11:05-11:15 (201)

Exposure to Time-Compressed Speech Changes Preferred Listening Rate. HENRY J. de HAAN, *U.S. Army Research Institute*—Preferred listening rates for time-compressed speech determined immediately after introduction were near the normal speaking rate. After approximately 1 h of further exposure, rates rose significantly. The increase was relatively greater for pitch-normalized, compressed speech than for pitch-varying, speeded speech. Habituation was suggested as a possible explanation.

11:20-11:30 (202)

Mechanical Recognition of Grammatical Sentences. JOHN K. EDDY, *Bell Labs, Holmdel*, & ARNOLD L. GLASS, *Rutgers University* (read by A. L. Glass)—A device for recognizing grammatical English sentences was implemented on an APPLE 48-K computer. The device consists of a memory containing several hundred abstract sentence constituents and a procedure for comparing a novel string with those constituents. It performed similarly to humans.

11:35-11:55 (203)

Verbal Disagreement: A Problem for the Information Age. THOMAS K. LANDAUER, GEORGE W. FURNAS, LOUIS M. GOMEZ, & SUSAN T. DUMAIS, *Bell Laboratories*—Information processing systems interpret messages correctly only if user and creator employ the same words. People provided words (names, descriptions, or categories) for objects (programs, text-editing commands, familiar things, sale items, or recipes). Pairs of people applied the same content word to an object less than one time in five. Explications, explanations, and implications will be given.

12:00-12:20 (204)

The Lard Factor in Writing. RUTH S. DAY, *Duke University*—Intelligent, well-educated people do not necessarily write well. Their sentences often have a high lard factor, packing in so many extra phrases that it is difficult to determine who did what to whom. The role of the lard factor in comprehension and memory is examined, along with implications for improving writing in a painless way.

TIMING AND CONTINGENCY Pennsylvania East, Friday morning, 8:00-12:10

Chaired by Peter Balsam, *Barnard College*

8:00-8:20 (205)

Preference for Mixed over Fixed Reinforcement Delay: The Harmonic Mean. JOHN GIBBON, *New York State Psychiatric Institute & Columbia University*, & STEPHEN FAIRHURST, *New York State Psychiatric Institute & City University of New York*—Two experiments studied preference for mixed delays over fixed delays to reinforcement using the time-left paradigm. Indifference was found to occur at approximately the harmonic mean of two-point mixtures in accordance with scalar expectancy theory. Alternative subjective time scales predict indifference at the arithmetic mean (absolute timing) or the geometric mean (log timing or Poisson timing).

8:25-8:35 (206)

Interference of Signal Timing by Response Timing. WARREN H. MECK, FARIBA KOMEILY-ZADEH, & RUSSELL CHURCH, *Brown University* (read by R. Church)—Responses of rats following a white-noise signal of 7 sec duration were reinforced, but responses following other signal durations (between 1 and 21 sec) were not. These reinforcements occurred on a fixed-interval schedule of 5, 8, or 13 sec for three independent groups. Temporal generalization functions were bimodal: One mode was at the reinforced signal duration (7 sec), and the other was near the value of the fixed interval response requirement. The animals

apparently used the same internal clock for response timing as they did for signal timing, since the fixed interval duration was reflected in performance of the temporal generalization task.

8:40-8:55 (207)

Effects of Experience on Self-Control. A. W. LOGUE, *SUNY, Stony Brook*—In some situations organisms choose a large, distant reinforcer over a small, near reinforcer (i.e., show self-control), while in other situations they do the reverse. Several experiments demonstrate large individual differences in self-control in pigeons as a result of experience. A quantitative model of self-control which incorporates such differences is described.

9:00-9:10 (208)

Periodicity and FI 30-sec Reinforcement. H. KEITH RODEWALD, *Michigan University*—During 10 sessions of FI 30-sec positive reinforcement, data for three pigeons showed an enduring, roughly periodic pattern of changes (ordinal periodicity) in response strength as the FI scallop developed. Some statistical properties of the pattern are accounted for by an assumption about response strength made explicit in a mathematical model.

9:15-9:35 (209)

Unified Reinforcement Principle: Some Related Experiments. JOHN W. DONAHOE, DAVID C. PALMER, & KENNETH J. STICKNEY, *University of Massachusetts*—Deviations from matching in discriminated interresponse-time (IRT) procedures may be influenced by autoshaping, as anticipated by a unified reinforcement principle. Autosshaping of keypecking does occur with long durations of the criterion IRTs. Preliminary findings are reported of a new classical conditioning procedure employing the nictitating membrane of the pigeon.

9:40-9:55 (210)

Operant and Pavlovian Determiners of Reinforcement. JOHN A. NEVIN, *University of New Hampshire*—In experiments with rats and pigeons, responses maintained by a food reinforcement schedule occasionally produced access to a second schedule with more frequent food. Response rate and resistance to change were compared with controls in which access to the second schedule was response-independent, to isolate operant and Pavlovian determiners of performance.

Chaired by Edward Wasserman, *University of Iowa*

10:10-10:20 (211)

A Chained Schedule Determination of the Relationship Between Effort and Reinforcement Value. STANLEY J. WEISS, *The American University*—Three rats were trained on a schedule in which R_2 in S_2 produced S_1 while R_1 produced food. Gradually increasing the R_1 effort requirement from 30 to 155 g significantly reduced R_1 rate and doubled work/reinforcement, but left the variable-interval reinforcement frequency unchanged. R_2 rate had a zero slope when plotted over R_1 bar weight. The conditioned reinforcement value of S_1 was unchanged by an increase in effort expended for reinforcement in its presence.

10:25-10:40 (212)

Response-Independent Reinforcement Elicits Pecking in Pigeons But Not in Crows. ROBERT W. POWELL, *University of South Florida*, & LINDA PALM, *Florida Mental Health Institute*—Common crows and pigeons were studied successively under variable-interval, variable-time, and extinction schedules. Key-pecking was similar for both species under the VI schedule. Under the VT schedule, the crows showed marked within-session attenuation of responding, while the pigeons showed no similar attenuation. This difference seemed to result from the frequent occurrence of keypecks in pigeons—but not crows—which were directly elicited by food presentations. There was no difference between species in responding under extinction.

10:45-11:05 (213)

On the Failure and Facilitation of Conditional Discrimination. BEN A. WILLIAMS, *University of California, San Diego*—Pigeons learned a conditional discrimination in an autoshaping procedure in which two keys were illuminated simultaneously with

various combinations of stimuli. However, when one of the keys was also illuminated in the ITI prior to a discrimination trial, the discrimination was not learned. Subsequent experiments suggested that a change in stimulus salience was the factor responsible for the failure of discrimination.

11:10-11:30 (214)

Hunt and Peck: Effects of Prey Density on Choice. JERRILYNN PETERS & ALAN C. KAMIL, *University of Massachusetts* (read by A. C. Kamil)—In an operant simulation of naturalistic foraging problems, blue jays chose between two hunting areas. They were sensitive to variations in prey density and approximated maximal efficiency when hunting in one area caused prey depletion. The relevance of these results to both the ecological and psychological views of choice will be discussed.

11:35-11:50 (215)

Autoshaping and Polydipsia: Leverpressing and Drinking as Substitutes for Eating. JAMES ALLISON, *Indiana University*—Leverpressing and drinking were studied under schedules that delivered food independently of the rat's behavior. When the lever predicted food, the schedule induced supernormal amounts of both responses (autoshaping and polydipsia). When a similar schedule presented lever and food independently, rats became polydipsic but showed no sign of autoshaping.

11:55-12:10 (216)

Analysis of the Stream of Behavior. DAVID BIRCH, *University of Illinois*—A new theory of the stream of behavior is presented and applied to observations of the general activity of the laboratory rat. The fit of the theory to the data is evaluated and special techniques for the analysis of this type of data are introduced.

(217)

(Read by title only)

Mathematics of Advanced Science of Behavior. WALTER C. STANLEY, *Gaithersburg, Maryland*—This paper describes properties of true numbers and their applications to psychology and other sciences. In the true-to-behavior number system, a true number is defined as one that has a beginning, extending, and ending. For example, let n_{ct} be a continuous (c) true (t) number (n), and let n_1 , n_2 , and n_3 , respectively, be beginning, extending, and ending of n_{ct} ; then, under appropriate conditions, n_{ct} is related to its three components and to the continuous (c) real (r) number system. Thus, $n_{ct} = n_1 n_2 - n_3 = 0_{cr}$.

PROBLEM SOLVING

Constitution/Independence, Friday morning, 8:00-12:20

Chaired by David Klahr, *Carnegie-Mellon University*

8:00-8:15 (218)

A Model of Social Science Problem Solving. JAMES F. VOSS, SHERMAN TYLER, & LAURIE YENGO, *University of Pittsburgh*—A jurisprudence model of argument (Toulmin, 1958) was modified and applied to protocols of individuals solving a social science problem. Experts, novices, and experts from other domains solved the problem. The basic model is presented, as well as results showing differences in developing a representation of the problem and executing a solution.

8:20-8:40 (219)

Confirmatory and Disconfirmatory Heuristics in Michael Faraday's Scientific Research. RYAN D. TWENEY, *Bowling Green State University*—Confirmatory and disconfirmatory heuristics interact in complex ways in laboratory studies of problem solving. Analysis of several hundred experiments carried out by Faraday in 1831 show that many of the same relationships hold in actual science, but can be understood only with reference to the semantic content of the hypotheses tested by each experiment.

8:45-8:55 (220)

Encoding Strategies for Deductive Reasoning Tasks. RICHARD E. MAYER & PIRAYE BAYMAN, *University of California, Santa Barbara*—Subjects showed different patterns of reading time

and RT performance in deductive reasoning for linear ordering vs. kinship material, suggesting that general experience encouraged using different encoding strategies. Following the first reasoning task, subjects showed the same pattern of reading time and RT performance for linear ordering and kinship material, suggesting that specific experience encouraged using the same encoding strategy.

9:00-9:15 (221)

Strategies and Solution Times in Simple Medical Problem Solving. GUY GROEN, DALE DAUPHINEE, & MARY McQUEEN, *McGill University*—Physicians and medical students were presented with multiple choice problems involving routine medical diagnosis. The problems were presented in segmented form using an Apple microcomputer. Subjects could move backwards and forwards through segments, and the time spent in each segment was automatically recorded. The main results concern individual differences in these times and the solution paths.

9:20-9:35 (222)

Use of Integrated Geometric Knowledge in Solving Problems. JILL H. LARKIN, *Carnegie-Mellon University* (sponsored by H. A. Simon)—A computer-implemented model solves three problems in fluid statics using problem representations richly endowed with geometric connections. Among 12 subjects, successful solvers execute most of the steps in the model solutions. Unsuccessful solvers' erroneous solutions correspond to those produced by the same model when geometric connections are removed.

9:40-10:00 (223)

Reliability and Consistency of Imprecise Probability Judgments about Dose-Response Curves. THOMAS S. WALLSTEN, BARBARA FORSYTH, *University of North Carolina, Chapel Hill*, & DAVID V. BUDESCU, *Research Triangle Institute*—On two occasions, nationally recognized health experts independently provided subjective probability intervals over points in dose-response spaces. Judgments were reliable and conformed well to a model of imprecise opinion currently under consideration by the Environmental Protection Agency for use in risk assessment in implementing the Clean Air Act.

Chaired by Ronald T. Kellogg, *University of Missouri, Rolla*

10:15-10:35 (224)

Toward a Formal Theory of Human Plausible Reasoning. ALLAN COLLINS, *Bolt Beranek & Newman*, & RYSZARD MICHALSKI, *University of Illinois, Urbana*—The talk will describe our attempts to formulate a theory of human plausible reasoning based on analysis of people's answers to a large number of everyday questions. The formalization generates a large number of plausible inference types from a small set of basic elements. We will try to show how a variety of human protocols can be accounted for, given such a system of plausible reasoning.

10:40-10:50 (225)

Individual Differences in Eye-Movement Patterns During Inductive Reasoning: Effects of Ability and Task Difficulty. RONNA F. DILLON, *Southern Illinois University*—The eye-scan patterns of 68 subjects, 19-35 years old, were examined during solution of complex figural analogies and spatial rotation items. Item difficulty was manipulated across tasks. Results indicated that intraphase and interphase scanning efficiency, strategy execution, and gross adaptations in scanning over time varied as a function of both subject ability and item difficulty. At some levels of analysis, ability and item difficulty were found to interact.

10:55-11:10 (226)

The Role of Naïve Theories in People's Interactions with Moving Objects. MICHAEL McCLOSKEY, DEBORAH KOHL, & ALLYSSON WASHBURN, *Johns Hopkins University*—Our previous research with pencil-and-paper problems suggests that many people have well-developed naïve theories of motion that are strikingly at variance with formal physical laws. Experiments are reported which indicate that these naïve theories manifest themselves when subjects make judgments about computer-simulated motions, and when they throw, drop, or push actual objects.

11:15-11:30 (227)

Computer Program Debugging by Experts. ROBIN JEFFRIES, *Carnegie-Mellon University* (sponsored by H. A. Simon)—Debugging a computer program written by someone else involves both comprehension, to understand what the program should be doing, and problem solving, to isolate and correct errors. Expert programmers recognized many specialized patterns, but they also constructed a hierarchical memory representation of the program's goals and actions, and used it to simulate program execution.

11:35-11:45 (228)

Prior Knowledge and the Structure of Mental Plans for Following Procedural Directions. PETER DIXON, *Bell Laboratories* (sponsored by Ernst Z. Rothkopf)—Patterns of sentence reading time were used in a series of experiments to make inferences about the performance plans that subjects constructed from written directions. The results suggested that mental plans were organized around the actions to be performed, and that this organization remained the same for different actions, task structures, and prior knowledge states.

11:50-12:05 (229)

Inferences from Quantified Expressions. RUSSELL REVLIN, *University of California, Santa Barbara*, & KENNETH KALLIO, *SUNY, Geneseo*—Comprehension of quantified expressions was examined in single and dual sentence verification and reasoning tasks. Results suggest an order-free interpretation of the subject-predicate relation. This interpretation is applied unless the asymmetries in the class-inclusion expressions are made obvious by syntactic and semantic markers.

12:10-12:20 (230)

Design of Public Telephone Instruction Cards. C. J. MORRIS & C. A. RILEY, *Bell Laboratories* (read by C. A. Riley; sponsored by M. S. Schoeffler)—Standardized instruction cards were designed for public telephones so that users could easily distinguish and learn the operational variations. The goal of the design concept developed was to make operational features easily identifiable, meeting the needs of both experienced and inexperienced users. Card designs developed according to the model were evaluated in the laboratory and in the field.

PICTURE PERCEPTION & KINEMATIC INFORMATION

Pennsylvania West, Friday morning, 8:00-12:20

Chaired by James J. Jenkins, *University of Minnesota*

8:00-8:15 (231)

Visual Interest in Motion Picture Sequences: Models and Data. JULIAN HOCHBERG, *Columbia University*, & VIRGINIA BROOKS, *Brooklyn College*—Short animated sequences, varying in view complexity, change rate, layout, and story, were presented as simultaneous pairs (channels). Subjects' glances at each were covertly recorded during "free" intervals (between cover tasks). Results show that exogenous motives must be included even in close, moment-by-moment accounts of visual interest maintenance.

8:20-8:35 (232)

Effects of Exponential Texture Spacing and Speed on Perceived Egospeed. RIK WARREN, DEAN H. OWEN, & LAWRENCE J. HETTINGER, *Ohio State University*—Simulated constant speed travel over exponentially increasing ground texture spacing produces a dramatic impression of decreasing egospeed. Exponentially increasing egospeed over constant texture produces perceived egospeed acceleration. Control displays had both egospeed and texture constant or both exponentially increasing. Results are discussed in terms of ecologically functional optic array information.

8:40-8:55 (233)

Forest Before Trees in Motion Perception? JAMES R. POMERANTZ & NELSON TOTH, *SUNY, Buffalo*—The motion of a dot configuration may be described as the sum of its relative (part) and common (whole) motion components. Is either of these components extracted before the other in perception? RT data from selective attention experiments show that neither component

can be responded to without interference from the other, implying that neither is extracted from the stimulus ahead of the other.

9:00-9:15 (234)

Blowing in the Wind: Perceiving the Structure of Trees and Bushes. JAMES E. CUTTING, *Cornell University*—When lights are mounted at the tips of the branches of a tree- or a bush-like structure, viewers are remarkably good at discerning certain aspects of that structure even when they cannot see the limbs or trunk. They appear to do this by attending to differences in movement that are generated. In particular, they seem attuned to second-order centers of moment.

9:20-9:35 (235)

Kinetic and Proximity Influences on Perceiving Structure in Revolving Point-Lights. DENNIS R. PROFFITT, *University of Virginia*—Observers judged the ease with which they could see various possible interpretations of revolving displays of point-lights. Results could not be easily attributed to the influences of either of two currently proposed perceptual minimum principles, one minimizing coded kinematic information and the other minimizing relative motions. It is suggested that observers are affected by proximity influences and may use a kinetic (causal) rather than a purely kinematic analysis.

9:40-9:50 (236)

Infant Sensitivity to the Structure of a Human Walker Revealed Through Kinematic Information. BENNETT I. BERTENTHAL, *University of Virginia* (sponsored by Dennis R. Proffitt)—In two experiments, infants viewed displays of point-lights moving as if attached to the joints of a walker. For moving, but not for static, displays, it was found that 20-week-old infants can discriminate a normal upright walker from an inverted (turned upside down) and also from an anomalous walker (equivalent point-light motions but scrambled topographic relations).

9:55-10:10 (237)

The Categorical Perception of Human Gait. JAMES T. TODD, *Brandeis University*—Two experiments, involving computer-animated stick figures, examine how observers distinguish among different gaits. Experiment 1 demonstrates that the motion of the lower leg (i.e., the tibia) is primarily responsible for distinguishing between running and walking. Experiment 2 shows that a perceptually salient walking gait can be transformed into running (or vice versa) by adding (or subtracting) a constant value to the angle of the lower leg over the entire step cycle. The size of this constant value is affected by the shape of the lower leg angle function and the motion of other limb segments.

Chaired by Hershel Leibowitz, *Pennsylvania State University*

10:25-10:45 (238)

Integrating Information from Successive Fixations. JOHN JONIDES, DAVID E. IRWIN, & STEVEN YANTIS, *University of Michigan*—One of the classic problems in perception is how visual information from successive fixations of a scene is integrated to form a coherent view of the scene. We report an experiment that demonstrates that this integration can be accomplished by a process that sums information from successive fixations after spatially reconciling the information from each glimpse.

10:50-11:00 (239)

Path-Guided Apparent Motion. ROGER N. SHEPARD & SUSAN ZARE, *Stanford University*—Momentary flashing of a static gray path between two alternately presented dots induces a more compelling illusion of apparent motion. Moreover, for a fixed separation of the dots, the motion can be induced to follow various curved paths with critical times for good motion dependent on length of path.

11:05-11:20 (240)

The Use of Parafoveal Information in Identifying Pictures. ALEXANDER POLLATSEK, KEITH RAYNER, & WILLIAM COLLINS, *University of Massachusetts*—Pictures of objects were presented parafoveally (at 5 deg or 10 deg) and during an eye movement either stayed the same or changed when fixated. The parafoveal picture was neutral (a square), identical to, similar

to, or dissimilar to the fixated picture. Naming time to the fixated picture, relative to the neutral condition, was faster at both visual angles for identical first pictures but only at 10 deg for similar first pictures.

11:25-11:40 (241)

Eye Movements and Picture Recognition: Contribution or Embellishment. DENNIS F. FISHER, ROBERT KARSH, FRANCIS BREITENBACH, & B. DIANE BARNETTE, *Human Engineering Laboratory, Aberdeen Proving Ground*—Picture recognition was examined under free viewing, while eye movements were being monitored, and tachistoscopic viewing of 50, 250, and 500 msec with altered pictures from the Meier Art Judgment Test. A slight, though significant, advantage of free viewing was found, but fixations during free view are: (1) stimulus bound, (2) found to correspond to perceived change, and (3) used to verify decisions of same or different.

11:45-12:00 (242)

Routes to the Top: Achieving the Gist of a Picture. JAMES R. ANTES, STEVEN W. MANN, & JAMES G. PENLAND, *University of North Dakota*—The processes involved in achieving the gist of briefly presented pictures were investigated in two experiments. In one experiment, subjects identified the themes of briefly presented pictures in which certain objects, selected according to their relationship to the meaning of the scene, had been systematically removed or altered. In the second experiment, theme identification of pictures masked by either low or high spatial frequency visual noise was required. The results support object identification as the primary route to the top.

12:05-12:20 (243)

Lowpass Spatial Frequency Filtering and Perceptual Organization. FRED L. ROYER, *Cleveland VA Medical Center*—Several important Gestalt phenomena can be explained by Ginsburg's (1979) lowpass spatial frequency filter model. The model's explanatory power appears good for Pomerantz' observations on emergent configurational features. Assuming certain cognitive operations, its power appears good for Royer's observations on the influence that correlational structure has on a subject's ability to draw the missing part of complex displays.

ATTENTION AND INFORMATION PROCESSING Constitution/Independence, Friday afternoon, 1:00-5:35

Chaired by Bruce K. Britton, University of Georgia

1:00-1:15 (244)

Tests of the Automaticity of Reading. DANIEL KAHNEMAN, *University of British Columbia* (sponsored by Anne Treisman)—Contrary to the notion of automatic and effortless processing of familiar words, the effects of a color word on color-naming are reduced by the simultaneous presentation of other words. Similar results are observed in other paradigms. There is evidence of interference and competition even among "automatic" involuntary processes.

1:20-1:35 (245)

An Early Interference Effect in Visual Perception. ANNE TREISMAN & DANIEL KAHNEMAN, *University of British Columbia*—In a variety of tasks, the simultaneous presentation of two objects in the field retards response to one of them. The interference cannot be attributed to peripheral interactions. It appears to represent competition for attention at an early stage. Alternative interpretations are discussed.

1:40-1:55 (246)

Automatic Detection Requires Attentional Resources. JAMES E. HOFFMAN & BILLIE NELSON, *University of Delaware*—A series of experiments investigated the question of whether automatic detection of visual targets requires the investment of attentional resources. Subjects were required to perform an automatic target detection task in conjunction with three different concurrent visual discriminations. Subjects were only able to increase their

accuracy on the concurrent task at the expense of decreasing performance on the automatic task, indicating that automatic detection requires the voluntary investment of a limited resource.

2:00-2:10 (247)

On the Time Course of Rapid Information Processing. DAVID E. MEYER & DAVID E. IRWIN, *University of Michigan*—Results will be reported from a new procedure for estimating the amount of partial information that people have accumulated at any moment during tasks involving rapid mental processes. This procedure, which combines various aspects of standard reaction-time and response-signal methods, provides tests of discrete-stage (e.g., all or none) vs. continuous (e.g., cascade) models of information processing.

2:15-2:35 (248)

Measuring the Information in the Iconic Image. GEOFFREY R. LOFTUS, CARRIE JOHNSON, & BRIAN WILLIAMSON, *University of Washington*—Three experiments investigated extraction of information following a brief (50-1,000 msec) presentation of a picture. We discovered that (1) actual duration of the icon is independent of exposure time of the picture, (2) absolute amount of information extracted from the icon decreases as a function of duration of the picture, and (3) perceived duration of the icon decreases as a function of exposure duration of the picture. The assumption uniting these findings is that the phenomenological appearance of the icon is dependent on the rate at which information is being extracted from the icon.

2:40-2:50 (249)

Bottom-Up Processing is Capacity Limited. VERONICA J. DARK & WILLIAM A. JOHNSTON, *University of Utah* (read by W. A. Johnston)—Subjects performed a visual detection task. There were two dependent variables (target detectability and priming potency of fillers) and three main independent variables (word clarity, display load, and exposure duration). Target detectability was affected by all three manipulations, but filler priming was affected only by display load and exposure duration. Results indicate that while bottom-up processing may be automatic, it is capacity limited.

2:55-3:05 (250)

Allocation of Attention According to Informativeness in Visual Recognition. DAVID NAVON & BARUCH MARGALIT, *University of Haifa*—In visual identification, is visual attention attracted to elements that are more critical for identification? This question was investigated by having subjects detect visual probes while performing a primary task that involved identification. Probes were located at the neighborhood of highly or poorly informative parts of the identified stimuli. The data suggest that more attention may indeed be directed to informative regions, and that this effect cannot be solely attributed to oculomotor factors.

3:10-3:20 (251)

The Cognitive Increment Function in Sustained Attention. JOEL S. WARM, RONALD L. SPRAGUE, & WILLIAM N. DEMBER, *University of Cincinnati*—Subjects monitored recurrent pairs of digits during a 1-h vigil. Critical signals for detection were identified by matching displayed items with those on a checklist or by making arithmetic calculations at three levels of complexity. The vigilance decrement appeared in all conditions except the one requiring the most complex calculations. In that case, performance improved over time. This unusual vigilance effect is most likely attributable to the intrinsic motivation (cf. Deci, 1975) of a challenging task.

Chaired by Kathy Pezdek, Claremont Graduate School

3:35-3:50 (252)

Memory for Context in Visual Search Tasks. WILLIAM N. HAYES, *Albion College*—Following performance on a traditional visual search task, subjects were tested on memory for the context characters. Results supported a pandemonium/levels-of-processing point of view.

3:55-4:15 (253)

Higher Level Automatic and Control Category Search. ARTHUR D. FISK & WALTER SCHNEIDER, *University of Illinois* (read by W. Schneider)—Subjects performed a memory search task comparing a probe word to one to four words or categories in STM. Target and distractor sets were either varied across trials (VM) or were consistent (CM). VM search results were serial self-terminating. The category search slopes were twice the word search slopes. CM category slope was nearly flat (1 msec), and subjects could perform CM search with little resource cost. The applications of automatic/control processing to higher level processing and cumulative learning are discussed.

4:20-4:35 (254)

Interference and Facilitation Effects in the Processing of Targets and Distractors Presented at Separated Retinal Locations. PAULA GOOKASIAN, *University of North Carolina, Charlotte*—Three follow-up experiments extended the finding that subjects selectively attend to foveal distractors while processing targets presented at extrafoveal retinal locations. Since pictorial symbols, rather than words, were used as the distractors, the design included conditions in which the distractors were also presented extrafoveally. The results replicated the original finding and in addition described the interference in foveal target processing that occurred when distractors were presented parafoveally.

4:40-4:55 (255)

Dissociation of Concurrently Presented Visual Information. HELENE INTRAUB, *University of Delaware*—Pictures were rapidly presented in a continuous sequence (8/sec). Perception of a black frame presented concurrently with one picture in the sequence was frequently reported as having occurred simultaneously with either the preceding or the following picture. Dissociation of the visual information occurred both with peripheral and central presentation of the frame.

5:00-5:15 (256)

Cognitive Interference in Perceptual Adaptation. GORDON M. REDDING, *Illinois State University*—Mental arithmetic and imagery tasks performed during hallway exploration reduce the amount of visual adaptation to optical tilt. These interference effects cannot be attributed to reduced exploration behavior (i.e., rate of walking) and appear to indicate an involvement of higher order cognitive processes in primary perceptual learning. Central processing capacity ("attention") may be necessary for perceptual adaptation, but present data do not rule out the possibility that interference arises from cognitive demands upon more peripheral mechanisms.

5:20-5:35 (257)

Unconscious Perception? PHILIP M. MERIKLE, *University of Waterloo*—Recent studies suggest that masked primes presented below the awareness threshold affect the perception of target stimuli. Since all reported studies use an inadequate method to define the threshold for discriminated verbal report (i.e., awareness), unconscious perception of masked primes is an undocumented phenomenon.

BRAIN MECHANISMS Cafe Careme, Friday afternoon, 1:00-3:20

Chaired by Bradford Bunnell
Walter Reed Army Institute of Research

1:00-1:15 (258)

Brainstem Mechanisms of the Conditioned Nictitating Membrane Response. JOHN W. MOORE & JOHN E. DESMOND, *University of Massachusetts, Amherst*—Rabbits received ipsilateral lesions of the pons and mesencephalon that disrupted conditioned, but not unconditioned, responding of the nictitating membrane response based to eye shock. Conditioned responding of the eye contralateral to the lesion was unaffected. Electrophysiological re-

cordings of multiple-unit activity in awake animals supports the conclusion that the brainstem contains elements essential for generation of conditioned response in this preparation.

1:20-1:30 (259)

Spinal Fixation in the Rat: A Neural Phenomenon. MICHAEL M. PATTERSON, *College of Osteopathic Medicine, Ohio University*, JOE STEINMETZ, & ALVIN BEGGS, *Ohio University*—Fixation of hindlimb asymmetry in the rat has been shown by central and peripheral stimulation. It has now been shown by central stimulation and peripheral local anesthetics that the fixation is not an artifact of stimulus-related tissue damage.

1:35-1:45 (260)

Ipsilateral Cerebellar Lesions Abolish a Simple Learned Response. DAVID A. McCORMICK, DAVID G. LAVOND, GREGORY A. CLARK, & RICHARD F. THOMPSON, *Stanford University* (read by R. F. Thompson)—Rabbits were well trained in short-delay classical NM conditioning (350-msec acoustic CS and 100-msec coterminating corneal airpuff UCS). Certain ipsilateral cerebellar lesions completely abolished the CR but had no effect on the UCR. We suggest that the "engram" for this simple learned response is localized to the cerebellum and related structures.

1:50-2:00 (261)

Minimal Retroactive Interference in a Spatial Task Following Hippocampal Damage in Rats. LEONARD E. JARRARD & DAVID G. ELMES, *Washington & Lee University*—Rats were trained preoperatively to choose 4 arms in a 12-arm radial maze (Problem A); then half were trained to choose 4 different arms (Problem B) while half served as yoked controls run in a cross-shaped maze. Three operations were carried out (hippocampal, cortical control, and unoperated control), and all animals were retrained postoperatively on Problem A. Retroactive interference was more apparent in controls than in hippocampals. Furthermore, the error data for hippocampals indicated a more general impairment in performance on the spatial task and is consistent with the spatial theory of hippocampal functioning.

2:05-2:15 (262)

Recovery of Function After Brain Damage: The Problem of Behavioral Specificity. PAUL HANKEY, N. DAVIS, T. E. LEVERE, *North Carolina State University* (read by T. E. LeVere)—Recent data suggests that recovery of function after brain injury is a very specific process dependent upon separately reinstating each individual behavior disrupted by the brain insult. For example, postoperative training on successive brightness discrimination is of absolutely no benefit to later recovery of a preoperatively learned simultaneous brightness discrimination. The present experiment extends these data by demonstrating that even replicating the preoperative training conditions is not sufficient to mitigate this specificity if the brain injured subject must recover under any circumstance that is not exactly like its preoperative training.

2:20-2:35 (263)

Food Intake as a Function of Intragastric (IG) Hydration. EUGENE EISMAN & PATRICIA HAYES, *University of Wisconsin, Milwaukee*—Baseline water intake was determined in rats that drank for 30 min per day for 2 weeks. Following baseline, they were given daily IG infusions of water in place of the daily drink. Food intake was recorded for 30 min and for 24 h after each hydrational session. Compared with controls, IG hydration interfered with short- but not long-term regulation of food intake.

2:40-3:00 (264)

Some Psychophysiological and Pharmacological Correlates of Normal and Hyperphagic Eating. STEPHEN GROSSBERG, *Boston University*—A neural network model linking concepts of arousal, drive, reinforcer, and incentive motivation to cholinergic-catecholaminergic interactions will be presented. The model shows how hyperphagic finickiness and obesity can be differentially affected by closely related network lesions. It also encompasses

such phenomena as secondary conditioning, self-stimulation, rebound eating, and satiety.

3:05-3:20 (265)

Neural Origin of Averaged Evoked Potentials Recorded From Electrodes Placed Near the Eyes. ROBERT G. EASON, MARTA OAKLEY, & LYNN FLOWERS, *University of North Carolina, Greensboro*—To ascertain the locus of origin of averaged EPs obtained with electrodes placed above, below, and at the external and internal canthi of the eyes, subjects fixated an evoking stimulus with the eyes rotated upward, downward, to the right, or to the left. These manipulations generated variations in amplitude and polarity consistent with the hypothesis that early EP components originate from a single retinal dipole source centered about the fovea, whereas later components reflect dipole sources of more central origin.

STRESS AND ENDOGENOUS OPIOIDS Cafe Careme, Friday afternoon, 3:30-5:40

Chaired by Jon L. Williams, Kenyon College

3:30-3:45 (266)

The Effect of Stress on Tumor Growth in the Rat. WILLIAM P. PARÉ & GEORGE P. VINCENT, *VA Medical Center, Perry Point, Maryland*—The effect of cold, swim, or restraint stress on the growth of a mammary tumor was observed. Exposure to swim and restraint stress prior to tumor inoculations resulted in earlier tumor appearance. Postinoculation stress exposure did not produce equivalent results. Cold, swim, and restraint stress exert differential effects on tumorigenesis.

3:50-4:05 (267)

Naloxone Hyperalgesia and Stress-Induced Analgesia in Rats. GARY B. ROLLMAN, *University of Western Ontario, & Terence J. CODERRE, McGill University*—Hyperalgesia, a significant decline in tail flick, paw lick, and jump latencies, was produced by naloxone. Continuous and intermittent shock yielded an analgesic effect, but only the latter form of stress-induced analgesia was naloxone-reversible. The results are compatible with a model of pain modulation involving opiate and nonopiate inhibitory systems, as well as both analgesia reversal and hyperalgesia produced by naloxone.

4:10-4:25 (268)

Effects of Naloxone and Shock Intensity on Variable-Cycle Avoidance in Rats. MARK GALIZIO, *University of North Carolina, Wilmington, & POLLY SANDERSON, University of Wyoming*—Rats' barpress rates on a variable-cycle 15-sec avoidance schedule were a direct function of shock intensity. Naloxone affected performances only at the high intensities and only in the latter part of the session. Naloxone appears to interfere with the transition from warm-up to steady state avoidance.

4:30-4:50 (269)

Learned Helplessness and the Activation of Opioid Systems. STEVEN F. MAIER, JAMES GRAU, RICHARD HYSON, *University of Colorado, JOHN MADDEN IV, & JACK BARCHAS, Stanford University*—Stressors such as electric shock activate both opioid and nonopioid mechanisms of pain inhibition. Here we report a series of experiments designed to determine the environmental factors that control the differential activation of these systems. It will be shown that conditions that facilitate the organism's learning that it has no control lead to both the opioid form of analgesia and supersensitivity to opiates.

4:55-5:15 (270)

Pituitary-Adrenal Correlates of Analgesic and Nonanalgesic Stressors. DENNIS D. KELLY, *New York State Psychiatric Institute and Columbia University, GLORIA COLURSO, DOROTHY T. KRIEGER, Mt. Sinai School of Medicine, & MURRAY GLUSMAN, New York State Psychiatric Institute and Columbia University*—Only certain stressors induce analgesia. To determine whether plasma levels of ACTH, β -endorphin or corticosterone were predictive of analgesia, rats were exposed to seven stressful

conditions. Although three analgesic stressors resulted in near maximal hormonal responses and a range of behavioral deficits, other stressors prompted similar elevations in all three hormones without inducing analgesia.

5:20-5:40 (271)

Enkephalinergic Supersensitivity: Implications for Behavior. ELIOT L. GARDNER, *Albert Einstein College of Medicine*—Both specific midbrain lesions and chronic naltrexone administration induced opiate receptor supersensitivity in rat forebrain regions. In all cases, opiate receptor number increases and specific correlations with behavior are observed. Both mu and delta receptor subtypes are affected. Studies of distinct brain regions showed highly significant regional variation in the induced supersensitivity. Implications for behavioral organization and for clinical opiate use are discussed.

CONCEPT LEARNING AND MEMORY IN ANIMALS

Pennsylvania East, Friday afternoon, 1:00-5:45

Chaired by Ralph R. Miller, SUNY, Binghamton

1:00-1:20 (272)

Organization of Visual Memory and Categorization in the Rhesus Monkey. STEPHEN F. SANDS, *University of Texas, El Paso, CHARLES E. LINCOLN, Bell Telephone Laboratories, & ANTHONY A. WRIGHT, University of Texas, Houston*—Two rhesus monkeys made same/different judgments of sequentially presented pictures in which every picture was compared with every other picture. The pictures depicted several categories, such as faces, fruit, flowers, and trees. Multidimensional scalings of these comparisons revealed that the monkeys grouped the pictures into similar categories. This finding suggests that monkeys, like humans, may employ natural perceptual categories in pictorial recognition.

1:25-1:45 (273)

Same/Different Symbol Use by Pigeons. THOMAS R. ZENTALL, CHARLES A. EDWARDS, & JOYCE A. JAGIELLO, *University of Kentucky*—Pigeons learned to respond at one spatial position when a pair of stimulus shapes matched and at a different position when they mismatched. When the birds were transferred to hue stimuli and then to constant/intermittent stimuli, they showed positive transfer relative to control birds. The data indicate that pigeons are capable of symbolic representation of the concepts "same" and "different."

1:50-2:10 (274)

Same/Different Concept Learning in Pigeons and Monkeys. PETER J. URUCUIOLI, *Purdue University, HECTOR C. SANTIAGO, ANTHONY A. WRIGHT, University of Texas Health Science Center, Houston, & STEPHEN F. SANDS, University of Texas, El Paso*—Groups of pigeons and monkeys acquired same/different performance with pairs of color slides. Transfer tests revealed that with a pool of 210 different items (to make up 70 same and 70 different pairs) arranged in different combinations, the same/different concept was only partially learned. This concept became more fully developed only when the item pool was expanded and new items were used daily.

2:15-2:25 (275)

Oddity and Dimension-Abstracted Oddity in Squirrel Monkeys. ROGER K. THOMAS & GORDON THOMAS FROST, *University of Georgia*—Six logically related, conceptually designed tasks (Tasks 1-3 were oddity and 4-6 were dimension-abstracted oddity) were given successively to four squirrel monkeys. The tasks were given in the presumed order of difficulty. All tasks were performed better than chance, but performances on Tasks 1, 2, and 4 were better than those on Tasks 3, 5, and 6.

2:30-2:40 (276)

Reproduction Memory of Two-Event Sequences in Pigeons. B. KENT PARKER, *West Virginia University*—Two experiments employed a discrete-trial procedure that required pigeons to peck

one of four possible sequences (left-left, left-right, right-right, right-left) on a given trial, signaled by the successive illumination of two response keys. Following a retention interval (.5 sec in Experiment 1, .5-30 sec in Experiment 2), a reinforcer was delivered if a subject reproduced the prior sample sequence during a test condition in which both keys were illuminated. Pigeons can remember and reproduce for up to 30 sec the order in which they have just seen and pecked two lighted keys. Memory for homogeneous (left-left, right-right) sequences was superior to that for heterogeneous patterns.

2:45-3:05 (277)

Advances in Delayed Sequence Discrimination. R. WEISMAN, M. GIBSON, & J. ROCHFORD, *Queen's University*—By pecking at the advance key during a sample stimulus in a delayed sequence discrimination, pigeons identified the earliest point in a sequence at which they could recognize that sequence as a member of the class of negative, nonreinforced, sequence types. The results falsify some, but implicate other, models of order processing in delayed sequence discrimination tasks.

3:10-3:25 (278)

Metamemory in the Pigeon: Knowledge About Recent Sequential Choice Behavior. CHARLES P. SHIMP, *University of Utah*—A pigeon's knowledge about its own recent sequential choice behavior was the object of study. Two different behavioral patterns were reinforced in a discrete-trials choice situation, and occasional probes asked a pigeon what it knew about what it had just done, i.e., which sequence of choices it had just produced. The results encouraged the view that reinforcement shapes and unitizes the behavioral pattern in active memory when a reinforcer is delivered.

Chaired by A. W. Logue, SUNY, Stony Brook

3:40-3:50 (279)

Retention Interval Duration as a Conditional Cue for Pigeons. W. K. HONIG & PETER W. D. DODD, *Dalhousie University*—An initial stimulus was followed by either a short (e.g., 2 sec) or a long (e.g., 10 sec) "retention interval" (RI) on each trial. Trial outcome for responding to a vertical or horizontal test stimulus was conditional on the duration of the preceding RI. This method identifies RI duration as a potential cue in working memory paradigms.

3:55-4:10 (280)

Long-Delayed Alternation in Pigeons. DEBORAH J. OLSON & WILLIAM S. MAKI, *North Dakota State University* (read by W. S. Maki)—Pigeons were taught a delayed alternation task in a T-maze. After rather little postacquisition training, they performed at high levels of accuracy with relatively long delays (8-16 min). Estimates of the pigeon's "short-term memory" (typically reported to be less than 1 min) are thus increased substantially. We will also report on the robustness of this retention as assessed by our studies of retroactive (delay interval) interference.

4:15-4:25 (281)

Stimulus Control of Encoding Prospective Processing in Delayed Matching to Sample. THOMAS B. STONEBRAKER & MARK RILLING, *Michigan State University* (read by M. Rilling)—Pigeons were simultaneously trained on two tasks: identity and symbolic matching. Only one set of sample stimuli was used, and it was followed by two comparison sets. "Instructional stimuli" superimposed on the sample, and continuing throughout the delay, predicted the upcoming comparison set (identity or symbolic matching on that trial). On probe trials, comparison sets were incorrectly used. The decrement in performance on probe trials reveals that the instructional cues had gained control over some aspect of processing. Similar results were obtained when an unconditional and a conditional discrimination were compared.

4:30-4:50 (282)

Mediated Transfer and Transitivity in Pigeons. LANNY FIELDS, *College of Staten Island, CUNY*, & JOSEPH DEMPSKY, *Queens College, CUNY*—After training pigeons to match six visual stimuli, 16 color/line matches were conditioned with red,

green, and horizontal interrelated and blue, yellow, and vertical interrelated. Finally, 12 arbitrary three-color matches were conditioned. All 34 conditional discriminations were maintained. Results were related to sample/comparison transitivity and color equivocality within stimulus classes.

4:55-5:05 (283)

Delayed Matching to Sample for Haptic Cues in Monkeys. TERRY L. STEELE & RICHARD H. BAUER, *Middle Tennessee State University* (read by R. H. Bauer)—Three rhesus monkeys were tested in a delayed matching-to-sample task using haptic cues. The stimuli were spheres and cubes of three different sizes. The percentage of correct matches decreased uniformly from slightly greater than 90% with short delays to 70% with the longest delay (64 sec).

5:10-5:25 (284)

Delayed Matching to Sample by Adult and Aged Rats in the Radial Maze. WINFRED F. HILL, TIMOTHY J. COLLIER, & ARYEH ROUTTENBERG, *Northwestern University*—Young adult rats found food in one of the eight arms of a radial maze and then received a second trial with food in the same arm. The majority mastered this task within 20 days at an intertrial delay of 1 min, with four matching trials a day slightly faster than one. A high level of performance was maintained with delays in some cases up to 6 h. Comparison with aged Fischer 344 rats will be discussed.

5:30-5:45 (285)

Comparison of Omission and Extinction Procedures in a Successive Matching-to-Sample Task With Rats. JAMES V. DEVINE & ANN SALO, *University of Texas, El Paso*—Rats were trained and tested with delays using discriminated omission or extinction procedures with a successive matching-to-sample task that included auditory and visual stimuli. Both groups showed similar rates of acquisition and forgetting functions, the greatest deficit occurring with visual stimuli.

MEMORY FOR EVENTS AND IDEAS Grand Ballroom East, Friday afternoon, 1:00-5:35

Chaired by Thomas O. Nelson, University of Washington

1:00-1:15 (286)

Can Deeper Understanding Improve Memory for Ideas? MICHAEL L. MACHT & HERMAN BUSCHKE, *Albert Einstein College of Medicine* (read by H. Buschke)—Two experiments compare free recall, cued recall, and recognition of 16 unrelated, clearly understandable ideas presented either with or without additional explanation. These explanations did not increase the number of ideas recalled by either young or old subjects. Recall of explanations, as well as ideas also did not decrease recall, presumably because both were remembered as part of a single conceptual unit.

1:20-1:35 (287)

Constructive Memory vs. Trace Retrieval: Some of Each. RONALD P. FISHER, D. THOMAS BIXBY, & ROBERT R. OLIVER, *UCLA*—"Memory" about events that were never presented was as accurate as memory about events that were presented, suggesting that memory may be considerably more complex than simply retrieving an episodic trace. A simplistic trace-retrieval notion does fit, however, when the task is changed slightly, since subjects can discriminate between presented and nonpresented events.

1:40-1:50 (288)

Memory for Truth and Falsity. GEORGE M. ROBINSON, *Smith College*—Most psychologists believe that, for reasons of efficiency and economy, people store only "true" information in memory. On this model, input we believe (or later discover) to be false is converted to a complementary true form for storage. In contrast, this experiment suggests that we have both a true and a false memory bin, that at least some false information is stored and retrieved directly.

1:55-2:10 (289)

Episodic and Generic Memory for Places. WILLIAM F. BREWER & DAVID A. DUPREE, *University of Illinois*—Two groups viewed a videotaped walk through a landscape followed by either (1) tapes of three more walks through the same landscape or (2) tapes of three very different walks. The first group showed superior visual recognition for generic information. The second group showed superior recognition for episodic information.

2:15-2:30 (290)

A Retention Function for Autobiographical Memory. DAVID C. RUBIN, *Duke University*—College students were asked to list and date episodes from their lives. If the students encoded an equal number of episodes each day of their lives, the number of episodes retrieved as a function of days ago could be viewed as a retention function. In fact, the data from two experiments fit the single trace retention function proposed by Wickelgren with correlations of .98.

2:35-2:50 (291)

An Examination of Word and Picture Retention Using RT as an Independent Measure of Processing Depth. ELIZABETH LIGON BJORK, MICHAEL S. GOLD, & STEPHEN A. WHITE, *UCLA*—As a test of the levels-of-processing framework, the level to which word and picture stimuli were processed was manipulated by the nature of the stimuli themselves, while the processing task remained constant, allowing the obtained RTs to constitute an independent measure of processing level. The subsequent recall and recognition performance has implications for word-picture differences as well as the effects of different processing levels.

2:55-3:10 (292)

Hypermnesia: Effects of Encoding and Retrieval Manipulations. HARLEY A. BERNBACH, HENRY L. ROEDIGER III, & DAVID G. PAYNE, *Purdue University*—In a hypermnesia experiment using three consecutive tests for memory of 100 words, encoding was manipulated by use of imagery or rehearsal instructions and retrieval by use of recall or two types of recognition test. Hypermnesia was found, as usual, in recall, but it was not found in recognition. Encoding effects will also be discussed.

Chaired by James Hinrichs, University of Iowa

3:25-3:40 (293)

Use of an Imagery Mnemonic by the Elderly in Natural Settings. JAMES D. PRATT & KENNETH L. HIGBEE, *Brigham Young University* (read by K. L. Higbee)—In a classroom, 28 people from 62 to 79 years of age used a visual-imagery mnemonic to improve their memory for 10 nouns. In their homes, 21 people from 60 to 80 years of age, using the mnemonic, remembered 10 sayings (e.g., *Silence is golden*) better than a control group.

3:45-3:55 (294)

Effect of Background Elaboration on Picture Memory in the Aged. DENISE CORTIS PARK, J. THOMAS PUGLISI, & MICHELLE SOVACOOL, *University of North Carolina, Charlotte*—Young and elderly subjects were presented 60 cartoons for study, half with background present and half with background absent. During recognition, presence of background was crossed factorially with presence during acquisition. Although the elderly exhibited an overall deficit, all subjects performed best when encoding and retrieval conditions were compatible.

4:00-4:15 (295)

Image Memory and Bizarreness: There Is an Effect. ROBERT R. HOFFMAN, *Adelphi University*, ANNETTE FENNING, *University of Minnesota*, & TERREL KAPLAN, *Adelphi University* (sponsored by James J. Jenkins)—Nine experiments tested hypotheses about the effect of image “bizarreness,” beginning with a replication of Wollen et al. (1972): Subjects learned nine paired-associate nouns presented with line drawing depictions. A control study suggested that some stimuli were unidentifiable at their 2-sec presentation rate. Our main experiments used 50 paired associates; the drawings used rich picture cues and were prepared

according to specific criteria about “bizarreness.” Results indicated that image interaction is a determinant of recall. Also, bizarreness interferes for noninteracting images and facilitates recall of interacting images.

4:20-4:30 (296)

Mental Shock. ELIZABETH F. LOFTUS & TERRENCE E. BURNS, *University of Washington*—Subjects in three experiments saw a short film of a mentally shocking event in which a young boy was violently shot in the face. Compared with other subjects who saw a nonviolent version of the same film, those who saw the mentally shocking version showed poorer recognition, as well as recall, of details. Impaired memory occurred only when the event was mentally upsetting and not when it was merely unexpected but not upsetting. Mentally upsetting episodes appear to disrupt the lingering processing necessary for full storage of information in memory.

4:35-4:50 (297)

How Permanent Are Memories for Real-Life Events? JOHN J. SHAUGHNESSY, *Hope College*, & JOCELYN L. MAND, *Loyola University of Chicago*—Consistent with previous findings (Loftus et al., 1978), misleading information presented after subjects viewed a slide sequence depicting an auto-pedestrian accident had a large debilitating effect on recognition test performance. The prevailing interpretation of this phenomenon is that the misleading information replaces the original memory. Using frequency theory of recognition memory (Underwood, 1971) as a basis, we propose an alternative interpretation which assumes that the original and misleading information remain in memory.

4:55-5:10 (298)

Mnemonics and Remembering Metric Information. DARRYL BRUCE & D. MARTIN CLEMONS, *Florida State University*—Students learned correspondences between metric and customary measurement units (e.g., a gram = .035 ounces) using mnemonic words from which the numbers could be generated according to learned rules. A control group did not use such mnemonics. In two of three experiments, the mnemonics facilitated long-term retention of the correspondences.

5:15-5:35 (299)

How and When Does New Information Alter World Knowledge? GEORGE R. POTTS & SHARYL B. PETERSON, *University of Denver*—Many studies have examined how readers use their existing world knowledge to guide the comprehension of new information. Little attention has been given to the equally important question of how and when new information is incorporated into, and thereby alters, the reader’s existing world knowledge. The present paper will address this issue. We will argue that the degree of incorporation is affected both by task variables and by individual differences among subjects.

VISUAL PERCEPTION

Pennsylvania West, Friday afternoon, 1:00-5:40

Chaired by Benjamin Wallace, Cleveland State University

1:00-1:15 (300)

Separate Effects of Magnification and Concomitant Truncation of Surround on Perception of Interobject Distance. ERNEST A. LUMSDEN, *University of North Carolina, Greensboro*—A 2×2 factorial design requiring judgments of interobject distance was utilized which separated the effects of magnification per se from the concomitant truncation of the visual field normally effected by optically produced magnification. Only the main effect of magnification was significant, and this was much less than the decreases optically specified by the decreased perspective and texture gradients.

1:20-1:30 (301)

Depth and Subjective Contours Revisited. STANLEY COREN, *University of British Columbia*, & CLARE PORAC, *University of Victoria*—It has been suggested that implicit depth cues contribute

to the formation of subjective contours. In a direct test, subjects adjusted a binocularly viewed marker until it appeared to be at the same depth as various parts of a monocularly viewed subjective contour configuration. In all cases, the subjective contour appeared closer to the subject than its background.

1:35-1:50 (302)

Utilitarian Contour Features in Pattern Perception. ROBERT PASNAK & ZITA TYER, *George Mason University*—The discrimination of very complex random polygons was investigated. Subjects had a tendency to base discrimination on the most complex portions of the contours. This tendency was not easily unlearned. The longest line segments were favored in retrieval processes. Neither type of contour was favored in attention.

1:55-2:05 (303)

The Effects of Divided Attention on Pattern Discrimination with Real and Subjective Contour Figures. WALTER S. PRITCHARD, MARVIN SCHWARTZ, RICHARD P. HONECK, & JOEL S. WARM, *University of Cincinnati* (read by M. Schwartz)—RTs to same/different discriminations were obtained for pairs of real or subjective contour forms. RTs were longer when an STM load was imposed than when such a load was absent, and this effect was notably greater with subjective contour than with real contour stimuli. The results support a “top-down” view of subjective contour perception.

2:10-2:25 (304)

Perceived Depth, Not Structural Relevance, Affects Object Superiority. MARK LANZE, NAOMI WEISSTEIN, *SUNY, Buffalo*, & JUDITH RICH HARRIS, *New Providence, New Jersey* (read by N. Weisstein)—In three experiments, subjects rated stimulus sets for overall three-dimensionality of each stimulus and for structural relevance of the target line in each stimulus. In two experiments in which structural relevance was held constant, subjects' target identification accuracy varied with rated three-dimensionality. In a third experiment, in which three-dimensionality and structural relevance varied independently, target identification accuracy varied with three-dimensionality but not with structural relevance.

2:30-2:45 (305)

Fixation Point Location and the Object-Line Effect. BRUCE EARHARD, *Dalhousie University*—The object-line effect (Williams & Weisstein, 1978) can be eliminated by positioning the fixation point at concentrations of line detail. Proximity of line detail to fixation was held constant and fixation point location was varied to examine the influence of spatial location of fixation per se, and attentional factors on the effect.

Chaired by James R. Antes, University of North Dakota

3:00-3:20 (306)

Autokinesis and Gaze Stability. H. LEIBOWITZ, *Pennsylvania State University*, R. B. POST, *University of California, Davis*, C. SHUPERT, *Pennsylvania State University*, & J. DICHGANS, *University of Tübingen*—Data are presented in support of the hypothesis that autokinesis results from the activation of the pursuit eye-movement system in the interest of maintaining fixational stability. The expectations of the observer play a major role in determining the direction of reported autokinesis. Gaze deviation is not a factor except for values that approach anatomical limits.

3:25-3:40 (307)

Temporal Buildup of Global and Local Information. P. J. G. KEUSS, *Free University, Amsterdam*, & L. C. BOER, *Institute for Perception TNO, Soesterberg*—The study provides several speed-accuracy tradeoff functions to probe Stroop-like interference between “global” and “local” features of a display. Opposite to the “global precedence” notion, the data indicate that in the temporal buildup of information comparable Stroop-like interference is found under “judge global” as well as “judge local” instructions.

3:45-4:00 (308)

The Perception of Unitary and Disjunctive Stimuli. JOHN CERASO, GEORGE LASCARIS, & ROBERT VELK, *Rutgers University, Newark*—Unitary and disjunctive stimuli, whose effects in memory experiments were well established, were studied in a perceptual task. We hypothesized and found that attributes of unitary events would be apprehended simultaneously, while attributes of disjunctive events would be alternately apprehended. The focus of our interest was the relation of perception and memory.

4:05-4:15 (309)

A New Dynamic Visual Illusion: The Bending Hourglass. JAMES T. WALKER, *University of Missouri, St. Louis*—A white hourglass moving laterally against a black background appears bent, the narrow portion apparently lagging behind its true position. A black hourglass moving against a white background produces no illusory bending. These effects are explained in terms of the differential visual persistence of the wide and narrow portions of an hourglass figure.

4:20-4:35 (310)

Factors Affecting Transfer of Decrement in the Mueller-Lyer Illusion. CLARE PORAC, *University of Victoria*, & STANLEY COREN, *University of British Columbia*—Mueller-Lyer configurations were altered in simple physical ways (for example, in color and orientation) and transfer of illusion decrement between similar and dissimilar variants was explored. It was found that some alterations of the physical stimulus did not affect the degree of decrement transfer, while other changes significantly reduced the transfer of decrement training.

4:40-5:00 (311)

Perceptual Plane Geometry: Mentally Extending an Angle's Sides Beyond Their Intersection. DANIEL J. WEINTRAUB, *University of Michigan & NASA Ames*, & SUSANNAH BROWN, *London School of Economics and Political Science*—The task: positioning a dot to be one line length beyond the vertex by mentally extending one line segment of the angle and, later, the other. Eight angles, variously oriented, provided errors attributable to perceptual extrapolation/line orientation/angle size. Responses can be modeled by a set of theoretically meaningful broadly applicable additive terms.

5:05-5:15 (312)

A Face Superiority Effect. DEAN G. PURCELL, *Oakland University*, & ALAN L. STEWART, *Stevens Institute of Technology*—The face superiority effect was investigated under conditions designed to eliminate or minimize the contribution of memory. Face superiority was obtained in three experiments that employed backward pattern masking. Obtaining the effect without a mask was task dependent.

5:20-5:40 (313)

Triangulating the Homunculus that Recognizes Patterns Traced on the Skin. MICHAEL KUBOVY, DAVID TUROCK, & THOMAS BEST, *Rutgers University*—When the palm of your hand faces your closed eyes and a “d” is traced on it, you perceive it as a “d.” When the back of your hand faces your closed eyes and the exact same points of your palm are stimulated again, you perceive a mirror image of the “d.” The point of transition between these two interpretations of the same proximal stimulus was used in the present experiment to locate by triangulation the position of a homunculus that recognizes such patterns.

(314)

(Read by title only)

Coordinate Systems in the Long-Term Memory Representation of Three-Dimensional Objects. PIERRE JOLICOEUR & STEPHEN KOSSLYN, *Harvard University*—Prior research has shown that people sometimes use viewer-centered representations of visual stimuli in memory. Marr and Nishihara (1978), however, suggested that recognition memory for three-dimensional shapes should utilize only object-centered representations. A series of experiments provides evidence suggesting that people use both viewer-centered and object-centered representations to store the shapes of three-dimensional objects in long-term memory.

LETTER AND WORD PROCESSING I
Grand Ballroom West, Friday afternoon, 1:00-5:30

Chaired by Doris Aaronson, New York University

1:00-1:15 (315)

Testing Feature Models of Letter Recognition. JOHN S. MONAHAN, *Central Michigan University*—Five sets of letters generated from Bouma's, Gibson's, Geyer's, and Lindsay and Norman's feature lists were tested under speeded classification for fit with Pandemonium. Subjects easily identified the classifying aspects, yet the data failed to match Pandemonium predictions. A holistic model based on similarity rather than on features is supported.

1:20-1:40 (316)

Development of Perceptual and Associative Interference. G. ROBERT GRICE, LYN CANHAM, & CHARLES SCHAFER, *University of New Mexico*—Effects of perceptual and associative interference were studied in a letter-identification RT task using identical, irrelevant, and response-incompatible noise letters in the display. Perceptual interference occurred early and had a constant effect throughout the RT distribution. Associative interference develops later, gradually increases, and then diminishes. Analysis is in terms of variable criterion theory.

1:45-2:00 (317)

A Signal Detection Analysis of Perceptual Sensitivity and Response Bias Indicators of Attentional Set in Word Discrimination. PHILIP GASQUOINE, MITCHELL L. KIETZMAN, GAIL KUSLANSKY, JOHN GALLUP, & GLORIA KASS, *Queens College of CUNY* (read by M. L. Kietzman)—Attentional set effects on word discrimination were investigated by presenting subjects initially with set words and homonyms of set words followed by words and nonwords (anagrams of the words), which were to be discriminated. A signal detection analysis showed both perceptual (d') and response (β) components to be influenced by attentional set.

2:05-2:20 (318)

On Beating Dead Horses: More About Word Processing in the Visual System. THOMAS H. CARR & TRACY L. BROWN, *Michigan State University*—In two same-different matching experiments, we sought the limits of the claim that meaning and familiarity do not influence the formation of a visual code representing a word. We did not find them. We might be close, however: A word advantage over pseudowords may be more *likely* under conditions of visual degradation, though it does not yet appear to be any *larger* under those conditions. Various explanations will be considered.

2:25-2:40 (319)

Feature-Specific Inhibition vs. Perceptual Independence in Letter Identification. JEFFREY SANTEE, *Bell Labs*, & HOWARD EGETH, *Johns Hopkins University* (read by H. Egeth)—Some studies have shown that letters in multiletter displays are encoded independently, while other studies have shown that encoding of display elements may be inhibited by adjacent similar elements. Our research shows that the discrepancy may be due to the type of perceptual limitation used to control response accuracy. Inhibitory interactions were found when premasks and/or postmasks were used, whereas independent encoding was found under energy-limited conditions (i.e., brief exposure with no masks).

2:45-3:05 (320)

Lexical Constraint: Redefined and Resurrected. KENNETH R. PAAP & SANDRA L. NEWSOME, *New Mexico State University*—Two-letter recognition experiments using energy masks show significant advantages of words over pseudowords (+2.7%) and words over anagrams (+8.8%). A model that uses single-letter confusion matrices to activate both letter and word units precisely predicts the obtained differences. The model also predicts performance on specific stimulus items and tests various explanations for why cuing (alternatives precued or postcued) and masking (energy or pattern) produce a crossover interaction that does not affect the magnitude of the WSE.

Chaired by Margaret Schadler, University of Kansas

3:20-3:40 (321)

An Alternative Look at Experiments with Words Presented in Alternating Cases. OVID J. L. TZENG, *University of California, Riverside*, DAISY L. HUNG, *University of California, Irvine*, KATHRINE MALLEY, *University of California, Riverside*, & JEAN DREHER, *University of Maryland*—In the past, experiments with words presented in the format of mixing upper- and lowercase letters have been conducted to gather evidence for visual reading in skilled readers. We will critically examine the conceptualization behind these experiments. Two new experiments will be reported to show that poor readers in fact suffer more than good readers when the visual patterns of the presented words are distorted by mixing upper- and lowercase letters.

3:45-4:05 (322)

Semantic Access Under Conditions That Do Not Permit Discrimination of Letter Case. LLOYD L. AVANT & ALICE T. WOODS, *Iowa State University*—Data from two paradigms suggest that initial segments of semantic analysis can proceed under forward and backward masking conditions that deny discrimination of letter case. A lexical decision task showed that, with exposure durations individually adjusted to produce chance-level discrimination of letter case, subjects performed 10% better in determining whether letter string pairs were words or nonwords. In a companion duration judgment task, in which stimuli were never recognized, lexical status of letter-string pairs influenced duration judgments, but letter case did not.

4:10-4:30 (323)

The Stability and Generality of Sentence Context Effects on Word Recognition Speed. KEITH E. STANOVICH, *Oakland University*, & RICHARD F. WEST, *James Madison University*—Several previous studies have found that the presence of a sentence context affects the speed of word recognition. In a series of studies, stimulus quality, word difficulty, strategic set, response mode, and timing parameters were manipulated in order to assess the stability and generality of such sentence context effects.

4:35-4:50 (324)

Effects of Context on the Processing of Visual Word Strings. PAUL G. ROSSMEISSL, *U.S. Army Research Institute*, & JOHN THEIOS, *University of Wisconsin* (read by J. Theios)—Two experiments investigated changes in printed word recognition times as a function of simultaneously displayed word contexts. The results indicated that word recognition times can be influenced by both syntactic and semantic factors, that such syntactic and semantic effects tend to accrue incrementally, and that the observation of contextual effects can depend on both the details of the experimental procedure and the subjects' processing strategies.

4:55-5:10 (325)

Effect of Noise Elements on Visual Classification: The Joint Contribution of Facilitative and Disruptive Processes in "Cascade" or "Continuous Flow." JOHN H. FLOWERS & NOREEN S. WILCOX, *University of Nebraska, Lincoln*—Visual noise elements which surround a target may cause either facilitation or interference with target classification, depending on experimental context. Discrepancies exist among previous studies, particularly in the effect of noise identical to the target. Our present data show systematic changes in facilitation/interference patterns as a function of onset asynchrony. These changes appear to illustrate differing time courses of several overlapping processes, each contributing to overall performance.

5:15-5:30 (326)

Holistic Processes In and After Mental Transformation. LYNN C. ROBERTSON, *VA Medical Center, Martinez, California* (sponsored by Eleanore Rosch)—"Normal" or "reflected" large letters (global) were created from the repetition of "normal" or "reflected" small letters (local) and presented in five orientations about the picture plane. Subjects responded as to whether a normal or reflected letter was present at the global and/or local levels. Reaction times increased with increasing disparity from upright and were faster to global than to the local forms, independently of

orientation. Results suggest that (1) transformations of global and local levels occur holistically, and (2) decision about the global form precedes that about local form.

LETTER AND WORD PROCESSING II Grand Ballroom West, Saturday morning, 8:00-12:10

Chaired by John S. Monahan, Central Michigan State University

8:00-8:20 (327)

A Word Class Encoding Model for Reading Times. STEVEN FERRERES, *Bell Laboratories*, & DORIS AARONSON, *New York University* (read by D. Aaronson)—Adults and 5th graders read sentences for immediate comprehension or complete retention. The words or word classes they read can be organized hierarchically in terms of values on physical and psychological dimensions. The reading times for these lexical classes can be described by a linear function of word length in syllables, word frequency, and sentential location relative to phrase boundaries.

8:25-8:45 (328)

Detection with Misspellings: A New Procedure to Investigate Reading Units. ALICE F. HEALY, *University of Colorado*, & ADAM DREWNOWSKI, *Rockefeller University*—Letter detection and proofreading procedures were combined by requiring subjects to search for the letter “t” in passages that contained some misspellings. Error rates decreased when the words containing “t” were misspelled. This effect was most dramatic for the word “the,” which also showed a small decline in errors when a neighboring word was misspelled. These results suggest that the word “the” may be read as part of a unit that contains more than one word.

8:50-9:10 (329)

Outside-to-Inside Processing of Letters in Words and Nonwords. JAMES C. JOHNSTON, *Bell Laboratories*—Two methods assess the order in which letters are processed in short printed words and nonwords. The methods depend on asynchronous presentation in one critical letter position of a single letter, or of two consecutive letters. Results show that, for both words and nonwords, outside letters are processed 10-15 msec earlier than inside letters for both words and nonwords.

9:15-9:30 (330)

Lateral Masking as a Function of Spacing. GEORGE WOLFORD & LAWRENCE J. CHAMBERS, *Dartmouth College*—The probability of identifying a tachistoscopic target is lowered if other characters are presented simultaneously. Some investigators have stressed the importance of grouping principles in determining the strength of lateral masking, while others have stressed the role of sensory variables. Present research shows that the relative importance of these two alternatives depends on intercharacter spacing.

9:35-9:50 (331)

Graphemic and Phonemic Processes in Backward Visual Masking of Words. CHARLES A. PERFETTI & LAURA BELL, *University of Pittsburgh*—The graphemic and phonemic relationships between word targets and following word masks were varied to examine possible automatic phonemic activation in word identification. Based on the reduction of masking effects due to target-mask similarity and target duration, the results suggest a large effect of graphemic similarity and a smaller and later occurring effect of phonemic similarity independent of reading skill.

9:55-10:10 (332)

The Development of Automatic Word Recognition in Interference Paradigms. MARGARET SCHADLER & CHRISTINA L. JORDAN, *University of Kansas*—Second and 4th grade children and adults were tested on a variation of the picture-word interference test in which the responses were yes/no, depending on whether or not the picture was of a dog. Interference was maximal for 4th graders. Theoretical implications will be discussed.

Chaired by Thomas H. Carr, Michigan State University

10:25-10:40 (333)

Feature Loss vs. Process Interruption: A Study of Visual Masking. D. J. K. MEWHORT, R. GURNSEY, *Queen's University, Kingston*, & A. J. CAMPBELL, *Bell-Northern Research Ltd.*—Two techniques for reducing tachistoscopic report were compared. In one, letter strings were brightened dots on a CRT followed by a string of mask characters. In the other (the collage technique), the display was split into two parts, each with half of the dots associated with each character. Overall levels of performance were equated across the techniques. Nevertheless, the masking and the collage technique reduced performance differently: The collage technique affected basic feature data, while the mask interrupted spatial operations acting upon a postcategorical representation.

10:45-11:00 (334)

Length Effects in Word Recognition: We Is Better than I, but Worse than You or Them. ARTHUR G. SAMUEL & JAN P. H. van SANTEN, *Bell Laboratories* (sponsored by Jim Johnston)—In brief presentations, words are better reported than single letters. The present study replicated Wheeler's (1970) finding that the words “I” and “A” do not enjoy this word advantage. This result was shown to be a manifestation of a more general length effect: Performance improved for words as a function of length (up to three or four letters); no such effect obtained for nonwords.

11:05-11:20 (335)

Recognition Time for Letters and Nonletters as a Function of Retinal Location and Array Length. MILDRED MASON, *Iowa State University*—Single letters and Greek symbols were similarly affected by retinal location. Multiletter and multisymbol arrays were differentially affected by array length, with the former yielding M-shaped and the latter U-shaped retinal location functions. Also, with retinal locus controlled, letter recognition time was equivalent in three- and five-letter arrays, whereas increasing array length significantly slowed down recognition time for symbols. Additional experimental manipulations indicate that the elevated end effect frequently obtained with letter stimuli cannot be attributed to structural variables.

11:25-11:45 (336)

Order Information in Perceptual Matching. ROGER RATCLIFF, *Yale University*—A model for the perceptual matching task is presented that consists of a submodel for the memory representation of the stimulus letter strings and a random walk retrieval model. The model is shown to account for reaction time and accuracy and for performance when the order of letters is changed from the study to the test strings.

11:50-12:10 (337)

The Alphabet Mnemonic and Visual-Imagery Mediation. FRANCIS S. BELLEZZA & JOHN C. DAY, *Ohio University*—Letters of the alphabet were rated high in visual imagery, but they were not effective mnemonic cues. It is suggested that concreteness is a better indicator of mnemonic effectiveness than rated imagery, because people have greater prior experience of physical objects interacting compared with letters and objects.

DEVELOPMENT OF PROBLEM SOLVING AND PERCEPTION

Grand Ballroom East, Saturday morning, 8:00-12:30

Chaired by Margaret Hagen, Boston University

8:00-8:15 (338)

Children's Strategies for Solving Simple and Complex Addition Problems. MARK H. ASHCRAFT & MARY SUE HAMANN, *Cleveland State University*—Students from grades 1, 4, 7, and 10 solved simple and complex mental addition problems in two tasks,

timed verification and verbalized solution. The evidence for counting, fact retrieval, and various "principled" strategies was charted as a function of age and task, revealing a unique mixture of processes at each grade level.

8:20-8:40 (339)

Using What You Know: Consistency and Adaptability in Problem Solving Strategies. HARRY BEILIN & ALICE KLEIN, *City University of New York*—Research with children from 4 to 11 years of age sought to determine their naturally occurring strategies for solving geometry problems which involved the congruence of triangles under three types of transformations (slide, flip, and turn). Analyses of strategy deployment across six tasks revealed that children at all ages manifest a set of strategies which, although uniquely adapted to task demands, nevertheless reflect a marked consistency in their underlying knowledge of congruence.

8:45-9:00 (340)

Tangram Solutions by Adults and Children. MITCHELL ROBINSON & DAVID KLAHR, *Carnegie-Mellon University* (read by D. Klahr)—Tangram problems require the placement of N standard pieces (triangles, square, parallelogram) inside a specified contour. Tangram moves are not sequence constrained, as in Tower of Hanoi or river-crossing problems (there are $N!$ possible minimum-path solution sequences). Preschoolers differ from adults in piece-placement criteria, bad move detection, and error recovery. However, even young children elaborate sparse problem instructions into task-appropriate heuristics.

9:05-9:20 (341)

Diagnosing the Reasoning Errors of Children. JANET CAPLAN, SANDRA SCARR, & BERNARDO FERDMAN, *Yale University* (sponsored by J. B. Overmier)—This research attempts to diagnose the nature of reasoning errors in children who test poorly. Two diagnostic tests, a verbal classification test and a verbal analogy test, were constructed. Each test consisted of sets of items representing various categories. The choice of categories was based on relevant findings from cognitive development research. Results from these tests are being used to develop a reasoning training program for children.

9:25-9:45 (342)

Young Children's Understanding of Dimensions. LINDA B. SMITH, *Indiana University, Bloomington*—Preschoolers' (2-, 3-, and 4-year-olds) understanding of two levels of relations was examined. The first level was that of shared *attribute*—a relation held between objects (e.g., two objects are both red). The second level was that of a shared *relation*—a relation held between sets of objects (e.g., a set of red objects and a set of blue objects are both organized by the relation "same color"). A follow-the-leader classification task was used to assess children's attention to the two levels, and a "Simon-says" task was used to assess children's linguistic knowledge of the terms that refer to specific relations at the two levels.

9:50-10:05 (343)

The Effect of Labeling the Relevant or Irrelevant Dimensions on Discrimination Learning and Transfer. TRACY S. KENDLER, *University of California, Santa Barbara*—The probability that choice behavior will be controlled by the previously relevant dimension is log function of age between 3 and 18 years. The parameters of that function have been shown to depend on a number of contextual or testing variables. For instance, the present research shows that labeling the cues on the relevant dimension during learning primarily affects the slope of the function, while labeling the cues on the irrelevant dimension primarily affects the intercept. Implications of these results for the nature and development of the underlying processes will be discussed.

Chaired by Rachel Joffe Falagne, Clark University

10:20-10:35 (344)

Congruity and the Development of Associative Priming. MARC MARSCHARK & MARGARITA AZMITIA, *University of North Carolina, Greensboro*—The development and organization of associative memory was examined using a bipolar symbolic com-

parison task. Students in grades 2, 4, 6, 10, and university made size judgments on lists of animals and objects. Patterns of RTs, congruity effects, and marking effects indicated greater flexibility but smaller priming effects with increasing age.

10:40-11:00 (345)

Children's Memory for Spatial Locations: Matching-Mismatching Encoding and Retrieval Contexts. JAMES F. HERMAN, *Washington University* (sponsored by Leonard Green)—In three experiments, children encountered large-scale spatial layouts and were then asked to recall object locations from the same encounter perspective (0 deg) or a different perspective (180 deg). Accuracy was related to the complexity of the spatial layout. Developmental differences across recall conditions were attributed to increasing ability over age to process spatial information in working memory.

11:05-11:15 (346)

Barrier Effects and Processing Demands. LYNN S. LIBEN, *University of Pittsburgh*, & NORA NEWCOMBE, *Temple University*—On a large-scale spatial task, Kosslyn, Pick, and Fariello (1974) found that children exaggerated distances between objects separated by any barrier, whereas adults exaggerated across opaque barriers only. Adults were tested here with a space containing twice as many objects. Qualified barrier effects were evident for both transparent and opaque barriers, suggesting the importance of developmental differences in processing capacity.

11:20-11:35 (347)

Verbally Guided Visual Search in Reflective Children. NANCY RADER, CAMPBELL LEAPER, & MARILYN C. WELSH, *UCLA*—Subjects were 48 8- to 10-year-old children identified as impulsive or reflective. Subjects were administered half the Zelniker and Jeffrey modified MFIT with a concurrent word-shadowing task and half the test without a concurrent task to investigate the role of verbal processes in controlling visual search. The word-shadowing task was found to be more disruptive for reflective children.

11:40-11:55 (348)

Aging: The Dependence of Cognitive Performance on Perceptual Functioning. ROBERT H. POLLACK & DAVID J. SCHWARTZ, *University of Georgia*—Examination of the performance by 72 female subjects aged 20-79 years on two tasks of embeddedness indicates that: (1) embeddedness is not a unitary stimulus dimension, and (2) high-level cognitive performance in older subjects can be masked by a deficit in figure-ground segregation induced by camouflage.

12:00-12:15 (349)

Infants Can Enumerate Objects and Events. PRENTICE STARKEY, *University of Oregon*, & ELIZABETH SPELKE, *University of Pennsylvania* (sponsored by Rochel Gelman)—In each of four experiments, 6- to 8-month-old infants detected numerical correspondences between a visible arrangement of objects and an audible sequence of sounds. In order to do so, infants must abstract away from the modality of presentation (visual or auditory) and the type of items to be enumerated (objects or events). We conclude that infants must be granted some capacity to enumerate objects and events.

12:20-12:30 (350)

Stochastic Models of Inexpert Counting. ALEX CHERRY WILKINSON, *University of Wisconsin* (sponsored by Arthur Glenberg)—Children who had partial knowledge of how to count were assessed twice with several counting tasks. Stochastic models of variance across tasks and across assessments suggested how the children's knowledge was cognitively structured.

PSYCHOLINGUISTICS
Pennsylvania West, Saturday morning, 8:00-12:15

Chaired by Ruth S. Day, Duke University

8:00-8:15 (351)

Generalized Semantic Networks. ROGER W. SCHVANEVELDT, *New Mexico State University*, & FRANCIS T. DURSO, *University of Oklahoma*—Several models of semantic memory assume a

generalized network as the underlying structure. However, the creation of networks typically relies upon introspections or upon scaling techniques that either do not form a network or impose a hierarchical constraint on the network. We are developing algorithms that produce generalized networks from similarity data. Both hierarchical and nonhierarchical aspects of the structure are revealed by the algorithms.

8:20-8:40 (352)

The Mental Representation of Meaning. TIMOTHY P. McNAMARA & ROBERT J. STERNBERG, *Yale University* (read by R. J. Sternberg)—Three experiments compared alternative contemporary models of the mental representation of word meanings. Three different kinds of tasks—word-attribute generation, word-attribute ratings, and speeded forced-choice comparison of attribute-based definitions of words—were used to distinguish among models. A single model provided the best fits to group and individual-subject data in all three experiments.

8:45-9:00 (353)

Theme Activation and Linguistic Integration. MICHAEL P. TOGLIA, *SUNY, Cortland*, & MICHAEL L. KAMIL, *University of Illinois, Chicago Circle* (sponsored by David F. Berger)—The role of thematic information was examined in the semantic integration paradigm. Theme recall results indicated that (1) memory representations appeared to be less integrated following a blocked than following a random presentation, and (2) theme retention was better immediately after acquisition than after a week. Correspondingly, recognition performance in the blocked-delayed conditions revealed that the linear effect was present only when themes were activated. An integration interpretation is evaluated.

9:05-9:25 (354)

A Structure-Mapping Theory of Metaphor and Analogy. DEDRE GENTNER, *Bolt Beranek and Newman*—It is proposed that when people interpret complex analogy and metaphor, they preserve relational information over object attribute information. They implicitly seek identical relationships among dissimilar objects. In Experiment 1, people first described objects and then judged and interpreted metaphors about those objects. Aptness ratings were correlated with relationality of the interpretations but not with attributionality; comparison of forward and reversed metaphors with their object descriptions revealed no effects of salience imbalance. Experiment 2 revealed a developmental increase in the amount of relational information in metaphor interpretations; attributionality remained constant.

9:30-9:50 (355)

Priming Metaphors: Literal Activation of Figurative Meaning. PATRICIA GILDEA & SAM GLUCKSBERG, *Princeton University* (read by S. Glucksberg)—We primed poor metaphors by presenting a related sentence immediately before each metaphor (e.g., *Some winters are cold* primed *All marriages are iceboxes*). These priming sentences effectively increased the comprehensibility of poor metaphors, presumably by activating the relevant ground concept (e.g., “cold” for the *marriages-iceboxes* statement). It made no difference if the priming sentences used the literal or figurative senses of the relevant concepts, suggesting that literal and figurative comprehension processes share common properties.

9:55-10:10 (356)

What Kind of Pitcher Can a Catcher Fill? Priming in Sentence Comprehension. LYNNE REDER, *Carnegie-Mellon University*—Comprehension time and interpretation errors were collected for sentences that ended in an ambiguous noun that had been disambiguated by selectional restrictions. However, the subject of the sentence and/or relative clause could prime either the appropriate or inappropriate meaning of the final word. Data support a threshold model of concept activation.

Chaired by Richard M. Weist, SUNY, Fredonia

10:25-10:40 (357)

Use of Syntactic and Semantic-Associative Information in Comprehending Words in Sentences. MIRIAM W. SCHUSTACK, *Carnegie-Mellon University* (sponsored by John R. Anderson)—

How is semantic and syntactic information used in processing noun-verb ambiguities (e.g., *steer, flea/flee*) in syntactically disambiguating sentences? The semantic-associative context of the sentence affects the accessibility of each meaning of the ambiguous word before the word occurs. Comprehension, however, is asymmetrically sensitive to differential accessibility of meanings: Appropriate semantic bias facilitates comprehension, but misleading bias does not hinder it.

10:45-11:00 (358)

The Real-Time Processing of Literal and Nonliteral Language. DAVID A. SWINNEY, *Tufts University*—The nature of, and processes involved in, the retrieval of meanings for grammatical idioms and metaphors in fluent speech is examined with cross-modal lexical priming and other real-time tasks. The temporal course of the availability of both nonliteral and literal interpretations for these units is discussed in terms of a model of “normal” speech segmentation and comprehension.

11:05-11:15 (359)

Reading Picture Puns. MARY C. POTTER, *M.I.T.*—When a pictured object replaces a word in an RSVP sentence, it is normally easy to understand the sentence. If the replaced word is a homonym and the picture illustrates the inappropriate meaning, however, the resulting pun is difficult to understand. This is consistent with other evidence that, even when it is presented as part of a sentence, a picture is understood without being named.

11:20-11:35 (360)

Effects of Language of Presentation on Memory for Words. MICHAEL J. WATKINS & ZEHRA PEYNIRCOĞLU, *Rice University*—Subjects fluent in both English and Turkish studied a list of either English or Turkish words. They were then cued with fragments of (i.e., letters from) either the studied words or their translations. Cuing for the translations was less effective than for the originals and no more effective than for words that had not been presented.

11:40-11:55 (361)

Reading Comprehension Processes in Polish and English. JOSEPH H. DANKS, *Kent State University*, & IDA KURCZ, *University of Warsaw*—Syntactic information is marked primarily by inflections in Polish, but by word order in English. Reading comprehension processes were assessed by measuring oral reading disruptions that resulted from textual violations. Polish readers focused on individual words more than did English readers. Reading comprehension processes reflected the different cognitive demands imposed by each language.

12:00-12:15 (362)

Lexical Decision and Naming in Serbo-Croatian Are Necessarily Phonological. LAURIE FELDMAN, *Haskins Laboratories* (sponsored by J. A. Scott Kelso)—The nature of the two alphabets of Serbo-Croatian sometimes allows that a given word be phonologically bivalent in one alphabet and phonologically unequivocal in the other. In a series of experiments, I show that alphabetic readers are slower in naming and in lexical decision on phonologically bivalent forms than on the unequivocal alphabetic transcription of the same words and that this effect is as strong for words as for pseudowords. In contrast to the claims for English, these data suggest that phonological mediation is not optional in Serbo-Croatian.

ANIMAL BEHAVIOR

Constitution/Independence, Saturday morning, 8:00-12:15

Chaired by Alan Kamil, University of Massachusetts

8:00-8:20 (363)

Should We Be Sensitive About Critical Periods? ROBERT T. BROWN, *University of North Carolina, Wilmington*—The way in which early experience may, relative to later experience, effect irreversible changes in human and nonhuman behavior is a subject of enduring controversy. Areas of behavior in which critical periods have been suggested to operate will be briefly reviewed and a new integrative theory of critical periods described.

8:25-8:40 (364)

On Pigeons, Mirrors, and Self-Awareness. GORDON G. GALLUP, JR., SUNY—Albany—Epstein, Lanza, and Skinner (1981) have argued that because pigeons can be conditioned to respond to marks on themselves in mirrors, self-recognition in chimpanzees and humans is merely a by-product of environmental factors. The present paper represents a critique of the Epstein et al. study, and concludes that since their procedures and conclusions are flawed by logical as well as methodological problems, their data have no bearing on the issue of self-awareness.

8:45-8:55 (365)

Evidence of "Kin Selection" in the Snow Monkey, *Macaca fuscata*. DOUGLAS K. CANDLAND, Bucknell University, & NANCY L. HOAG, Kent State University—Theories emphasizing kin selection assume that animals are able to distinguish some characteristics of one another, or otherwise it would not be possible to behave differently toward one another in ways correlated with genetic similarity. Evidence is presented that, among *Macaca fuscata*, such differences, expressed by spatial proximity, may be found into the third generation.

9:00-9:10 (366)

Sex and Memory in the Male Rat. D. H. THOR & W. R. HOLLOWAY, E. R. Johnstone Training & Research Center—Male rats with and without prior copulatory experience were compared on performance in identity recall of a juvenile conspecific. Males with copulatory experience demonstrated significantly better recall than males lacking copulatory experience. The results are interpreted as suggesting that copulation enhances memory for individual identity recognition, thus facilitating territorial behaviors.

9:15-9:30 (367)

Parameters of Conditioned Sexual Arousal. EDWARD ZAMBLE & JOHN MITCHELL, Queen's University, Kingston—A previous study demonstrated an increase in the speed of copulation after male rats were given conditioning trials using a signal for access to a female. Several studies will be reported here to show functions for acquisition extinction and CS-US interval, all indicating a robust effect.

9:35-9:50 (368)

Mating and Paternity in *Betta splendens*. PAUL M. BRONSTEIN, Trenton State College—Male Bettas provoke a vertical-bar display among females; females release both nest fixation and courtship among males. Reproduction is disrupted by a male intruder, while females have little effect on a breeding pair. Males defend nest sites against adults by fighting and display. Eggs and fry are defended by the male's preventing lethal fungus growths.

9:55-10:05 (369)

Comparison of Activity Level in Young and Old Male Gerbils. TERRY F. PETTIJOHN, EDWIN R. SHIRLEY, & CHRIS E. PATERSON, Ohio State University, Marion—The study examined activity level and rearing frequency in 20 3-month-old and 20 12-month-old male Mongolian gerbils. Testing was done in a 1-m square open field with 25 equal squares. Young animals had a higher activity level, while older gerbils showed higher frequencies of rearing behavior. Both groups decreased activity with time, but maintained stable rearing frequencies.

Chaired by Robert D. Hall, Worcester Foundation

10:20-10:35 (370)

Effects of Litter Period Environmental Stability Upon Responses of Spiny Mice to New Environmental Contexts. JOSEPH L. DeSANTIS & ETHEL TOBACH, American Museum of Natural History (read by E. Tobach)—Spiny mice reared in stable environments spent more time locomoting ($p = .057$) and acting upon environmental structures ($p = .015$) than those reared in changeable ones when placed into a new environment upon weaning. Prior familiarity with a structure determined the time spent by animals investigating structures in the new context.

10:40-10:55 (371)

Ducklings' Perceptual Specificity of Mallard Maternal Alarm Calls. DAVID B. MILLER, University of Connecticut—Field observations and laboratory studies have revealed that mallard ducklings reliably "freeze" and cease vocalizing upon hearing the mallard maternal alarm call. Experiments with maternally-naïve ducklings have shown that variations of a particular acoustic feature—repetition rate, or number of notes per second—differentially affect behavioral inhibition vs. excitation. Ducklings are selectively tuned to a narrow range of slow repetition rates that affect vocal and locomotor inhibition.

11:00-11:15 (372)

Suppression of Roosttime Restlessness in Captive Flocks of American Robins. LEONARD A. EISERER, Elizabethtown College—The presence of conspecifics suppressed roosttime restlessness in captive robins. However, this social inhibition of restlessness at dusk was mitigated by aggression among males.

11:20-11:30 (373)

REM Sleep Deprivation Inhibits Fear in Rats. MARY EWIG, SCOTT BARTON, JOE REYES, & ROBERT A. HICKS, San Jose State University (read by R. A. Hicks)—REM-sleep-deprived male rats and groups of untreated control animals were tested twice (i.e., immediately after treatment and then after recovery from REM deprivation) in one of two test chambers which varied in fear-evoking potential. The results indicate that REM sleep deprivation temporarily inhibits fear in a manner that is related to the salience of the fear-evoking potential of the test environment.

11:35-11:50 (374)

Cadaverine and Putrescine Initiate the Burial of Dead Conspecifics by Rats. JOHN P. J. PINEL, BORIS GORZALKA, & FERIAL LADAK, University of British Columbia—Rats buried bodies of conspecifics dead for more than 40 h but not those dead for less than 5 h. They also buried anesthetized conspecifics or wooden dowels sprinkled with putrescine or cadaverine. However, rats rendered anosmic by intranasal injections of zinc sulfate did not bury aged carcasses or dowels sprinkled with putrescine or cadaverine. Thus, the burial of dead conspecifics by rats appears to be under the control of these two polyamines characteristic of decaying tissue.

11:55-12:15 (375)

The State of Comparative Psychology. JOSEPH H. PORTER, SUZANNE B. JOHNSON, & R. GRAY GRANGER, Virginia Commonwealth University—In 1950, in "The Snark was a Boojum," Frank Beach warned that comparative psychology had "suddenly and softly vanished away." The present study examined articles in *JCPP* from 1961 through 1976, and articles in eight psychology journals for the single year 1980. The data replicated Beach's findings that the Norway rat is the experimental subject in more than 50% of the articles examined. The implications of these findings for the current state of comparative psychology will be discussed.

PSYCHOPHYSICS AND SCALING

Pennsylvania East, Saturday morning, 8:00-12:10

Chaired by Jozef Zwislocki, Institute for Sensory Research

8:00-8:20 (376)

Magical Mystery Tour of Magnitude and Category Matching. LAWRENCE M. WARD, University of British Columbia—Sequential dependencies were examined in data collected by Stevens and Marks' method of magnitude matching and by a variant, category matching. Assimilation of current to previous responses occurred independently of stimulus modality, but contrast with previous stimuli occurred only within a particular stimulus modality. These and other results imply that two independent mechanisms mediate such sequence effects.

8:25-8:40 (377)

Pitch Contrast Effects in Impaired Hearing. WILLARD LARKIN, University of Maryland—Individuals with bilateral

cochlear impairment, but with excellent ability to judge pitch, adjusted brief sinusoids in an A-B-X pitch-matching paradigm. The contrast effect of the leading tone, A, on the pitch of the test tone, B, was greatly exaggerated, in comparison with normal ear response. Implications for the nature of frequency resolution in cochlear impairment are discussed.

8:45-9:00 (378)

Pitch Shifts Contingent on the Modulation Frequency of a Pure Tone. ANDREW T. SMITH, *Newcastle upon Tyne Polytechnic, JAMES G. MAY, University of New Orleans, & ROSALINDE R. LYMAN, Tulane University* (read by J. G. May)—Following adaptation to a frequency-modulated tone, the pitch of a test tone of slightly lower or higher frequency is shifted downwards or upwards, respectively. These shifts are greatest when the adaptation and test tones are frequency modulated at the same rate, suggesting the involvement of neurons tuned for both absolute frequency and rate of change of frequency.

9:05-9:20 (379)

Detection of Stepwise Changes in a Constant-Level Signal. A. B. KRISTOFFERSON, LORRAINE G. ALLAN, & FIONA A. CAMPBELL, *McMaster University* (read by L. G. Allan)—The detectability of a stepwise change in frequency is compared with the detectability of a pattern composed of two such steps. For steps separated by less than 1,000 msec, two steps of like sign summate and two steps of unlike sign subtract. When the steps are separated by about 2,000 msec, the sign of the second step is irrelevant: summation occurs, and the extent is the same for steps of like sign and unlike sign.

9:25-9:35 (380)

Successive Ratio Judgments. GREGORY R. LOCKHEAD & MICHAEL C. KING, *Duke University*—For a string of stimuli, people judged how many times more or less intense each tone was than the just previous tone. Trial-by-trial analyses revealed that equal stimulus ratios do *not* produce equal response ratios, except on average. Rather, as shown also for magnitude estimations and absolute judgments, responses depended lawfully on the just prior stimuli. A memory model is suggested to describe the data.

9:40-9:50 (381)

Reaction Times to Monochromatic and Bichromatic Lights. BRIAN A. WANDELL & DAVID WELSH, *Stanford University* (sponsored by Geoff Loftus)—Reaction time vs. intensity curves of 630- and 670-nm lights have the same form, and reaction time to mixtures of these lights is accurately predicted by energy summation. Analogous curves for shorter wavelength lights follow a different form, and adding a 540-670-nm light slows response times even though test energy is increased. Implications for various theories are considered.

Chaired by Lawrence M. Ward, University of British Columbia

10:05-10:20 (382)

Application of Psychophysical Scaling Techniques to "Expert Judgment" of Human Error Probabilities (HEPs). DONALD L. SCHURMAN & ROHN J. HRITZ, *Applied Science Associates*—Recognizing the contribution of the reliability of the human element to the overall reliability of nuclear systems, nuclear reliability engineers have used "expert judgment" (expressed to four decimals) as a basis for estimating human failure rates. Probabilities have then been calculated using these estimates as if they were of four-place accuracy, rather than the ordinal estimates they really are. The authors report a system of multidimensional scaling of error-probability estimates using psychophysical scaling techniques and the results of testing the system.

10:25-10:45 (383)

Predicting Detection Decisions about Noisy Visual Targets. RICHARD G. SWENSSON & PHILLIP F. JUDY, *Harvard Medical School*—One scheme for detecting visual targets at specific locations in noisy image backgrounds is to scan a matched filter across each possible target location. This physical detector predicted both the changes in observers' level of detection perfor-

mance and their (interval-scaled) ratings of the individual target and nontarget locations.

10:50-11:05 (384)

Individual Relations Between Sensation Magnitudes and their Numerical Estimates. JOZEF J. ZWISLOCKI, *Syracuse University*—Absolute magnitude estimation of the loudness of single tone bursts and of burst pairs leads to the conclusion that the relations obey approximately power functions with exponents that vary from subject to subject, but whose mean approximates unity. The exponents predict the individual magnitude-estimation functions of subjective line lengths.

11:10-11:25 (385)

Experiments on the Tau and Kappa Effects. YIH LEHR HUANG, *Dalhousie University*, & BILL JONES, *Carleton University* (read by B. Jones)—The tau effect refers to the influence of duration on the judgment of distance, and the kappa effect refers to the influence of distance on the judgment of duration. It is shown that the effect of the context on the illusory judgment increases as the difficulty of the primary judgment increases. A linear algebraic model is developed for the two effects.

11:30-11:45 (386)

Role of Experience in the Development of Subjective Scales. GIDEON KEREN, *Institute for Perception TNO* (sponsored by J. Hellige)—Subjects from two populations (Canada and Israel) were asked to estimate the future price of a product based on a given rate of inflation. Both groups exhibited the phenomenon of underestimation of exponential growth, but there was a marked difference between the two populations. The results are discussed within the framework of subjective scales for numbers.

11:50-12:10 (387)

Objects and their Features in a Single Structural Representation. GEORGE W. FURNAS, *Bell Laboratories* (sponsored by J. D. Carroll)—Most previous work in proximity scaling uses the similarity between pairs of objects. However, if the relations between objects and their features are used, richer representations are possible, with features appearing in the structure, along with the associated objects. Theory, methods, examples from birds and colors, and correspondence to more traditional representations, will be discussed.

NEUROCHEMISTRY AND PSYCHOPHARMACOLOGY Cafe Careme, Saturday morning, 8:00-10:05

Chaired by Joseph W. Terres, VA Hospital, Philadelphia

8:00-8:15 (388)

Stereospecific Nicotinic-Cholinergic Receptors Mediate the Prostration Syndrome. C. J. LEVY, L. CARRON, & K. YOUNG, *Philip Morris R&D*—Studies were conducted which demonstrated that (–)-nicotine is 20 times more active than (+)-nicotine in producing the prostration syndrome in rats, as characterized by Abood et al. (1978). Furthermore, the prostration syndrome is blocked by preinjection of mecamylamine hydrochloride but not by preinjection of hexamethonium chloride. These results suggest that the prostration syndrome is mediated by stereospecific nicotinic-cholinergic sites in the brain.

8:20-8:35 (389)

Age-Dependent Anticholinergic and Adrenergic Interactions with Tonic Immobility in Chickens. RICHARD A. HUGHES, *Iowa State University*—Atropine, scopolamine, and their methyl analogs significantly reduced tonic immobility duration in 10-day-old chickens. A second experiment indicated that the methyl analog effects were due to age-dependent blood-brain-barrier development. Experiment 3 demonstrated increased immobility duration by epinephrine, an effect that was reversed by anti-cholinergic pretreatment.

8:40-8:50 (390)

Diisopropyl Phosphorofluoridate and Copulation by Male Rats. G. RUFUS SESSIONS, *Walter Reed Army Institute of Research*, JOHN R. LEU, *University of Nebraska, Omaha*, & BRADFORD

N. BUNNELL, University of Georgia (read by B. N. Bunnell)—Rats that had recovered from nonlethal doses of diisopropyl-phosphorofluoridate (DEP) were given an extensive battery of tests for neurological effects and then tested for copulatory behavior. Although their neurological signs were within normal limits, the treated animals exhibited a dose-dependent increase in ejaculation latencies. The behavioral evidence suggests that both peripheral and central neuropathy may be involved in this effect.

8:55-9:10 (391)

Chlordiazepoxide-Induced Discrimination Impairment. **SHERWOOD O. COLE & MARIA WELLS, Rutgers University, Camden**—Chlordiazepoxide (0.0, 2.5, 5.0, 10.0 mg/kg) produced a dose-dependent impairment in the reinforcement-cued discrimination performance of male Sprague-Dawley rats. An examination of operant components indicated that the performance impairment was due to differences in the patterns of responding to nonreinforcement and reinforcement contingencies by the drug groups.

9:15-9:30 (392)

Different Rates of Responding Controlled by Equivalent Rates of Food Presentation: Effects of Acute and Chronic Cocaine in Squirrel Monkeys. **MARC N. BRANCH, University of North Carolina, Chapel Hill**—Interresponse-time contingencies added to an interval schedule of food presentation resulted in three distinct rates of leverpressing. Daily administration of cocaine for nearly 200 days did not result in marked tolerance, despite the fact that frequency of food presentation was decreased substantially by the drug.

9:35-9:50 (393)

LSD and Elephants. **RONALD K. SIEGEL, UCLA**—Male Asiatic elephants exhibit a periodic “musth madness” characterized by endocrine changes and bizarre behavior. A 1962 *Science* study attempted to mimic this syndrome with LSD, which resulted in the elephant’s death and legislation against LSD as a dangerous drug. The present study corrected procedural errors. Two elephants survived large LSD dosages and exhibited musth behaviors. Results are discussed in terms of the difficulties blind reviewers encounter when examining intoxicated elephants.

9:55-10:05 (394)

The Effects of Alcohol on Two Forms of Aggression in Rats. **M. MARLYNE KILBEY & J. W. MOORE, JR., Middle Tennessee State University** (sponsored by Robert E. Prytula)—The effect of five dose levels of alcohol (0.0, .25, .5, 1.0, and 2.0 g/kg) on predatory and resident-intruder aggression was determined in male and female rats. Administration of vehicle reduced aggression. Following .25 g/kg ETOH, aggression returned to normal levels, but all other doses reduced aggression significantly.

HUMAN LEARNING AND MEMORY IN ALTERED STATES

Cafe Careme, Saturday morning, 10:30-12:00

Chaired by Terry DeVietti, Central Washington University

10:30-10:50 (395)

Differential Effects of Knowledge of Results and Amphetamine on RT. **J. HUETING, University of Brussels, M. DEBOECK,**

National Fund for Scientific Research (Belgium), L. MICHELS, & E. SOETENS, University of Brussels—Conditions were: amphetamine, placebo, and controls, with and without knowledge of results. Amphetamine, with a general arousing effect, exerts its clearest influence on reaction time with variable foreperiod, conceived as Nuttin’s closed task. Knowledge of results, with specific information effect, exerts its clearest influence on reaction time with constant foreperiod, conceived as an open task.

10:55-11:05 (396)

Alcohol, Rehearsal, and Decrement in Recognition Memory. **CHRISTIAN W. MUELLER & STEPHEN A. LISMAN, SUNY, Binghamton** (sponsored by Norman E. Spear)—Last year we reported that contrary to several hypotheses, elaborative rehearsal was unable to offset the damaging effects of acute intoxication on recall. We have since carried out two larger experiments using both free recall and forced-choice recognition measures. Neither showed that elaboration could reduce the alcohol deficit. Similarly, our data indicate that such processing may be irrelevant to the “paradoxical” facilitation (e.g., Parker et al., 1980) that occurs when drinking follows—rather than precedes—list learning.

11:10-11:20 (397)

Diazepam and Human Memory: Acquisition vs. Retention. **JAMES V. HINRICHES, University of Iowa, STEVEN P. MEWALDT, Marshall University, M. M. GHONEIM, & JANIS L. BERIE, University of Iowa**—Diazepam (Valium) markedly impairs memory performance. Multiple-trial free recall, paired-associate learning, and a serial learning task all demonstrated large reductions in performance for drugged subjects (.3 mg/kg) compared with placebo controls. Analyses directed toward identifying the memorial processes influenced by diazepam indicated that the acquisition phase was most severely affected.

11:25-11:35 (398)

Generation Is a Better “Antidote” for Alcohol Amnesia than Semantic Elaboration. **SHAHIN HASHTROUDI, George Washington University, ELIZABETH S. PARKER, LAURI YABLICK, National Institute on Alcohol Abuse and Alcoholism, LYNN E. DeLISI, & RICHARD JED WYATT, National Institute of Mental Health** (read by E. S. Parker)—Intoxicated and sober subjects were provided with precise or imprecise elaborators, or they generated their own elaborators. Precision of elaboration did not reduce alcohol’s detrimental effect on recall of target items. In contrast, generation differentially improved recall under alcohol. More importantly, intoxicated subjects recalled their self-generated elaborators about as well as sober controls did.

11:40-12:00 (399)

How Well Do Laboratory Tests Predict Everyday Memory? **ALAN BADDELEY, JOHN HARRIS, & ALAN SUNDERLAND, MRC Applied Psychology Unit, Cambridge**—Head-injured and control subjects were given memory tests, and they and their spouses were required to complete a questionnaire and keep a diary of memory lapses. Results suggest that (1) some tests do predict everyday memory, and (2) people may be less good at evaluating their own memories than are their spouses.