PROGRAM

for The Twenty-sixth Annual Meeting of The Psychonomic Society

BOSTON PARK PLAZA HOTEL & TOWERS
Arlington Street at Park Plaza
Boston, Massachusetts

Friday, Saturday, Sunday
November 22, 23, 24, 1985

GENERAL INFORMATION

Please note that this year's meeting is being held on Friday, Saturday, and Sunday.

Hotel Accommodations

The Boston Park Plaza Hotel & Towers, Arlington Street at Park Plaza, Boston, Massachusetts 02117 (617-426-2000), will house participants. Two limousine companies provide transportation to and from the airport; one, costing $4.00, serves all hotels in the downtown area, and the other, costing $5.00, serves only the Boston Park Plaza Hotel.

Hotel Reservations

A room reservation card for the hotel is enclosed with this program. Please make your room reservations promptly by returning the completed card to the hotel. Availability of our room block and the special rates are guaranteed only to those whose reservation cards are received three weeks prior to the meeting. Reservations received after the deadline will be confirmed only on an availability basis. Also note that reservations are held only until 6 p.m. without a guarantee.

Registration

A registration desk will be available in the hotel on the Mezzanine beginning late Wednesday afternoon. *Please do register.* In 1982, the Governing Board and Membership authorized a token $5 registration fee for all attendees.

Programs

Please bring your program with you. Additional programs may be purchased at the registration desk for $5. Programs may also be purchased in advance by mail from the Secretary-Treasurer (J. P. Goggin, Department of Psychology, University of Texas at El Paso, El Paso, TX 79968) for $5.50 (U.S. dollars) or for $6.00 for addresses outside the U.S., Canada, or Mexico.

Hospitality

There will be a general reception with a cash bar in the Georgian Room (Mezzanine) from 6 p.m. until ? on Thursday, Friday, and Saturday evenings.

Other Meetings

Participants may be interested in the following other meetings scheduled at the Park Plaza immediately prior to the Psychonomic Society meeting:

— Center for Automation Research
(University of Maryland)
Workshop on Human and Machine Vision
Tuesday, Wednesday, Thursday, November 19-21

— Society for Computers in Psychology
Thursday, November 21

OFFICERS

Chairman, 1984, Fergus I. M. Craik
Secretary-Treasurer, 1984-1986, Judith P. Goggin

GOVERNING BOARD

Fergus Craik (1980-85)
Robert Rescorla (1980-85)
Robert Crowder (1981-86)
Isidore Gormezano (1981-86)
Donald Blough (1982-87)
Jean M. Mandler (1982-87)
Richard Shiffrin (1983-88)
Bruce Overmier (1983-88)
Robert Bolles (1984-89)
Herbert Jenkins (1984-89)
Norman Spear (1985-90)
Anne Treisman (1985-90)

The names of two new members elected to the Governing Board for 1986-91 will be announced at the Business Meeting on Saturday, November 23rd.

NOTES TO MEMBERS

The Program

The program contains 377 papers and symposium contributions drawn from 547 submitted abstracts. All papers on the program were submitted by Members, except for a few sponsored papers from foreign visitors. There are three invited symposia, which were authorized by the Governing Board in 1984. Members' papers that could not be fit on the program were all received after the deadline; in many cases, these abstracts were also submitted by Members who presented last year. There was no time available for sponsored papers from some foreign visitors, or from Associates and non-Members.

In an attempt to fit as many papers as possible on the program, the lunch hours were shortened and, where rooms were available, sessions were extended to about 6 p.m. In accordance with the information provided on the Call for Papers, 10 minutes were allocated for papers where no time was specified by the submitter; otherwise, the requested time was always allotted.

Program history is in the table below:

Year	1985	1984	1983	1982	1981	1980	1979
Submissions	547	455	447	406	475	428	-
Accepted	377	368	374	377	399	370	397

Smoking

We would appreciate no smoking where papers are being given, in accordance with Society policy.

Judith P. Goggin
Secretary-Treasurer
University of Texas at El Paso
El Paso, Texas 79968

CONDENSED SCHEDULE A

Friday Morning

Motor Control I (1-6)	8:00-10:05, Arlington Room
Pattern Perception (7-13)	10:15-12:15, Arlington Room
Human Learning & Memory I (14-19)	8:00-10:15, Imperial Ballroom
Retention & Forgetting (20-24)	10:25-12:20, Imperial Ballroom
Animal Memory I (25-30)	8:00-10:15, Plaza Ballroom
Animal Cognition I (31-35)	10:25-12:15, Plaza Ballroom
Information Processing: Rotation & Motion (36-42)	8:00-10:15, Georgian Room
Letter/Word Processing I (43-48)	10:25-12:25, Georgian Room
Comprehension & Reasoning (49-57)	8:00-11:00, Stanbro Room
Brain Function (58-60)	11:10-12:10, Stanbro Room
Psychophysics I (61-66)	8:00-10:05, Berkeley/Clarendon Rooms
Perception I (67-72)	10:15-12:15, Berkeley/Clarendon Rooms

Friday Afternoon

Aversive Learning (73-80)	1:00-3:40, Arlington Room
Reinforcement (81-86)	3:50-5:50, Arlington Room
Ebbinghaus Symposium (87-93)	1:00-4:00, Imperial Ballroom
Human Learning & Memory II (94-98)	4:10-6:00, Imperial Ballroom
3-D Perception (99-105)	1:00-3:20, Plaza Ballroom
Letter/Word Processing II (106-112)	3:30-6:00, Plaza Ballroom
Motor Control II (113-118)	1:00-3:05, Georgian Room
Development (119-123)	3:15-5:05, Georgian Room
Learning & Reinforcement (124-131)	1:00-3:25, Stanbro Room
Problem Solving (132-138)	3:35-6:00, Stanbro Room
Social/Personality (139-146)	1:00-3:25, Berkeley/Clarendon Rooms
Aging & Amnesia (147-153)	3:35-5:50, Berkeley/Clarendon Rooms

Saturday Morning

Animal Learning & Conditioning (154-158)	8:00-9:45 Arlington Room
Animal Cognition II (159-164)	9:55-12:05, Arlington Room
Hemispheric Specialization (165-169)	8:00-9:10, Imperial Ballroom
Cognitive Neuropsychology Symposium (1699-177)	9:20-12:20, Imperial Ballroom
Human Learning & Memory III (178-184)	8:00-10:00, Plaza Ballroom
Cognition I (185-190)	10:10-12:15, Plaza Ballroom
Cognitive Processes: Practice & Training Effects (191-198)	8:00-10:40, Georgian Room
Human/Computer Interactions (199-202)	10:50-12:15, Georgian Room
Attention I (203-209)	8:00-10:30, Stanbro Room
Psychopharmacology (210-214)	10:40-12:15, Stanbro Room
Vision I (215-220)	8:00-10:05, Berkeley/Clarendon Rooms
Speech Perception (221-226)	10:15-12:15, Berkeley/Clarendon Rooms

Saturday Afternoon

Information Processing I (227-235)	1:00-4:10, Arlington Room
Psychophysics II (236-240)	4:20-6:05, Arlington Room
Recognition & Recall (241-248)	1:00-4:10, Imperial Ballroom
Animal Learning & Conditioning II (249-252)	4:20-5:45, Imperial Ballroom
Language/Discourse Processing I (253-258)	1:00-3:05, Plaza Ballroom
Information Processing II (259-265)	3:15-5:45, Plaza Ballroom
Perception II (266-270)	1:00-2:45, Georgian Room
Cognition II (271-276)	2:55-5:00, Georgian Room
Symposium: Neural Substrates of Learning (277-288)	1:00-6:00, Stanbro Room
Psycholinguistics (289-295)	1:00-3:30, Berkeley/Clarendon Rooms
Reading (296-302)	3:40-5:55, Berkeley/Clarendon Rooms

Saturday Evening

Business Meeting . . . . 6:10-7:00, Stanbro Room

Sunday Morning

Perception III (303-309) . . . . 8:00-10:10, Arlington Room
Vision II (310-316) . . . . 10:20-12:25, Arlington Room
Human Learning & Memory IV (317-322) . . . . 8:00-10:15, Imperial Ballroom
Encoding & Retrieval (323-328) . . . . 10:25-12:30, Imperial Ballroom
Music Perception (329-332) . . . . 8:00-9:20, Plaza Ballroom
Decision Making (333-341) . . . . 9:30-12:30, Plaza Ballroom
Attention II (342-347) . . . . 8:00-10:25, Georgian Room
Language/Discourse Processing II (348-353) . . . . 10:35-12:30, Georgian Room
Animal Memory II (354-360) . . . . 8:00-10:35, Stanbro Room
Physiological Processes (361-366) . . . . 10:45-12:25, Stanbro Room
Reinforcement & Choice (367-372) . . . . 8:00-10:25, Berkeley/Clarendon Rooms
Animal Learning & Conditioning III (373-377) . . . . 10:35-12:30, Berkeley/Clarendon Rooms

Hospitality (Cash Bar) in the Georgian Room Boston Park Plaza Hotel, Thursday, Friday, and Saturday, 6:00 p.m. on.

CONDENSED SCHEDULE B

	Arlington Room	Imperial Ballroom	Plaza Ballroom	Georgian Room	Stanbro Room	Berkeley/Clarendon Rooms
Friday Morning	Motor Control I 8:00-10:05 Pattern Perception 10:15-12:15	Human Learning & Memory I 8:00-10:15 Retention & Forgetting 10:25-12:20	Animal Memory I 8:00-10:15 Animal Cognition I 10:25-12:15	Information Processing: Rotation & Motion 8:00-10:15 Letter/Word Processing I 10:25-12:25	Comprehension & Reasoning 8:00-11:00 Brain Function 11:10-12:10	Psychophysics I 8:00-10:05 Perception I 10:15-12:15
Friday Afternoon	Aversive Learning 1:00-3:40 Reinforcement 3:50-5:50	Symposium: Where is Memory Research 100 Years After Ebbinghaus? 1:00-4:00 Human Learning & Memory II 4:10-6:00	3-D Perception 1:00-3:20 Letter/Word Processing II 3:30-6:00	Motor Control II 1:00-3:05 Development 3:15-5:05	Learning & Reinforcement 1:00-3:25 Problem Solving 3:35-6:00	Social/Personality 1:00-3:25 Aging & Amnesia 3:35-5:50
Saturday Morning	Animal Learning & Conditioning II 8:00-9:45 Animal Cognition II 9:55-12:05	Hemispheric Specialization 8:00-9:10 Symposium: Recent Advances in Cognitive Neuropsychology 9:20-12:20	Human Learning & Memory III 8:00-10:00 Cognition I 10:10-12:15	Cognitive Processes: Practice & Training Effects 8:00-10:40 Human/Computer Interactions 10:50-12:15	Attention I 8:00-10:30 Psychopharmacology 10:40-12:15	Vision I 8:00-10:05 Speech Perception 10:15-12:15
Saturday Afternoon	Information Processing I 1:00-4:10 Psychophysics II 4:20-6:05	Recognition & Recall 1:00-4:10 Animal Learning & Conditioning II 4:20-5:45	Language/Discourse Processing I 1:00-3:05 Information Processing II 3:15-5:45	Perception II 1:00-2:45 Cognition II 2:55-5:00	Symposium: Neural Substrates of Learning 1:00-6:00	Psycholinguistics 1:00-3:30 Reading 3:40-5:55
Saturday Evening					Business Meeting 6:10-7:00	
Sunday Morning	Perception III 8:00-10:10 Vision II 10:20-12:25	Human Learning & Memory IV 8:00-10:15 Encoding & Retrieval 10:25-12:30	Music Perception 8:00-9:20 Decision Making 9:30-12:30	Attention II 8:00-10:25 Language/Discourse Processing II 10:35-12:30	Animal Memory II 8:00-10:35 Physiological Processes 10:45-12:25	Reinforcement & Choice 8:00-10:25 Animal Learning & Conditioning III 10:35-12:30

Hospitality (Cash Bar) in Georgian Room, Thurday, Friday, and Saturday, from 6:00 p.m.

CONDENSED SCHEDULE C

FRIDAY MORNING

Motor Control I (1-6), Arlington Room

8:00-8:15	Keele, Ivry, & Pokorny (1)
8:20-8:35	Rosengren, Pick, von Hofston, & Neeley (2)
8:40-8:55	Craske (3)
9:00-9:15	Jagacinski & Hah (4)
9:20-9:35	Roberts (5)
9:40-10:00	Proctor & Reeve (6)

Pattern Perception (7-13), Arlington Room

10:15-10:30	Lederman & Browse (7)
10:35-10:50	Nodine & Locher (8)
10:55-11:05	Massaro (9)
11:10-11:25	Cavanagh (10)
11:30-11:40	Hock, Smith, Cavedo, & Escoffery (11)
11:45-11:55	Coren & Porac (12)
12:00-12:10	Porac & Coren (13)

Human Learning & Memory I (14-19), Imperial Ballroom

8:00-8:20	Murdock & Lewandowsky (14)
8:25-8:40	Coltheart, Hale, & Walsh (sp. Winograd)(15)
8:45-9:05	Reder (16)
9:10-9:25	Haentjens & d'Ydewalle (17)
9:30-9:45	Slamecka & Katsaiti (18)
9:50-10:10	Intons-Peterson & Smyth (19)

Retention & Forgetting (20-24), Imperial Ballroom

10:25-10:45	Indow (20)
10:50-11:10	Gelfand & Bjork (21)
11:15-11:35	Monahan & Hackett (22)
11:40-11:55	Fischler & Woods (23)
12:00-12:15	Crovitz (24)

Animal Memory I (25-30), Plaza Ballroom

8:00-8:20	Gibbon (25)
8:25-8:40	Thor & Holloway (26)
8:45-9:05	Chase, Murofushi, & Asano (27)
9:10-9:30	Spetch (28)
9:35-9:55	Thomas (29)
10:00-10:10	Terrace (30)

Animal Cognition I (31-35), Plaza Ballroom

10:25-10:45	Gardner & Gardner (31)
10:50-11:10	Gardner, Gardner, & Rimpau (32)
11:15-11:30	Candland, Briggs, & Hallal (33)
11:35-11:50	Schrier (34)
11:55-12:10	Epstein (35)

Information Processing: Rotation & Motion (36-42), Georgian Room

8:00-8:15	Freyd & Finke (36)
8:20-8:35	Finke, Freyd, & Shyi (37)
8:40-8:50	Shepard & Metzler (sp. Shepard)(38)
8:55-9:05	Bethell-Fox & Shepard (39)
9:10-9:30	Kubovy & Toth (40)
9:35-9:50	Rieser, Weatherford, & Guth (41)
9:55-10:10	Goolkasian (42)

Letter/Word Processing I (43-48), Georgian Room

10:25-10:35	Katz (43)
10:40-10:55	Clayton (44)
11:00-11:15	Masson & Freedman (45)
11:20-11:35	Deboeck, Hueting, & Soetens (46)
11:40-12:00	McCann & Besner (47)
12:05-12:20	Gorfein & Bubka (48)

Comprehension & Reasoning (49-57), Stanbro Room

8:00-8:15	Pezdek, Simon, Kieley, & Stoeckert (49)
8:20-8:40	Reed (50)
8:45-9:00	Bloom & Rundus (51)
9:05-9:20	Voss, Post, Wolfe, & Ney (52)
9:25-9:35	Herrmann, Chaffin, & Janicki (53)
9:40-9:55	Embretson & Epperson (54)
10:00-10:15	Agnoli & Krantz (sp. Poltrock)(55)
10:20-10:35	Gentner & Landers (56)
10:40-10:55	Block (57)

Brain Function (58-60), Stanbro Room

11:10-11:25	Petros, Sawler, & Harsch (58)
11:30-11:45	Gilinsky (59)
11:50-12:05	Stanley (60)

Psychophysics I (61-66), Berkeley/Clarendon Rooms

8:00-8:15	Larkin & Reilly (61)
8:20-8:35	Telage & Gorman (62)
8:40-8:50	Zwislocki & Jordan (63)
8:55-9:15	Cowan (64)
9:20-9:35	Macmillan & Braida (65)
9:40-10:00	Ward (66)

Perception I (67-72), Berkeley/Clarendon Rooms

10:15-10:35	Clark, Carroll, & Janal (67)
10:40-10:50	Newman, Craig, & Hall (68)
10:55-11:15	Loomis (69)
11:20-11:35	Klatzky & Lederman (70)
11:40-11:50	Hollins & Kelley (71)
11:55-12:10	Mark (72)

FRIDAY AFTERNOON

Aversive Learning (73-80), Arlington Room

1:00-1:10	Figler, Wazlavek, Walko, & Chaves (73)
1:15-1:30	Williams & Lierle (74)
1:35-1:55	Bersh, Whitehouse, Blustein, & Troisi (75)
2:00-2:15	Hanselow & Sigmundi (76)
2:20-2:30	Johnson (77)
2:35-2:55	Franchina & Dyer (78)
3:00-3:15	Mitchell (79)
3:20-3:35	Riley, Mastropaolo, Tuck, & Dacanay (80)

Reinforcement (81-86), Arlington Room

3:50-4:10	Allison (81)
4:15-4:25	McSweeney & Dougan (82)

4:30-4:45	Williams & Royalty (83)
4:50-5:05	Weiss & Schindler (84)
5:10-5:20	Miller, Reas, & Kristofzski (85)
5:25-5:45	Nevin (86)

Symposium: Where is memory research 100 years after Ebbinghaus? (87-93), Imperial Ballroom

Chairman:	**Tulving**
Speakers:	Roediger (87)
1:00-4:00	Bower (88)
	Shiffrin (89)
	Jacoby (90)
	Tulving (91)
Discussants:	Craik (92)
	Estes (93)

Human Learning & Memory II (94-98), Imperial Ballroom

4:10-4:30	Moeser (94)
4:35-4:50	Poltrock (95)
4:55-5:10	Manning & Silverstein (96)
5:15-5:35	Ratcliff & McKoon (97)
5:40-5:55	Bellezza (98)

3-D Perception (99-105), Plaza Ballroom

1:00-1:15	Klopfer & Cooper (99)
1:20-1:35	Andersen & Braunstein (100)
1:40-2:00	Craton, Arterberry, & Yonas (101)
2:05-2:15	Fox, Cormack, Oross, & Patterson (102)
2:20-2:30	Tarr & Pinker (103)
2:35-2:50	Kaiser, Proffitt, Flannagan, & Sullivan (104)
2:55-3:15	Ramachandran & Cavanagh (105)

Letter/Word Processing II (106-112), Plaza Ballroom

3:30-3:50	Whitlow (106)
3:55-4:15	Holender & Katz (107)
4:20-4:40	Grice & Gwynne (108)
4:45-5:00	Bentin & Frost (109)
5:05-5:25	Slowiaczek & Pisoni (110)
5:30-5:40	Grosjean (111)
5:45-5:55	Hanson (112)

Motor Control II (113-118), Georgian Room

1:00-1:15	Reeve & Proctor (113)
1:20-1:35	Kelso & Scholz (114)
1:40-1:55	Tuller & Kelso (115)
2:00-2:15	Wing, Church, & Gentner (116)
2:20-2:40	Gentner (117)
2:45-3:00	Inhoff & Morris (118)

Development (119-123), Georgian Room

3:15-3:35	Gelman (119)
3:40-3:50	Kail (120)
3:55-4:15	Haber (121)
4:20-4:35	Klahr & Carver (122)
4:40-5:00	Dellarosa, Kintsch, & Weimer (123)

Learning & Reinforcement (124-131), Stanbro Room

1:00-1:10	Marcucella (124)
1:15-1:25	Flaherty, Grigson, & Rowan (125)
1:30-1:40	Gawley, Timberlake, & Lucas (126)
1:45-2:05	Dinsmoor, Lee, & Brown (127)
2:10-2:20	Wilson & Neuringer (128)
2:25-2:40	Wetherington & Riley (129)
2:45-2:55	Wasserman, Hussar, & Bhatt (130)
3:00-3:20	Bronstein (131)

Problem Solving (132-138), Stanbro Room

3:35-3:50	Bassok & Holyoak (132)
3:55-4:15	Groen & Patel (133)
4:20-4:40	Sternberg & Kalmar (134)
4:45-5:00	Barsalou, Usher, & Sewell (135)
5:05-5:20	Just & Carpenter (136)
5:25-5:35	Smith & Blankenship (137)
5:40-5:55	Robinson (138)

Social/Personality (139-146), Berkeley/Clarendon Rooms

1:00-1:20	Allen (139)
1:25-1:40	Bernstein, Huang, & Lin (140)
1:45-1:55	Kelley (141)
2:00-2:10	Katz (142)
2:15-2:25	Skinner & Picone (143)
2:30-2:40	Mewaldt, Janosky, & Lindberg (144)
2:45-3:05	Singh (145)
3:10-3:20	Martin, Hanser, & Park (146)

Aging & Amnesia (147-153), Berkeley/Clarendon Rooms

3:35-3:50	Eich (147)
3:55-4:10	Kihlstrom (148)
4:15-4:30	Light & Singh (149)
4:35-4:50	Kemper (150)
4:55-5:10	Day (151)
5:15-5:30	Bartlett & Leslie (152)
5:35-5:45	Rosenbaum & Klooz (153)

SATURDAY MORNING

Animal Learning & Conditioning I (154-158), Arlington Room

8:00-8:15	Best, Meachum, Nash, & Batson (154)
8:20-8:40	Miller, Gordon, Matzel, & Brown (155)
8:45-9:00	DeVietti, Bauste, Nutt, & Barrett (156)
9:05-9:20	Bitterman & Abramson (157)
9:25-9:40	Dess & Soltysik (158)

Animal Cognition II (159-164), Arlington Room

9:55-10:10	Meck (159)
10:15-10:30	Page, Cynx, & Hulse (160)
10:35-10:50	Cook, Wright, Sands, & Jitsumori (161)
10:55-11:10	Neiworth & Rilling (162)
11:15-11:35	Roberts (163)
11:40-12:00	Cheng & Gallistel (164)

Hemispheric Specialization (165-169), Imperial Ballroom

8:00-8:10	Boles (165)
8:15-8:25	Searleman & Krivda (166)
8:30-8:45	Hellige, Jonsson, & Michimata (167)
8:50-9:05	Kee, Bathurst, Gottfried, Schmid, & Howell (168)
	Tzeng & Hung (title only) (168a)

Symposium: Recent Advance in Cognitive Neuropsychology (169-177) Imperial Ballroom

Chairman:	**Cermak**
Speakers:	Blumstein (169)
9:20-12:20	Swinney (170)

Coltheart & Byng (171)
Caramazza (172)
Schacter (173)
Cermak (174)
Smith (175)
Bauer (176)
Tallal (177)

Human Learning & Memory III (178-184), Plaza Ballroom

8:00-8:15	Tuten & Jenkins (178)
8:20-8:35	Ellis (179)
8:40-8:50	Christianson, Fallman, & Nilsson (180)
8:55-9:10	Thompson (181)
9:15-9:25	Kroll (182)
9:30-9:40	Penrod, Cutler, & Martens (183)
9:45-9:55	Izawa (184)

Cognition I (185-190), Plaza Ballroom

10:10-10:25	Carey & Diamond (185)
10:30-10:40	Purcell & Stewart (186)
10:45-11:00	Malpass & Hughes (187)
11:05-11:25	Millward & O'Toole (188)
11:30-11:50	Reisberg & Heuer (189)
11:55-12:10	Lupker (190)

Cognitive Processes Practice Training Effect, (191-198), Georgian Room

8:00-8:10	Dillon, Kelly, & Tzechova (191)
8:15-8:30	Longstreth, Alcorn, Howell, & Horn (192)
8:35-8:55	Fuson (193)
9:00-9:15	Lesgold, Rubinson, Klopfer, & Glaser (194)
9:20-9:35	Brewer & Vosniadou (195)
9:40-10:00	Regian, Shute, & Pellegrino (196)
10:05-10:20	Ashcraft, Koshmider, Roemer, & Faust (197)
10:25-10:35	Smith, Arabian, & Wing (198)

Human/Computer Interactions (199-202), Georgian Room

10:50-11:10	Kay & Black (199)
11:15-11:30	Baggett & Ehrenfeucht (200)
11:35-11:50	Olson & Nilsen (201)
11:55-12:10	Gugerty & Olson (202)

Attention I (203-209), Stanbro Room

8:00-8:15	McClelland & Mozer (203)
8:20-8:35	Pomerantz (204)
8:40-8:55	Joshi, Dember, Warm & Scerbo (205)
9:00-9:20	LaBerge (206)
9:25-9:40	Schårf, Quigley, Aoki, Peachey, & Reeves (207)
9:45-10:00	Verfaellie, Bowers, & Heilman (sp. d'Ydewalle)(208)
10:05-10:25	Haber & Haber (209)

Psychopharmacology (210-214), Stanbro Room

10:40-10:55	Schnur & Raigoza (210)
11:00-11:15	Siegel & Hinson (211)
11:20-11:30	Wellman, Marmon, Reich, & Ruddle (212)
11:35-11:45	Grilly & Gowans (213)
11:50-12:10	Hertzler & Daly (214)

Vision I (215-220), Berkeley/Clarendon Rooms

8:00-8:15	Breitmeyer, Ritter, & Simpson (215)
8:20-8:35	Brussell, Kruk, Masson, & April (216)
8:40-8:55	Hughes (217)
9:00-9:20	Kohfeld (218)
9:25-9:40	Miller, Pigion, & Takahama (219)
9:45-10:00	Wolfe (220)

Speech Perception (221-226), Berkeley/Clarendon Rooms

10:15-10:30	Sawusch & Tomiak (221)
10:35-10:55	Samuel (222)
11:00-11:15	Dell, Segal, & Bergman (223)
11:20-11:35	Jamieson (224)
11:40-11:50	Repp (225)
11:55-12:10	Remez, Rubin, Katz, & Dodelson (226)

SATURDAY AFTERNOON

Information Processing I (227-235), Arlington Room

1:00-1:15	Greenwald & Liu (227)
1:20-1:35	Johnson & Smith (228)
1:40-2:00	Yantis & Meyer (229)
2:05-2:25	Kolers & Duchnicky (230)
2:30-2:50	MacKay (231)
2:55-3:15	Kornblum & Osman (232)
3:20-3:35	Beckwith, Petros, & Erikson (233)
3:40-3:50	Wallace (234)
3:55-4:05	Engle & Turner (235)

Psychophysics II (236-240), Arlington Room

4:20-4:35	Norwich (236)
4:40-5:00	Morrison & Allan (237)
5:05-5:20	Marks (238)
5:25-5:45	Link (239)
5:50-6:00	Collyer (240)

Recognition & Recall (241-248), Imperial Ballroom

1:00-1:15	Grossberg & Carpenter (241)
1:20-1:40	Shiffrin (242)
1:45-2:05	Wickens, Young, Williford, & Mister (243)
2:10-2:30	Hunt (244)
2:35-2:55	Mandler, Graf, & Kraft (245)
3:00-3:20	Neely & Durgunoglu (246)
3:25-3:45	Hall (247)
3:50-4:05	McDaniel & Kowitz (248)

Animal Learning & Conditioning II (249-252), Imperial Ballroom

4:20-4:35	Gordon & Weaver (249)
4:40-5:00	Bouton & Swartzentruber (250)
5:05-5:20	Lippman (251)
5:25-5:40	Fedorchak & Bolles (252)

Language/Discourse Processing I (253-258), Plaza Ballroom

1:00-1:15	Mandler & Murachver (253)
1:20-1:35	Smith (254)
1:40-1:55	Simpson, Peterson, Casteel, & Burgess (255)
2:00-2:20	Zwitserlood (sp. Marslen-Wilson)(256)
2:25-2:40	Kelly, Bock, & Keil (257)
2:45-3:00	Singer & Parbery (258)

Information Processing II (259-265), Plaza Ballroom

3:15-3:30	Mather (259)
3:35-3:50	Treisman (260)
3:55-4:15	Warren (261)
4:20-4:35	Sternberg, Knoll, & Turock (262)
4:40-5:00	Vaughan, Herrmann, Ross, Malaquias, & Bell (263)

5:05-5:20	Intraub (264)
5:25-5:40	Siple, Walls, & Miller (265)

Perception II (266-270), Georgian Room

1:00-1:20	Hochberg (266)
1:25-1:40	Mack, Goodwin, Thordarson, & Palumbo (267)
1:45-2:05	Palmer, Kruschke, & Simone (268)
2:10-2:25	Landy, Dosher, & Sperling (269)
2:30-2:40	Green (270)

Cognition II (271-276), Georgian Room

2:55-3:10	Clemmer & Hart (271)
3:15-3:35	Deffner (sp. Bourne)(272)
3:40-3:50	Blumer & Arkes (273)
3:55-4:10	Cowan (274)
4:15-4:35	Hampton (275)
4:40-4:55	Shoben (276)

Symposium: The Neural Substrate of Learning (277-288), Stanbro Room

Chairman: **I. Gormezano**

Speakers:	Thompson, Steinmetz, & Lavond (277)
1:00-3:25	Berger, Bassett, & Weikart (278)
	Desmond & Moore (279)
	Patterson & Port (280)
	Alkon (281)
	Disterhoft (282)
3:35-6:00	McCabe & Schneiderman (283)
	Kapp, Pascoe, & Markgraf (284)
	Gallagher (285)
	Berry (286)
	Gabriel (287)
	Kehoe (288)

Psycholinguistics (289-295), Berkeley/Clarendon Rooms

1:00-1:15	Honeck, Firment, & Case (289)
1:20-1:40	McCloskey & Sokol (290)
1:45-2:00	Seidenberg & Vidanovic (291)
2:05-2:20	Carpenter & Carver (292)
2:25-2:45	Stowe, Tanenhaus, & Carlson (293)
2:50-3:05	Bock (294)
3:10-3:25	Potter (295)

Reading (296-302), Berkeley/Clarendon Rooms

3:40-3:50	O'Connell & Kowal (296)
3:55-4:15	McConkie, Reddix, & Zola (297)
4:20-4:30	Bruder, Engl, & Schultz (298)
4:35-4:55	Levy (299)
5:00-5:10	Chen & Tsoi (sp. Liu)(300)
5:15-5:30	Haberlandt (301)
5:35-5:50	Townsend & Bever (302)

SATURDAY EVENING

General Business Meeting, Stanbro Room

6:10-7:00	Fergus I.M. Craik, Chairman

SUNDAY MORNING

Perception III (303-309), Arlington Room

8:00-8:10	Redding & Wallace (303)
8:15-8:30	Walk & Walters (304)
8:35-8:50	Cutting (305)
8:55-9:05	Lindauer (306)
9:10-9:25	Mikaelian, Wilcox, & Cameron (307)
9:30-9:50	Flock (308)
9:55-10:05	Reeves & Lemley (309)

Vision II (310-316), Arlington Room

10:20-10:30	Westendorf & Blake (310)
10:35-10:55	Ganz (311)
11:00-11:10	Seaber & Lockhead (312)
11:15-11:25	Corwin (313)
11:30-11:40	Meyer & Doughery (314)
11:45-12:05	May, Martin, McCana, & Lovegrove (315)
12:10-12:20	Eason, Conder, Moore, & Oakley (316)

Human Learning & Memory IV (317-322), Imperial Ballroom

8:00-8:15	Nelson, McSpadden, Fromme, & Marlatt (317)
8:20-8:35	Shedler, Jonides, & Manis (318)
8:40-9:00	Maki & Ostby (319)
9:05-9:20	Hodge (320)
9:25-9:45	Higbee & Oaks (321)
9:50-10:10	Penney & Butt (322)

Encoding & Retrieval (323-328), Imperial Ballroom

10:25-10:45	Healy, Cunningham, Till, & Fendrich (323)
10:50-11:00	Marshall & Chen (324)
11:05-11:25	Nelson, Canas, & Bajo (325)
11:30-11:45	Graf & Biason (326)
11:50-12:05	Rabinowitz & Zwas (327)
12:10-12:25	Burrows (328)

Music Perception (329-332), Plaza Ballroom

8:00-8:15	Weber & Brown (329)
8:20-8:40	Palmer & Krumhansl (330)
8:45-8:55	Miller (331)
9:00-9:15	Dowling (332)

Decision Making (333-341), Plaza Ballroom

9:30-9:45	Hoffman (333)
9:50-10:00	Gettys (334)
10:05-10:20	Busemeyer (335)
10:25-10:40	Yates & Curley (336)
10:45-11:05	Birnbaum, Anderson, & Hynan (337)
11:10-11:25	Nygren & Isen (338)
11:30-11:45	Doherty & Falgout (339)
11:50-12:05	Shanteau, Dino, Ettenson, & Gaeth (340)
12:10-12:25	Isen, Nygren, & Ashby (341)

Attention II (342-347), Georgian Room

8:00-8:20	Brown, McDonald, Brown, & Carr (342)
8:25-8:45	Logan (343)
8:50-9:10	Flowers & Reed (344)
9:15-9:35	Posner, Inhoff, & Cohen (345)
9:40-9:55	Pollatsek, Walker, Friedrich, & Posner (346)
10:00-10:20	Schneider (347)

Language/Discourse Processing II (348-353), Georgian Room

10:35-10:50	Kellogg (348)
10:55-11:05	Winshel & Glucksberg (349)
11:10-11:25	Perfetti, Beverly, Didonato, & Pertsch (350)
11:30-11:45	Graesser & Millis (351)
11:50-12:05	Harris, Schoen, & Lee (352)
12:10-12:25	Harvey (353)

Animal Memory II (354-360), Stanbro Room

8:00-8:20	White & Edhouse (354)
8:25-8:45	Urcuioli & Zentall (355)
8:50-9:00	Roberts, Kraemer, & Mazmanian (356)
9:05-9:15	Parker (357)
9:20-9:40	Cohen & Fuerst (358)
9:45-10:05	Hoffman & Maki (359)
10:10-10:30	Jitsumori, Wright, & Cook (360)

Physiological Processes (361-366), Stanbro Room

10:45-11:00	Adair, Adams, & Akel (361)
11:05-11:15	Overmier & Murison (362)
11:20-11:35	Randich (363)
11:40-11:50	Wideman & Murphy (364)
11:55-12:05	Brush, Pellegrino, King, & Collins (365)
12:10-12:20	Starzec & Berger (366)

Reinforcement & Choice (367-372), Berkeley/Clarendon Rooms

8:00-8:20	Eisenberger Masterson Gillespie Adornette (367-372)
8:25-8:45	Logue & Chavarro (368)
8:50-9:10	Shettleworth, Krebs, & Stephens (369)
9:15-9:30	Rashotte (370)
9:35-9:55	Horner & Staddon (371)
10:00-10:20	Catania & Cerutti (372)

Animal Learning & Conditioning III (373-377), Berkeley/Clarendon Rooms

10:35-10:55	Hall (373)
11:00-11:15	Hinson, Chew, & Streather (374)
11:20-11:40	Hirsch & Holliday (375)
11:45-12:00	Domjan, Lyons, & North (376)
12:05-12:25	Ross & LoLordo (377)

Papers read at the 26th Annual Meeting of the Psychonomic Society Boston Park Plaza Hotel & Towers, Boston, Massachusetts November 22, 23, 24, 1985

MOTOR CONTROL I
Arlington Room, Friday morning, 8:00-10:05

Chaired by J. A. Scott Kelso, Haskins Laboratories

8:00-8:15 (1)

On the Nature of the Clock Underlying Perception and Movement. STEVEN W. KEELE, RICHARD IVRY, & ROBERT POKORNY, *University of Oregon*—Our previous studies suggest a common clock for perception and motor production. Is the clock a pacemaker or an interval timer? Timing starts in synchrony with an internal beat with a pacemaker but can start at arbitrary times with an interval timer. Subjects listened to a set of evenly spaced clicks. Then at a tap signal, which varied with respect to the "internal beat," they reproduced the click interval. The results favor an interval timer.

8:20-8:35 (2)

Perceptual Basis of Catching Skills. KARL S. ROSENGREN, HERBERT L. PICK, JR., *University of Minnesota, CLAES VON HOFSTON, University of Umea,* & GREG NEELEY, *University of Minnesota* (read by H. L. Pick, Jr.)—Three experiments concerned with perceptual information for ball catching are reported. In the first, although catching a luminescent ball in the dark was possible, performance under normal lighting was significantly better. The second and third experiments assessed whether visual field information and/or visual information about one's body aided performance. Visibility of the hand did not facilitate performance, but minimal visual field information produced significant improvement in one experiment and non-significant improvement in another.

8:40-8:55 (3)

Disturbance of Limb Position Sense Triggers Motor Oscillator Mechanisms. B. CRASKE, *Memorial University*—1. Mechanisms associated with the control of musculature are intrinsic to human position sense. 2. Disturbance of the positional system occurs during prism adaptation and in other paradigms, but these yield little evidence of any motor involvement. 3. Using the finding that there are direction specific oscillator mechanisms in the human motor system, we have shown that prism adaptation differentially triggers motor oscillators to operate in the plane of the adaptive shift, thus showing intimate perceptual/motor linkage.

9:00-9:15 (4)

Progression-Regression Effects in Tracking a Repeated Dynamic Pattern. RICHARD J. JAGACINSKI & SEHCHANG HAH, *Ohio State University*—Sujects performed compensatory tracking of a repeated input pattern. Tracking error decreased with practice and increased with the addition of a concurrent memory task. The shape of the ensemble-averaged tracking error resembled the shape of the input velocity signal throughout these changes in performance. These results are interpreted in terms of a progression-regression hypothesis in which the dependence of tracking movement on input velocity increases with practice and decreases with secondary-task loading.

9:20-9:35 (5)

Self-Monitoring and Flexible Encoding in Motor Learning. LARRY E. ROBERTS, *McMaster University*—Self-monitoring and flexible encoding were examined in motor learning, using the biofeedback experiment as the method of study. Results confirmed the importance of conscious processing of feedback behavior in the early stage of skill development. However, flexible management of response information was observed at this stage only if subjects experienced persistent failure at the task.

9:40-10:00 (6)

Coding Operations in Spatial Precuing Tasks. ROBERT W. PROCTOR & T. GILMOUR REEVE, *Auburn University*—Experiments are reported that examined coding operations in spatial precuing tasks by manipulating hand placement for vertical stimulus-response arrangements. The results provide evidence against the hypothesis that programming of finger responses is movement-specific. They also indicated that hand, as well as spatial location, is used to code responses in some circumstances, with the combined influence of hand and spatial coding being consistent with the salient-features coding principle (Proctor & Reeve, 1985).

PATTERN PERCEPTION
Arlington Room, Friday morning, 10:15-12:15

Chaired by Irving Biederman, SUNY at Buffalo

10:15-10:30 (7)

Tactual Feature Integration. SUSAN LEDERMAN & ROGER BROWSE, *Queen's University*—A set of tactual search studies demonstrated that, whether exploring a display of items for a single target (texture; orientation) or a disjunction of those features (texture OR orientation), a parallel search process was used. However, when searching for the conjunction (texture AND orientation), a serial self-terminating process was employed. The results confirm and extend Treisman's feature integration theory to tactual perception. Texture and orientation may serve as tactual primitives in computational models of machine touch.

10:35-10:50 (8)

Symmetry Affects Visual Scanning and Aesthetic Judgments of Abstract Paintings. CALVIN F. NODINE, *Temple University,* & PAUL J. LOCHER, *Montclair State College*—Stimulus symmetry has been shown to influence perceptual encoding. We have previously linked symmetry to visual scanning strategies by showing that subjects fixated only one-half of symmetrical nonsense shapes. Eye movements were measured as subjects judged the aesthetic potential of abstract paintings differing in symmetry and semantic vs. syntactic detail. Results are interpreted within the context of Berlyne's theory of psychoaesthetics, which suggests that symmetry limits visual exploration and this, in turn, impacts on aestetic judgment.

10:55-11:05 (9)

Conjoining Multiple Sources of Information in Pattern Perception. DOMINIC W. MASSARO, *University of California, Santa Cruz*—A fundamental process in pattern perception, categorization, and decision making is integrating or conjoining multiple sources of information. The integration process is embedded within these complex acts, making it difficult to observe directly. Although we have learned something about the process, recent conclusions have been premature. Namely, judgments of the conjunction of two events as more likely than one of the events does not necessarily violate probability theory. Nor does fuzzy set theory provide an inappropriate description of the process of conjunction.

11:10-11:25 (10)

Subjective Contours Signalled by Luminance, Vetoed by Motion or Depth. PATRICK CAVANAGH, *Université de Montreal*—A Kanizsa triangle defined by color (e.g., red on green), texture, motion, or depth does not produce a subjective contour. Adding a luminance difference restores the subjective contour for the color or texture representations but not for the motion or depth representations. Information from the luminance pathway is therefore necessary to signal subjective contours, but information from the motion or depth pathways can veto them.

11:30-11:40 (11)

Pattern Perception: Encoding Element Location. HOWARD S. HOCK, LAUREL B. SMITH, L. CLAYTON CAVEDO, & LEONIE ESCOFFERY, *Florida Atlantic University*—After seeing a series of patterns inside a frame, subjects were unexpectedly asked to estimate how often specific locations within the frame were occupied by the constituent elements of the patterns. Although subjects claimed ignorance, they estimated location frequency with surprising accuracy. Their knowledge of element location was not derived from memory representations corresponding to the previously seen patterns. Nor did it depend on insight into compositional factors that constrained the frequency of various locations.

11:45-11:55 (12)

Transfer of Illusion Decrement: Apparent vs. Retinal Size. STANLEY COREN, *University of British Columbia,* & CLARE PORAC, *University of Victoria*—Four groups observed the Mueller-Lyer illusion with free eye movements in order to obtain illusion decrement. The amount of decrement transferred was tested either for a physically identical figure seen at a distance (1/3 retinal size, equivalent apparent size), a larger configuration at a distance (same retinal size), or one of two control conditions. The amount of illusion decrement transferred seemed to be dependent upon retinal, rather than phenomenal, size.

12:00-12:10 (13)

Processing Dominance and the Mueller-Lyer Illusion. CLARE PORAC, *University of Victoria,* & STANLEY COREN, *University of British Columbia*—We devised a new version of the Mueller-Lyer figure that puts global features of the form in conflict with its local elements. For example, while the overall organization was the apparently shorter segment of the ML array, the local cues suggested the reverse illusion effect. We will discuss observers' responses to these new ML figures in terms of the processing dominance of global versus local form information.

HUMAN LEARNING AND MEMORY I
Imperial Ballroom, Friday morning, 8:00-10:15

Chaired by Thomas O. Nelson, University of Washington

8:00-8:20 (14)

A Distributed-Memory Model for Serial-Order Information. BENNET MURDOCK & STEPHAN LEWANDOWSKY, *University of Toronto*—A distributed-memory model based on chaining will be briefly reviewed. Fits of the model to a variety of data will be presented. The model can adequately describe serial-order effects at a quantitative level with a small number of free parameters. The results suggest that item-to-position associations may not be necessary to explain seriation.

8:25-8:40 (15)

Semantic Representation of Taxonomic Categories: Multidimensional Scaling and Categorization Experiments. VERONICA COLTHEART, DENISE HALE, & PAUL WALSH, *City of London Polytechnic* (sponsored by Eugene Winograd)—Twenty subjects provided similarity ratings and ratings on bipolar scales for 20 bird names. A Sindscal analysis yielded a four-dimensional solution. Property-fitting identified the four dimensions as water vs. land, flying vs. non-flying, rural-ferocious vs. urban-mild, and exotic vs. mundane. Reaction time effects in a subsequent speeded-categorization experiment using the bird names as stimuli were successfully predicted from the scaling solution.

8:45-9:05 (16)

Mechanisms for Strategy-Selection in Question-Answering. LYNNE M. REDER, *Carnegie-Mellon University*—Evidence is reviewed as to why one strategy is not always preferred for question-answering and why a simple race model between competing strategies will not work. A set of mechanisms for selecting the most appropriate strategy in a given situation is proposed. Experiments are described that support the proposed strategy-selection model.

9:10-9:25 (17)

Ebbinghaus (1885) Revisited: Hypermnesia with Socratic Stimuli. G. HAENTJENS & G. d'YDEWALLE, *University of Leuven, Belgium* (read by G. d'YDEWALLE)—Socratic descriptions for generating a memory list of unpresented items produces the strongest hypermnesia. New experiments are reported, focusing on variables which facilitate the emergence of hypermnesia with Socratic descriptions. It is shown that a less well-known invention of Ebbinghaus, the sentence completion test for measuring mental capacity, is incidentally very similar with the Socratic presentation condition.

9:30-9:45 (18)

Forgetting After Massed vs. Distributed Learning. NORMAN J. SLAMECKA & LILLY KATSAITI, *University of Toronto*—A list of 40 target words in paired-associate format was given 4 acquisition trials. The massed conditions had the trials in immediate succession, while the distributed conditions had one trial a day for 4 consecutive days. Cued recall was tested at retention intervals of 30 sec and 7 days after acquisition. The distributed conditions showed less forgetting. Several explanatory hypotheses for the phenomenon were evaluated.

9:50-10:10 (19)

Repertory Memory. M. J. INTONS-PETERSON, *Indiana University,* & M. M. SMYTH, *University of Lancaster*—Repertory actors perform incredible feats of memory when they play different roles on successive days. To study this type of verbatim memory for substantial material, we videotaped expert actors and novices as they learned and repeatedly recalled two passages over six days. This procedure permitted a tracking of the acquisition and retention of individual words, phrases, and other semantic units, in addition to organizational factors. The results are compared with predictions from various models.

RETENTION AND FORGETTING
Imperial Ballroom, Friday morning, 10:25-12:20

Chaired by Douglas L. Nelson, University of South Florida

10:25-10:45 (20)

Retention Curve Over Long Range. TAROW INDOW, *University of California, Irvine*—From the data in a study by Warrington and Sanders (1971), retention curves of natural memory (events and faces) over 40 years were generated for 5 age groups from 20 to 60 years. The method of generation and analysis in terms of stochastic processes are discussed. Parameters in the equation vary systematically according to age.

10:50-11:10 (21)

On the Locus of Retrieval Information in Directed Forgetting. HAROLD GELFAND, *St. Bonaventure University,* & ROBERT A. BJORK, *University of California, Los Angeles* (read by R. A. Bjork)—In any memory system, efficient retrieval of current information requires a process that destroys or sets aside or inhibits the retrieval of out-of-date information. In human memory that process appears to be retrieval inhibition, but it is unclear whether such inhibition is a by-product of learning new information, or, rather, a direct consequence of being instructed to forget the old information. The present results suggest that retrieval inhibition is a by-product of new learning.

11:15-11:35 (22)

Brief Memories and Decay. JOHN S. MONAHAN & ANN M. HACKETT, *Central Michigan University*—In three experiments, we tested effects of decay, retroactive interference, and proactive interference on recall of five, six, or seven-digit numbers rehearsed once. Rehearsal and other strategies were eliminated by single-trial participation, cover story, and debriefing. Processing of symbols during retention caused forgetting. Previous exposure to numbers caused forgetting. Passage of time during retention caused no forgetting. Thus, retroactive and proactive interference affected brief (60 s) memories. Decay did not.

11:40-11:55 (23)

Associative Inhibition vs. Competition in the Retroactive Interference Paradigm. IRA FISCHLER & CHARLES B. WOODS, *University of Florida*—Single words were learned as responses to two different stimuli (*AB* and *DB*) prior to learning new responses to half the A words (*AC*). *AC* learning decreased accuracy and speed of *AB* but not *DB* recall, suggesting that acquisition of the second response did not inhibit retrieval of the first, but merely competed with it given the common cue *A*. An attempt to inhibit *DB* recall at retrieval with an *A* prime is also described.

12:00-12:15 (24)

Did You Forget This in the Past 24 Hours? H. F. CROVITZ, *Duke University*—Three studies (n = 1,000) used published lists of forgetting experiences reported in week-long/on-line diaries (*Cortex*, 1984;

Bull. Psychon. Soc., 1984) to study the types of forgetting undergraduates claim they experienced during the past 24 hours. Gender and cue differences and the form of the retention function for the experience of noticing the forgetting of a name will be reported.

ANIMAL MEMORY I
Plaza Ballroom, Friday morning, 8:00-10:15

Chaired by Thomas Zentall, University of Kentucky

8:00-8:20 (25)

Eliminating the Preference for Variable Delay to Reward. JOHN GIBBON, *N.Y.S. Psychiatric Institute*—A set of variable delays to reward is much preferred to a fixed delay equal to the mean of the variable set. Scalar Expectancy Theory ascribes this preference to positive skew in the memory for the variable delays, induced both through the scalar property on the variance of remembered time, and through the Poisson, constant-probability delay schedule. This interpretation was tested in the time-left paradigm. Subjects exposed to a variable set of standards preferred it more than a fixed standard equal to the mean. However, when the standard was made variable but with a backward exponential delay schedule, the preference for variability was eliminated.

8:25-8:40 (26)

Caffeine and Long-Term Social Reference Memory in the Male Rat. D. H. THOR & W. R. HOLLOWAY, JR., *Johnstone Training & Research Center*—When confronted with a novel conspecific, sexually inexperienced male rats engage in social investigatory behaviors for longer intervals than do sexually experienced male rats. We examined the interaction of sexual experience and caffeine exposure on this social reference memory. The results reveal a disinhibitory effect of caffeine, i.e., caffeine apparently interferes with access to reference memory in this model. The results confirm a long-term effect of sexual experience on social investigatory behavior and demonstrate a dose-related interaction of caffeine exposure with prior sexual experience.

8:45-9:05 (27)

Memory Limitations on Absolute Identifications by Monkeys and Humans. SHEILA CHASE, *Hunter College/CUNY,* KIYOKO MUROFUSHI, & TOSHIO ASANO, *Primate Research Institute, Kyoto University*—Similarities in the absolute identification of light intensities by pigeons, monkeys, and humans suggests that similar underlying processes are involved—processes that can be accounted for by a model that assumes a maximum likelihood decision rule and limited access to records of previous experiences.

9:10-9:30 (28)

Pigeons' Memory for Time: Interaction Between Training and Test Delay. MARCIA L. SPETCH, *Dalhousie University*—Pigeons trained on a duration discrimination task make systematic errors when the delay (retention interval) is varied. The magnitude and direction of these errors depend on the relationship between training and test delays. During the same sessions, pigeons made more incorrect "short" choices at delays longer than the last training delay, but more incorrect "long" choices at delays shorter than the training value. These results support the subjective shortening model of memory for time.

9:35-9:55 (29)

A Test of Skinner's "Memory Retrieval" Interpretation of Spontaneous Recovery. DAVID R. THOMAS, *University of Colorado*—Two experiments with pigeon subjects examined Skinner's (1950) assertion that handling cues associated with reinforced training might account for spontaneous recovery when they are reinstated following extinction. In Experiment 1, extinction following unique handling cues led to enhanced spontaneous recovery when the normal (non-extinguished) handling cues were reintroduced. In Experiment 2, however, normal handling, which had been present during extinction, did not enhance responding relative to that of subjects tested without handling cues altogether.

10:00-10:10 (30)

Chunking of a Serial List by Pigeons. H. S. TERRACE, *Columbia University*—The production of a homogeneous list of 5 colored elements (A→B→C→D→E) took twice as long to learn as a heterogeneous list of 3 colored elements and 2 achromatic forms (A→B→C→D′→E′). A heterogeneous list which segregated the different kinds of elements (→B′→C→D′→E) did not facilitate learning. Other evidence of chunking includes performance on 2-element subsets involving boundaries of the A→B→C and the D′→E′ chunks and latencies of pecks to the elements of each type of sequence.

ANIMAL COGNITION I
Plaza Ballroom, Friday morning, 10:25-12:15

Chaired by Warren H. Meck, Columbia University

10:25-10:45 (31)

Signs of Reference in Cross-Fostered Chimpanzees. R. ALLEN GARDNER & BEATRIX T. GARDNER, *University of Nevada, Reno*—Chimpanzees can communicate in American Sign Language (ASL) to human observers whose only source of information is the ASL signs of the chimpanzees in specially designed tests. In order to show that the chimpanzees were naming natural language categories, each test trial was a first trial in that the test photos were only presented once. Films illustrate the test procedure as well as the spontaneous naming of pictures by a chimpanzee signing to himself.

10:50-11:10 (32)

Inflectional Devices in Signed Conversation of Cross-Fostered Chimpanzees. BEATRIX T. GARDNER, R. ALLEN GARDNER, & JAMES RIMPAU, *University of Nevada, Reno*—Naturally occurring human languages use a mix of devices, such as markers, inflections, and word-order, to modulate meaning. In American Sign Language (ASL)—like other face-to-face languages but unlike written English—inflection is far more prominent than word-order. Here we discuss some of the inflectional devices for the modulation of meaning that appeared in the conversational use of ASL by Washoe, Moja, Tatu, and Dar.

11:15-11:30 (33)

Assessing Nonhuman Primate Categories of Perception. DOUGLAS K. CANDLAND, STEVEN BRIGGS, & JOHN HALLAL, *Bucknell University*—Kyes and Candland, at the 24th meeting, reported that baboons (*Papio hamadryas*) selected projected slides of other troop members in accordance with their social and genetic relationship with the member. We also showed that it is the eyes, more than the mouth or nose, to which the baboon attends. We have duplicated these experiments with the Japanese snow monkey (*Macaca fuscata*) and found similar results.

11:35-11:50 (34)

Facilitation of Categorization by Monkeys by Preventing Individual Instance Learning. ALLAN M. SCHRIER, *Brown University*—In previous tests of "natural concepts," our macaque monkeys seemed to learn to categorize instances much less readily and to transfer the learning to new instances at a much lower level than has typically been the case in similar studies with pigeons. In a new experiment, involving comparisons of scenes with humans with scenes without humans, categorization was greatly facilitated by precluding learning of individual instances, a procedure not necessary with pigeons.

11:55-12:10 (35)

Spontaneous Interconnection of Four Repertoires of Behavior in a Pigeon. ROBERT EPSTEIN, *University of Massachusetts at Amherst*—A pigeon was trained (a) to peck a small facsimile of a banana placed within its reach, (b) to climb onto a box, (c) to open a door, and (d) to push a box toward targets. When confronted with a new situation—the banana was placed out of reach, and the box was placed behind the door—the four repertoires came together rapidly to produce a humanlike solution to the problem. A running account of the performance is offered in terms of empirically validated principles.

INFORMATION PROCESSING: ROTATION & MOTION
Georgian Room, Friday morning, 8:00-10:15

Chaired by Dennis R. Proffitt, University of Virginia

8:00-8:15 (36)

A Velocity Effect for Representational Momentum. JENNIFER J. FREYD, *Cornell University*, & RONALD A. FINKE, *SUNY at Stony Brook*—Observers saw a rectangle at three orientations along a path of rotation. They attempted to remember the third orientation and were then shown a fourth orientation that was either the same as, or slightly different from, the third. Every observer tested was more likely to accept as "same" distractors rotated past the third orientation than test items presented in the physically same position. The memory shift increased with the implied velocity of the inducing display.

8:20-8:35 (37)

Memory Distortions Induced by Implied Velocity and Acceleration. RONALD A. FINKE, *SUNY at Stony Brook,* JENNIFER J. FREYD, *Cornell University,* & GARY C.-W. SHYI, *SUNY at Stony Brook*—Visual memories can be distorted in ways that resemble some of the inertial properties of physically moving objects. Subjects observed a sequence of dot patterns in which the dots were displaced in separate directions, implying changes in the shapes of the patterns. Memories for the final pattern in the sequence were shifted according to the implied motions of the dots, by an amount determined by their implied velocity and acceleration.

8:40-8:50 (38)

Mental Rotation: Effects of Stimulus Dimensionality and Type of Task. SHENNA SHEPARD, *Tufts University,* & DOUGLAS METZLER, *University of Pittsburgh* (sponsored by Roger N. Shepard)—A 2-by-2 design varied dimensionality of stimuli (R. Shepard & J. Metzler's 3-D objects versus Cooper's 2-D polygons) and task (Shepard & Metzler's comparison between two stimuli versus Cooper's comparison of one stimulus with a memory representation). Dimensionality influenced the intercept, while task affected the slope of the function relating reaction time to angular disparity. Evidently the 3-D stimuli took longer to encode, but the 2-stimulus task produced the slower mental rotations.

8:55-9:05 (39)

Mental Rotation: Effects of Stimulus Complexity, Familiarity, and Individual Differences. CHARLES E. BETHELL-FOX, *Ministry of Defence, London,* & ROGER N. SHEPARD, *Stanford University* (read by R. N. Shepard)—Rates of mental rotation, for (Podgorny & Shepard) patterns of filled-in squares in a 3-by-3 grid, were initially much slower for more complex patterns (those with more "pieces"). However, except for a few subjects who adopted a slower, verbal strategy, rates of mental rotation became with practice equally fast for the simplest and most complex patterns (cf. Cooper & Podgorny's 1976 results). Apparently, subjects can imagine familiar patterns transformed holistically, regardless of complexity.

9:10-9:30 (40)

Parallel vs. Serial Mental Transformations. MICHAEL KUBOVY & NELSON TOTH, *Rutgers University*—We will present data regarding two kinds of mental transformations of planar random polygons: those that can be performed concurrently with a mental rotation and those that must be performed before a mental rotation. We will also discuss the issue of transformations which may not need to be performed at all.

9:35-9:50 (41)

Rotations, Translations, and Sensitivity to Perspective Structure. JOHN J. RIESER, DAVID A. WEATHERFORD, & DAVID A. GUTH, *Vanderbilt University*—Subjects judged the headings to targets scattered in a room from their initial viewing point, from novel points occupied under a blindfold, and from imagined, but not occupied, points. Movements from initial to novel points were either rotations or translations. After blindfolded movements, no differences in latency or error were found for the rotations vs translations. But with imagined movements, rotations were consistently more difficult. Alternative explanations in terms of the geometry of movement and the underlying computations are discussed.

9:55-10:10 (42)

Spatial Location and Distractor Effects on Detection of a Moving Target. PAULA GOOLKASIAN, *University of North Carolina-Charlotte*—Response latencies indicating the direction of an illusory moving target were measured at varied spatial locations from 0 to 25 degrees to the right and left of the fixation point. Words and arrowheads, that were the same, different, or neutral with respect to the target response, were used as distractors. The distractor was presented at the fixation point and appeared simultaneously with the target. The analysis determined whether the spatial distribution of the target and the type of distractor affected target latencies.

LETTER/WORD PROCESSING I
Georgian Room, Friday morning, 10:25-12:25

Chaired by David B. Pisoni, Indiana University

10:25-10:35 (43)

A Repeated-Letter Visual Reaction-Time Task. SANFORD KATZ, *Hobart & Wm. Smith Colleges*—Four-letter visual displays served as stimuli. Two of the positions in the display had the same letter, and the subject was to identify the repeated letter. Of interest were the 6 possible position pairs of the repeated letter. Reaction times were significantly faster for adjacent positions. Left-to-right differences were found for nonadjacent positions but not adjacent positions. An interpretation of these results will be suggested.

10:40-10:55 (44)

Digit and Letter Priming Effects. KEITH CLAYTON, *Vanderbilt University*—Subjects classified digit-letter pairs as "same" (both digits or both letters) or "different" (otherwise). For the digit-digit pairs, reaction time for correct "same" responses increased linearly with magnitude of the absolute difference. This result contrasts with the symbolic distance effect. For the letter-letter pairs, reaction time was related to a measure of bigram frequency but not to an association-value measure. This result contrasts with semantic priming effects with words.

11:00-11:15 (45)

Fluency in the Identification of Repeated Words. MICHAEL E. J. MASSON & LAWRENCE FREEDMAN, *University of Victoria*—Identification of a word may be made more fluent by a recent prior exposure to that word. Repeated presentation of a homograph, however, does not lead to a faster lexical decision unless the same interpretation is invoked on both presentations. Lexical decisions about perceptually degraded words are biased but not made more accurate by prior exposure. We conclude that identification of repeated words is affected by fluency in interpreting rather than constructing a perceptual representation.

11:20-11:35 (46)

More Mask-Information Masks More Information. M. DEBOECK, *Bank Brussel-Lambert,* J. HUETING, & E. SOETENS, *Vrije Universiteit Brussel* (read by J. Hueting)—In a series of 5 experiments the influence of different masks on consonant-letter recognition was investigated. Target durations ranged from 2 - 64 ms. Masks were random patterns of squares, lines, lines-curves, trigrams and bigrams (the latter to test possible overload of STM). The influences of same masks versus changing masks were compared. The general conclusion is that the more information masks contain, the stronger their masking effects are, as revealed by longer critical ISI's.

11:40-12:00 (47)

Locus of Frequency Effects in Word Recognition and Production. ROBERT S. McCANN & DEREK BESNER, *University of Waterloo* (read by D. Besner)—Evidence from lexical decision, phonological lexical decision, and naming is presented in support of the assertion that word frequency effects do not reside in (a) an orthographic input lexicon, (b) an auditory input lexicon, (c) a semantic system, and (d) a phonological output lexicon.

12:05-12:20 (48)

Repeated Homograph Effects in Lexical Decision. DAVID S. GORFEIN & ANDREA BUBKA, *Adelphi University*—Item repetition in lexical decision has been shown to produce facilitation for decisions beyond the first. Theories of homograph meaning are concerned with the role of priming and of the representation of homographs. The present study employs a range of homographs and prime contexts (primary and secondary primes-constant vs. changed primes) to elucidate both the nature of the lexical decision task and the possible forms of homograph representation.

COMPREHENSION AND REASONING
Stanbro Room, Friday morning, 8:00-11:00

Chaired by James A. Hampton,
The City University, London

8:00-8:15 (49)

Individual Differences in Television Comprehension. KATHY PEZDEK, SARA SIMON, JIM KIELEY, & JANET STOECKERT, *The Claremont Graduate School*—The ability to comprehend and remember information presented on television varies widely among adults. This study tests two factors hypothesized to predict individual differences in television comprehension. (Good and poor television comprehenders participated in (a) the sentence-picture verification task of Chase & Clark (1972) and (b) a paper folding test of spatial ability. Subjects who performed the sentence-picture verification task using nonlinguistic strategies were better television comprehenders than those who used a linguistic strategy. Also, television comprehension was positively correlated with spatial ability.

8:20-8:40 (50)

A Structure-Mapping Model for Word Problems. STEPHEN K. REED, *Florida Atlantic University*—In Experiment 1 students in a college algebra class were given a detailed solution to a mixture problem and to a work problem. They then used each solution to construct equations for related test problems. In Experiment 2 students had to match concepts in the test problems to concepts in the solution. A model based on Gentner's (1982) structure-mapping theory is used to interpret the results.

8:45-9:00 (51)

The Effect of Terminology on Instruction Comprehension. CHARLES P. BLOOM & DEWEY RUNDUS, *University of South Florida* (read by D. Rundus)—Two experiments examined how terminology influences the comprehensibility of complex, unfamiliar instructions. Experimentally naive subjects received practice at executing instructions for setting up mailing-lists and form-letters. Half the subjects studied instructions containing the original, unfamiliar technical terminology, and half studied instructions containing familiar terms selected expressly for their ability to evoke appropriate conceptual and contextual referents. Results of a transfer-task supported the hypothesis that using familiar terms leads to improved comprehension of complex, unfamiliar instructions.

9:05-9:20 (52)

Attitude and Knowledge as Factors in Probabilistic Conditional Reasoning. JAMES F. VOSS, TIM A. POST, CHRISTOPHER WOLFE, & LAURIE NEY, *University of Pittsburgh*—After measuring the subjects' attitude toward and knowledge of the USSR, probability ratings of hypothetical political events involving USSR aggression, USSR non-aggression, USA aggression, and USA non-aggression were obtained. Subsequently, the event statements were conditionalized in the eight possible ways, e.g., if USSR aggressive, then USA aggressive. Estimates were again obtained. For each rating, justifications also were obtained. The results are related to conditional reasoning processes and the relation of attitude and knowledge to such processes.

9:25-9:35 (53)

Semantic Relations in Language and Thought. DOUGLAS J. HERRMANN, *Hamilton College*, ROGER CHAFFIN, *Trenton State College*, & CHRISTOPHER M. JANICKI, *Utica Free Academy*—For nearly two decades research has investigated how people recognize that two words are related in a particular way, e.g., by class inclusion, synonymity, and antonymy. This paper considers whether the phenomena of relations, manifested in semantic memory tasks, are found as well in other language, perceptual, and reasoning tasks. It is concluded that an adequate theory of semantic relation phenomena addresses processes that are fundamental to most, if not all, kinds of cognition.

9:40-9:55 (54)

Decision Models for Paragraph Comprehension Tasks on Ability Tasks. SUSAN EMBRETSON & JOHN EPPERSON, *University of Kansas*—Paragraph comprehension tasks are a popular item on verbal ability and reading achievement tests. Although several theories of text processing have been studied, the decision processing has received little attention for the multiple choice format of test items. An experiment was conducted to determine the impact of two factors—number of falsifiable alternatives and position of correct answer—on the decision processing of paragraph comprehension items. Significant results were obtained and a decision processing model is developed.

10:00-10:15 (55)

The Conjunction Fallacy: Natural Heuristic vs. Formal Training. FRANCA AGNOLI, *University of Padua*, & DAVID H. KRANTZ, *Bell Laboratories* (sponsored by Steven E. Poltrock)—Tversky and Kahneman showed that even people with formal training in probability often judge a compound event more probable than one of its components. We confirm that such errors are produced by use of the representativeness heuristic, but demonstrate that they can be considerably reduced by brief training about Venn diagrams and set inclusion, even in subjects with weak formal background. We present a competing-heuristic model that accords with both sets of results.

10:20-10:35 (56)

Analogical Access: A Good Match Is Hard to Find. DEDRE GENTNER, *University of Illinois, Champaign*, RUSSELL LANDERS, *Massachusetts Institute of Technology*—This study concerns analogical access: What kinds of similarity matches are most accessible. Subjects read 32 scenarios. A week later, they saw new scenarios constructed to form either true analogies or spurious mere-appearance matches with the originals. They wrote any original scenarios that came to mind; then they rated all pairs for soundness. Although subjects rated true analogies as soundest, their spontaneous access was highest for the mere-appearance matches. This suggests that analogical *access* and analogical *inferencing* are governed by different principles.

10:40-10:55 (57)

Varieties of Symbolic Reasoning. RICHARD A. BLOCK, *Montana State University*—Information-processing analyses of reasoning have explored a wide variety of tasks, and there has been little agreement on basic components involved. In this study, subjects performed 14 different symbolic reasoning tasks constructed to reflect the kinds commonly used. Factor analyses were conducted to confirm either two underlying factors (such as deduction and induction) or, possibly, three factors (with analogical reasoning being separate). The structure was not as simple as expected.

BRAIN FUNCTION
Stanbro Room, Friday morning, 11:10-12:10

Chaired by David B. Boles, Rensselaer Polytechnic Institute

11:10-11:25 (58)

Visual Evoked Potential Correlates of Sentence Priming and Reading Ability. THOMAS V. PETROS, BRUCE G. SAWLER, & JEFF HARSCH, *University of North Dakota*—Skilled and less skilled college readers named easy or difficult words that were preceded by a congruous, incongruous, or neutral sentence prime. Visual evoked potentials were averaged for each condition. A principal components factor analysis produced four factors. Analyses of variance of the resultant factor scores produced significant effects involving reading ability, priming, and word difficulty. These effects were most frequently observed for the factor corresponding to the last 450 milliseconds of the 1 second evoked potential.

11:30-11:45 (59)

How the Brain Recognizes Meaningful Objects. ALBERTA S. GILINSKY, *University of Bridgeport*—Two different neuropsychological approaches provide converging evidence for the neuronal basis of perceptual categorization. Selective impairment of the ability to recognize particular classes of objects—faces, inanimate objects, bodily postures, etc.—in brain damaged patients are well established as mutually dissociable deficits. Secondly, populations of neurons in monkey temporal cortex respond selectively to faces, head orientation, eye gaze, or human movement. Results reflect categorical specificity of complex percepts at the cellular level.

11:50-12:05 (60)

Brain Function: An Observational, Experimental, and Mathematical Analysis. WALTER C. STANLEY, *Gaithersburg, MD*—A 1949 hypothesis that "cortical act-inhibition" is a function of the integrity of the frontal cortex is revised and discriminatively augmented in the light of newer self-observational, animal-experimental, and behavior-mathematical findings. The new hypothesis is then related to locus of brain function, consciousness, and motor coordination.

PSYCHOPHYSICS I
Berkeley/Clarendon Rooms, Friday morning, 8:00-10:05

Chaired by Lorraine G. Allan, McMaster University

8:00-8:15 (61)

Skin Sensitivity Depends on Body Size. WILLARD D. LARKIN, *University of Maryland,* & J. PATRICK REILLY, *Johns Hopkins University Applied Physics Laboratory*—Detection thresholds and suprathreshold sensation magnitudes were determined for brief electrical pulses on the forearm and fingertip. Subjects were 124 adults, including college students, office workers, and skilled manual tradesmen. Individual differences in sensitivity were related ($r \simeq .5$) to body weight and surface area, but not to any other measured variable. As a group, women were more sensitive than men, but this "sex difference" was completely erased by covariance analysis, taking body size into account.

8:20-8:35 (62)

Low Frequency Adaptation and Recovery Effects for Lingual Vibrotactile Thresholds. KAL M. TELAGE & PETER J. GORMAN, *Ithaca College*—Lingual vibrotactile threshold adaptation and recovery effects were investigated. Three minutes of continuous vibrotactile stimulation preceded each of three experimental threshold trials. During recovery, three threshold trials followed rest periods of 1.5, 3.0, and 4.5 min. A control group performed the same tasks with no adaptor stimulus. The experimental subjects showed significant threshold decay from baselines with subsequent recovery. The control subjects' thresholds remained consistent with baselines. Findings support the presence of an (NP) receptor system.

8:40-8:50 (63)

Relation of JND's in Sound Intensity to Loudness. JOZEF J. ZWISLOCKI, *Syracuse University,* & HERBERT N. JORDAN, *V.A. Hospital, Iowa City*—Comparative measurement of sound-intensity jnd's on listeners with normal hearing and those with hearing loss accompanied by loudness recruitment reveals that the jnd's are constant when the loudnesses are constant, independent of the slopes of the corresponding loudness functions. The jnd values obtained in the presence of normal hearing agree with the results of other reasonably recent studies.

8:55-9:15 (64)

Quantitative Aspects of Auditory Sensory Storage, Integration, and Processing. NELSON COWAN, *University of Missouri, Columbia*—There is a brief, auditory sensory store that outlasts the stimulus. The present work brings together 2 lines of research on this store: one demonstrating that the store is experienced as continued stimulation, and another demonstrating that stimulus information is extracted from the store. These 2 conclusions lead to contrasting predictions in a backward masking of loudness paradigm. The predictions are explored with 4 experiments and a quantitative model of auditory sensory storage and integration.

9:20-9:35 (65)

Toward a Psychophysics of the Speech Mode. NEIL A. MACMILLAN, *Brooklyn College, CUNY,* & LOUIS D. BRAIDA, *Massachusetts Institute of Technology*—Listeners identified and discriminated synthetic steady-state vowels ranging from /i/ to /I/, before and after training. Resolution for single tokens was compared with that for multiple tokens (produced by randomly varying F0). Both practice and the use of single tokens, manipulations which may discourage perception in the "speech mode," yielded large improvements in identification and much smaller gains in discrimination. According to Durlach and Braida's psychophysical model, these effects result from reduced context coding variance.

9:40-10:00 (66)

Remembrance of Sounds Past: Memory and Psychophysical Scaling. LAWRENCE M. WARD, *University of British Columbia*—A "perturbation" design, in which stimuli judged on Day 2 were 12 dB more or less intense than those judged on Days 1 and 3, reveals that subjects' scaling judgments are dramatically but inconsistently affected by judgments made and/or stimuli judged 24 hr earlier. These memory effects were explored in four common paradigms: absolute and ratio magnitude estimation, category judgment, and cross-modality matching.

PERCEPTION I
Berkeley/Clarendon Rooms, Friday morning, 10:15-12:15

Chaired by Julian Hochberg, Columbia University

10:15-10:35 (67)

Multidimensional Scaling Procedures Discover and Define the Dimensions of Pain. W. C. CLARK, *NYS Psychiatric Institute,* J. D. CARROLL, *AT&T Bell Laboratories,* & M. N. JANAL, *NYS Psychiatric Institute*—Similarity judgments were made by 45 volunteers to all possible pairings of 9 verbal descriptors related to global pain. INDSCAL analysis revealed a 3-dimensional group stimulus space: D-1, pure sensory pain; D-2, somatosensory; and D-3, aversive-emotional. The subject also rated each of the descriptors on 10 bipolar visual analogue scales of various perceptual and psychological attributes. The attribute vectors determined by PREFMAP analysis confirmed the interpretation of the INDSCAL dimensions, e.g., Indifferent—Unpleasant, D-1; Lethargic—Energized, D-3, etc.

10:40-10:50 (68)

Judgments of Dot Numerosity: Effects of Three Variables. SLATER E. NEWMAN, RANDALL A. CRAIG, *North Carolina State University,* & ANTHONY D. HALL, *IBM Corporation*—Subjects ($N = 72$) haptically examined standard or large braille symbols for 5 or 10 sec on each of three trials and judged the number of dots in each symbol. All three main effects were significant, but none of the interactions was. Some implications for the design of braille instructional programs will be discussed.

10:55-11:15 (69)

A Model of Character Recognition and Legibility. JACK M. LOOMIS, *University of California, Santa Barbara*—A stimulus-driven computational model of character recognition and legibility will be presented. It consists of spatial filtering, template matching, and response selection stages. With just three fixed parameters, the model is successful in accounting for the legibility of 23 character sets sensed in two ways: as raised characters sensed by touch and as optical characters sensed by vision under conditions of optical low-pass spatial filtering.

11:20-11:35 (70)

Hand Movements: A Window into Haptic Object Recognition. ROBERTA KLATZKY, *University of California, Santa Barbara,* & SUSAN LEDERMAN, *Queen's University*—Hand movements that explore three-dimensional objects provide valuable information concerning haptic recognition of objects and their properties. Blindfolded observers matched objects on the basis of specific properties of form, substance, or function. The videotaped exploration was scored as a sequence of "exploratory procedures," each procedure a well-defined class of movement. Predicted relationships between exploratory procedures and object properties were confirmed. These relationships form the initial steps toward a model of haptic object recognition.

11:40-11:50 (71)

Knowledge of Layout in Congenitally Blind Subjects. MARK HOLLINS & ELIZABETH K. KELLEY, *University of North Carolina at Chapel Hill*—Blindfolded sighted and congenitally blind subjects learned the positions of objects on a table, then walked part-way around the table and from there aimed a pointer at the objects. Blind subjects were less accurate than the sighted, confirming Rieser et al. (1982). When asked to *replace* objects on the table, however, the two groups were equally accurate. Thus blind people incorporate self-movement into knowledge of layout, but cannot demonstrate this updated knowledge by pointing.

11:55-12:10 (72)

The Perception of Surfaces that Afford Sitting. LEONARD S. MARK, *Miami University*—Two studies indicate that, for a given individual, maximum and minimum heights of surfaces that afford "sitting on" can be expressed as a constant proportion of each person's leg-length. People's perceptual judgments and action capabilities correspond to predictions of a biomechanical analysis of the act of sitting. These findings provide a new demonstration of how environmental properties are perceived with reference to the individual's action capabilities and requirements.

AVERSIVE LEARNING
Arlington Room, Friday afternoon, 1:00-3:40

Chaired by F. Robert Brush, Purdue University

1:00-1:10 (73)

Intruder Size Advantage and Territorial Behavior in Convict Cichlids. MICHAEL H. FIGLER, BERNARD E. WAZLAVEK, BETTY A. WALKO, & LIN M. CHAVES, *Towson State University*—The consequences of an intruder size advantage on the territorial prior residence effect were evaluated using a number of resident-intruder pairs in which the intruder was either 10%-20%, 25%-30%, or 40%-50% larger than the resident. Intruders established dominance in every pair in which any aggression occurred, and delivered significantly more attacks (bites) than the residents. Apparently, an intruder size advantage can readily overwhelm the territorial prior residence effect.

1:15-1:30 (74)

Effects of Shock Controllability on Subsequent Defeat by Colony Intruders. JON L. WILLIAMS & DEAN M. LIERLE, *Kenyon College*—Previously, I've reported that exposure to inescapable, but not escapable, shock results in a reduction in aggression and an increase in defensive behavior of dominant male rats when tested with colony intruders. The present research demonstrates that inescapably shocked rats show enhanced defeat as intruders and that this effect can be counteracted by immunization and therapy procedures. These findings are discussed in terms of learned helplessness explanations and a proposed stress-fear-defense interpretation.

1:35-1:55 (75)

Delayed vs. Trace Conditioning in the Chronic Learned Helplessness Effect. PHILIP J. BERSH, *Temple University,* WAYNE G. WHITEHOUSE, *University of Pennsylvania Medical School,* JOSHUA E. BLUSTEIN, & JOSEPH R. TROISI, II, *Temple University*—Rats chronically exposed to signalled inescapable shocks, involving a Pavlovian delayed conditioning procedure, were substantially impaired in subsequent shock-escape acquisition in the shuttlebox. Chronic exposure to identical inescapable shocks with a trace conditioning procedure was ineffective. These data support a Pavlovian conditioning interpretation of the learned helplessness effect produced by chronic exposure to signalled inescapable shocks.

2:00-2:15 (76)

Innate Danger Signals, Defensive Freezing, and Opioid Analgesia. MICHAEL S. FANSELOW, *Dartmouth College,* & RONALD A. SIGMUNDI, *St. Lawrence University*—Naltrexone (7 mg/kg) enhanced defensive freezing that followed a single shock *only* when shock accompanied an innate danger stimulus (either stress-odors from shocked conspecifics or dorsal stimulation from handling). Furthermore, dorsal stimulation increased jump latency on the hot plate test, and the two innate danger signals in combination, but not in isolation, triggered freezing. These data are consistent with the hypothesis that cues that trigger opioid analgesia also control defensive behavior.

2:20-2:30 (77)

Egg White and Albumin as a Deer Repellant at Feeding Stations. DAVID A. JOHNSON, *Ohio University*—Blended whole egg was applied to test ears of corn at feeding stations used regularly by White Tailed Deer. Untreated ears were consumed in a few hours while treated ears were entirely avoided for six days. Although avoidance would probably last much longer, consumption by birds limited test to six days. In Experiment 2, blended whole egg slurry applied to test shrubs (pine, taxus, Rhododendron) reduced browse damage by as much as 85% for periods of up to 6 weeks.

2:35-2:55 (78)

Effects of Congener Contents on Aversion Conditioning to Alcohol Beverages in Rats. JOSEPH J. FRANCHINA & ANTOINETTE B. DYER, *Virginia Polytechnic Institute and State University*—Alcoholic beverages in wine, beer, and distilled spirits classes consist of ethanol, water, and substances which collectively are called congeners. Holding ethanol concentration at 4.5 - 5.0% (v/v), aversion conditioning across beverage classes was higher the greater the congener content of the class. Manipulation of congener content (high versus low) within a class yielded reliable aversion differences depending upon the particular beverage and on whether one or both levels of the congeners occurred in conditioning.

3:00-3:15 (79)

Emergence Neophobia Predicts Conditioned Taste Aversion Magnitude. DENIS MITCHELL, *University of Southern California*—Rats were alternately tested in emergence neophobia and conditioned taste aversion paradigms. Emergence neophobia, determined by the latency to enter and traverse a novel alley from a familiar home cage, was positively correlated with conditioned taste aversion magnitude, determined by extinction curves obtained after treatment with lithium chloride four hours following consumption of a novel saccharin solution. Moreover, home cage habituation increased both emergence latency and conditioned taste aversion magnitude.

3:20-3:35 (80)

Conditioned Taste Aversions to Delayed-Onset Toxins: A Procedural Assessment. ANTHONY L. RILEY, JOHN P. MASTROPAOLO, DIANE L. TUCK, & ROBERT J. DACANAY, *The American University*—Rats given ad-lib access to saccharin and poisoned 12, 24, or 36 hours into this access period acquired an aversion (Experiments 3-5). Because aversions at such delays are not acquired under water-deprivation, even with repeated trials (Experiment 1) and a two-bottle test (Experiment 2), the non-deprived procedure may be more effective in detecting aversions to toxins whose onset extends beyond the delay generally effective in inducing aversions, e.g., warfarin.

REINFORCEMENT
Arlington Room, Friday afternoon, 3:50-5:50

Chaired by E. A. Wasserman, The University of Iowa

3:50-4:10 (81)

On the Path-Dependence of Total Time Spent Drinking. JAMES ALLISON, *Indiana University*—The thirsty rat's typical pattern of unconstrained drinking consists of bouts that shorten, and pauses that lengthen, as the drinking progresses. A novel inversion schedule gave each individual a chance to duplicate the exact reverse of its unconstrained baseline pattern. Forced out of their unconstrained patterns, the five rats consistently fell short of the total time spent drinking under the unconstrained baseline condition, but generally maintained total licks and volumetric intake.

4:15-4:25 (82)

Positive Treadle-Press Contrast as a Function of Component Duration. FRANCES K. McSWEENEY & JAMES D. DOUGAN, *Washington State University*—Pigeons pressed treadles on multiple schedules. The size of positive contrast generally increased with increases in component duration. The functions were similar to those found for negative treadle-press contrast and opposite to those found for positive key-peck contrast. The results suggest that the same theory may describe both positive and negative contrast. They also question some simpler explanations for differences between treadle-press and key-peck contrast.

4:30-4:45 (83)

Delayed Conditioned Reinforcement in Chain Schedules. BEN A. WILLIAMS & PAUL ROYALTY, *University of California, San Diego*—Pigeons were trained on a three-link chain schedule. Brief unsignaled delays of reinforcement were imposed at various points in the chain. Response rates were greatly decreased in the component with the delay but unaffected in the remaining components. The results indicate that conditioned reinforcement plays a vital role in maintaining behavior in a chain schedule and that the reinforcement properties of a signal are independent of the response rates it controls during its presence.

4:50-5:05 (84)

Integrating Control Generated by Positive and Negative Reinforcement: Appetitive-Aversive Interactions. STANLEY J. WEISS, *The American University,* & CHARLES W. SCHINDLER, *NIDA Research Center, Baltimore*—Rats responded for food in tone and avoided shock in light (counterbalanced). During stimulus compounding, tone, light and tone-plus-light controlled comparable rates—suggesting reciprocal inhibition of appetitive and aversive incentive states. While an appetitive or aversive discriminative stimulus (S^D) subjected to extinction did not reduce responding to an excitatory S^D of the same incentive class on a summation test, it did inhibit responding to an excitatory S^D of the opposite incentive class.

5:10-5:20 (85)

The Small Trials PREE in an Operant Conditioning Situation. LAURENCE MILLER, CINDY REAS, & JOESEPH KRISTOFZSKI, *Western Washington University*—Following familiarization and magazine training, three groups of rats received either: (1) four food pellets for each of four lever presses; (2) food for only the first and third lever presses; or, (3) food for only the second and fourth lever presses. Responding was then extinguished. There was no significant difference between the groups in number of lever presses during extinction or time to extinguish; and, no significant correlation with various measures.

5:25-5:45 (86)

Behavioral Momentum and the Partial Reinforcement Extinction Effect. JOHN A. NEVIN, *University of New Hampshire*—Reexamination of all published quantitative data on free-operant extinction reveals that, after an initial decrement that is directly related to rate of reinforcement during training, responding decreases more slowly after asymptotic training with continuous reinforcement than with various partial schedules. The latter result is contrary to the usual statement of the partial reinforcement extinction effect, but is consistent with known determiners of behavioral momentum.

SYMPOSIUM: WHERE IS MEMORY RESEARCH 100 YEARS AFTER EBBINGHAUS?
Imperial Ballroom, Friday afternoon, 1:00-4:00

Chaired by Endel Tulving, University of Toronto

This symposium has been organized to honor Hermann Ebbinghaus and to celebrate the centennial of his epoch-making monograph, Über das Gedächtnis, which was published in 1885. Participants of the symposium will review certain highlights of the first hundred years of memory research. After the discussion of their views by two other symposiasts, the meeting will be thrown open for a general discussion.

(87)

Origins of Memory Research: Ebbinghaus' Contributions. HENRY L. ROEDIGER, III, Purdue University—This historical survery of Ebbinghaus' contributions will focus on his methodological inventions, his empirical discoveries and his sophisticated analytic techniques. Emphases will be on his empirical and conceptual nuggets that have not been successfully mined and which may yet guide research in the field.

(88)

You've Come a Long Way, Baby. GORDON H. BOWER, *Stanford University*—Conceptual analyses of memory have advanced greatly since Ebbinghaus. We view cognitive architecture as control processes operating over data bases, the former modelled by goal-driven production systems, the latter by associative networks of concepts, images, and schemas. Advances include constructs like neo-associationism, unitization, modality-specific stores, encoding strategies, schemas, etc. Future prospects lie in relating memory to conditioning and emotion, while increasing understanding of ecological event memories and learning of large-scale systems.

(89)

Models of Memory. RICHARD M. SHIFFRIN, *University of Indiana*—Although a surprising number of conceptual ideas underlying present day theorizing about memory date back at least to the time of Ebbinghaus, many advances have occurred in the interim. Of these, I choose to focus on the use of formal modeling, in the form of mathematical models, and computer simulation models. Some successes, potential advantages, and problems of such approaches are discussed.

(90)

The Relationship Between Learning and Recollection: Memory Attributes vs. Memory Attributions. LARRY L. JACOBY, *McMaster University*—Memory for past experiences can be shown by perceptual activities even when not shown by performance on tests of recognition memory or recall. This dissociation of learning from recollection is evidenced by an investigation of memory for source. Research relevant to understanding the variable relationship between learning and recollection will be reviewed.

(91)

The First 100 Years 100 Years From Now. ENDEL TULVING, *University of Toronto*—Which notable achievements of the first one hundred years of memory research are likely to be mentioned in the histories of the field written one hundred years from now? In this paper, I will reveal and discuss my own select list of relevant items. The list contains a larger number of empirical discoveries than theoretical ideas.

Discussants: FERGUS I.M. CRAIK, *University of Toronto (92)*
WILLIAM K. ESTES, *Harvard University (93)*

HUMAN LEARNING & MEMORY II
Imperial Ballroom, Friday afternoon, 4:10-6:00

Chaired by James J. Jenkins, University of South Florida

4:10-4:30 (94)

Alcohol and Memory Retrieval Processes. S. D. MOESER, *Memorial University*—Subjects learned two paired associate lists either while sober or under the influence of alcohol intoxication. One week later they were tested on their ability to remember these pairs, while in either the same or a different intoxication state than their learning state. Sober subjects were significantly better than intoxicated subjects on the cued recall test regardless of their training state. This finding contradicts previously published reports.

4:35-4:50 (95)

Learning Names for Places in 1−, 2−, and 3−Dimensions. STEVEN POLTROCK, *MCC*—Subjects learned to associate words with cubes positioned in a 1−, 2−, or 3−Dimensional arrangement. Words from the same semantic category were assigned systematically or randomly to locations. As expected, more associations were learned when category assignments were systematic. However, the number of dimensions did not affect learning, contrary to intuitions. Apparently subjects could not effectively use the additional spatial information provided by more spatial dimensions.

4:55-5:10 (96)

Suffix Effects in First and Second Languages. SUSAN KARP MANNING, *Hunter College and the Graduate Center, CUNY*, & BETSEY SILVERSTEIN, *Hunter College, CUNY*—Shand and Klima proposed that recency and end-of-sequence suffix effects are characteristics of a subject's 'primary linguistic mode' but not of a recoded second language. We compared serial recall of French and English word sequences by native English speakers with limited knowledge of French. Recency and suffix effects were similar for both languages suggesting that Shand and Klima's 'primary linguistic mode' hypothesis may be inadequate.

5:15-5:35 (97)

A Retrieval Interpretation of Priming. ROGER RATCLIFF & GAIL McKOON, *Northwestern University*—A retrieval view of priming is presented that is based on the Gillund and Shiffrin (1984) model. The model assumes that a prime and target form a compound cue in memory and that this compound cue is used to access memory and produce a familiarity value (leading to reaction time predictions). The model requires *no* spreading activation assumptions, and predictions of this model are contrasted with those of spreading activation theories.

5:40-5:55 (98)

Simulation of a Model of Episodic Memory. FRANCIS S. BELLEZZA, *Ohio University*—A model of learning and forgetting, REM (Retrieval from Episodic Memory), is outlined, and the results of its simulation by a FORTRAN program are described. The model incorporates memory processes such as rehearsal and the chunking of episodic information. Each chunk includes representations of list items and temporal-contextual tags. During retrieval, temporally defined search sets are created, and only those chunks containing temporal tags defined by the search set are retrieved.

3-D PERCEPTION
Plaza Ballroom, Friday afternoon, 1:00-3:20

Chaired by Gregory Lockhead, Duke University

1:00-1:15 (99)

Using Apparent Motion to Measure the Structure of Perceived Space. DALE S. KLOPFER, *University of Pittsburgh*, & LYNN A. COOPER, *University of Arizona* (read by L. A. Cooper)—Studies suggesting that Korte's third law of apparent motion also holds for phenomenal distance typically manipulate perceived depth by using a rotation or a single translation in depth. We examined Korte's law where perceived depth was manipulated by depicting translations along the x, y, and z-axes. Results suggest that judged onset of apparent movement is not affected by our manipulation of depth. These results are compared to subjects' ratings of motion quality.

1:20-1:35 (100)

Postural Instability from Simulated 3-D Motion in Central Vision. GEORGE J. ANDERSEN, *University of Illinois, Urbana-Champaign*, & MYRON L. BRAUNSTEIN, *University of California, Irvine* (read by M. L. Braunstein)—We previously reported that stimulation of the central visual field with an optic flow pattern simulating observer motion through a 3-D environment can result in perceived self-motion (Andersen & Braunstein, 1985). The present study examined the effects of this type of pattern on postural stability. Greater postural instability occurred for displays simulating backward rather than forward motion. This provided further evidence for the contribution of the central field to ambient processing.

1:40-2:00 (101)

Common Motion: Kinetic Information for Depth at an Edge. LINCOLN CRATON, MARTHA ARTERBERRY, & ALBERT YONAS, *University of Minnesota* (read by A. Yonas)—Although J. J. Gibson argued that sensitivity to accretion and deletion of visual texture results in the perception of depth at an edge, experiments interpreted as supporting this hypothesis have confounded accretion-deletion information with another motion-carried cue specifying occlusion. This study used displays similar to those of Gibson and Kaplan in demonstrating that common motion between texture and a contour generates the perception of depth at an edge, even when accretion-deletion information is not present.

2:05-2:15 (102)

Depth Threshold Asymmetry Between Crossed and Uncrossed Disparity. ROBERT FOX, *Vanderbilt University*, ROBERT CORMACK, *New Mexico Institute of Mining and Technology*, STEPHEN OROSS III, & ROBERT PATTERSON, *Vanderbilt University*—The geometry intrinsic to stereopsis predicts that the depth interval for uncrossed disparity will become larger, relative to crossed disparity, as fixation distance and absolute disparity increase. Results obtained from observers who made equidistant settings (two rod) at different disparities and distances support this prediction, an outcome that bears on the difference between uncrossed and crossed disparity reported in the literature.

2:20-2:30 (103)

Nearest Neighbors in Apparent Motion: Two or Three Dimensions? *MICHAEL J. TARR & STEVEN PINKER, Massachusetts Institute of Technology* (read by S. Pinker)—In a changing scene, corresponding elements in successive views are linked by the "nearest neighbor" principle. Ullman (1978) argued that the correspondence process uses 2-D retinal distances in determining "nearness." However, Ullman's CRT displays lacked depth cues and could have been perceived as 2-D patterns. We presented subjects with a real 3-D display of flashing lights viewed binocularly. Lights still appeared to move to their nearest neighbors in 2-D space.

2:35-2:50 (104)

When Worlds Collide: Observers' Sensitivity to Collision Dynamics. MARY KISTER KAISER, *NASA Ames Research Center*, DENNIS R. PROFFITT, *University of Virginia*, MICHAEL FLANNAGAN, & JOHN M. SULLIVAN, *University of Michigan* (read by D. R. Proffitt)—Formally, the kinematics (pure motions) of a simple collision are sufficient to specify dynamic parameters of the event. However, observers' sensitivity to this information is an empirical issue. Our first set of studies investigated the potential effect of form size on judgments of relative mass. No analogue to the size-weight illusion that occurs with lifted objects was observed in our data. A second set of studies investigated observers' sensitivity to violations of linear-momentum conservation.

2:55-3:15 (105)

Illusory Contours Capture Stereopsis and Apparent Motion. V. S. RAMACHANDRAN, *University of California, San Diego*, & P. CAVANAGH, *University of Montreal*—Illusory (Kanizsa) triangles were presented sequentially to produce apparent motion. When this movie was projected on a grating, the lines appeared to move with the triangle although they were stationary. Next, two Kanizsa triangles were viewed binocularly and disparities introduced to create a triangle floating out of the paper. When a "template" of this stereogram was superimposed on vertical gratings, the lines were pulled forward with the triangle even though they were at zero disparity. Thus image segmentation profoundly influences motion and stereopsis.

LETTER/WORD PROCESSING II
Plaza Ballroom, Friday afternoon, 3:30-6:00

Chaired by Keith Clayton, Vanderbilt University

3:30-3:50 (106)

Semantic Priming and Typicality Effects. J. W. WHITLOW, JR., *Rutgers University*—Nominal identity pairs, like "robin — ROBIN" were used to eliminate visual matching processes from the semantic matching paradigm. This manipulation eliminated a theoretically significant interaction between priming and typicality reported by Rosch (1975). The overall pattern of results points to a dominant locus of priming effects at the level of decision rather than encoding processes and appears consistent with a "blind" comparator description of the matching task.

3:55-4:15 (107)

Role of Letter Spacing in Word Recognition. DANIEL HOLENDER, *University of Brussels*, & LEONARD KATZ, *University of Connecticut* (read by L. Katz)—Relative to normal typewriting, inserting two spaces between the letters of four-letter words determines (1) a severe reduction in the word superiority effect observed with brief masked presentations and (2) almost no increase in response latencies for a lexical decision or for a semantic classification bearing on clearly visible items. The validity of the inferences made from Reicher's paradigm to normal word reading will be questioned on the basis of these contrasting results.

4:20-4:40 (108)

Stimulus Identity and Response Compatibility as Factors in Facilitation. G. ROBERT GRICE & JOHN W. GWYNNE, *University of New Mexico*—In letter identification, noise letters identical to the target, flanking and preceding it by 100 msec, facilitate RT more than letters that are merely response compatible. Different time-courses of response facilitation and the facilitation of stimulus coding are indicated. Further research related to the process of stimulus coding includes a comparison of physical and name identity.

4:45-5:00 (109)

Visual Word Recognition in an Orthographically Deep and Lexically Ambiguous Language. SHLOMO BENTIN, *Department of Neurology, Hadassah, Jerusalem*, & RAM FROST, *Hebrew University*—Hebrew orthographiy carries mostly consonantal information, while vowels are usually omitted. Normal print contains a large proportion of phonemically and lexically ambiguous homographs. We found that inclusion of vowels induces prelexical disambiguation, but postpones lexical decisions. Naming phonemically ambiguous nonwords was facilitated by vowel's presence, but they had no effect on nonambiguous words. It is concluded that, in Hewbrew, unvoweled words gain rapid lexical access via orthographical codes, while phonemic and lexical disambiguation occur post-lexically.

5:05-5:25 (110)

Phonological Activation of Lexical Candidates in Auditory Word Recognition. LOUISA M. SLOWIACZEK & DAVID B. PISONI, *Indiana University* (read by D. B. Pisoni)—Cohort theory (Marslen-Wilson & Welsh, 1978) proposes that a "cohort" of words sharing initial acoustic-phonetic information is activated during the word recognition process. This activation assumption was tested in three auditory identification experiments using primes and targets that shared phonemes from the front (Experiments 1 and 2) and from the end (Experiment 3). Phonological priming observed in the first two experiments supports the cohort activation assumption. Priming found in Experiment 3, however, does not support the predictions made by cohort theory.

5:30-5:40 (111)

The Recognition of Spoken Words after their Acoustic Offset. FRANCOIS GROSJEAN, *Northeastern University*—The aim of this study was to show that continuous spoken word recognition cannot always be a sequential, left to right, word by word process. Using the gating paradigm, it was found that more than half of the monosyllabic words tested were isolated after their offset, and that almost all received a perfect confidence rating during the next word or words. Implications for sequential, left to right, models of word recognition will be discussed.

5:45-5:55 (112)

Phonetic Recoding by Deaf Readers. VICKI L. HANSON, *Haskins Laboratories*—When asked to circle occurrences of the letter F in printed sentences, prelingually, profoundly deaf college students, like hearing college students, often failed to detect occurrences in the word OF. Further tests indicated that this effect was inconsistent with hypotheses emphasizing the special status of the word OF as a short high-frequency function word. Implications of this tendency among deaf readers to recode phonetically are discussed.

MOTOR CONTROL II
Georgian Room, Friday afternoon, 1:00-3:05

Chaired by Herbert L. Pick, Jr., University of Minnesota

1:00-1:15 (113)

Physical Constraints Imposed by Finger Placements in Two-Choice Tasks. T. GILMOUR REEVE & ROBERT W. PROCTOR, *Auburn University*—Kornblum (1965) found two-choice reaction times to be faster when the responses were fingers on different hands rather than fingers on the same hand. We examined this relationship when only the two relevant fingers were placed on response keys or when four fingers were. The former condition replicated Kornblum's results, whereas the latter showed no differences between finger pairings. Therefore, the reaction-time patterns are determined by physical constraints imposed by the finger placements.

1:20-1:35 (114)

Critical Phenomena in Bimanual Hand Movements. J. A. S. KELSO & J. P. SCHOLZ, *Haskins Laboratories, University of Connecticut*—Abrupt transitions in the phasing among muscle groups occur in rhythmical, bimanual hand movements under scaling changes in cycling frequency. New experiments show that the hypothesized order parameter (relative phase) specifying such behavioral shifts exhibits two features characteristic of all critical instabilities far from equilibrium: 1) critical slowing down as the transition is approached; 2) enhanced space-time fluctuations near the transition. A theoretical model derived from concepts of synergetics and non-linear oscillator theory reproduces these observations.

1:40-1:55 (115)

Bimanual Coordination Following Commissurotomy. BETTY TULLER, *Haskins Laboratories & Cornell University Medical Center*, & J. A. SCOTT KELSO, *Haskins Laboratories & University of Connecticut*—Tapping of the left and right index finger was studied in normal and split-brain subjects, at phase differences varying from 0° to 360° in ten equal steps. Synchrony and alternation were more stable than intermediate phases for both subject groups, even though each finger's pacing light was projected to a single hemisphere's visual cortex. Thus, interhemispheric connections do not appear to be crucial to guarantee the stability of bimanual timing.

2:00-2:15 (116)

Timing and Coordination of Multiple Movements. ALAN M. WING, *Medical Research Council*, RUSSELL M. CHURCH, *Brown University*, & DONALD R. GENTNER, *University of California, San Diego*—Five human subjects pressed a pressure-sensitive key at a rate set previously by an auditory signal. On blocks of trials they used the index finger of the left hand or the right hand at intervals of 200, 400, and 800 msec, or alternated between hands at 100, 200, or 400 msec. analysis of the autocorrelation and cross-correlation functions suggests that the coordination between hands was accomplished by phase correction of two periodic timers.

2:20-2:40 (117)

A Composite Model of Motor Control. DONALD R. GENTNER, *University of California, San Diego*—Models of motor control tend to focus exclusively on either central or peripheral mechanisms. However, studies of typewriting and other motor skills show that neither control scheme is sufficient by itself. This paper proposes a composite model of motor control that integrates both central and peripheral mechanisms. Experimental data and simulation models show how the primary locus of control can shift with changes in skill level and the nature of the task.

2:45-3:00 (118)

Eye Movements in Transcription Typing. ALBRECHT W. INHOFF, *University of New Hampshire*, & ROBIN MORRIS, *University of Massachusetts*—Eye movements of two professional typists were recorded during the transcription of short passages of prose. Nontyping control subjects read the same stories for comprehension while their eyes were being monitored. The results show that saccade size and fixation duration are affected by the typing task. Specifically, saccade size dramatically decreases and average fixation duration increases during transcription typing.

DEVELOPMENT
Georgian Room, Friday afternoon, 3:15-5:05

Chaired by Marc Marschark, University of North Carolina at Greensboro

3:15-3:35 (119)

When Preschoolers Do Succeed on a Constrained Counting Task. ROCHEL GELMAN, *University of Pennsylvania*—Variations in set size and pretask conditions alter the strategies 3- and 4-year-olds use to solve a constrained counting task. Up to 75% of the youngest children succeed in some conditions; a considereable number transferred. To succeed they have to honor counting principles, including that of order-irrelevance. The results are analyzed in terms of the Greeno, Riley, and Gelman (1984) analysis of competence.

3:40-3:50 (120)

The Locus of Age Differences in Processing Speed. ROBERT KAIL, *Purdue University*—Ubiquitous age differences in processing speed on cognitive tasks could be due to (a) the acquisition of task-specific declarative or procedural knowledge, or (b) developmental change in some central mechanism that limits performance on all speeded tasks. The correlation across conditions of a mental rotation task between 8-year-olds' and adults' response times is 1, which is consistent with alternative (b).

3:55-4:15 (121)

The Sheriff That the Indian Robbed Had a Fat Belly. LYN R. HABER, *University of Illinois at Chicago*—The present experiment (1) defines normative age levels at which SS, OS, SO, OO two- and three-way reversible embedded sentences are acquired; (2) describes strategies of interpretation that differentiate levels of acquisition; (3) establishes normative ages at which those strategies are employed. This is the first test available for older children; even eighth graders have not reached adult competence. Data are based on a picture comprehension test of 60 sentences administered to over 700 public school children grades 4-8.

4:20-4:35 (122)

Debugging LOGO Programs: A Model of Children's Performance. DAVID KLAHR & SHARON McCOY CARVER, *Carnegie-Mellon University*—A production-system model of children's LOGO debugging skills is used as a basis for both instruction and evaluation. The model simulates children's debugging behavior on a variety of bugs in simple graphics programs, including those having recursive subprocedures. A training study with 7- to 9-year olds indicated that after 24 hours of "typical" LOGO instruction, children acquired only rudimentary debugging skills, and that they lacked most of the requisite productions for efficient debugging.

4:40-5:00 (123)

Children's Recall of Arithmetic Word Problems. DENISE DELLAROSA, WALTER KINTSCH, & RHONDA WEIMER, *University of Colorado* (read by W. Kintsch)—Children typically perform worse on word problems than on comparable numeric problems, with characteristic errors on certain problem types. To investigate the source of these errors, we required second graders to solve and recall easy and hard problems of three types. We found that (1) children tended to transform difficult problems into simpler ones, (2) these transformations often produced structurally incorrect problem representations, and (3) "characteristic" errors were often related to their problem representation and were correct answers to the incorrectly built problem structure representations.

LEARNING AND REINFORCEMENT
Stanbro Room, Friday afternoon, 1:00-3:25

Chaired by Sara J. Shettleworth, University of Toronto

1:00-1:10 (124)

The Control of Key Pecking by Trace Stimuli. HENRY MARCUCELLA, *Boston University*—Pigeons peck at brief signals which predict an increase in reinforcement rate in a subsequent component even though pecking has no scheduled consequence in the presence of the signal. The rate of signal key pecking was a function of signal duration, but relatively insensitive to signal frequency or to the reinforcement rate difference preceding and following the signal. Responding controlled by the signal generalized to other stimuli along the same stimulus dimension.

1:15-1:25 (125)

Determinants of Contrast May Change Over Postshift Period. CHARLES F. FLAHERTY, PATRICIA S. GRIGSON, & GRACE A. ROWAN, *Rutgers University*—The negative contrast that occurs when rats are shifted from 32% to 4% sucrose recovers in three to four days. Evidence indicates that the mechanisms controlling contrast may change over this period. Our interpretation of these data, including the effects of anxiolytic drugs, corticosterone levels, and manipulation of the preshift-postshift interval, is that an emotional response is not involved in the initial occurrence of consummatory contrast, but becomes so over time.

1:30-1:40 (126)

Molar and Local Behavior Regulation Under Schedule-Constraint. DON GAWLEY, WILLIAM TIMBERLAKE, & GARY A. LUCAS, *Indiana University* (read by W. Timberlake)—Two experiments examined molar and local effects of ratio schedules relating wheel running and drinking in rats. The schedules constrained the average baseline burst duration of drinking but not necessarily the baseline totals of drinking or running. Both wheel running and drinking approximated baseline totals, contradicting Dunham's optimal duration model and supporting the assumption that rats defend molar response characteristics. However, several local effects also suggested defense of more molecular characteristics of responding.

1:45-2:05 (127)

Aversive Character of First Stimulus in Sequence Leading to Food. JAMES A. DINSMOOR, DIANA M. LEE, & MARCELINE M. BROWN, *Indiana University*—Pigeons were repeatedly presented with a sequence of four colors on the key, followed by food. When it produced displays of a fifth color, pecking increased in the first and decreased in the last color. The first color can therefore be characterized as aversive, but there is no corresponding classification for the last color. When only two colors were used, the second elicited very little pecking but reinforced it quite effectively in the first.

2:10-2:20 (128)

Learning to Respond Randomly in Pigeons. NATHAN WILSON & ALLEN NEURINGER, *Reed College* (read by A. Neuringer)—Hungry pigeons had to generate highly variable patterns of responses on two response keys. Every response was evaluated to determine whether it resulted in the particular sequence of left and right responses which had previously occurred least frequently. Meeting this "least frequent" criterion caused reinforcement. The pigeons quickly learned to generate variable patterns approximating, but not exactly matching, those from a computer-based random number generator.

2:25-2:40 (129)

Schedule-Induced Polydipsia Under Fixed-, Variable-, and Random-Time Schedules. CORA LEE WETHERINGTON, *University of North Carolina at Charlotte*, & ANTHONY L. RILEY, *The American University*—The overall temporal distribution of post-pellet drinking was identical under three schedules of spaced food delivery, i.e., fixed-, variable- and random-time. Although an averaging of different temporal distributions following the varying interpellet intervals within the schedules could produce this result, a pellet-by-pellet analysis of the post-pellet licking pattern revealed that the overall similarity among the schedules reflected a true averaging of the time between pellet deliveries.

2:45-2:55 (130)

Disentangling Effects of Delay of Reinforcement From Rate of Reinforcement. E. A. WASSERMAN, K. A. HUSSAR, & R. S. BHATT, *The University of Iowa*—A new procedure was devised to vary the delay of reinforcement without also affecting the rate of reinforcement, a serious confounding in most prior studies. Pigeons' keypecking under this new procedure systematically decreased as the delay of food reinforcement was increased from 0 to 10 to 20 s. Comparing performance at each of these delays with a schedule of response-independent reinforcement suggests that only the 0- and 10-s delays reliably enhanced response rate.

3:00-3:20 (131)

Of Mice, Monkeys, Men, Motives, Mishegoss, Myopia, & Myself. PAUL M. BRONSTEIN, *University of Michigan, Flint*—This is a theoretical paper demonstrating some important limitations of reductionistic research in understanding learning and motivation in animals—the creation of epiphenomena, for instance. Benefits of a dialectical, spatiotemporal, and ecological orientation are asserted; and T. C. Schneirla's theoretical approach extolled.

PROBLEM SOLVING
Stanbro Room, Friday afternoon, 3:35-6:00

Chaired by James Pellegrino, University of California, Santa Barbara

3:35-3:50 (132)

Transfer Between Isomorphic Topics in Algebra and Physics. MIRIAM BASSOK, *Hebrew University*, & KEITH J. HOLYOAK, *University of Michigan* (read by K. J. Holyoak)—Transfer between arithmetic-series problems in algebra and constant-acceleration problems in physics was investigated. High-school students who had learned one of these topics in school were given word problems with either familiar content or unfamiliar content from the analogous domain. Transfer was asymmetric: Students who had learned arithmetic series were very likely to recognize that the physics problems could be solved the same way, but students who had learned constant acceleration showed no transfer to algebra.

3:55-4:15 (133)

Forward Chaining and Mental Models in Medical Problem Solving. GUY J. GROEN & VIMLA L. PATEL, *McGill University*—Psychological research on medical problem solving has suffered from a lack of explicit process models. This paper uses some notions from expert systems to remedy this. Propositional analysis of protocols from a series of experiments on diagnostic explanation is used to derive models of how experts and novices generate explanations and diagnoses from their knowledge base. Specific attention is paid to differences in the use of forward chaining and the connectedness of object-like mental models.

4:20-4:40 (134)

When Will the Milk Spoil? Everyday Induction in Daily Life. ROBERT J. STERNBERG & DAVID KALMAR, *Yale University*—Will your coffee still be hot in 20 minutes? How do we make everyday inductions, and what makes some harder than others? Townspeople made timed predictions or postdictions about stimuli that would or would not change in state over time. In Experiment 1, subjects made state judgments; in Experiment 2, they made time judgments. Internal validation produced a well-fitting quantified processing model, and external validation related components of processing to external measures.

4:45-5:00 (135)

Schema-Based Planning of Events. LAWRENCE W. BARSALOU, JONELL ADAIR USHER, *Emory University*, & DANIEL R. SEWELL, *Search Technology*—Three exploratory studies examined how people plan events (*purchases*, *vacations*). The first catalogued goal-derived categories people use to instantiate schema variables while planning. The second explored means by which the instantiation of a schema variable is constrained by the instantiations of previous variables. The third examined how number, typicality, and type of instantiation affect degree of constraint and also whether the joint constraint of several instantiations equals the intersection of their individual constraints.

5:05-5:20 (136)

A Computer Simulation of Performance on an Intelligence Test. MARCEL JUST & PATRICIA CARPENTER, *Carnegie-Mellon University*—Computer simulations and eye fixation studies explore the processes in solving the visual analogy problems in the Raven Progressive Matrices test. One simulation, which accounts for the eye fixations and total scores of average college students, uses relatively little planning and induces relations on the basis of pairwise comparisons of elements in a problem. A program using more sophisticated planning and comparisons of triplets of elements accounts for the behavior of the most successful problem solvers.

5:25-5:35 (137)

Forgetting as a Means of Release From Fixation in Problem-Solving. STEVEN M. SMITH & STEVEN E. BLANKENSHIP, *Texas A & M University*—Fixation in solving rebus problems was induced by presenting misleading clues with problems. A second problem-solving session with the same problems (minus the clues) followed either (a) No interval, (b) An unfilled interval, (c) An interval filled with new problems, or (d) An interval filled with a music perception task, a very different task designed to help subjects forget incorrect solutions. Greatest improvements followed the music perception task. Induced forgetting may provide a means of release from problem-solving fixation.

5:40-5:55 (138)

Simulating Scientific Discovery. GEORGE M. ROBINSON, *Smith College*—Apprentice scientists try to discover a pattern by doing miniature experiments. When the rewards for each "publishable" experiment are *reduced*, they discover patterns faster by performing fewer, more critical experiments. With greater rewards for each successful experiment, people get trapped by their hypotheses, have difficulty looking beyond their data, are less bold at developing new lines of research, and take longer to find adequate theories. There are implications for how faculty research is evaluated.

SOCIAL/PERSONALITY
Berkeley/Clarendon Rooms, Friday afternoon, 1:00-3:25

Chaired by Alan Searleman, St. Lawrence University

1:00-1:20 (139)

A Nuclear Attack on Boston: Physical and Sociopsychological Effects. BEM P. ALLEN, *Western Illinois University*—A hypothetical 1962 attack on Boston is compared to a modern attack. Physical and sociopsychological effects of the modern attack are considered.

1:25-1:40 (140)

Perception of Sexual Attractiveness and Attitudes Towards Pornography. IRA H. BERNSTEIN, MING-HONG HUANG, *University of Texas at Arlington*, & TSAI-DING LIN, *Chinese Cultural University*—Male college students rated the sexual attractiveness of female pictures varying in degree of dress. Pro-pornography and neutral subjects were not separable from each other although both were from anti-pornography subjects. Anti-pornography subjects rated clothed pictures as more attractive than nude pictures. Pro-pornography and neutral subjects rated them conversely. Obliterating the faces had little effect upon clothed pictures but substantially lowered the attractiveness of nude and semi-nude pictures, especially among anti-pornography subjects.

1:45-1:55 (141)

Effects of Stranger's and Respondent's Chronic Self-Destructiveness on Interpersonal Attraction. KATHRYN KELLEY, *SUNY at Albany*—The study investigated the effects of variations in chronic self-destructiveness on interpersonal attraction among college students. Participants responded to the chronic self-destructiveness scale and then inspected the scale responses of a stranger presented as either high or low on that dimension. Highly self-destructive strangers were less attractive than lows. Highly self-destructive participants expressed greater attraction to a self-destructive stranger than less chronically self-destructive subjects.

2:00-2:10 (142)

Is There a Creative Self-Image? ALBERT N. KATZ, *University of Western Ontario*—Two studies will be reported that are consistent with the hypothesis that creative persons possess a distinctive self-image. High creatives (Remote Associate Test scorers) recalled more creative-relevant trait terms than did low creatives; there were no memory differences between groups for creative-irrelevant descriptors. This memory difference was observed only for the condition in which one's self-image was activated (a self-referent condition) and was not observed under other encoding conditions.

2:15-2:25 (143)

Cognitive Style Differences in Creative Problem Solving. NICHOLAS F. SKINNER & GREGORY J. PICONE, *King's College*—Kirton argues that adaptors (who strive to "do things better") and innovators (who attempt to "do things differently") will perform equally well on tests of convergent and divergent production. Others, however, predict higher convergent scores for adaptors, and higher divergent scores for innovators, respectively. The present study investigates these opposing views of cognitive style by comparing the results of adaptors and innovators on convergent (Remote Associates) and divergent (Alternate Uses) tests of creative problem-solving.

2:30-2:40 (144)

Levels-of-Processing and Recall of Self-Relevant Information. STEVEN P. MEWALDT, *Marshall University*, JANINE E. JANOSKY, *University of Pittsburgh*, & MARC A. LINDBERG, *Marshall University*—The Feningstein-Self Consciousness Scale was used to classify 160 subjects according to the Buss' distinction between public and private self-consciousness. Subjects were then asked to recall a list of nouns after hearing them presented in a structural, semantic, public- or private- self-referent orienting levels-of-processing task. Recall of items presented in a context consistent with self-perception exceeded that of items recalled from either a context inconsistent with self-perception or a neutral semantic context.

2:45-3:05 (145)

Behavioral and Cognitive Deficits in Alcoholic and Obese Humans. DEVENDRA SINGH, *University of Texas at Austin*—Obese and alcoholic subjects were given transfer of training (mirror-drawing), Stroop, and functional fixation tests. Both obese and alcoholic subjecs, compared to controls, showed a marked deficit in all these tests. It is argued that similar behavioral and cognitive rigidity exhibited by obese and alcoholics is primarily due to deficit in response inhibition. The nature of this deficit and its implications for understanding the behavior of obese and alcoholics are discussed.

3:10-3:20 (146)

Cognitive Ability as a Predictor of ROTC Performance. CLESSEN J. MARTIN, LAWRENCE M. HANSER, & RANDOLPH K. PARK, *U. S. Army Research Institute for the Behavioral & Social Sciences*—This research determined the validity of the Officer Selection Battery (OSB) in predicting several measures used to assess ROTC Basic Camp performance among 3,668 ROTC candidates. The correlation between the OSB and a general military skills job performance measure was .25 and .30 for the college grade point average (GPA). Considering the OSB measures primarily verbal and quantitative aptitudes, it is nearly as effective in predicting a job performance skills test as in predicting GPA.

AGING AND AMNESIA
Berkeley/Clarendon Rooms, Friday afternoon, 3:35-5:50

Chaired by Peter Graf, University of Toronto

3:35-3:50 (147)

Anesthesia, Amnesia, and the Memory/Awareness Distinction. ERIC EICH, *University of British Columbia*—Several studies have shown that surgical patients cannot consciously remember events that occurred during general anesthesia. Might evidence of memory for intraoperative events be revealed through the performance of a postoperative test that does not demand deliberate or intentional remembering? Results of the present study, involving the recognition and spelling of semantically biased homophones, suggest a negative answer to this question, and imply that intraoperative events cannot be postoperatively remembered, either with or without awareness.

3:55-4:10 (148)

Free Recall, Cued Recall, and Recognition in Posthypnotic Amnesia. JOHN F. KIHLSTROM, *University of Wisconsin*—Hypnotized subjects memorized a list of categorized nouns, and then received a suggestion for temporary posthypnotic amnesia. Memory improved across tests of free recall, cued recall, and recognition—though recognition by the hypnotic subjects was inferior to that displayed by subjects tested in the normal waking state. Results from additional priming and list-differentiation experiments indicate that recognition in posthypnotic amnesia is mediated by familiarity rather than by respecification of context.

4:15-4:30 (149)

Memory With and Without Awareness in Young and Older Adults. LEAH L. LIGHT, *Pitzer College*, & ASHA SINGH, *Scripps College*—Amnesic patients are impaired on conventional memory tests but show sparing of memory that does not require conscious recollection. We present the results of a series of studies comparing the performance of young and older adults on tasks which do not involve deliberate acts of remembering as well as on recall and recognition. Similarities and differences in the nature of memory deficits in amnesia and normal aging will be discussed.

4:35-4:50 (150)

Syntactic Deterioration in Elderly Adults. SUSAN KEMPER, *University of Kansas*—Oral narratives told by adults between 50 and 90 years and written diaries kept by adults for six or seven decades reveal a pattern of syntactic deterioration in old age. A sentence imitation task provided converging evidence that elderly adults have difficulty producing and imitating complex syntactic constructions involving sentence-initial embedded clauses. The data suggest that elderly adults are unable to process such embeddings due to attentional limitations in working memory.

4:55-5:10 (151)

Aging and Cognitive Pattern. RUTH S. DAY, *Duke University*—Many view aging as the time when loss of cognitive as well as physical function occurs. However, qualitative instead of quantitative changes may underlie the performance of the aged in many cognitive tasks. There may be a shift in overall cognitive pattern as individuals age, rather than the loss of specific cognitive capabilities. This research holds implications for cognitive development over the lifespan as well as for the field of aging.

5:15-5:30 (152)

Age Differences in Memory for Faces vs. Views of Faces. JAMES C. BARTLETT & JO E. LESLIE, *University of Texas at Dallas*—We compared young and elderly subjects' recognition memory for faces. In a standard single-view condition—in which each input face was shown as just one photograph—we replicated prior findings of an age-related deficit. In a more naturalistic multi-view condition, no age-related differences were found. A signal-detection analysis indicated a deficit in remembering details of single-views of faces, as opposed to remembering faces per se.

5:35-5:45 (153)

Aging Effects in Neuropsychological Functions. GERALD ROSENBAUM & NANCY KLOOZ, *Wayne State University*—Cognitive, affective, attentional, and proprioceptive functions were assessed in male and female adults in the 5th, 6th, 7th, 8th, and 9th decades. Impairments with age showed similar monotonic increases in proverb interpretation (cognition), anhedonia (affect), and reaction-time latency (attention). Significant neurospychological deficits were observed: (a) in cognition by the 8th decade: (b) in anhedenia by the 7th decade in men; and in attention by the 7th decade in women. No significant impairments in weight-discrimination (proprioception) were found for either age or sex.

ANIMAL LEARNING & CONDITIONING I
Arlington Room, Saturday morning, 8:00-9:45

Chaired by Allan M. Schrier, Brown University

8:00-8:15 (154)

Extinguishing a Lithium-Mediated Flavor Preference: Evidence for Excitatory Control of Conditioned Inhibition. MICHAEL R. BEST, CYNTHIA L. MEACHUM, *Southern Methodist University*, SUSAN M. NASH, *University of Texas at Austin*, & JOHN D. BATSON, *Furman University*—Three experiments demonstrated a conditioned flavor preference using an A+/AX− inhibition procedure. This preference was diminished significantly by repeated testing and extinction of the conditioned excitor. The outcomes speak to the role of conditioned inhibition as a "slave" to excitation.

8:20-8:40 (155)

Conditioned Excitation and Inhibition Are Not Mutually Exclusive. RALPH R. MILLER, ELIZABETH L. GORDON, LOUIS D. MATZEL, & ANDREA M. BROWN, *SUNY, Binghamton*—Using thirsty rats as subjects, a partially reinforced CS passed a lick suppression test for excitation while failing summation and retardation tests for inhibition. A subsequent study found the same reinforcement schedule supplemented with frequent unsignalled USs produced a CS which passed summation and retardation tests while also passing an excitation test, albeit weakly. Although this last observation was found to depend upon partial reinforcement of the CS, the finding nevertheless creates problems for several contemporary theories.

8:45-9:00 (156)

Is Latent Inhibition (LI) a Trace Conditioning Phenomenon? TERRY L. DeVIETTI, ROBERT BAUSTE, GARY NUTT, & OWEN BARRETT, *Central Washington University*—Experiments were conducted using rats and a one-trial fear conditioning task. The first showed that the task was sensitive to trace conditioning effect. The second, that pre-exposure to a short CS produced less LI than pre-exposure to a long CS. However, CS duration also affected the retention of non pre-exposed animals. The third, with a procedure that did not influence the retention of controls, showed that LI strength was a direct function of CS duration.

9:05-9:20 (157)

Latent Inhibition in Honeybees. M. E. BITTERMAN, *University of Hawaii*, & C. I. ABRAMSON, *Boston University*—Free-flying foragers were conditioned during feeding with substrate vibration or air stream as the CS and brief, avoidable shock as the US. A pre-exposed stimulus not only conditioned less readily but suppressed responding when compounded with a previously conditioned stimulus.

9:25-9:40 (158)

Ontogeny of Conditioned Inhibition: Methodology and Data. NANCY K. DESS & S. STEFAN SOLTYSIK, *Mental Retardation Research Center, U.C.L.A.*—A current project employs a novel methodology to study the ontogeny of conditioned inhibition in cats. Excitatory conditioning is measured as a decrease in respiration amplitude, termed *conditioned respiratory suppression* (CRS). Conditioned inhibition is measured as a reversal of respiration suppression, in some cases surpassing baseline amplitude. In addition to rapid excitatory conditioning and contrary to others' reports, a selected conditioning procedure yields robust and reliable inhibitory conditioning in young kittens.

ANIMAL COGNITION II
Arlington Room, Saturday morning, 9:55-12:05

Chaired by John Gibbon, N.Y.S. Psychiatric Institute

9:55-10:10 (159)

Internal Structure and the Representation of Temporal Patterns. WARREN H. MECK, *Columbia University*—Rats were trained to classify temporal sequences of auditory stimuli into two types: Those that are conceivable in terms of an equal interval beat-based framework and those that are not. Although the metrical-nonmetrical property of the temporal sequences was readily discriminated, there were systematic distortions in the representation of certain metrical sequences. This suggests that the perception of temporal patterns is strongly influenced by an internal structure on which subjects try to map stimulus sequences.

10:15-10:30 (160)

Do Songbirds Perceive Pitch Relations in Serial Patterns? SUZANNE PAGE, JEFFREY CYNX, & STEWART HULSE, *Johns Hopkins University* (read by S. Hulse)—An attempt was made to train starlings to discriminate between serial acoustic patterns that either rose or fell in pitch. Exemplars were chosen such that the birds could not use overall tone height (frequency) as a cue. Among other things, results suggest that the birds acquired the discrimination with great difficulty, if at all. Discrimination was possible, however, when tone height was available as a cue.

10:35-10:50 (161)

Rehearsal Processes in Monkeys and Humans. ROBERT G. COOK, ANTHONY A. WRIGHT, *University of Texas Health Science Center*, STEPHEN F. SANDS, *University of Texas at El Paso*, & MASAKO JITSUMORI, *Chiba University, Japan* (read by S. F. Sands)—Rehearsal in monkeys and humans was examined by changing the interstimulus-interval (ISI) and viewing time (VT) of list items in a Serial Probe Recognition task. For humans, increases in ISI and VT faciliated performance. For monkeys, VT, but not ISI, increased performance in the exact same task. This ISI advantage disappeared for humans when remembering items difficult to label verbally (kaleidoscope images). Apparently, rehearsal occurs during the ISI only when the material is verbally coded.

10:55-11:10 (162)

Evidence of an Imagery Process in the Pigeon. J. J. NEIWORTH & M. E. RILLING, *Michigan State University* (read by M. E. Rilling)—Five pigeons were trained in a choice response task to discriminate between a rectangle which rotated with constant velocity and one which violated constant velocity rotation. Pigeons' representations of rotation were tested in trials in which the rotating rectangle was absent for varied times before a choice response was required. The data indicate that pigeons accurately represented rotation of the rectangle in its absence by some analog process. An imagery process is a likely candidate.

11:15-11:35 (163)

Evidence for Distinct Serial Processes from a Wide Range of Data. SETH ROBERTS, *University of California, Berkeley*—Three kinds of results—additive factors with reaction time, multiplicative factors with response rate, and, sometimes, independent measures—suggest that the underlying mental processing can be divided into distinct serial processes, distinct in the sense that each can be changed without changing the others. Examples of these results come from a wide range of experiments, involving both human and animal subjects, many tasks, and many responses. Taken together, the examples suggest that distinct sequential processes are common.

11:40-12:00 (164)

A Geometric Module in the Rat. KEN CHENG, *University of Sussex, UK*, & C. R. GALLISTEL, *University of Pennsylvania (read by C. R. Gallistel)*—Experiments in reference memory and working memory tasks in a rectangular space show that the rat generally determines locations solely on the basis of the shape of the space, ignoring salient non-geometric stimuli (white versus black walls, distinctive smells, etc.) that would disambiguate confusions between different locations that are geometrically equivalent because of axial symmetry in the shape of the rectangle. This impenetrability to non-geometric data is explained on computational grounds.

HEMISPHERIC SPECIALIZATION
Imperial Ballroom, Saturday morning, 8:00-9:10

Chaired by Jennifer A. Mather, University of Lethbridge

8:00-8:10 (165)

Bilateral vs. Unilateral Visual Stimulation, and Reaction Time Asymmetries. DAVID B. BOLES, *Rensselaer Polytechnic Institute*—Previous research indicates that when accuracy measures are used, bilateral stimulation produces larger visual field asymmetries than does unilateral stimulation. Here, two experiments extend the observation to reaction time. When subjects made odd-even judgments of bargraphs, bilateral stimulation produced a much larger (44 msec) LVF advantage than did unilateral stimulation (4 msec). When subjects made vowel-consonant discriminations of cued letters in strings, bilateral stimulation produced a larger RVF advantage (24 msec) than did unilateral stimulation (11 msec).

8:15-8:25 (166)

Validity of Self-Assessment Procedures for Determining Handwriting Posture. ALAN SEARLEMAN & STEPHEN KRIVDA, *St. Lawrence University*—Direct experimenter assessment of handwriting posture using the two criteria suggested by Levy and Reid (1976, 1978) was obtained for 227 subjects. Using this experimenter assessment as a criterion variable, it was found that self-assessment of handwriting posture using either questions or pictorial prototypes had high validity. For both left- and right-handed females who wrote with a straight hand posture the picture method of self-assessment was the most accurate.

8:30-8:45 (167)

Face Processing from LVF, RVF, and LVF+RVF Presentations. JOSEPH B. HELLIGE, JON E. JONSSON, & CHIKASHI MICHIMATA, *University of Southern California*—Observers indicated whether two successively presented drawings of faces were identical or differed in one feature. The first face of each pair was presented at the fixation point and the second was presented to the LVF, RVF or to both visual fields simultaneously (LVF+RVF). Errors and RT were lowest for RVF presentation, intermediate for LVF presentation and highest for LVF+RVF presentation. Implications are considered for various models of interhemispheric interaction and independence.

8:50-9:05 (168)

Manual Laterality and Left-Hemisphere Language Specialization in Children. DANIEL W. KEE, KAY BATHURST, ALLEN GOTTFRIED, CHERLY SCHMID, & SCOTT HOWELL, *California State University, Fullerton*—The relationship between manual laterality and left-hemisphere language specialization was evaluated in 71 right-handed children tested at ages five and six. Measures of manual laterality included finger tapping and peg movement. Language laterality was measured by dual task procedures (finger tapping and rhyme recitation). Hand differences in finger tapping performance accounted for significant variance in the language laterality scores which were based on percent of baseline change under dual task conditions.

(168a)

(Read by title only)

Visual-glue experiments in Chinese aphasics. OVID J. L. TZENG, *University of California-Riverside* and *Salk Institute, San Diego*, & DAISY L. HUNG, *Salk Institute, San Diego*—It has been often noted that Chinese and Japanese alexic patients who, when confronted with a logo graph (Chinese character or Kanji) that they could not read, would trace its strokes over and over again with their fingers as if trying to evoke a proprioceptive memory of writing it. A visual-glue experiment was conducted in which various types of Chinese aphasic patients were asked to identify a presented character by putting its fragmentary components together. It was found patients with frontal lesions could perform this task while patients with posterior lesions could not. Implications for a sequential graphomotoric coding strategy for the recognition of the Chinese characters will be discussed.

SYMPOSIUM: RECENT ADVANCES IN COGNITIVE NEUROPSYCHOLOGY
Imperial Ballroom, Saturday morning, 9:20-12:20

Chaired by Laird S. Cermak, Boston VA Medical Center, Boston University School of Medicine

The investigation of linguistic, memory, and other cognitive disabilities of brain-injured patients has always been a source of curiosity for theorists of normal cognitive processes. While it has often been viewed as a fertile testing ground for theories, it has never been seen as a source for new areas of exploration or conceptualization. Localization approaches to brain integration have probably contributed to this perspective, but, with the emergence of processing approaches to brain integration, a new vitality to research on brain dysfunction has emerged. This new approach seems to provide an excellent resource for new insights into normal information processing abilities as well as disabilities. The purpose of this symposium is to present several examples of this new approach within the discipline of the neuropsychology of cognitive disorders.

(169)

Lexical Processing in Aphasia. SHEILA E. BLUMSTEIN, *Brown University and Boston Aphasia Research Center*—A series of studies have been conducted to explore lexical processing deficits in aphasia. Wernicke's and Broca's aphasics were given lexical decision tasks in both the auditory and visual modalities. In addition, patients were given a semantic judgment task using the same word pairs as those used in the lexical decision tasks. Results showed that Wernicke's aphasics showed semantic facilitation in the lexical decision, although they were unable to perform the metalinguistic judgment task. Results for the Broca's aphasics were less clear-cut, showing inconsistent semantic facilitation in the lexical decision task, but good performance on the judgment task. These findings will be discussed in terms of automatic and controlled processing dichotomies in lexical access.

(170)

Lexical Processing and Mental Modularity: Critical Evidence from a Neuropsychological Approach to the Problem. DAVID SWINNEY, *Tufts University*—Real-time examinations of lexical processing during sentence comprehension in neurologically-impaired subjects (agrammatic aphasics) are presented. These studies provide the critical testing ground for claims of mental modularity, autonomy of lexical processing, privilege of access, and specialized roles for different vocabulary types during language comprehension: A discussion of functional mental architecture underlying language processing is provided, based on these data.

(171)

Sentence Comprehension Deficits: Theory and Therapy. MAX COLTHEART & SALLY BYNG, *Birkbeck College*—Understanding a simple sentence may involve three things: parsing the sentence into its syntactic elements (subject, object, etc.), retrieving from the lexical entry of the sentence's verb the thematic roles associated with the particular verb (e.g., agent, theme, goal) and mapping the thematic roles onto the syntactic elements. This framework is applied to the interpretation of a sentence-comprehension deficit in an individual aphasic patient. It will be argued that it was the mapping process which was specifically impaired in this patient. Remediation derived from this theoretical analysis restored the patient's ability to understand simple sentences.

(172)

Reading and Lexical Processing Mechanisms. ALFONSO CARAMAZZA, *The Johns Hopkins University*—The pattern of dissociations (e.g., good performance with morphologically derived vs. inflected words) and the structure of errors (e.g., producing *she rabbit* in response to *mare*) in oral reading allows us to draw inferences about the structure of the normal lexical processing system. I will review evidence which suggests that the lexicon represents words in morphologically decomposed form even though lexical access normally occurs through whole-word representations. Evidence also suggests that the orthographic input lexicon, the lexical semantic system, and the phonological output lexicon are functionally autonomous processes.

(173)

Priming, Remembering, and Organic Amnesia. DANIEL L. SCHACTER, *University of Toronto*—Direct priming refers to the facilitative effects of an encounter with a stimulus on subsequent processing of the same stimulus. Several studies have demonstrated that amnesic patients, who are severely impaired on standard recall and recognition tests, nevertheless show intact priming on tasks such as word completion and word identification. This paper attempts to specify the conditions under which amnesic patients show intact priming, and to delineate the implications of the phenomenon for theories of normal memory.

(174)

The Extent of Semantic Priming in Amnesics. LAIRD S. CERMAK, *Boston VA Medical Center & Boston University School of Medicine*—The effect of priming on amnesic patients' perceptual identification has now been shown to be limited to information learned prior to brain-injury. Whether or not any modification of previous semantic learning can occur is explored here within the context of a spelling experiment. Then, the extent to which associative priming can occur at all for these amnesic patients is presented. Finally, implications for dichotomous models of memory and information processing will be discussed.

(175)

The Role of the Frontal Lobes in Sensitivity to Frequency of Occurrence. MARY LOU SMITH, *Toronto General Hospital*—Sensitivity to frequency of occurrence was studied in patients with unilateral frontal- or temporal-lobe lesions and normal control subjects. Patients with frontal-lobe lesions were impaired in judging the frequency with which abstract designs or words appeared in a series, the deficit for words being demonstrated for both examiner-provided and self-generated stimuli. This impairment is discussed in terms of the possible underlying factors, either a disorderly search in memory or a deficit in cognitive estimation, or both.

(176)

Psychophysiological Studies of the Visual Recognition Defect in Prosopagnosia. RUSSELL M. BAUER, *University of Florida*—Prosopagnosia is a rare disorder in which a patient with brain damage cannot visually recognize the faces of previously familiar persons. Three studies of verbal and psychophysiological responses during face recognition, facial learning, and picture identification tasks reveal: (1) preserved ability to autonomically discriminate familiar vs. unfamiliar faces despite total verbal recognition failure, and (2) no verbal or psychophysiological evidence that such patients can engage in any substantial new visual learning. A cognitive model of prosopagnosia is proposed.

(177)

Neuropsychological Profiles Associated with Developmental Language Disturbance. PAULA TALLAL, *University of California, San Diego*—Children with developmental language delay of unknown origin are diagnosed by exclusion as developmentally aphasic. Research into the basis of this disorder has focused primarily on linguistic analysis. However, more recently, neuropsychological studies have demonstrated consistent patterns of non-verbal as well as verbal perceptual and motor deficits, specifically in the ability to both perceive and produce information rapidly in time. These neuropsychological deficits have been shown to correlate highly ($r = .83$) with the receptive language deficit and also to differentiate language-impaired from normal children 98% correctly.

HUMAN LEARNING & MEMORY III
Plaza Ballroom, Saturday morning, 8:00-10:00

Chaired by Norman J. Slamecka, University of Toronto

8:00-8:15 (178)

Variable Visual Recognition Performance: Task or Stimulus Differences? JAMES TERRELL TUTEN, III & JAMES J. JENKINS, *University of South Florida* (read by J. J. Jenkins)—Research on the capacity of visual recognition memory has followed two major lines: One, showing high recognition accuracy, uses independent, highly-descriminable stimuli, and a forced-choice task. The other, showing low accuracy, uses related, highly-similar stimuli and a yes/no task. No study has directly compared the two tasks. Studies are reported comparing the tasks on two sets of naturally-occurring stimuli. Results implicate the nature of stimuli rather than the tasks in accounting for differences.

8:20-8:35 (179)

Mood and Schematic Organization in Memory. HENRY C. ELLIS, *University of New Mexico*—Experimentally induced depressed mood states are known to reduce the effectiveness of encoding and retrieval in memory. In three experiments, the effects of depressed mood states on memory for schematically organized sequences were examined. Although recall was enhanced by schematic as opposed to random organization, the depressed mood induction did not reduce either verbatim or paraphrase recall. These results contrast with earlier studies of mood effects on organization involving perceptual grouping.

8:40-8:50 (180)

Memory of Central and Peripheral Information in Emotional Events. SVEN-ÅKE CHRISTIANSON, LARS FÄLLMAN, *University of Umea, Sweden,* & LARS-GÖRAN NILSSON, University of Toronto—Remembering of central and peripheral details in short emotional vs neutral pictorial stories was studied. It was hypothesized that attentional processes are more narrowed in states of heightened emotional arousal, because of attentional provoking features of the source of arousal. Data revealed that central details in emotional events were better retained whereas peripheral details were worse retained. This result indicates that people who witness emotional events are reliable in remembering central but not peripheral detail information.

8:55-9:10 (181)

A Language Effect in Voice Identification. CHARLES P. THOMPSON, *Kansas State University*—Seven bilingual students recorded two voice samples each in English, Spanish, and English with a Spanish accent. Subjects heard a single voice sample and attempted to identify the voice in a six-voice lineup one week later. The lineup voices spoke the same language (and accent) as the initial voice. Three experiments demonstrated a language effect on hits but not on false alarms. In addition, hits and false alarms were made with equal confidence.

9:15-9:25 (182)

Misleading Questions and the Retrieval of the Irretrievable. NEAL E. A. KROLL, *University of California, Davis*—Loftus and Loftus (1980) contend that event memory sometimes undergoes distoritions that appear irreversible: Misleading questions between visual presentations and recognition tests lead to incorrect choices, which then appear to have completely replaced original memory. However, Bekerian and Bowers (1983) demonstrated that these distortions only occur when sequence information is missing from the recognition test, and the present experiments indicate that sequence information presented *after* the distortion has occurred greatly improves performance on later recognition tests.

9:30-9:40 (183)

The Influence of Encoding and Retrieval Variables on Eyewitness Identifications. STEVEN PENROD, BRIAN CUTLER, & TODD MARTENS, *University of Wisconsin*—In three studies, subjects (N's=169, 320, and 297) viewed a realistic videotaped re-enactment of an armed robbery and later tried to identify the robber from a lineup. The studies investigated the effects of 22 encoding and retrieval variables on eyewitness independent variables within each study. The relative magnitude of encoding and retrieval variable effects are compared across studies.

9:45-9:55 (184)

Free Associations to Numbers 0 to 100. CHIZUKO IZAWA, *Tulane University*—Norms were obtained for Numerals 0 through 100 from 440 college students during 30 sec of free association per stimulus number. Associations to individual numbers greatly differed qualitatively and quantitatively; however, a clear trend emerged: Associations involved personal attributes including students' ages, chronologies of significant events in their lives and those of others close to them, and touched on school achievements, as well as other items of a numerical nature.

COGNITION I
Plaza Ballroom, Saturday morning, 10:10-12:15

Chaired by Robert A. Bjork, University of California, Los Angeles

10:10-10:25 (185)

Why Faces Are and Are Not Special--An Effect of Expertise. SUSAN CAREY & RHEA DIAMOND, *Massachusetts Institute of Technology*—Neuropsychological and psychophysical evidence support the existence of a processor specialized for human faces. The psychophysical evidence: stimulus inversion impairs face encoding more than the encoding of any other class so far examined: bridges, airplanes, costumes, stick figures, buildings, complex scenes, dog faces, and landscapes. Two experiments show that dog experts, but not ordinary folk, are as impaired at encoding upside-down dogs as they (and ordinary folk) are at encoding upside-down faces. We conclude that faces are not special and offer an account of the large inversion effect.

10:30-10:40 (186)

The Face Detection Effect. DEAN G. PURCELL, *Oakland University,* & ALAN L. STEWART, *Steven's Institute of Technology*—The face superiority effect (FSE) has only been demonstrated with a post-stimulus identification task. The present studies investigated the related face detection effect (FDE) by determining the backward masked detection threshold for normal inverted and scrambled faces. The FDE was found to be related to the retinal location of the face as well as to the type of mask (flash or pattern) used.

10:45-11:00 (187)

The Formation of Facial Prototypes. R. S. MALPASS & K. D. HUGHES, *SUNY at Plattsburgh*—Three models of facial prototype formation were compared: an averaging model involving mean values for dimensions of variability; an attribute frequency model, involving most frequent features; and the interval encoding hypothesis, related to the attribute frequency model. Subjects were shown Identikit II faces constructed from feature value frequency distributions, such that the three models made differential predictions. Subjects were shown old, new, and predicted "proto-typical" faces in the test sets. Recognition confidence ratings supported the attribute frequency model.

11:05-11:25 (188)

Spatial Frequency Transfer Shifts in Face Recognition. RICHARD B. MILLWARD & ALICE O'TOOLE, *Brown University*—Recognition memory for unfiltered, high, and low spatial frequency faces was tested after subjects made trait or feature judgments about the unfiltered faces. The usual trait superiority effect was observed. However, the transfer to low and high spatial frequency faces was differentially affected by the judgments. Feature judgments produced better transfer to the high spatial frequency faces while trait judgments produced better transfer to the low spatial frequency faces. Various explanations for the results will be discussed.

11:30-11:50 (189)

Vivid Imagery is Reliably (but Negatively!) Predictive of Visual Memory. DANIEL REISBERG & FRIDERIKE HEUER, *New School for Social Research*—There are dramatic differences in how individuals describe their visual imagery, yet many studies have found no relation between these differences and performance of "imagery tasks." We report six experiments showing a robust predictive relation between imagery vividness and visual tasks (e.g., color memory). Surprisingly, high vividness imagers are consistently *less* accurate (albeit more confident) in these tasks. We discuss both the contrast between "visual" and "spatial" tasks, and the function of visual imagery.

11:55-12:10 (190)

Picture Priming in Naming and Object-Decision Tasks. STEPHEN J. LUPKER, *University of Western Ontario*—Semantic and associative priming of pictures were examined under three circumstances: when subjects (a) named targets, (b) made object decisions about targets, and (c) made object decisions about simultaneously presented prime-target pairs. Substantially different patterns of priming emerged in the three situations. Explanations of these differences center on differences in post-access processing. The memory-access process, thought to be a priming locus for words, receives no empirical support as a priming locus for pictures.

COGNITIVE PROCESSES: PRACTICE & TRAINING EFFECTS
Georgian Room, Saturday morning, 8:00-10:40

Chaired by David Klahr, Carnegie-Mellon University

8:00-8:10 (191)

Implications of Educational Experiences for Adaptive Testing. RONNA F. DILLON, FRANCIS J. KELLY, *Southern Illinois University,* & MARIA TZECHOVA, *Universytet Im. Adama Mickiewicza, Poznan, Poland*—Aspects of academic discipline affect cognitive operations. This experiment provides evidence that inductive reasoning for Polish college students in an intensive linguistics curriculum is more accurately measured under verbal mediation conditions than under standard procedures because of insufficient practice in mediation during problem solving. Students in intensive mathematics-physics and biologychemistry programs receive extensive practice in verbal mediation. Induced mediation during testing is unnecessary to accurately assess these students' cognitive abilities and skills.

8:15-8:30 (192)

Test Bias: Test-Related Commercial Games and Effects on IQ Scores. LANGDON E. LONGSTRETH, MARK B. ALCORN, MARGARET J. HOWELL, & COLETTE C. HORN, *University of Southern California*—A commercial game almost identical to the Block Design subtest of the WISC-R has been shown to produce positive transfer to that subtest. But the game is so similar, one is tempted to conclude that practice on a test item improves performance on that test item. The present experiment shows that when the game is not quite so similar, no IQ-score gain can be demonstrated beyond that attributable to general effects.

8:35-8:55 (193)

Roles of Representation in Learning Multi-Digit Addition and Subtraction. KAREN C. FUSON, *Northwestern University*—First- and second-grade children were successfully taught symbolic multi-digit addition and subtraction procedures by doing the procedures with a physical embodiment of the first four places of the base ten system. Most children successfully extended the procedures to ten-digit symbolic problems done without the embodiment. For most children who made procedural errors on delayed tests, the mental representation of the procedure with the physical embodiment was strong enough for them to use it to self-correct their symbolic procedure.

9:00-9:15 (194)

Impasses in Complex Perceptual Learning. ALAN LESGOLD, HARRIET RUBINSON, DALE KLOPFER, & ROBERT GLASER, *University of Pittsburgh*—A theory of impasses in learning will be outlined, and preliminary evidence will be presented that shows how deep understanding can mitigate the effects of nonoptimal training experiences on perceptual learning. Keller's refutation of the concept of learning plateaus will be discussed.

9:20-9:35 (195)

Children's Cosmologies and the History of Astronomy. WILLIAM F. BREWER & STELLA VOSNIADOU, *University of Illinois*—Philosophers of science have used the development of theories in astronomy as classic examples of revolution in scientific theory (Kuhn, 1957, 1962). We have gathered preliminary data on children's knowledge of observational astronomy to see: (a) to what degree the children's theories are similar to the historical theories, and (b) to what degree the child's developing knowledge of astronomy can be conceptualized as a restructuring of earlier knowledge.

9:40-10:00 (196)

The Modifiability of Spatial Processing Skills. J. WESLEY REGIAN, *University of California, Santa Barbara,* VALERIE J. SHUTE, *University of Pittsburgh,* & JAMES W. PELLEGRINO, *University of California, Santa Barbara* (read by J. W. Pellegrino)—Subjects of varying spatial ability were given extended practice on mental rotation problems. All ability groups demonstrated systematic changes in processing parameters for stimuli of varying exposure frequency. Low ability subjects achieved terminal processing rates equivalent to the initial processing rates of high ability subjects. Posttesting on an ability battery showed significant increases in "spatial ability" for low ability subjects. The posttest scores of low ability subjects were comparable to the pretest scores of high ability subjects.

10:05-10:20 (197)

Automaticity and Practice in Mental Arithmetic. MARK H. ASHCRAFT, JOHN W. KOSHMIDER III, JOAN M. ROEMER, & MICHAEL FAUST, *Cleveland State University*—We continue our examination of automatic and conscious processes in mental arithmetic performance. For the priming studies, addition and multiplication reaction times varied as a function of prime relevance, SOA, and prime type (answer vs. addend). A pilot study on the effects of extended practice augments these results in suggesting the nature of extant automatic processing of arithmetic in adults, and the changes in processing across multiple sessions.

10:25-10:35 (198)

Criterion-Related Validity of Practice on a Cognitive Abilities Test Battery. ELIZABETH P. SMITH, JANE M. ARABIAN, & HILDA WING, *U. S. Army Research Institute* (read by H. Wing)—Practice on cognitive tests typically leads to small score gains. Because of the large sample sizes required, little evidence is available concerning the criterion-related validity of such gains. The Army's larger sample sizes permit investigation of the validity of initial vs. retest applicant scores on the Armed Services Vocational Aptitude Battery (ASVAB) for later performance on job knowledge tests. Ten different Army occupation samples (n greater than 100) will be analyzed.

HUMAN/COMPUTER INTERACTIONS
Georgian Room, Saturday morning, 10:50-12:15

Chaired by Stephen K. Reed, Florida Atlantic University

10:50-11:10 (199)

Changes in Memory Representation with Increasing Expertise in Using Computers. DANA S. KAY, *Yale University,* & JOHN B. BLACK, *Teachers College, Columbia University* (read by J. B. Black)—When people learn to use a computer system, their memory representation of knowledge about the system evolves through four phases: 1) they have preconceptions from prior knowledge, 2) they learn goals and what actions are related to those goals, 3) they combine the actions into simple plans to accomplish the goals, and 4) they become fully expert by combining simple plans into full plans and learning when to use a particular plan to accomplish a goal.

11:15-11:30 (200)

How People Find Information in a Computer Environment. PATRICIA BAGGETT & ANDRZEJ EHRENFEUCHT, *University of Colorado*—Subjects had four tasks or problems; information and solutions were available from a computer. (One could get them by a correct sequence of keystrokes.) Keystroke sequences and system responses were recorded. The data analysis objectives are to find what subjects' natural queries are and to locate "minimal identifiers" for the tasks. We then plan to design information access to maximize successful retrieval. How well the approach works will be discussed.

11:35-11:50 (201)

Analysis of the Cognition Involved in Software Interaction. JUDITH REITMAN OLSON & ERIK NILSEN, *University of Michigan*—We analyzed the performance of people using two seemingly similar spreadsheet packages, Lotus 1-2-3 and Multiplan. An important part of the behavioral differences observed required assessment of moment-by-moment short- and long-term memory and perceptual loads in addition to keystrokes. Although keystroke analysis (Card, Moran, and Newell, 1983) accounts well for tasks that require a lot of data/command entry, tasks that require more planning and review, like those with spreadsheets, need analysis of more cognitive abilities.

11:55-12:10 (202)

Debugging Computer Programs by Expert and Novice Programmers. LEO GUGERTY & GARY M. OLSON, *University of Michigan* (read by G. M. Olson)—Two studies compared the debugging behavior of expert and novice programmers. In the first, subjects were taught LOGO and then debugged three short graphics programs. In the second, subjects who already knew Pascal debugged a Pascal program. As expected, experts were faster and more successful in finding bugs. Thinking aloud protocols and detailed monitoring of behavior provided information about the similarities and differences in the debugging strategies of experts and novices.

ATTENTION I
Stanbro Room, Saturday morning, 8:00-10:30

Chaired by Walter Schneider, University of Pittsburgh

8:00-8:15 (203)

Perceptual Interactions in Multiword Displays: Effects of Similarity and Familiarity. JAMES L. McCLELLAND, *Carnegie-Mellon University,* & MICHAEL MOZER, *University of California, San Diego*—Letter migration errors (reports of SAND from the display LAND SANE) indicate perceptual interactions between simultaneously presented stimuli. We find that migrations depend on the familiarity of the stimuli in which the letters are embedded, on the abstract but not physical similarity of the strings, and on whether the migration forms a word. Our findings are interpreted in terms of models in which both strings simultaneously access stored knowledge of familiar stimuli.

8:20-8:35 (204)

Selective Attention: Differences Between Stroop and Garner Interference. JAMES R. POMERANTZ, *SUNY at Buffalo*—Failures of selective attention may result from either the *contents of* or mere *variation on* an irrelevant dimension. These failures are called Stroop and Garner interference, respectively. Some stimuli produce neither; some show both; some show only Garner; but no stimuli are found that show only Stroop. Garner interference may provide a relatively pure diagnostic of attention being allocated to the irrelevant dimension, whereas Stroop requires additionally that the codings for the two dimensions conflict.

8:40-8:55 (205)

Capacity Demands in Sustained Attention. ANJALI JOSHI, WILLIAM N. DEMBER, JOEL S. WARM, & MARK SCERBO, *University of Cincinnati* (read by W. N. Dember)—Successive (absolute judgment) and simultaneous (differential discrimination) - type vigilance tasks were combined factorially with event rate (5,30 events/min) and spatial uncertainty (certain, uncertain). For both tasks, detection efficiency (A′) varied inversely with event rate. Spatial uncertainty had little effect on performance with the simultaneous task but degraded performance with the successive task. Results support Davies & Parasuraman's (1982) contention that successive tasks are more capacity demanding than simultaneous tasks.

9:00-9:20 (206)

Discrete and Analog Properties of Attention Shifts in Visual Space. DAVID LaBERGE, *University of California, Irvine*—Attention shifts originating at target locations of low expectancy and moving to destination points of high expectancy appear to be of a discrete nature, while shifts to low expectancy destinations appear to be of an analog nature. It is proposed that locations of high expectancy may be integrated into distinctive configurations termed expectancy maps, which attract the attention focus at display onset. Velocity of the focus shift appears to vary with destination probability.

9:25-9:40 (207)

Auditory Attention and Frequency Selectivity. BERTRAM SCHARF, SHARON QUIGLEY, CHISATO AOKI, NEAL PEACHEY, & ADAM REEVES, *Northeastern University*—With the probe-signal method, untrained listeners detect faint tones at expected frequencies, but miss them at unexpected frequencies. The attention bandwidth (twice the necessary separation between expected and unexpected frequencies) approximates the critical band. Although expected frequencies are presented much more often than unexpected frequencies, mere repetition cannot account for these results. Moreover, for the most part, unexpected sounds were not simply ignored; they were inaudible.

9:45-10:00 (208)

The Influence of Attentional Manipulations on Stimulus-Response Compatibility Effects. MIEKE VERFAELLIE, *University of Louvain, Belgium & University of Florida,* DAWN BOWERS, & KENNETH HEILMAN, *University of Florida* (sponsored by Gery d'Ydewalle)—A choice reaction time task, in which preliminary selective attentional and/or intentional information was given, was administered to normal subjects. Attentional cues indicated where in space the target stimulus would occur; intentional cues indicated which hand to use to respond. Stimulus-response compatibility effects were observed only in the condition in which intentional, but not attentional, information was given. These findings are discussed in light of existing interpretations of stimulus-response compatibility effects.

10:05-10:25 (209)

Case Study: Automatic and Controlled Attention; Subway Motormen and Controllers. RALPH NORMAN HABER & LYN R. HABER, *University of Illinois at Chicago*—A detailed task analysis of motormen and control center controllers was done for six rapid transit rail systems, varying in their automation. The motormen's tasks require automatic attention, and performance fails primarily because of vigilance decrements. The controllers' tasks require controlled attention, and fail due to task overloading. The case study approach allows useful exploration of the theoretical properties of attention. It also offers practical solutions to the problems of operation and controlling trains.

PSYCHOPHARMACOLOGY
Stanbro Room, Saturday morning, 10:40-12:15

Chaired by Eleanor R. Adair, John B. Pierce Foundation Laboratory, Yale University

10:40-10:55 (210)

Naloxone Reversal of Morphine-Elicited Sedation and Hyperactivity. PAUL SCHNUR & VICTOR P. RAIGOZA, *University of Southern Colorado*—Three experiments investigated the effects of naloxone on morphine (15 mg/kg) elicited changes in hamster locomotor activity. In Experiment 1, naloxone (0.4 mg/kg) converted morphine-elicited hypoactivity into hyperactivity. In Experiment 2, naloxone reversal of morphine-elicited hyperactivity was directly related to naloxone dose (0, 0.04, 0.1, 0.4 mg/kg). In Experiment 3, morphine-treated animals were hypoactive relative to saline controls for approximately 40 min after each of two naloxone injections. Results are discussed in terms of a modified dual-action hypothesis.

11:00-11:15 (211)

Pavlovian Inhibitory Conditioning and Tolerance to Pentobarbital-Induced Hypothermia. SHEPARD SIEGEL, *McMaster University,* & RILEY E. HINSON, *University of Western Ontario*—Rats received, on alternate days, CS_1 paired with pentobarbital and CS_2 paired with saline. During subsequent tolerance testing, half the rats continued receiving the drug in the presence of CS_1, and the others received the drug in the presence of CS_2. Compared to control conditions, pentobarbital-induced hypothermia was smallest (most tolerance) in rats injected following CS_1, and greater (least tolerance) in rats injected following CS_2. The results provide evidence for inhibitory conditioning of tolerance.

11:20-11:30 (212)

Nicotine and Weight Loss: No Role for Brown Adipose Thermogenesis. PAUL J. WELLMAN, MICHELLE M. MARMON, STACY REICH, & JENNIFER RUDDLE, *Texas A&M University*—The role of brown fat thermogenesis in nicotine-induced weight loss was evaluated in 2 experiments. In Experiment 1, 0.8, 1.2, or 1.6 mg/kg nicotine had no effect on in vivo interscapular brown adipose tissue (IBAT) temperature in rats whereas a combination of 10 mg/kg caffeine and 0.8 mg/kg nicotine had a modest effect on IBAT temperature. In Experiment 2, rats chronically treated (3x day, 14 days) with nicotine gained significantly less weight whereas rats treated with a combination of nicotine and caffeine were not different from saline controls.

11:35-11:45 (213)

Naltrexone Fails to Block Shock-Induced Deficits in an Appetitive Discrimination. DAVID M. GRILLY & GORDON C. GOWANS, *Cleveland State University*—Acute inescapable stress induces opioid and non-opioid mediated analgesia-like effects. Other behavioral effects of these treatments have been noted. To determine whether acute shock-induced disruptions in discrimination performance could be blocked with a narcotic antagonist, rats were trained in a 2-choice discrimination task. Exposure to a 30-sec, 2.5 mA shock disrupted both accuracy and performance measures. Neither were blocked with naltrexone (5 and 20 mg/kg) pretreatment, suggesting that analgesia-inducing stressors may also have non-opioid dissociative properties.

11:50-12:10 (214)

Ingestion of Neurotoxic Lake Ontario Salmon Influences Behaviors of Laboratory Rats. DAVID R. HERTZLER & HELEN B. DALY, *SUNY at Oswego* (read by D. B. Hertzler & H. B. Daly)—Rats fed ground salmon from Lake Ontario (30, 15, or 8% diet) for 20 days have elevated levels of mirex and PCB in their brains compared with rats fed ocean salmon or no salmon. Results from open field, preference for predictable rewards, and passive-avoidance tests suggest that neurotoxic contaminants in Lake Ontario Salmon increase reactivity to aversive events. A computer simulation model of aversive nonreward (DMOD), which can account for these results, will be presented.

VISION I
Berkeley/Clarendon Rooms, Saturday morning, 8:00-10:05

Chaired by William N. Hayes, Albion College

8:00-8:15 (215)

Visual Persistence and Multistable Stroboscopic Motion. BRUNO G. BREITMEYER, ALYSIA RITTER, & TREFFORD L. SIMPSON, *University of Houston*—In multistable stroboscopic motion displays, progressive transitions from nonmotion to element to group motion as interstimulus interval increases depend on element size, stimulus duration, stimulus eccentricity, and flicker masking. These dependencies are predictable from the systematic influence which these variables are known also to exert on visual pattern persistence, indicating that such persistence plays a significant role in determining which percept dominates during multistable stroboscopic motion sequences.

8:20-8:35 (216)

Multiple Images Induced by Smooth Pursuit Eye Movements. EDWARD M. BRUSSELL, *Concordia University*, R. KRUK, *CAE Electronics Ltd. of Montreal*, ANDRÉ MASSON, & PETER APRIL, *Concordia University*—Unidirectional smooth pursuit eye movements can be elicited by a target in apparent motion. However, the eye movements are only guaranteed to be accompanied by the perception of a single, moving target if the stimulus is exposed in a given physical position once. The number of multiple exposures per position and the eye movement velocity will determine the number of overlapping images seen to move smoothly across the visual field.

8:40-8:55 (217)

Asymmetric Interference Between High and Low Spatial Frequencies. HOWARD C. HUGHES, *Dartmouth College*—Choice reaction times (CRTs) to signal the orientation (horizontal/vertical) of a high frequency grating (5.0 cpd) were slowed by the presence of a low frequency grating (0.5 cpd), but low frequency CRTs were unaffected by the high frequency grating. This asymmetric interference occurs when CRTs to the individual gratings are matched, but is reduced with gradual (rather than abrupt) onsets. The results are considered in terms of interactions between transient and sustained channels.

9:00-9:20 (218)

Sensory and Response Components in Visual Contrast Sensitivity Measures. DAVID L. KOHFELD, *Southern Illinois University at Edwardsville*—Visual contrast sensitivity functions (CSFs) were obtained using a video display that generated vertical sine-wave gratings. The CSFs revealed that visual resolving power is best at intermediate spatial frequencies and progressively less keen at relatively extreme frequencies. Deconvolution methods and hazard function estimates revealed that the distributions of contrast sensitivity measures were comprised of at least two component processes, depending on the amount of response bias involved in the psychophysical method used to generate the data.

9:25-9:40 (219)

Oculomotor Vergence Effects of Ingested Ethanol. R. J. MILLER, *Washington State University*, RICHARD C. PIGION, *Virginia Polytechnic Institute & State University*, & MASATOSHI TAKAHAMA, *Washington State University*—Eight male emmetropes (aged 21-23) participated in two alcohol dosage conditions (placebo and 1.5 ml/kg of 95% ethanol). After drinking, dark vergence and fusional and accommodative vergence to near (30 cm) and far (6 m) targets were assessed every 30 min for 6 hr. Intoxication increased convergence for far fusional and accommodative targets and, to a smaller degree, decreased convergence for near targets. Dark vergence was not affected by alcohol, nor was it related to other vergence changes.

9:45-10:00 (220)

The Trinocular Vision Demonstration. JEREMY WOLFE, *Massachusetts Institute of Technology*—If one eye views vertical stripes while the other views horizontal, binocular rivalry ensues. At any location, either vertical or horizontal is seen. Intersections are not seen. If a random dot stereogram is added, forming oblique stripes on the "cyclopean retina," these contours do not produce rivalry. They are seen continuously and form intersections with monocular stripes. This and other findings support the theory that rivalry and stereopsis are parallel and independent pathways in human vision.

SPEECH PERCEPTION
Berkeley/Clarendon Rooms, Saturday morning, 10:15-12:15

Chaired by William E. Cooper, The University of Iowa

10:15-10:30 (221)

Integrality and the Use of Coarticulatory Knowledge in Speech Perception. JAMES R. SAWUSCH & GAIL R. TOMIAK, *SUNY at Buffalo*—Noise-tone analogs of disyllables were used in a speeded classification task with subjects instructed to treat the stimuli as either speech or nonspeech. Previous research with single syllable stimuli has shown integral processing of phones (speech) but separable processing of pitch and amplitude (nonspeech). The present study extended this line of inquiry to phonemes in different syllables. Results will be discussed in relation to the use of knowledge of coarticulatory information in phonetic coding.

10:35-10:55 (222)

Red Herring Detectors and Speech Perception: In Defense of Selective Adaptation. ARTHUR G. SAMUEL, *Yale University*—The selective adaptation paradigm was used extensively for about five years following its introduction to speech research in 1973. During the next few years, its use dropped dramatically, and it is now little used. I will review the reasons for this decline, and argue that, properly used, selective adaptation is too useful to be shelved. Several experiments, using adaptation and contrast paradigms, with analyses of reaction times, will be presented in support of the claims being made.

11:00-11:15 (223)

Effect of Frequency and Vocabulary Type on Phonological Speech Errors. GARY S. DELL, JEFFREY S. SEGAL, *University of Rochester*, & ERIC BERGMAN, *Emory University*—Speech errors involving the misordering of initial consonants were elicited using the Baars-Motley interference paradigm. Slips involving closed-class words (*by the pin→pie the bin*) were just as likely as those involving identically pronounced open-class stimuli (*buy the pin→pie the bin*). A second experiment showed that higher frequency words are less likely to participate in these kinds of errors (e.g., *vote pass→pote vass* is less likely than *vogue pang→pogue vang*).

11:20-11:35 (224)

Sensitivity to Frequency Transitions. DONALD G. JAMIESON, *University of Calgary*—Psychoacoustic experiments on the discriminability of frequency transitions which are followed by a steady state have indicated that humans are most sensitive when transitions are approximately 50 msec in duration. The data to be presented indicate that this discriminability maximum is not an absolute, but is an interaction between parameters of the transition and the amplitude and duration of the following steady state.

11:40-11:50 (225)

Perception of the [m]-[n] Distinction in CV Syllables. BRUNO H. REPP, *Haskins Laboratories*—Results of gating and splicing experiments show that, in [−a] and [−u] contexts, the [m]−[n] distinction is largely cued by the vocalic formant transitions. The nasal murmur contributes relatively little, though it contains some place of articulation information. In [−i] context, however, neither cue is sufficient by itself, and perception of the [m]−[n] distinction requires that both cues be present. Thus the relative weights of cues and their interdependence are context-specific.

11:55-12:10 (226)

On the Influence of Lexical Status in Phonetic Perception. ROBERT E. REMEZ, *Barnard College*, PHILIP E. RUBIN, *Haskins Laboratories*, MINDY KATZ, & SUSAN DODELSON, *Barnard College*—The hierarchical organization of linguistic constituents—phones compose syllables compose words—is reflected in accounts of word perception that begin with an acoustic-to-phonetic mapping and proceed with recognition by stepping up the levels of organization. We evaluated vexing counterevidence (Ganong, 1980) in which phonetic perception seemed contingent on the lexical status (word or nonword) of the syllable containing it. Lexical and cognitive manipulations were imposed to modulate this contingency, ultimately to identify the role of the lexicon in this case of phonetic perception.

INFORMATION PROCESSING I
Arlington Room, Saturday afternoon, 1:00-4:10

Chaired by Gordon D. Logan, Purdue University

1:00-1:15 (227)

Limited Unconscious Processing of Meaning. ANTHONY G. GREENWALD & THOMAS J. LIU, *Ohio State University*—Recent studies have supported claims of extensive automatic (unconscious) processing of nondetectable, tachistoscopically backward-masked words. We found that RT in an evaluative decision task (judging whether a word was good or bad in meaning) was influenced by subdetectable, evaluatively polarized single words (e.g., hero, win, lose), but not by the evaluative meaning of 2-word propositions (e.g., hero fails, villain loses). Propositions apparently require analyses that exceed the limits of automatic processes.

1:20-1:35 (228)

Inhibitory Processes in Automatic Code Activation. PEDER J. JOHNSON & HAL SMITH, *University of New Mexico*—In a series of physical identity same-different letter match RT experiments, subjects were presented low validity pairs of letter primes either simultaneously or sequentially. Of special interest were the mixed prime conditions (e.g., AC prime for AA target). In the mixed prime condition, a mismatching prime virtually eliminated the benefits of a matching prime. The findings suggest some limitations regarding the generality of inhibitionless code activation.

1:40-2:00 (229)

Dynamics of Spreading Activation in Information Processing. STEVEN YANTIS, *Stanford University,* & DAVID E. MEYER, *University of Michigan* (read by D. E. Meyer)—Human information processing can be characterized in terms of a network of interconnected nodes in which activation spreads from a source node to recipient nodes. The growth of activation at a recipient node may be modeled as a continuous function or as an abrupt shift between discrete activation states. We report results from an adaptive priming procedure with which these two classes of models were tested. Models involving a small number (≤ 3) of discrete activation states are contradicted by the data.

2:05-2:25 (230)

Reading Through Disturbed Text. PAUL A. KOLERS & ROBERT L. DUCHNICKY, *University of Toronto*—In order to study some of the pattern analyzing characteristics underlying literacy, we required students to read text that was subjected to various typographic distortions. Different distortions interfered with performance in different ways rather than in a single way; and despite the distortions, readers acquired skill at the tasks. The results challenge the claims made by some workers regarding lateral masking and feature analysis as processes important to character recognition or reading.

2:30-2:50 (231)

Self-Inhibition and the Disruptive Effects of Feedback. DON MacKAY, *University of California, Los Angeles*—This paper examines the hypothesis that, following activation, the components for producing skilled behavior undergo a brief period of self-inhibition during which these components are less readily activated again. Support for this self-inhibition hypothesis is reviewed from studies in electrophysiology, kinesiology, and neuropsychology, as well as psycholinguistics and mainstream psychology. Also discussed is a theoretical rationale for self-inhibition, derived from a recently proposed 'node structure' theory for perception and production of skilled behavior.

2:55-3:15 (232)

Determinants of Sequential Effects in Choice Reaction Time. SYLVAN KORNBLUM & ALLEN M. OSMAN, *University of Michigan*—Sequential effects are viewed as the result of automatic and controlled preparatory processes. An experimental procedure is described that is designed to distinguish between these alternatives and between stimulus and response determined effects. Experimental results bearing on these issues are presented.

3:20-3:35 (233)

The Effects of Caffeine and Impulsivity on Memory Scanning. BILL E. BECKWITH, THOMAS V. PETROS, & GEORGE ERIKSON, *University of North Dakota*—The effects of caffeine on the rate of searching working memory were examined using the Sternberg Item Recognition Task. Subjects classified as high- or low-impulsive were administered 0 mg/kg, 2 mg/kg or 4 mg/kg of caffeine. Caffeine decreased response time at all memory set sizes for low-impulsive subjects but did not affect the response time of high-impulsive subjects. The results suggest that caffeine may facilitate performance on tasks that place minimal demands on working memory.

3:40-3:50 (234)

Individual Differences in Proofreading Accuracy. BENJAMIN WALLACE, *Cleveland State University*—Proofreading accuracy was examined on subjects who were judged to be high or low on the attributes of imaging ability and hypnotic susceptibility level. Six scripts were presented, each with a different topic content (e.g., current events, science, history). Error location accuracy did not differ as a function of script content. However, the ability to locate errors did differ in terms of the aforementioned attributes. These results are explained in terms of individual differences in search strategies.

3:55-4:05 (235)

"Modality/Suffix" Effects in the Absence of Auditory Input. RANDALL W. ENGLE & MARILYN TURNER, *University of South Carolina*—Three studies tested whether "modality/suffix" effects with silent mouthing are mediated by the same mechanisms mediating those effects with auditory input. Two experiments varied whether the CV stimuli were vowel-varied or consonant-varied. Very weak "modality/suffix" effects resulted that were not convincingly affected by the consonant/vowel variable. Another study showed that the manner of presenting stimuli made no difference and that with digit stimuli, "modality/suffix" effects resulted as large as those obtained with true auditory input.

PSYCHOPHYSICS II
Arlington Room, Saturday afternoon, 4:20-6:05

Chaired by Willard D. Larkin, University of Maryland

4:20-4:35 (236)

Sensory Adaptation Signifies a Gain in Information. KENNETH H. NORWICH, *University of Toronto*—It is suggested that sensory adaptation represents a process of progressive acquisition of information. When a stimulus is first applied, there is a period of rapid transfer of information to the perceiver, reflected in the steep rate of fall of the adaptation curve. As time increases, the perceiver becomes progressively more "certain" about the nature of the stimulus, and the rate of gain of information decreases. Adaptation, so analyzed, provides some new insights into psychophysics.

4:40-5:00 (237)

The Relationship Between Magnitude Estimates and d'. G. ROLFE MORRISON & LORRAINE G. ALLAN, *McMaster University* (read by L. G. Allan)—Discrimination and scaling have usually been studied separately in different types of experiments, often leading to conflicting conclusions about the psychophysical law. We have developed a method for obtaining discriminability measures from magnitude estimation data, and we are able to reconcile Stevens' power law with Fechner's log law. We apply our method to the magnitude estimates of temporal intervals reported by Allan (1983).

5:05-5:20 (238)

On the Cross-Modal Perception of Magnitudes. LAWRENCE E. MARKS, *J. B. Pierce Foundation, Yale University*—When people compare intensities of sensory experiences in different modalities, the judgments represent a compromise between "absolute comparison"—judgments based solely on the particular sensations compared—and "relative comparison"—judgments based, contextually, on relative positions within the stimulus ranges. The compromise varies markedly among individuals and depends on the attributes compared, relativity being greatest for loudness vs. vibration, slightly less for loudness vs. brightness, notably less, but still consequential, for auditory duration vs. visual duration.

5:25-5:45 (239)

How Numerical Comparisons Occur. STEPHEN LINK, *McMaster University*—A new experimental procedure called the Method of Symmetric Differences provided a new view of the numerical comparison process. The method also permitted estimation of Relative Judgment Theory parameters that are difficult to determine using the method of paired comparisons. Tests of relative judgment predictions concerning response time/response probability relations show that the results are entirely consistent with the random walk interpretation of their origin.

5:50-6:00 (240)

Comparison of Simple and Complex Models Using Cross-Validation. CHARLES E. COLLYER, *University of Rhode Island*—True models do not necessarily fit best in conventional model-fitting; for example, complex models (with more parameters) can fit better even when a simpler model is true. In cross-validation, there is an almost opposite bias in favor of simple models. Two models of the mental rotation/response time function were compared in a Monte Carlo cross-validation procedure. Among other things, this procedure allows estimation of the probability that a source model will be correctly identified by the best-fitting model under a variety of conditions.

RECOGNITION AND RECALL
Imperial Ballroom, Saturday afternoon, 1:00-4:10

Chaired by M. J. Intons-Peterson, Indiana University

1:00-1:15 (241)

Neural Dynamics of Category Learning and Recognition: Attention, Consolidation, Amnesia. STEPHEN GROSSBERG & GAIL A. CARPENTER, *Boston University*—A neural theory is developed of how recognition categories are learned in real-time. Interactions between an attentional subsystem and an orienting subsystem enable the network to self-stabilize its learning. As the learned code becomes globally self-consistent, the orienting subsystem is automatically disengaged and memory consolidates. The model explains properties of word recognition and evoked potentials (processing negativity, mismatch negativity, P300). Malfunction of the orienting subsystem causes a formal amnesic syndrome analogous to medial temporal amnesia.

1:20-1:40 (242)

A Comparison and Test of Several Recognition Models. RICHARD M. SHIFFRIN, *Indiana University*—Predictions for single item, double item, and cued recognition performance are derived for several models: SAM by Gillund and Shiffrin (1984); MINERVA2 by Hintzman (1984); TODAM by Murdock (1982); the matrix model of Pike (1984), and others. Only SAM predicts the data. It is suggested that the fit of the other models can be improved by incorporation of a key assumption in SAM: Limited capacity governs the use of multiple retrieval cues.

1:45-2:05 (243)

Experiments on Repetition and Retrieval Time in Recognition Memory. DELOS D. WICKENS, *Colorado State University*, A. GRANT YOUNG, BRUCIE WILLIFORD, & RENA DURR MISTER, *Louisiana State University*—Three experiments investigated the influence of repetition on retrieval time using an analytical paradigm developed by Wickens, Moody, and Dow (1980). This paradigm permits one to analyze total reaction time into two major components, namely, time required to retrieve the set from inactive memory and time required to process the information once it is in working memory. The experiments give no clear evidence for reduction of the retrieval time component with repetition.

2:10-2:30 (244)

No Generation Effect but Source Information Facilitates Event Memory. R. REED HUNT, *University of North Carolina, Greensboro*—Past research has demonstrated a robust superiority in memory for self-generated over read material, except in cases where the generated materials are meaningless or anomalous. Two experiments are reported using a simple procedure in which recall of meaningful words did not differ following self-generation and reading. Further, the experiments delineate at least one circumstance under which source-information facilitated event memory.

2:35-2:55 (245)

Indirect Activation in Recognition and "Priming." GEORGE MANDLER, *University of California, San Diego*, PETER GRAF, *University of Toronto*, & DOLORES KRAFT, *University of Virginia*—The dual-process model of recognition posits effects of automatic activation (which generates familiarity) as well as of elaboration (which makes retrieval possible). Activation also affects simple automatic word-completion tasks. It will be shown that indirect activation produces transient effects on both recognition and completion, while elaboration produces lasting effects on recognition. Arguments about the independence of activation (priming) and recognition are refuted.

3:00-3:20 (246)

Orthographic Priming and Recall vs. Recognition Dependencies in Word-Fragment Completion. JAMES H. NEELY & AYDIN DURGUNOGLU, *Purdue University*—After studying words such as SINCERE and CARDIGAN, subjects received free recall or recognition tests and a word-fragment completion (WFC) test. WFC of SINCERE to SI_C___E was more positively related to its recall than its recognition. WFC of CAMPAIGN to CA___AI_N was positively related to the recognition of the orthographically similar and studied CARDIGAN but negatively related to its recall. These effects were independent of the proportion of fragments orthographically similar to studied words in the WFC test.

3:25-3:45 (247)

Word-Frequency and Presentation-Condition Effects on Recall and Recognition. JAMES W. HALL, *Northwestern University*—Free recall was higher with complete than discrete list presentation and with four list presentations at a 0.7-s rate than with one presentation at a 2.8-s rate. Distractor-free recognition did not differ across those conditions. High-frequency words were recalled better but recognized less well than were low-frequency words. These variables did not interact, either for recall or recognition. The results argue against several proposed accounts of the word-frequency effect.

3:50-4:05 (248)

The Effects of Initial Recall on Retention. MARK A. McDANIEL & MICHAEL KOWITZ, *University of Notre Dame*—After performing semantic and phonemic encoding tasks on a word list, subjects received a cued-recall test with cues from the encoding task, cues from the same level at which the target was encoded, cues from a different level at which the target was encoded, or no immediate test. The three immediate tests produced different patterns of facilitation on a final recall test. This result suggests that the type of cue on the immediate test affects how retrieval will influence the existing memory representation.

ANIMAL LEARNING & CONDITIONING II
Imperial Ballroom, Saturday afternoon, 4:20-5:45

Chaired by Roger L. Mellgren, University of Oklahoma

4:20-4:35 (249)

Effects of Cuing after Backward Conditioning Trials. WILLIAM C. GORDON & MELANIE S. WEAVER, *University of New Mexico*—Rats were given backward conditioning trials using a shock US and a tone CS. Prior to a lick suppression test using the tone, some rats were exposed to a cuing treatment (i.e., an exposure to a distinctive contextual stimulus that had been present during conditioning). Cued rats showed evidence of suppression in the presence of the tone. Control conditions suggested that explanations based on second-order conditioning or non-associative effects of cuing were difficult to maintain.

4:40-5:00 (250)

Properties of Contexts Participating in a Simple Pavlovian Discrimination. MARK E. BOUTON & DALE SWARTZENTRUBER, *University of Vermont*—When reinforced presentations of a CS in Context A are alternated with nonreinforced presentations in Context B, rats quickly learn to respond differently to the CS in the two contexts. Tests of the CS in a third context suggest that the signaling properties of Contexts A and B both contribute to the discrimination. Systematic tests of A and B for their associative and occasion-setting properties suggest a complex role for context in this situation.

5:05-5:20 (251)

Motivational State as a Basis for Toleration Extinction. LOUIS G. LIPPMAN, *Western Washington University*—Following VI training, rats were satiated before undergoing 21.5-hr water re-deprivation either in a holding cage or in the operant chamber. To equate session-onset cues, all animals were then placed in home cages for 0.5 hr before the first extinction session. Rats re-deprived in the operant chamber showed facilitated extinction, supporting the assumption that internal cues associated with a deprivation state can mediate extinction by serving as a manipulable component of the original learning context.

5:25-5:40 (252)

The Differential Outcome Effect with a Biologically Neutral Outcome Difference. PAUL M. FEDORCHAK & ROBERT C. BOLLES, *University of Washington* (read by R. C. Bolles)—Two experiments with rats examined the differential outcome effect (DOE) using a biologically neutral outcome differentiator, a 0.5-sec flash of light. Two-choice (barpress) conditional discrimination acquisition was enhanced if response 1 (R1) during stimulus 1 (S1) produced water plus lightflash while R2 during S2 produced only water. Acquisition was unaffected when the lightflash differentiated *incorrect* outcomes (i.e., if R2 during S1→ flash, but R1 during S2→ no flash).

LANGUAGE/DISCOURSE PROCESSING I
Plaza Ballroom, Saturday afternoon, 1:00-3:05

Chaired by Betty Ann Levy, McMaster University

1:00-1:15 (253)

Script Activation and Lexical Processing. JEAN M. MANDLER & TAMAR MURACHVER, *University of California, San Diego*—Sanford and Garrod (1981) claim that script concepts act like explicitly stated (given) information, and that mentioning such concepts should not speed subsequent processing as much as for unrelated words. We tested this claim using texts containing script-related and unrelated words that were given prior mention or not. Related words were read faster than unrelated words, but prior mention had the same effect on both. Unstated script concepts did not act like given information.

1:20-1:35 (254)

Evidence for Bilingual Activation Using Word Fragment Completion. MARILYN SMITH, *University of Toronto*—Is the representation of a concept unique for each language of a bilingual or is there a common representation for both languages? One approach has examined priming effects: whether a response to a word is facilitated if it is preceded by that same word in the same or the second language. Previous studies have not shown bilingual facilitation when the interstimulus interval exceeds a few seconds. Using word fragment completion, a sensitive indicator of memorial activation, bilingual priming effects were demonstrated for both actually presented and self-generated concepts.

1:40-1:55 (255)

Lexical and Sentence Context Effects in Word Recognition. GREG B. SIMPSON, ROBERT R. PETERSON, MARK A. CASTEEL, & CURT BURGESS, *University of Nebraska at Omaha*—Subjects named targets that were preceded by context sentences containing words that were highly associated to the target. Sentences were presented in either normal or scrambled form. Target naming times were faster following related than unrelated sentence contexts, and, among related contexts, were faster following normal than scrambled sentences. The results suggest the presence of sentence context effects on word recognition beyond those attributable to intralexical priming effects.

2:00-2:20 (256)

Activation of Word-Candidates During Spoken Word-Recognition. PIENIE ZWITSERLOOD, *Max-Planck-Institute for Psycholinguistics* (sponsored by W. D. Marslen-Wilson)—The early activation of multiple word-candidates in spoken word recognition was investigated, in and out of context, using a cross-modal lexical decision task. The results show that within 100 msec of word-onset, multiple candidates are activated and that context does not affect this initial bottom-up activation. Significant effects of context only appear later in the recognition process, facilitating the recognition of contextually appropriate candidates.

2:25-2:40 (257)

Sentence Production and Prototypicality: Conceptual vs. Lexical Accessibility. MICHAEL H. KELLY, *Cornell University*, J. KATHRYN BOCK, *Michigan State University*, & FRANK C. KEIL, *Cornell University* (read by F. C. Keil)—The relationship between prototypicality and sentence structure was explored in sentence recall and generation tasks. Sentences were changed in recall so that prototypical instances of categories appeared before nonprototypical instances. In free generation, prototypes preceded nonprototypes when subjects wrote sentences about pairs of pictured objects, but not when they wrote about the corresponding name pairs. The results are explained in terms of the sensitivity of sentence production processes to the lexical accessibility of prototypes.

2:45-3:00 (258)

Focused Search of Semantic Cases in Question Answering. MURRAY SINGER & GRANT E. PARBERY, *University of Manitoba*—In two experiments, subjects learned to criterion sentences that linked profession names to concepts filling the patient and/or instrument cases. They subsequently answered yes-no questions that asked about the patient or instrument. Answer times varied primarily as a function of the number of concepts in the relevant case, or "relevant fan," rather than total fan. It was concluded that people can execute focused memory searches in question answering.

INFORMATION PROCESSING II
Plaza Ballroom, Saturday afternoon, 3:15-5:45

Chaired by Robert V. Kail, Purdue University

3:15-3:30 (259)

Multiple Influences on Spatial Memory. JENNIFER A. MATHER, *University of Lethbridge*—Cognitive, task, and place variables all affect a simple memory task, of replacing named small items. Recalled items were replaced sooner and with less error. Item displacement was affected by laterality, rotation by item cues. No sex differences in memory or encoding strategy were found using an interference task. Subjects performed better when the encoding and recall task was removed; remembering names of items interfered with spatial memory, and here the laterality effect was lost.

3:35-3:50 (260)

Search Asymmetries and Visual Feature Analysis. ANNE TREISMAN, *University of British Columbia*—Visual search has been used as one diagnostic for simple features: targets that "pop out" with latencies that are independent of display size are assumed to be detected preattentively at an early stage of visual processing. Further studies have revealed a striking asymmetry, which suggests that search for the *presence* of a visual primitive is automatic and parallel, whereas search for the *absence* of the same feature is serial and requires focused attention.

3:55-4:15 (261)

Figural Complexity and Trend Chart Judgments. ROBERT E. WARREN, *AT&T Bell Laboratories*—Judgments of the trends of individual bands in a cumulative trend chart are shown to be independent of overall trend and distortion in the chart. Judgments are, however, dependent on characteristics of other bands insofar as their composition increases figural complexity. Delays in judging trends are induced by the accumulation of irregularities in the band stack, with higher bands showing the greatest effect.

4:20-4:35 (262)

Direct Access by Spatial Position in Visual Memory. SAUL STERNBERG, *University of Pennsylvania & AT&T Bell Laboratories*, RONALD L. KNOLL, & DAVID L. TUROCK, *AT&T Bell Laboratories*—The effect of array size (2-6 digits) on the latency to name a visually marked item in a brief display increases rapidly with marker delay, revealing a change in representation. For early markers the effect is negligible, indicating direct access; for late markers the effect is a linear increase, suggesting search. Two alternatives to direct access (marker makes item visually distinctive; marker automatically attracts visual attention) are rejected, as tactile spatial markers produce similar effects.

4:40-5:00 (263)

Evoked Responses Reflect Stages of Information Processing in Within-Subjects Analysis. JONATHAN VAUGHAN, DOUGLAS J. HERRMAN, *Hamilton College,* JULIA L. ROSS, *Harvard University,* LISA MALAQUIAS, & GREGORY BELL, *Hamilton College*—Two experiments explored cortical evoked responses during Sternberg memory search and a semantic relation identification task. A within-subjects, within-electrode-location factorial design was analyzed by Principal Components Analysis, then ANOVA. This revealed components suggestive of priming, memory interrogation, and response selection (in the Sternberg task) and priming, semantic evaluation, and response stages of processing (in the semantic task). Using this design to elucidate, information processing stages will be discussed.

5:05-5:20 (264)

Illusory Conjunctions: Integration Errors in a Very Short-Term Store. HELENE INTRAUB, *University of Delaware*—Experiments demonstrating illusory conjunctions of objects and scenes during rapid sequential presentation of pictures (9/sec) will be reported. It will be argued that these errors reflect the action of an integrative short-term store. The use of the high-speed technique as a tool for studying scene perception will be discussed.

5:25-5:40 (265)

Visual Similarity and Semantic Activation by Pictures and Words. PATRICIA SIPLE, WAYNE F. WALLS, & CHARLOTTE MILLER, *Wayne State University*—Previous studies have suggested a differential effect of object similarity on the processing of pictures and words. Conceptually related and unrelated picture-picture and word-word pairs of items varying in visual/object similarity were presented at 250 and 500 msec SOA for same-different category judgments. While pictures showed a greater effect of similarity, the direction of the effect was the same for both picture pairs and the word pairs naming the pictured objects.

PERCEPTION II
Georgian Room, Saturday afternoon, 1:00-2:45

Chaired by James E. Cutting, Cornell University

1:00-1:20 (266)

Illusory Nonrigidity in Real Objects: Which Perceptual Theories Don't Work. JULIAN HOCHBERG, *Columbia University*—Demonstrations of new illusions are shown (and opposed-set psychophysical data are presented) in which normally viewed rigid moving objects appear unambiguously to bend and deform radically. Elective determinants can be separated from stimulus factors. Neither unconscious inference, invariance nor rigidity principles can be sustained as general or useful theoretical assertions in predicting object appearance. The shape of acceptable perceptual/cognitive theories is sketched.

1:25-1:40 (267)

A Reversed Motion Aftereffect. ARIEN MACK, JOAN GOODWIN, HELGA THORDARSON, & DONNA PALUMBO, *New School for Social Research*—Data will be presented demonstrating that, contrary to the accepted view, motion aftereffects (MAEs) produced by tracking a moving point over a stationary array are not equivalent to those produced in the normal way. Tracking produces a reversed, apparently induced, MAE in the area of the display that had been retinally stable during adaptation. Reasons for this will be discussed.

1:45-2:05 (268)

Reference Frame Effects on Shape Perception in Two vs. Three Dimensions. STEPHEN E. PALMER, JOHN K. KRUSCHKE, & EDWARD J. SIMONE, *University of California, Berkeley*—Configural reference frame effects on shape perception were found to depend more on perceived structure in 3D than on image structure in 2D. In 2D perceived displays, squares and diamonds took much longer to discriminate when configured diagonally than vertically. Similar stimuli perceived as pictures representing figures in different depth planes showed almost no corresponding difference between retinally diagonal and vertical configurations. Results from stereoscopic depth displays will also be reported.

2:10-2:25 (269)

Assessing Kinetic Depth in Multi-Dot Displays. MICHAEL S. LANDY, *New York University,* BARBARA ANNE DOSHER, *Columbia University,* & GEORGE SPERLING, *New York University* (read by B. A. Dosher)—Displays of random dots scattered on the surface or within the interior of a rotating multidot object were judged for perceived coherence (number of separate objects), rigidity, and depth. Number of dots, perspective, type and size of object were varied. All three judgments increased with number of dots. Interior points produced as much or more depth as surface points, but did not affect other judgments. These and other complex interactions constrain models of KDE.

2:30-2:40 (270)

What Determines Correspondence in Apparent Motion? MARC GREEN, *York University*—Correspondence is the process by which objects retain identity when appearing at different places at different times. I examined possible correspondence tokens in apparent motion. Each frame of a motion sequence contained "Gabor functions" differing in spatial frequency, orientation, and phase. Motion path was determined primarily by spatial frequency and secondarily by orientation. Phase had no effect. I also demonstrated that previous failures to identify tokens resulted from luminance artifacts.

COGNITION II
Georgian Room, Saturday afternoon, 2:55-5:00

Chaired by Ira Fischler, University of Florida

2:55-3:10 (271)

Emotive Cognition in Roseliep Haiku: Metaphors and Images of Experience. EDWARD J. CLEMMER & JOHN HART, *Indiana University-Purdue University at Fort Wayne*—Twelve haiku by the poet Raymond Roseliep were evaluated on 24 semantic-differential scales by 63 subjects, undergraduates and English Department faculty. Factor analysis showed six dimensions: two well known connotative aspects (1) evaluation and (2) power, two sensory dimensions involving (3) sound and (4) temperature, and two images largely focusing on (5) youth and (6) shape. All poems were ordered on the six dimensions by one-way ANOVA. Connotations, sensations, and images are contrasted, and how each poem was experienced is described.

3:15-3:35 (272)

Thinking Aloud vs. in Silence: Does Performance Differ Qualitatively? GERHARD DEFFNER, *University of Hamburg* (sponsored by L. E. Bourne, Jr.)—Predictions from the Ericsson/Simon model of concurrent verbalization were tested in an experimental study comparing a silent and a think-aloud group. The experimental material consisted of n-term series tasks concerning spatial arrangements. During the experiment, eye movements were monitored and these recordings were the basis for subsequent identification of solution strategies. Usage of strategies and changes thereof were then compared across groups and were related to other measures describing protocols and performance.

3:40-3:50 (273)

Repetition, Perceived Truthfulness of Information, and the Validity Effect. CATHERINE H. BLUMER & HAL R. ARKES, *Ohio University* (read by H. R. Arkes)—Hasher, Goldstein, and Toppino (1977) have found repeated information subjects are uncertain about is rated more valid than nonrepeated information. These results have been referred to as the validity effect. The present study varied the initial perceived truthfulness of information to ascertain if the validity effect occurs for both factual and attitudinal statements which are perceived as true, false, or uncertain. The validity effect occurred similarly for these statements distinguishing this effect from attitude polarization.

3:55-4:10 (274)

Why Conway's Game is so Life-Like. THADDEUS M. COWAN, *Kansas State University*—John Conway's cellular game has life-like properties given, presumably, by the interaction between the rules of "life," "death," and "birth." Why this game is perceived as life-like should be of interest to psychologists. LDB configurations were computed for an arbitrary cell, then their probabilities plotted against each other on triangular coordinates. So far Conway's version is the only one which has a constant death rate with an increasing birth rate over moderate densities.

4:15-4:35 (275)

Combination of Natural Concepts. JAMES A. HAMPTON, *The City University, London*—Experiments studied how people judge typicality and membership of items in conjunctive concepts such as 'Sports which are Games.' Inconsistency due to overextension, noncommutativity, and concept dominance effects were obtained in both typicality and membership judgments. The results are interpreted as supporting a unitary theory of concept typicality and membership, and an intensional model of conjunction formation.

4:40-4:55 (276)

Examining the Expectancy Hypothesis of Congruity Effects in Linear Orders. EDWARD J. SHOBEN, *University of Illinois*—A pervasive finding in linear orders is the *congruity effect*: people are faster to determine the larger of two large objects, but the smaller of two small objects. The expectancy hypothesis explains this result by claiming that the form of the question primes objects of congruent magnitude. In an experiment in which subjects could not profitably use their expectancies, robust congruity effects were obtained, thereby casting doubt on the viability of the expectancy hypothesis.

SYMPOSIUM: THE NEURAL SUBSTRATES OF LEARNING
Stanbro Room, Saturday afternoon, 1:00-6:00

Chaired by Isidore Gormezano, The University of Iowa

Despite the potential of conditioning paradigms to reveal the functional properties of higher neural processes and, despite their axiomatic status in behavior theories, there has been a paucity of research with preparations suitable for fulfilling both physiological and theoretical roles. The present symposium is devoted to model conditioning preparations in the rabbit and their utilization in addressing enduring theoretical questions on the anatomical, neurophysiological, and neurochemical substrates of learning.

1:00-3:25

(277)

Localization of an Essential Memory Trace Circuit. RICHARD F. THOMPSON, JOSEPH STEINMETZ, & DAVID LAVOND, *Stanford University*—Our evidence shows that the essential memory trace circuit for the learning of discrete, adaptive behavioral responses to deal with aversive events involves discrete pathways to and from the cerebellum. Further, the essential memory traces themselves appear to be localized in the cerebellum. Thus, electrical microstimulation of the climbing fibers from the dorsal accessory olive as a US and of mossy fibers from the pons as a CS yields normal behavioral learning.

(278)

Hippocampal-Cerebellar Interactions During Classical Conditioning. THEODORE W. BERGER, JULIA L. BASSETT, & CATHERINE WEIKART, *University of Pittsburgh*—Both the hippocampal and cerebellar brain systems have been shown to play important but different roles in classical conditioning of the rabbit nictitating membrane (NM) response. We will present neuroanatomical, electrophysiological and lesion/behavioral data strongly suggesting that the hippocampus exerts an influence on the conditioned NM responding through multisynaptic projections to the cerebellum.

(279)

Single-Unit Activity During Conditioning of the Nictitating Membrane Response. J. E. DESMOND & J. W. MOORE, *University of Massachusetts*—Activity of single brain stem units was recorded during conditioning of the rabbit nictitating membrane response. A discrimination procedure allowed comparison of unit activity on CR and non-CR trials. Units which increased firing to the CR were found dorsomedial to the brachium conjunctivum. Units which decreased firing to the CR were located in dorsal and dorsomedial aspects of nucleus reticularis pontis oralis. CR-related unit activity frequently preceded the behavioral CR by 30-100 ms.

(280)

Hippocampal Participation in Timing of Conditioned Behavior. MICHAEL M. PATTERSON, *Ohio University, College of Osteopathic Medicine*, & RICHARD L. PORT, *Ohio University*—Recent differentiation of learning paradigms into temporal or spatial tasks has led to the development of various theories which characterize hippocampal function into a specific operational category. However, the role of the hippocampus may be further restricted to certain aspects of each category. Data from our laboratory suggest that, within the realm of temporal processes, the hippocampus may modulate timing of conditioned behavior but is not vital to the timing of sensory events, per se.

(281)

Persistent Transformation of Membrane Channels: A Substrate of Associative Memory. DANIEL L. ALKON, *N.I.N.C.D.S.*—Reduction of identified membrane currents (a rapidly activating K^+−current, I_A, and a Ca^{2+}−dependent K^+ current, I_c) has been shown to persist in identified neurons (even after isolation) of classically conditioned molluscs (*Hermissenda*) but not control animals. Depolarization and elevated Ca_i^{2+} accompany the integrated visual-vestibular network responses during conditioning and lead, via Ca^{2+}−dependent phosphorylation, to the K^+ channel changes, which, evidence suggests, contribute to retention of a CR. Similar membrane changes have been measured in CA1 hippocampal neurons in slices from classically conditioned (but not control) rabbits during retention of an acquired CR.

(282)

Biophysical Alterations in Rabbit Hippocampus *In Vitro* after Conditioning. JOHN F. DISTERHOFT, *Northwestern University Medical School*—Biophysical alterations have been observed in hippocampal CA1 pyramidal neurons of *in vitro* brain slices from nictitating membrane/eye retraction conditioned rabbits. Conditioning-specific reductions in the magnitude and duration of the afterhyperpolarization (AHP) seen after current-induced action potentials were seen. A reduced AHP (generated by a calcium-mediated potassium current) should make the neurons more excitable *in vivo*. The reductions in potassium current are intrinsic to the hippocampus, post-synaptic and are not dependent upon the rest of the brain for their expression.

3:35-6:00

(283)

CNS Mediation of Differentially Conditioned Bradycardia in Rabbits. PHILIP M. McCABE & NEIL SCHNEIDERMAN, *University of Miami*—Bilateral lesions of the Amygdala Central Nucleus (ACE) or Lateral Subthalamic Region (LZI) abolish a bradycardia CR without influencing the UR or nictitating membrance conditioning, suggesting that these structures are part of the heart rate CR pathway. Horseradish peroxidase injections into ACE produced labeling in the medial geniculate nucleus (MGN). Lesions of MGN abolish discrimination between auditory CS+ and CS− but do not affect the magnitude of the bradycardia CR. Thus, the CS pathway may be organized with rostral structures mediating discrimination, and more caudal structures mediating conditioned bradycardia.

(284)

Forebrain Contributions to Pavlovian Heart Rate Conditioning in the Rabbit. BRUCE S. KAPP, JEFFREY P. PASCOE, & CARRIE G. MARKGRAF, *University of Vermont*—Our research utilizes conditioned bradycardia in the rabbit during Pavlovian fear conditioning as a model response for investigating the neuroanatomical substrates of learning. Recent behavioral, neuroanatomical and single-unit electrophysiological data will be presented which point to the amygdaloid central nucleus as one component of a more extensive forebrain system involved in the acquisition of conditioned bradycardia, as well as in the etiology of potentially life-threatening cardiac dysfunction during conditioned fear.

(285)

Neural Mechanisms of Classical Conditioning: Regulation by Opioid Peptides. MICHELA GALLAGHER, *University of North Carolina, Chapel Hill*—Against a background of research indicating that opiates and opioid peptides impair the acquisition of classically conditioned responses, this presentation will focus upon the effects of opiates on latent inhibition of classically conditioned heart rate in the rabbit. Recent research demonstrates that opiates are capable of altering the effects of pre-exposure to a conditioned stimulus on later learning. Neural systems involved in conditioning that are regulated by opioid peptides are concurrently being elucidated.

(286)

Septo-Hippocampal Responses During Appetitive Classical Conditioning. STEPHEN D. BERRY, *Miami University*—During classical conditioning of the rabbit jaw movement response, time-locked conditioned responses develop in the septal region and hippocampus. These data have important similarities to, and differences from, those obtained during nictitating membrane conditioning. Results suggest septohippocampal involvement in both response modulation and motivational aspects of learning. They also indicate that differences in conditioning paradigms may alter the locus of conditioned neural activity in the limbic forebrain.

(287)

A Neural Model for Discriminative Avoidance Conditioning in Rabbits. MICHAEL GABRIEL, *University of Illinois*—A model and supporting data are reviewed for the neural mediation of discriminative avoidance conditioing in rabbits. The model states that the neural discriminative stimulus code is formed in limbic thalamic nuclei, that the code is projected through cingulate cortex to motor systems wherein it initiates the release of primed responses, and the hippocampus may block progress of the code to the motor systems if novel or unexpected stimulus events are detected.

(288)

A Neural Network Model of Classical Conditioning. E. JAMES KEHOE, *University of New South Wales*—Recent advances in artificial intelligence theory have begun to make "conceptual nervous systems" useful for the rigorous explanation of learning. I will present a model composed of four neuron-like adaptive elements that not only explains well known conditioning phenomena, e.g., blocking and conditioned inhibition, but also phenonema that have been previously intractable, namely "learning to learn" and "spontaneous configuration." The implications of the proposed model for physical localization of the "engram" will be dissucced.

PSYCHOLINGUISTICS

Berkeley/Clarendon Rooms, Saturday afternoon, 1:00-3:30

Chaired by Sam Glucksberg, Princeton University

1:00-1:15 (289)

Context in Conceptually Based Categories. RICHARD P. HONECK, MICHAEL FIRMENT, & TAMMY CASE, *University of Cincinnati*—In two experiments, which differed on memory load, subjects learned the underlying, nonliteral meanings of families of sentences that sampled either narrow or wide semantic domains. During testing, novel sentences were presented that were either consistent or inconsistent with family meanings and either from the same or different domains as acquisition families. Wide contexts produced superior transfer, a result inadequately treated by Classical, Probabilistic, and Exemplar views (Smith & Medin, 1981) of categorization.

1:20-1:40 (290)

Cognitive Mechanisms in Number Production: Inferences from Impaired Performance. MICHAEL McCLOSKEY & SCOTT SOKOL, *Johns Hopkins University*—Patterns of impaired performance exhibited by individual brain-damaged subjects on number-processing tasks are presented in support of a model of the cognitive processes involved in spoken production of verbal numbers (numbers in the form of words, such as "six hundred seven"). On the basis of the subjects' error patterns it is argued that verbal number production involves generation of a syntactic frame that guides retrieval of lexical representations from a lexicon partitioned into functionally distinct classes.

1:45-2:00 (291)

Word Recognition in Serbo-Croatian and English: Do They Differ? MARK SEIDENBERG & SUZANA VIDANOVIC, *McGill University*—Previous studies have suggested that there is more phonological mediation in the 'shallow' Serbo-Croatian orthography than in the 'deep' English orthography. However, few studies have directly compared word recognition in the two languages. The present research shows that word naming is lexically mediated in both languages. Both yield semantic priming, frequency, and word/nonword effects. The results suggest that the manner in which an orthography encodes phonology has little effect on skilled word recognition.

2:05-2:20 (292)

Children's and Adults' Heuristics for Interpreting Noun-Noun Compounds. PATRICIA A. CARPENTER & SHARON CARVER, *Carnegie-Mellon University*—Noun-noun compounds, like *bookstore*, are interpreted by using the first noun to modify the second. This combinatorial rule can also be used to interpret noun phrases, like *bookstore owner.* Three studies explore when and how the rule is violated by children and adults. For children, familiarity and plausibility are more important than word order when interpreting a novel phrase like *fire teeth.* The same is true for adults, once their STM capacity is exceeded by a complex phrase like *house fire teeth.*

2:25-2:45 (293)

Parsing Filler-Gap Sentences. LAURIE A. STOWE, *University of Melbourne,* MICHAEL K. TANENHAUS, *University of Rochester,* & GREG N. CARLSON, *University of Iowa* (read by M. K. Tanenhaus)—Three experiments tested predictions made by competing models of gap-location in sentences with embedded questions (e.g., The sheriff wasn't sure which horse the cowboy raced down the hill). Our results support Fodor's 1978 lexical expectation model, in which the parser postulates a gap following a verb which is normally used transitively but does not postulate a gap following a normally intransitive verb.

2:50-3:05 (294)

Lexical Inhibition in Sentence Production. J. KATHRYN BOCK, *Michigan State University*—Priming words were spoken prior to the production of extemporaneous sentences in an incidental speech task. Words that were phonologically related to the primes were produced later in the sentences than unrelated control words. This occurred when subjects produced the primes, but not when they heard them. The effect was related to alternations between active and passive sentence structure as well as simple word-order variations, suggesting that phonological factors can influence syntactic planning processes.

3:10-3:25 (295)

Lexical Substitutions in Immediate Recall. MARY C. POTTER, *Massachusetts Institute of Technology*—Word substitutions in immediate recall were induced by an incidental priming task. The pattern of intrusions suggests that immediate recall of a sentence is based on a conceptual representation that surfaces by using recently activated lexical items. Although this process normally results in verbatim recall, incidental priming produces systematic intrusions. Effects of the rate of sentence presentation on primed intrusions and the influence of syntactic constraints on lexical selection will be discussed.

READING

rkeley/Clarendon Rooms, Saturday afternoon, 3:40-5:55

Chaired by Arthur Graesser, Memphis State University

3:40-3:50 (296)

Use of Punctuation in Oral Reading. DANIEL C. O'CONNELL, *Loyola University of Chicago,* & SABINE KOWAL, *Technical University of Berlin*—Punctuation in 20 German radio homilies by four speakers accounted for 91% of pause time and 84% of pause number. Pause duration varied according to punctuation type. Commas accounted for 95% of punctuated positions *not* used for pausing. Relevance for both cognitive theory and stylistics is discussed.

3:55-4:15 (297)

Chronometric Analysis of Language Processing During Eye Fixations in Reading. GEORGE W. McCONKIE, MICHAEL D. REDDIX, & DAVID ZOLA, *Center for the Study of Reading, University of Illinois*—College students silently read text containing various errors, each of which was hypothesized to interfere with normal language processing at a different level. Eye movement records were analyzed to determine the elapsed time from fixating a word until processing reached different levels. Results are reported for orthographic, lexical, syntactic, semantic, and discourse level characteristics of language processing. Even the highest levels can be reached with 220-240 msec, the duration of many of the fixations.

4:20-4:30 (298)

Preposed Adverbials Signal Change in the Narrative Deictic Center. GAIL A. BRUDER, LORRAINE ENGL, & JUDY SCHULTZ, *SUNY at Buffalo*—We use the term "deictic center" to represent the time, place, and characters in the narrative which are the focus of the readers' attention. We hypothesize that this center influences the interpretation of sentences and comprehension of narrative. Preposed adverbials tell the reader to modify the center's location. Such adverbials were manipulated, and sentence reading time was measured. Results indicate these linguistic devices influence comprehension as predicted by our deictic center hypothesis.

4:35-4:55 (299)

Familiarity Influences Skilled Reading. BETTY ANN LEVY, *McMaster University*—Experiments will demonstrate that familiarity with a text leads to both faster and more accurate reading of that text. These improvements in reading fluency for familiar passages include both better analysis of the visual display and greater sensitivity to syntactic-semantic aspects of the text, as indicated by improved detection of errors at both levels of analysis. The results suggest that fluent reading is a more efficient, not an abbreviated, form of reading.

5:00-5:10 (300)

Reading Texts Presented in a Moving Format. HSUAN-CHIH CHEN & KAM-CHEONG TSOI, *The Chinese University of Hong Kong* (sponsored by In-Mao Liu)—In two experiments, texts were presented successively from right to left along a single line on a computer-controlled display. The exposure duration of different parts of a text was under either experimenter control with constant rates or subject control via turning a knob which was connected to an analogue to digital interface. Results showed that allowing on-line subjective control over the exposure duration did not result in better comprehension performance.

5:15-5:30 (301)

How Readers Abstract Information from Sentences. KARL HABERLANDT, *Trinity College*—In self-paced reading experiments involving different retention tasks, patterns of word-reading times were used to investigate the manner in which readers abstract information from the sentences of brief passages. Abstraction episodes occurred during reading pauses, especially at the ends of sentences. The duration of an abstraction episode depended on the amount of new information in the sentence, the genre of the text, the difficulty of the retention task, and the reader's average reading speed.

5:35-5:50 (302)

Accessing Discourse Meaning during Sentence Processing. DAVID J. TOWNSEND, *Montclair State College*, & THOMAS G. BEVER, *University of Rochester*—Increasing the discourse relevance of sentences reduced line-reading times only when the lines presented entire sentences, not when they presented all but the last word. This shows that processes that occur prior to the sentence boundary have limited access to information about discourse relevance. Processes that occur at the sentence boundary more naturally use information about discourse relevance.

PERCEPTION III
Arlington Room, Sunday morning, 8:00-10:10

Chaired by Howard S. Hock, Florida Atlantic University

8:00-8:10 (303)

Cognitive Load and Task Structure as Determinants of Prism Adaptation. GORDON M. REDDING, *Illinois State University*, & BENJAMIN WALLACE, *Cleveland State University*—Adaptation to displacement is inversely related to difficulty of arithmetic problems given aloud during hallway walking. Visual adaptation is greater than proprioceptive adaptation when the speaking experimenter is visible. Results support a model which assumes cognitive load and task structure are independent determinants of level and locus of adaptation, respectively. Task structure specifies direction of coordinative linkage between sensory-motor systems, and adaptation is localized in guided systems. Cognitive load limits ability to activate available linkages.

8:15-8:30 (304)

Event Perception Studies of the Bodily Expression of Emotion. RICHARD D. WALK & KATHY L. WALTERS, *George Washington University*—We used Johansson's technique (Johansson, 1973) of projecting points of light from the body to depict anger, disgust, fear, happiness, sadness and surprise, emotions frequently used with facial expressions. The first study used a different mime to cross-validate our earlier research. The second compared second-grade children's judgments to those of adults. The third study asked children to don a mask and express emotions with the body, then had adults judge their videotaped portrayals.

8:35-8:50 (305)

Rigidity in Cinema Seen from the Front Row, Side Aisle. JAMES E. CUTTING, *Cornell University*—Photographs and films seen obliquely are not very disruptive, an oft-noted fact surprising in light of projective theory. Typical explanations entail cognitive procedures that rectify observer position with respect to the image plane. An alternative is presented in which information underlying projective distortions in natural viewing is shown to underlie those in affine distortions as well. This means information about rigidity in cinema is preserved regardless of where one sits.

8:55-9:05 (306)

Physiognomic Size Perception. MARTIN S. LINDAUER, *SUNY at Brockport*—Physiognomy's enhancement of perception was investigated in three size-matching studies (N=35, 60, and 55). Four unfamiliar stimuli, two of which were physiognomic (expressive), along with six familiar stimuli, were used. Comparison stimuli were either lines or shapes of different sizes. The "aggressive" taketa was seen as bigger than the "peaceful" maluma and several other stimuli. These results highlight the sensory-perceptual rather than associative character of physiognomy.

9:10-9:25 (307)

Traversal Measures of Auditory Rearrangement. H. H. MIKAELIAN, L. M. WILCOX, & E. L. CAMERON, *University of New Brunswick*—Functional rotation of the interaural axis produces equivalent displacement of auditory space. Errors in orienting, while stationary, towards auditory targets reflect the angular rotation of the interaural axis; walking towards them results in a curved trajectory best described as a cycloid. Twenty minutes of walking produces a family of curved trajectories with progressively reduced radii, indicating a reduction in dynamic localization error. Orientation while stationary fails to reflect corresponding reductions.

9:30-9:50 (308)

Achromatic Color Constancy of Specular Surfaces. HOWARD R. FLOCK, *York University*—The specular walls of a room and specular objects that were sometimes placed in the room were viewed binocularly under a variety of conditions; and were also viewed under reduction conditions. Some degree of achromatic color constancy always occurred, even though under the same conditions matte surfaces gave no perceptual constancy. These parametric data will also be discussed from a theoretical point of view.

9:55-10:05 (309)

Attentional and Imagery Effects on Visual Acuity. ADAM REEVES & CATHERINE LEMLEY, *Northeastern University*—Visual acuity for foveal line targets is reduced by instructions either to divert attention from, or to maintain visual imagery in, the target area. The imagery ('Perky') effect is not attentional, as acuity (in d') depends strongly on the spatial relationship between target and image when the attentional demand of the imagery task is constant. However, an interaction occurs: imagery lowers d' more for central than for diverted attention.

VISION II
Arlington Room, Sunday morning, 10:20-12:25

Chaired by Robert Fox, Vanderbilt University

10:20-10:30 (310)

Binocular Reaction Times to Contrast Increments. DAVID H. WESTENDORF, *University of Arkansas, Fayetteville*, & RANDOLPH

BLAKE, *Northwestern University*—We used reaction times to compare binocular to monocular performance in the detection of a sudden increase in the contrast of a grating. When the magnitude of the contrast increment was near threshold, the advantage of binocular viewing decreased as the initial contrast of the grating increased. But with higher contrast increments the binocular advantage was independent of the initial contrast and of a magnitude exceeding that expected from probability summation.

10:35-10:55 (311)

Marr-Ullman Model Predictions and Directionally Selective Neurons. LEO GANZ, *Stanford University*—171 single neurons in cat striate cortex responding to combinations of static lines presented in succession and in continuous motion have been analyzed. Marr-Ullman Model specifies early extraction of primitives: triple AND-Gating of an excitatory (S^+) and an inhibitory (S^-) sustained neurons and a transient neuron (T^+ or T^-). We show: directionally selective neurons operate more like OR-Gates; a T input is not required. Collaborators: Ralph Felder, Arthur Lange.

11:00-11:10 (312)

Binocularity and the McCollough Effect. JUDY H. SEABER & GREGORY R. LOCKHEAD, *Duke University* (read by G. R. Lockhead)—Monocular and binocular adaptation to complementary displays produced opposite but co-existing McCollough effects in subjects with normal binocular vision. If it is assumed that strabismics lack binocularity and that the two eyes function independently, the aftereffects should cancel. Instead, strabismic subjects perceived monocular aftereffects when tested monocularly or binocularly, and the effect was stronger in the non-dominant eye. We discuss how the two eyes appear to interact in strabismus.

11:15-11:25 (313)

The High Frequency Attenuation Characteristic for Uniform-Field Flicker. THOMAS R. CORWIN, *New England College of Optometry*—Modulation sensitivity for uniform-field flicker declines rapidly with increasing temporal frequency (f). Alternative theoretical models have proposed that log sensitivity is proportional to (1) f [Ferry-Porter law], (2) $\sqrt{f}$[diffusion model], or (3) log f [cascaded integrator model]. Polynomial curve-fits to data for 4 observers over a wide range of luminances indicate that functions (1) and (2) describe the data equally well, whereas function (3) deviates systematically from the data.

11:30-11:40 (314)

The Effects of Flicker Induced Depth on Chromatic Subjective Contours. GLENN E. MEYER & THOMAS DOUGHERY, *Lewis and Clark College*—In the first experiment a chromatic subjective contour had its inducing elements flickered. These became background, and the "dark background" became foreground (like a slice of black swiss cheese). Simultaneously, the chromatic contour disappeared.

Second, a subjective faces/vase pattern was tinted with the McCollough effect and flickered. The figure assumed one depth plane and its concentric rectangle configuration, eliminating the subjective edge and hues. The results support the role of organization in both phenomena.

11:45-12:05 (315)

Spatial Frequency, Temporal Transients, and Measures of Temporal Process. JAMES G. MAY, *University of New Orleans*, FRANCIS MARTIN, FINIAN McCANA, & WILLIAM J. LOVEGROVE, *University of Tasmania*—The effects of spatial frequency and rate of onset/offset were assessed using measures of visual persistence (VP), reaction time (RT), and temporal order judgments (TOJ). Two patches of horizontal sine wave gratings were presented for 900 msec with abrupt or ramped (200 msec) onsets and offsets. RT and TOJ thresholds were significantly elevated when ramped, while VP measures were unaffected. Spatial frequency effects were not systematic across subjects.

12:10-12:20 (316)

Attention and the ERG: A New Recording Technique. ROBERT G. EASON, SALLY CONDER, RODNEY MOORE, & MARTA OAKLEY, *University of North Carolina, Greensboro*—A new electrode has been improvised for recording the averaged ERG in humans. The electrode rests on the lacrimal caruncle (fleshy area) on the nasal side of the eye. The electrode can be attached quickly and causes little or no discomfort to the subject. Examples of the effects of parametric changes in the stimulus and in psychobiological state variables, including selective attention, will be presented.

HUMAN LEARNING & MEMORY IV
Imperial Ballroom, Sunday morning, 8:00-10:15

Chaired by Charles P. Thompson, Kansas State University

8:00-8:15 (317)

Effects of Alcohol Intoxication on Metamemory and Retrieval. THOMAS O. NELSON, MERRILL McSPADDEN, KIM FROMME, & G. ALAN MARLATT, *University of Washington*—Eighty people consumed alcohol (1 ml/kg), and 80 consumed a placebo drink. Then each person went through the FACTRETRIEVAL2 computer program (Wilkinson & Nelson, 1984) so that we could assess the retrieval of general-information facts and two kinds of metamemory. Recall was hindered by alcohol intoxication, but there was no effect on confidence judgments during recall or on feeling-of-knowing accuracy.

8:20-8:35 (318)

Availability: Plausible but Questionable. JONATHAN SHEDLER, JOHN JONIDES, & MELVIN MANIS, *University of Michigan* (read by J. Jonides)—The availability heuristic has been hypothesized to account for judgments about the frequency of occurrence of events. This hypothesis is based upon the observation that variables affecting the memorability of an event also affect its judged frequency. We present an analysis of frequency judgments suggesting that these judgments are not mediated by memorability, at least under all circumstances. This analysis may have implications for other situations in which the availability heuristic has been applied.

8:40-9:00 (319)

Effects of Level of Encoding and Rehearsal on Frequency Judgments. RUTH H. MAKI & ROBERT S. OSTBY, *North Dakota State University*—Attention given to encoding words affects the slope of the function relating actual to estimated frequency. Processes that occur after encoding, such as rehearsal following remember (R) and forget (F) cues, affect the intercept of frequency estimates. Encoding differences show up in forced-choice frequency discrimination tasks; rehearsal differences do not. R and F cues produce different effects on frequency estimates of high- and low-familiarity words and random shapes depending on encoding and rehearsal processes.

9:05-9:20 (320)

Processing Strategy and Hypermnesia. MILTON H. HODGE, *University of Georgia*—Two experiments examined the effect of processing strategy on hypermnesia with high (HI) and low imagery (LI) words. Recall improved with HI words when subjects constructed stories, formed images, or learned 40 words presented in lists of 10, but not with LI words. Level of recall and recall improvement were greatest in the story group. Less improvement was found when similar tasks were performed on groups of three words.

9:25-9:45 (321)

Process Mnemonics: Prospects and Problems. KENNETH L. HIGBEE & JOHN L. OAKS, *Brigham Young University*—Most mnemonics are "fact" mnemonics, used to remember specific facts on a one-to-one basis. Some recently studied Japanese mnemonics might be called "process" mnemonics, because they are used to remember rules, procedures, and operations in problem solving. We discuss prospective implications of process mnemonics for such areas as educational applications, memory theory, and mnemonics research. We also discuss problems involving such areas as definitions, culture, and language.

9:50-10:10 (322)

Temporally Distant Probes Are More Effective than Cross-Modality Probes. CATHERINE G. PENNEY & A. KERRY BUTT, *Memorial University of Newfoundland*—Two experiments are presented in which different kinds of probes were compared in a short-term probed recall task. Presentation modality changed after every second digit in the stimulus list such that the probe and target had the same modality but were not temporally contiguous or they were adjacent in the list but presented in different modalities. Accuracy and latency data indicate that modality is more important than temporal contiguity.

ENCODING AND RETRIEVAL
Imperial Ballroom, Sunday morning, 10:25-12:30

Chaired by Leah L. Light, Pitzer College

10:25-10:45 (323)

Effects of Cuing on Short-Term Retention of Order Information. ALICE F. HEALY, *University of Colorado,* THOMAS F. CUNNINGHAM, *St. Lawrence University,* ROBERT E. TILL, *University of North Dakota,* & DAVID W. FENDRICH, *University of Colorado*—In two experiments, subjects recalled one of two letter sequences following a digit-filled retention interval. Recall performance was increased by precues informing subjects which letter sequence would be tested, and the cuing advantage remained throughout 60-digit intervals. No improvement was found, however, for cues occurring after the letters but before the digits. The cuing effects were attributed to encoding, not rehearsal, processes and were explained by a version of the Estes perturbation model.

10:50-11:00 (324)

Task Related Retrieval and Automatic Temporal Order Encoding. PHILIP H. MARSHALL & CHYONG-YAU CHEN, *Texas Tech University*—Two replications of Zacks et al.'s (1984) study on the encoding of temporal order are presented. Observing output strategies over several lists indicated that the previously reported "practice" effects may have been due to subjects' changing retrieval startegies, and that the previous conclusion for non-automaticity of temporal order encoding may have been premature. The second replication used a forced-choice procedure to obviate the role of retrieval strategies, and no improvement over lists was observed.

11:05-11:25 (325)

How Fragments Are Completed. DOUGLAS NELSON, JOSE CANAS, & MARIA-TERESA BAJO, *University of South Florida*—In fragment completion, subjects are presented with letters and spaces, and they are asked to produce a word that fits the cue (e.g., ________ESH). One aim of these experiments was to determine if subjects complete this task by: (1) using a letter-generation procedure to fill in missing letters, or (2) using presented letters to conduct a search through non-semantic memory. A second aim was to determine if fragment completion, like cued recall, involves the retrieval of encoded meaning.

11:30-11:45 (326)

Dissociable Components of Memory Representations. PETER GRAF & ANGELA BIASON, *University of Toronto*—Performance on episodic memory tasks, such as recall and recognition, becomes dissociated from performance on priming tasks, such as word completion and word identification. Such dissociations may occur because priming depends primarily on memory for sensory/perceptual information, while recall and recognition depend primarily on semantic/contextual information. We used word completion, word identification and cued recall tests to examine this possibility. The results call for an alternative explanation of memory dissociations.

11:50-12:05 (327)

The Benefits of Prior Retrieval for Subsequent Recall. JAN C. RABINOWITZ & DONNA ZWAS, *Barnard College*—When a final free-recall test follows cued recall, items successfully retrieved to semantic cues are more likely to be recalled than items previously recalled to rhyme cues. This effect is independent of the initial encoding task. When the final test is a cued recall test, the benefit from prior retrieval depends on the similarity between the information used to guide the initial retrieval and the type of final retrieval cue.

12:10-12:25 (328)

Memory Retrieval as a Re-encoding Process. DAVID BURROWS, *Skidmore College*—Subjects classified words as positive or negative on the basis of 1, 3, or 5 orienting questions asked about the word, and later attempted to reproduce the classifications without the presence of the questions. Performance on the final test decreased with the number of orienting questions and was poorer than for a control group whose final test was an old/new decision. Retrieval is interpreted as a process of retracing the steps involved in original encoding.

MUSIC PERCEPTION
Plaza Ballroom, Sunday morning, 8:00-9:20

Chaired by Neil Macmillan, Brooklyn College, CUNY

8:00-8:15 (329)

Music Imagery. ROBERT J. WEBER & SUELLEN BROWN, *Oklahoma State University*—An objective indicator of music imagery is developed that involves tracking the up and down movements of the tonal contour of an imagined musical phrase. In two experiments, college students' imagery of music was examined. Music imagery was found to draw on the same representation as overt song.

8:20-8:40 (330)

Independent Temporal and Pitch Structures in Musical Phrase Perception. CAROLINE PALMER & CAROL KRUMHANSL, *Cornell University* (read by C. Krumhansl)—The roles of temporal and pitch structures in melodic phrase perception were measured in two experiments. Musical excerpts were judged in terms of how good or complete a phrase they made. In one experiment, either the pitch or temporal pattern was altered, and in another experiment, one pattern was shifted and recombined with the other pattern. Temporal and pitch structures had independent and additive effects in the perception of meaningful musical phrases.

8:45-8:55 (331)

Sensitivity to Tonal Structure in a Musical Savant. LEON K. MILLER, *University of Illinois, Chicago*—A developmentally delayed, musically gifted 6-year old with no formal musical training was asked to repeat passages on the piano. Analysis of responses to melodies in each of the 24 major and minor keys indicated sensitivity to aspects of tonal structure (e.g., tonic, and relative diatonic notes in a given key) exhibited in the mature listener.

9:00-9:15 (332)

Assimilation of Quarter-Steps to Half-Steps by Musically Untrained Listeners. W. JAY DOWLING, *University of Texas at Dallas*—Categorical perception for pitches of the chromatic scale of semitone intervals has not previously been demonstrated for musically untrained listeners. This is not due to nonmusicians' lack of a chromatic pitch-coding schema, but to the contextual simplicity of tasks that made precise judgments of pitch height relatively easy. In contrast, here listeners judged pitch changes in rapid target melodies interleaved with tonal context. Judgments were accurate for chromatic half-steps, but quarter-steps were confused with their chromatic neighbors.

DECISION MAKING
Plaza Ballroom, Sunday morning, 9:30-12:30

Chaired by Richard B. Swensson

9:30-9:45 (333)

The Affective Component of Risk Propensity. PAUL J. HOFFMAN, *Naval Postgraduate School (and Cogitan)*—A theoretical framework for risk-propensity is suggested, differing importantly from classical SEU theory, Prospect "theory," etc. Decision-makers undertake to minimize subjective expected utility of the consequences of decisions, while simultaneously motivated by affective needs, such as the experience of success and the fear of failure. Affective dimensions of utility are in a sense independent of the more tangible, cognitively considered consequences of actions.

A model and experimental evidence will be presented.

9:50-10:00 (334)

Impoverished Problem Structures: A Challenge to Decision Analysis. CHARLES GETTYS, *University of Oklahoma*—Studies addressing the completeness of human problem structuring of ill-defined decisions are reviewed. Human abilities to generate actions, and the possible states of the world that might affect these actions are adequate for trivial problems in a benign environment, but appear to be impoverished for purposes of decision analysis, thus presenting a challenge to and a potential justification for decision analysis. An important exception and the role of expertise are also discussed.

10:05-10:20 (335)

An Adaptive Approach to Resource Allocation. JEROME R. BUSEMEYER, *Purdue University*—Resource allocation is a problem that requires the decision maker to allocate a limited resource (e.g., time or effort) to competing activities in order to maximize an explicit objective (e.g., payoffs). In contrast to past research which has compared optimal to observed performance, the present study investigated how individuals learn to improve their resource allocation policies as a result of trial-by-trial outcome feedback. A learning principle called hill-climbing provided a useful way of explaining many of the results.

10:25-10:40 (336)

Primacy Effects and Attention Decrement in Contingency Judgment. J. FRANK YATES & SHAWN P. CURLEY, *University of Michigan*—People have difficulty correctly assessing contingencies between events, e.g., between symptom S and disease D in medical diagnosis. The reported results shed light on possible contributors to this phenomenon. Subjects' contingency judgments were found to exhibit a significant primacy effect. The data also implied that this primacy effect was due to "attention decrement" (Anderson, 1981), whereby attention to relevant information ceased after the subject was shown only a small sample of such information.

10:45-11:05 (337)

Theories of the Conjunction Fallacy and Conditional Probability. MICHAEL H. BIRNBAUM, CAROLYN J. ANDERSON, & LINDA G. HYNAN, *University of Illinois, Urbana-Champaign*—Judgments of intuitive probability often violate the algebra of mathematical probability. To test rival theories of intuitive probability, subjects were asked to judge probabilities of events, conjunctions, and both conditionals. Simple judgment models that allow subjective scales of events and responses give a coherent account of the several types of judgments. Methods and theories of judgment and decision making research will be disucssed.

11:10-11:25 (338)

Examining Probability Estimation: Evidence for Dual Subjective Probability Functions. THOMAS E. NYGREN, *Ohio State University*,& ALICE M. ISEN, *University of Maryland*—Two studies examined subjects' judgments of likelihoods of events for gambles described in terms of probability phrases. In the first study, ambiguous information about the phrases was presented. In the second study, a positive affective state was induced in subjects. In both cases, subjects interpreted the probabilities differently depending on whether they were evaluating positive or negative outcomes. Data are interpreted in terms of a decision making model with dual subjective probability functions.

11:30-11:45 (339)

Subjects' Data Selection Strategies for Assessing Covariation. MICHAEL E. DOHERTY & KATHLEEN FALGOUT, *Bowling Green State University*—Four assessments of covariation tasks were run. Subjects decided whether each day's data (Clouds seeded? Rained?) should be tabulated in a computer or discarded as irrelevant to the determination of cause. Subjects subsequently studied the table, then indicated whether cloud seeding caused rain. The expected pattern (keep only cause present days) was shown by 45% of subjects; 28% also kept seeded/no rain days. Given such individual differences, generalizations about data usage in covariation tasks are moot.

11:50-12:05 (340)

Psychological Characteristics of Expert Decision Makers. JAMES SHANTEAU, *Kansas State University*, GERI ANNE DINO, *Suffolk University*, RICHARD ETTENSON, *University of Maryland*, & GARY GAETH, *University of Iowa*—An examination of studies involving expert decision makers revealed 10 consistent psychological characteristics. Some of these (e.g., superior pattern recognition abilities) coincide with characteristics reported previously for expert problem solvers. However, other characteristics (e.g., strong sense of confidence) have not received much attention in the literature. Implications are considered for (1) the definition of expertise, (2) the training of novices to become experts, and (3) the design of expert systems.

12:10-12:25 (341)

The Influence of Positive Affect on Perceived Utility of Gains and Losses. ALICE M. ISEN, *University of Maryland*, THOMAS E. NYGREN, & F. GREGORY ASHBY, *The Ohio State University*—A modification of the procedure originally used by Davidson, Suppes, & Siegel (1956) to measure subjective expected utility was used to study the influence of positive affect on subjects' utility functions. Results indicated, as expected, that subjects in whom positive affect had been induced showed increased negative utility (disutility) of losses. On the "gains" end of the curve, however, where no loss was possible, the utility functions of the two groups did not differ. These findings were related to other work suggesting that positive affect promotes risk aversion in high-risk situations, where loss is possible.

ATTENTION II
Georgian Room, Sunday morning, 8:00-10:25

Chaired by James R. Pomerantz, SUNY at Buffalo

8:00-8:20 (342)

Adapting to Processing Demands in Discourse Production: The Case of Handwriting. JOSEPH S. BROWN, JANET L. McDONALD, *Michigan State University*, TRACY L. BROWN, *University of North Carolina at Asheville*, & THOMAS H. CARR, *Michigan State University* (read by T. H. Carr)—To make either execution or generation the rate-limiting factor in production of discourse via handwriting, we asked people to copy expository prose or to reconstruct it from memory. Instructions stressed speed or legibility of output, and the task was done alone or in concert with another task. Patterns of adaptation to instructions and dual-task demands are analyzed in terms of time sharing, resource sharing, and generation-execution interaction as sources of performance constraint.

8:25-8:45 (343)

Repetition Priming and the Development of Automaticity. GORDON D. LOGAN, *Purdue University*—Subjects performed up to 16 lexical decisions on the same items, and decision time decreased with repetition for words and nonwords in a manner characteristic of the development of automaticity. Consistency of stimulus-response mapping did not affect the repetition effect but consistency of interpretation had strong effects: Alternating between lexical decisions and pronunciation decisions virtually eliminated the repetition effect. These results suggest that repetition priming, like automaticity, has an associative basis.

8:50-9:10 (344)

Characteristics of Visual Context Effects in Classification Tasks. JOHN H. FLOWERS & DORIE REED, *University of Nebraska, Lincoln*—Several experiments that manipulated the relative onset time of visual targets and surrounding context elements have allowed us to distinguish between several distinct voluntary and involuntary priming effects. We have shown that (1) "involuntary" response competition and facilitative priming reflect fundamentally different psychological processes with important implications for selective attention, and (2) "voluntary" preparation reflects a mixture of stimulus expectation and response preparation effects.

9:15-9:35 (345)

Dissociating Deficits in Alerting and Orienting to Visual Events. MICHAEL I. POSNER, *Washington University*, ALBRECHT INHOFF, *University of New Hampshire*, & ASHER COHEN, *University of Oregon*—Left and right parietal patients show about equal deficits in the ability to shift attention from a current visual focus to engage a target in a contralateral direction. No such contralateral disadvantage is found when attention is committed to a non visual task. When no warning is given prior to the target, right-sided patients show a much greater elevation in reaction time than do lefts or normals. Thus, right hemisphere damage seems to involve a reduction in general alerting in addition to the orienting deficit.

9:40-9:55 (346)

Spatial Attention in Reading Words. ALEXANDER POLLATSEK, *University of Massachusetts*, JOHN A. WALKER, *Good Samaritan Hospital, Portland*, FRANCES J. FRIEDRICH, *University of Utah*, & MICHAEL I. POSNER, *University of Oregon*—In Experiment 1, parietal patients demonstrated deficits in spatial attention when scanning letter strings for the presence of mismatching letters (replicating Friedrich, Walker & Posner, 1985). In Experiment 2, patients were asked to report aloud briefly-presented words or nonwords; errors were scored for spatial position. Parietal lesions affected the encoding of nonwords for all patients but affected the encoding of words for some patients. The results confirm that lexical access can occur without attention, but attention affects it.

10:00-10:20 (347)

A Quantitative Model of Controlled and Automatic Processing. WALTER SCHNEIDER, *University of Pittsburgh*—The model assumes cognitive processing is accomplished through a network of units transmitting vector messages. Controlled processing modifies the gain with which messages are transmitted, senses the activation of units, and sequences message transmissions. Automatic processing performs associative translation, filtering, and transmission of messages. Simulations illustrate: why controlled processing must be serial and automatic processing can be parallel; how controlled processing builds automatic processing; and why the resource load decreases with consistent practice of component tasks.

LANGUAGE/DISCOURSE PROCESSING II
Georgian Room, Sunday morning, 10:35-12:30

Chaired by Edward J. Clemmer, Indiana University-Purdue University at Fort Wayne

10:35-10:50 (348)

Why Written Outlines Help Writers. RONALD T. KELLOGG, *University of Missouri-Rolla*—This study tested two processing explanations for why written outlines help writers. The translation hypothesis assumes that planning an outline during prewriting allows the writer to concentrate on translating ideas into text during composition. The memory hypothesis contends that the external aid of a written outline decreases the load on working memory during composition. Measurements of the time devoted to translating across no outline, written outline, and mental outline conditions supported only the translation hypothesis.

10:55-11:05 (349)

Between Ewe, Me and the Lambpost: Phonological Recoding During Reading. STEVEN A. WINSHEL & SAM GLUCKSBERG, *Princeton University* (read by S. Glucksberg)—People made lexical decisions to words such as YOU and ME or EWE and ME. Words primed both their own associates and those of their homophones, e.g., ME was primed equally by YOU or EWE. Apparently, people automatically recode single printed words acoustically, and the acoustic representations then activate their several word meanings.

11:10-11:25 (350)

Parsing Newspaper Headlines. CHARLES A. PERFETTI, SYLVIA BEVERLY, LISA DIDONATO, & LINDA PERTSCH, *LRDC, University of Pittsburgh*—Newspaper headlines offer a rich source of psycholinguistic data for theories of parsing. Ambiguous headlines such as "Rumors about NBA Referees Growing Ugly," which are fairly commonplace, allow questions about the computational autonomy of syntax and the contribution of pragmatics to comprehension. In a series of experiments, we examine headline reading in different contexts. We discuss the implications of the results for models of parsing.

11:30-11:45 (351)

The Impact of Connectives on Memory for Expository Text. ARTHUR C. GRAESSER & KEITH K. MILLIS, *Memphis State University*—College students comprehended and later recalled short expository passages about scientific mechanisms. We varied the type of connectives in the texts: temporal (*before*), causal (*caused/enabled*), vs. intentional (*in order to/so that*). Type of connective had a major impact on the recall of text propositions, showing an increase as a function of computational complexity, i.e., temporal < causal < intentional.

11:50-12:05 (352)

Culture-Based Distortion in Memory. RICHARD JACKSON HARRIS, LAWRENCE M. SHOEN, & D. JOHN LEE, *Kansas State University*—Subjects read a story that was consistent with culturally-specific knowledge from either North America or Brazil. They then performed a truth-judgment task either immediately or one week later. Results showed that subjects used their own culturally-specific knowledge in memory as a sort of default option in processing to distort information in a direction more consistent with their own cultural knowledge, especially so at longer retention intervals.

12:10-12:25 (353)

Distractibility and Discourse Failure in Manic and Schizophrenic Psychoses. PHILIP D. HARVEY, *SUNY at Binghamton*—Manic (n = 18) and schizophrenic (n = 23) patients were evaluated with linguistic assessments of reference performance and were tested with a digit span distraction task. Correlational analyses found that both distraction and nondistraction performance were related equally to discourse failures in manics while distraction performance was the only significant predictor of discourse failure in the schizophrenic sample. The significance of the fact that susceptibility to the effects of distraction seemed to be an important and specific predictor of discourse failures in schizophrenia is discussed.

ANIMAL MEMORY II
Stanbro Room, Sunday morning, 8:00-10:35

Chaired by Herbert S. Terrace, Columbia University

8:00-8:20 (354)

Proactive Interference in Delayed Matching. K. GEOFFREY WHITE, *University of Otago, New Zealand*, & WENDY V. EDHOUSE, *University of Wellington, New Zealand*—In a delayed matching-to-sample procedure, agreement of sample-stimulus color and comparison-stimulus position between trial n and trial n − 1 was factorially combined with intertrial interval, trial n delay, and trial n − 1 delay. Intertrial agreement interacted with trial n delay and trial n − 1 delay, whereas intertrial interval interacted only with trial n delay. There may be two independent sources of proactive interference in delayed matching, a general trial-spacing effect and a specific intertrial agreement effect that includes the influence of trial n − 1 sample stimuli.

8:25-8:45 (355)

Retrospective Memory in Pigeons' Delayed Matching-to-Sample. PETER J. URCUIOLI, *Purdue University*, & THOMAS R. ZENTALL, *University of Kentucky*—Separate groups of pigeons were trained to high levels of accuracy on matching-to-sample with hues and lines combined factorially as samples and comparisons. When subsequently tested on delayed matching, birds trained with hue samples matched more accurately and showed slower rates of forgetting than birds trained with line samples. Comparison dimension had little or no effect on memory performance. These data indicate that pigeons retrospectively code the samples in delayed matching-to-sample.

8:50-9:00 (356)

Monkey and Human Memory for Picture Fragments. WILLIAM A. ROBERTS, *University of Western Ontario*, PHILIPP J. KRAEMER, *SUNY at Binghamton*, & DWIGHT S. MAZMANIAN, *University of Western Ontario*—A delayed matching-to-sample procedure was used to study memory for pictures of common objects and scenes in squirrel monkeys and humans. In different experiments, picture fragments were presented as sample and/or comparison stimuli. Picture fragments were formed by masking different parts of pictures—central, peripheral or noise mask—and different amounts of pictures—25%, 50%, or 75%. Results indicated that both monkeys and humans showed better retention with a peripheral mask than with central or noise masks and that retention improved as the percentage of the picture observed increased.

9:05-9:15 (357)

Event Duration Memory: Effects of Illumination and Post Sample Cuing. B. KENT PARKER, *West Virginia University*—Three experiments examined pigeons' memory for event duration using a discrete trial successive matching to sample task. Discrimination was shown to be a decreasing function of the retention interval (RI) separating the duration to be discriminated from the terminal test stimulus. Increases in RI illumination produced larger discrimination decrements than did decreases in RI illumination levels. Post sample cuing (forget cues associated with a comparison-omission procedure) was shown to differentially control matching performance.

9:20-9:40 (358)

Attenuation of the Modality Effect in the Rat's STM. JEROME COHEN & DARREN FUERST, *University of Windsor*—Rats were trained and tested for retention of a light and tone sample stimulus in successive DMTS when each sample was presented in the same or in different DMTS tasks. Retention of the visual sample stimulus was poorer than retention of the auditory sample stimulus only in the DMTS task that contained both stimuli. These results suggest that a rat may use different encoding strategies in STM.

9:45-10:05 (359)

Sources of Proactive Interference in Spatial Working Memory. NORMAN HOFFMAN & WILLIAM S. MAKI, *North Dakota State University* (read by W. S. Maki)—When two radial-arm maze trials occurred within a day, rats' performance on the second trial was poor. Several experiments were conducted using variations of the two-trial paradigm in attempts to identify the variables responsible for the proactive interference (PI). Difficulty of discriminating between choices made on different trials within a day contributes to poor performance on the second trial, but temporal discriminability is not the only source of PI. Experimental evidence relevant to the identification of the additional source(s) will be reviewed.

10:10-10:30 (360)

Release from Proactive Interference Effect in Monkeys. MASAKO JITSUMORI, *University of Texas, Houston, & Chiba University, Japan,* ANTHONY A. WRIGHT, & ROBERT G. COOK, *University of Texas, Houston* (read by A. A. Wright)—Two monkeys were trained in a serial-probe-recognition task with 320 travel slides arranged in counterbalanced 4-item list sequences. Performance accuracy gradually decreased, which was shown to be due to proactive interference (PI) from previous daily sessions. This PI from very long-term memory decreased the accuracy of recognition in short-term memory. Release from PI was demonstrated by transfer to novel items and by changes in item categories.

11:40-11:50 (364)

Physiological Changes Induced Through Interaction of Food Restriction and Vasopressin Deficiency. CYRILLA H. WIDEMAN & HELEN M. MURPHY, *John Carroll University*—Brattleboro (DI) and Long-Evans (LE) rats were given access to: 24 hr, 2 hr, or 1 hr of food per day. DI animals with 1 or 2 hr of access survived for a shorter period of time and had a greater decrease in body weight than other subjects. Although DI animals with 2 hr access consumed a higher percentage of food than DI animals with 1 hr access, survival was not enhanced and body weight was not elevated.

11:55-12:05 (365)

Morphometric Analysis of Adrenal Glands of SHA and SLA Rats. F. ROBERT BRUSH, LOUIS J. PELLEGRINO, JOAN E. KING, & PAMELA Y. COLLINS, *Purdue University*—It was reported last year that SLA (Syracuse Low Avoidance) rats have larger adrenal glands than SHA (Syracuse High Avoidance) animals. In this paper we present a morphometric description of adrenal medullary and cortical (reticularis/fasciculata and glomerulosa) volumes in animals of both sexes from these two selected lines. When tissue volumes were adjusted for body weight, there were no line differences in medullary volumes. All cortical volumes were greater in SLA than SHA animals.

12:10-12:20 (366)

Effects of Stress Age and Strain on Serum Glucose Levels. JAMES J. STARZEC & DAVID F. BERGER, *SUNY at Cortland* (read by D. F. Berger)—Ninety-day and one-year old male Sprague-Dawleys and SHRs were exposed to unpredictable, uncontrollable shocks 51 min daily for 30 sessions. Food intake was equated between stressed and non-stressed groups. Terminal serum samples showed stress-induced increases in both strains. This effect interacted with age in the SHRs. Older increased more than younger. No such interaction occurred with the Sprague-Dawleys. Both younger groups had higher glucose levels than the older groups.

PHYSIOLOGICAL PROCESSES
Stanbro Room, Sunday morning, 10:45-12:25

Chaired by C. R. Gallistel, University of Pennsylvania

10:45-11:00 (361)

Behavioral Thermoregulation During High-Intensity Microwave Exposure. ELEANOR R. ADAIR, BARBARA M. ADAMS, & GILLIAN M. AKEL, *John B. Pierce Foundation, Yale University*—Adult male squirrel monkeys underwent brief (10 min) or prolonged (90 min) whole-body exposures to 2450-MHz microwaves at high intensities (30 to 70 mW/cm^2) while controlling ambient temperature (T_a) behaviorally. Body temperaturs (colonic, skin, hypothalamus) were always regulated efficiently during microwave exposure because a cooler, intensity-correlated T_a was selected by the animals. No response ceiling was detected at either exposure duration.

11:05-11:15 (362)

Prior Exposure(s) to a Stressor Modulate Later Gastric and Corticoid Responsivity to that Stressor. J. BRUCE OVERMIER, *University of Minnesota,* & ROBERT MURISON, *University of Bergen, Norway*—Rats were exposed to restraint in a cool water bath as a stressor. Gastric ulceration and serum corticosterone reactions to a stressor when later encountered were differently influenced by the parametric variation of number but not by severity of the prior exposures. A single prior exposure decreased ulceration to the final stressor, but four exposures did not. In contrast, four prior exposures decreased the corticosterone response to the final stressor, but a single exposure did not.

11:20-11:35 (363)

Volume Loading Hypoalgesia in SHR, WKY and a F_1 Backcross. ALAN RANDICH, *The University of Iowa*—Volume loading resulted in significant inhibition of the tail-flick reflex to painful radiant heat in SHRs, but failed to induce hypoalgesia in WKYs. The F_1 offspring of an SHR X WKY cross showed levels of hypoalgesia to volume loading that were intermediate to those of SHRs and WKYs. There were no differences between these strains in their hypotensive and bradycardic responses to volume loading. These findings are discussed in terms of cardiovascular-somatosensory interactions.

REINFORCEMENT AND CHOICE
Berkeley/Clarendon Rooms, Sunday morning, 8:00-10:25

Chaired by John A. Nevin, University of New Hampshire

8:00-8:20 (367)

Generalized Self-Control of Effort and Delay. ROBERT EISENBERGER, FRED A. MASTERSON, KATHERINE GILLESPIE, & MICHAEL ADORNETTO, *University of Delaware*—The effects of rewarded effort and delayed reward on generalized self-control involving effort and delay were studied with rats and preadolescent school children. Rewarded effort increased the subsequent choice of a large reward requiring high effort over a small reward requiring low effort, there being little effect of delay training. Delayed reward increased the subsequent choice of a delayed, large reward over an immediate, small reward, there being little effect of effort training.

8:25-8:45 (368)

Absolute vs. Relative Values of Reinforcement as Determinants of Choice. A. W. LOGUE & ADOLFO CHAVARRO, *SUNY at Stony Brook*—Six pigeons chose between two alternatives that differed in terms of their absolute, but not relative, values of reinforcement. The absolute values of the three reinforcer parameters, reinforcer delay, amount, and frequency, were each varied separately. For each reinforcer parameter, the sensitivity of the pigeons' choices to the relative differences between the alternatives varied systematically as the absolute values of reinforcement were varied.

8:50-9:10 (369)

Optimal Sampling in a Fluctuating Environment: Tests of a Model. SARA J. SHETTLEWORTH, *University of Toronto,* JOHN R. KREBS, *Oxford University,* & D. W. STEPHENS, *University of Utah*—Pigeons worked on a discrete-trial concurrent VR VR simulating two foraging patches. The unstable patch changed unpredictably between extinction and a rich VR; the stable patch was an intermediate VR. Food intake in this situation is maximized by periodically sampling the unstable patch and switching to it when it is rich. Behavior matched the predictions of a quantitative model of optimal sampling in some respects, but not in others. Mechanistic accounts of "sampling" are considered.

9:15-9:30 (370)

A Hard Day's Night: Nocturnal Hypothermia in Response to High Food Costs in the 24-hr Closed Economy. MICHAEL E. RASHOTTE, *Florida State University*—When the behavioral cost of finding food in a closed economy is high, pigeons eat less food than usual each day but their body weight remains relatively unchanged. A probable factor is that energy is saved during the night by lowered body temperature. Implications for motivational and economic analyses of behavior in the closed economy are noted.

9:35-9:55 (371)

Choice on Probabilistic Schedules: A Reward-Following Analysis. JOHN M. HORNER & JOHN E. R. STADDON, *Duke University* (read by J. E. R. Staddon)—When hungry pigeons must choose between independent or interdependent random-ratio schedules of food reward, they seem to behave according to a simple reward-following rule that can lead to predictable, sub-optimal behavior under certain conditions. Reward following may be a basic "default" mechanism animals use to adapt to schedules that lack temporal or other reward predictors.

10:00-10:20 (372)

Multiple Concurrent Chains: Method for Rapid Determination of Preferences in Pigeons. A. CHARLES CATANIA, *University of Maryland, Baltimore County,* & DANIEL T. CERUTTI, *Temple University*—Multiple concurrent chains arrange one pairing of initial and terminal links during one stimulus and a reversed pairing during another stimulus. With this arrangement, preferences can be distinguished from biases and can be observed within single sessions. The procedure is also sensitive to small preferences not easily observable in standard concurrent chains. Data from experiments on preference for free choice over forced choice will illustrate these and other features of the procedure.

ANIMAL LEARNING & CONDITIONING III
Berkeley/Clarendon Rooms, Sunday morning, 10:35-12:30

Chaired by Sheila Chase, Hunter College

10:35-10:55 (373)

The CER as a Model of Pavlovian Conditioning. JOHN F. HALL, *Pennsylvania State University*—Many investigators have assumed that the CER can serve as a model for Pavlovian conditioning, but methodological problems with the CER have been identified. Some experimenters, however, believe that if the two paradigms reveal similar experimental results, these problems can be ignored. A literature survey suggests that such comparisons between the paradigms frequently reveal similar findings but there are sufficient disparities to warrant caution in assuming that they are measuring the same learning correlate.

11:00-11:15 (374)

"Priming" and Place Preference Conditioning. RILEY E. HINSON, JOHN CHEW, & ANGELA STREATHER, *University of Western Ontario*—The effects of drug injections and cues on place preference were investigated. Initial training involved administration of morphine (10 mg/kg) to rats in a black box and 48 hr later administration of amphetamine (1.5 mg/kg) in a white box. This sequence repeated 16 times; then rats were given access to both boxes. A preference for the morphine box was exhibited. This preference was altered when subsequent tests were preceded by injection of amphetamine or cues associated with amphetamine.

11:20-11:40 (375)

Behavior-Genetic Analysis of *Drosophila Melanogaster*: Excitatory Conditioning, Extinction, Reliable Individual Differences, and Selection. JERRY HIRSCH & MARK HOLLIDAY, *University of Illinois at Urbana-Champaign*—Evidence is presented for individual differences in the acquisition and extinction of conditioned elicitation of the proboscis extension reflex in *D. melanogaster* and its use as the phenotype for a genetic selection study. The value of a contingency approach to this problem is also considered.

11:45-12:00 (376)

Sexual Classical Conditioning in Japanese Quail. MICHAEL DOMJAN, RICHARD LYONS, & CAMILLE NORTH, *University of Texas at Austin*—Male Japanese quail received classical conditioning trials in which illumination of a localized light preceded or was randomly presented relative to access to a sexually mature female bird. Paired but not random presentations of the light and access to the female resulted in approach behavior when the light was illuminated. These findings are consistent with earlier studies of the social behavior of Japaneese quail.

12:05-12:25 (377)

Failure to Block "Occasion Setting" by Pavlovian Conditioned Stimuli. ROBERT T. ROSS & VINCENT M. LoLORDO, *Dalhousie University* —(ready by V. M. LoLordo)—Blocking was assessed within a Pavlovian serial feature-positive discrimination. Results indicated that an occasion setting stimulus blocked acquisition of a similar hierarchical signaling function to a novel stimulus. In contrast, a conditioned stimulus blocked acquisition of a direct association between a novel stimulus and the food US, but failed to block acquisition of an occasion setting function to that same novel stimulus. Relationships between hierarchical signaling functions (occasion setting) and basic associations are discussed.