

Course Syllabus

Advanced Human Factors I
Psychology 617 (56-6170)

Human Factors Seminar I
Psychology 416 (56-4160)

Rensselaer Polytechnic Institute
Fall term, 1990-91

Instructor
Michael S. Wogalter
Carnegie Hall 305c
Office: 276-8513
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Class Meetings
Mondays
1:00 - 3:50 P.M.
West Hall 213

Office Hours
Mondays and Wednesdays
5:05 - 5:50 P.M.
Tuesdays 5:30 - 6:00 P.M.
Thursdays 6:05 - 7:15 P.M.
or by appointment

Prerequisites

This seminar is the first of the required two-course sequence in the Human Factors graduate program in RPI's Department of Psychology. The seminar is also open to advanced undergraduate students who have already taken the prerequisite course Human Factors in Design (56-220). The exception to this rule is that psychology majors who have already taken 3 or more courses in the Department or have taken the Experimental Methods and Statistics course may be admitted with permission of the instructor. There are no other exceptions.

Course Objectives

The aim of the seminar is to examine the relationship between people and various aspects of the world around them. The topics to be explored will include safety, work-related anthropometry, instructions and warnings, noise, stress, and forensic issues. This is not a lecture course. The instructor will not be giving regular lectures. Rather this course is seminar in which the class participates in active discussion. Each student will be assigned two sets of readings and asked to lead the class in discussion of the assigned topic. Leaders will summarize the articles in 10-12 minutes. Discussion by classmates will follow.

Readings

The basis of the seminar is the reading of journal articles and various book chapters. Some of the readings will be taken from the book:

Sanders, M. S., & McCormick, E. J. (1987). Human Factors in Engineering and Design (6th ed). New York: McGraw-Hill.

This book is recommended, but not required. This is a good sourcebook to own if you have any intentions of doing subsequent work in Human Factors.

It is the responsibility of the class leaders to make sure that the readings are placed on reserve within 2 weeks of the start of the course. In cases where materials are not available in the library, leaders must be order them through interlibrary loan (reference desk in Folsom).

Course Requirements

Class participation

Because of the nature of the course, i.e., a seminar, your participation in class is essential. You should be prepared to speak up and add to each meeting's discussion. Class participation will be worth

10% of the final course grade.

Exams

Two exams will be given. The exams will be based on the assigned readings, and the discussions. The exams will be available on the Friday on the calendar and must be returned in typewritten form by the Monday class meeting. Each exam will account for 20% of the course grade. All students are required to take the exams on the dates specified on the calendar. Late exams will be assessed an automatic penalty equal to 25% of the exam grade per day.

You are strongly encouraged to critically read the assigned readings twice: Once before making up questions (discussed below) and again after receiving the set of discussion questions from the instructor. It is recommended that you take handwritten notes of the readings as you go through them. Review your notes prior to coming to every class.

Leader assignments

The quality of your presentation and discussion leadership will be worth 25%.

Topic questions

Each person is required to submit 1 or 2 discussion questions on each assigned reading for the upcoming session. Questions are due by 8:00 P.M. on the Thursday before the next session. They should be sent by EMAIL to the instructor (UserADGH). Questions will be edited and collated and written to a permitted file by Friday 2:00 P.M. The file will be called generically ADGH:HFTOPIC[month/day], e.g., ADGH:HFTOPIC9/17 for the September 17 topic. The quality of your questions will be worth 10%.

Demonstration

Every meeting there will be one or two in-class demonstrations (for 5-10 minutes) on some aspect related to Human Factors. The demonstration can be based partially on some interesting project that can be found in Human Factors texts/workbooks, but preference will be given to demonstrations that you have created on your own. Where possible demonstration materials/instructions should be printed and distributed to the class members (for future use by them) or at least, a copy given to the instructor for subsequent distribution. Students wishing to take the course for graduate credit must give two presentations during the semester (and where at least one of the two presentations have little or no common relationship to demonstrations in texts/workbooks). Demonstration topic must receive prior approval from the instructor (to increase quality, maintain relevance, and avoid topic redundancy). The demonstration will account for 5% of the final course grade.

Mini-experiments

Students seeking graduate credit are also required to complete two mini-experiments. After approval of the instructor, the student will construct the materials and collect data from friends and acquaintances, analyze it and write a brief report containing a title page, abstract, short introduction, method (materials and procedure), results and discussion, and references. The report should be no longer than 5 double-spaced pages of text (excluding the title page, abstract and references). Each will be worth 10%. The percentages described for all of the other assignments assumed undergraduate credit. Those persons doing these assignments for graduate credit will have the percentages reduced for all other assignments by a factor of .80. These assignments are not required for those seeking 400-level credit.

Attendance Policy

Students will be expected to attend every class meeting. Good attendance will be worth 5%. Missing 3 meetings will result in an automatic 10% subtracted to your final grade. Missing four or more meetings will result in an automatic 30% subtracted to your final grade. Take the necessary precautions to avoid

getting sick, breaking the law, roommate conflicts, etc.

Grading

All students are expected to do and turn their own work. Dishonorable behavior will not be tolerated and when necessary will be pursued through the Institute's judicial channels.

The grading scale is shown below:

A	At least 90%
B	At least 80%
C	At least 70%
D	At least 60%
F	Less than 60%

Calender for Advanced Human Factors I & Human Factors Seminar I

September 10

Organizational session; Selected topics: Measurement (classical psychophysical methods, and signal detection theory). Readings in Goldstein's Sensation and Perception on the above topics.

September 17

Introduction to Human Factors.

Chapanis, A. (1983). Quo vadis, ergonomia. Ergonomics, 22, 595-605.

Sanders, M. S., & McCormick, E. J. (1987). Human factors and systems. Human factors in engineering and design (pp. 3-19). New York: McGraw-Hill.

Schmidt, J.K. (1986). A sketchbook history of human factors. Proceedings of the Human Factors Society, 30, 1390-1394.

Wickens, C.D. (1984). Introduction to engineering psychology and human performance. Engineering psychology and human performance (pp. 1-18). Columbus, Ohio: Charles E. Merrill.

September 24

•1st half. *Safety signs and symbols.*

Collins, B. L. & Lerner, N.D. (1982). Assessment of fire-safety symbols. Human Factors, 24, 75-84.

Riley, M.W., Cochran, D.J., and Ballard, J.L. (1982). An investigation of preferred shapes for warning labels. Human Factors, 24, 737-742.

Sanders, M. S., & McCormick, E. J. (1987). Human factors and systems. Human factors in engineering and design (Chap. 4). New York: McGraw-Hill.

•2nd half. *Traffic signs and symbols.*

Whitaker, L.A. (1985). Is the airport symbol sufficient to convey route information? Human Factors, 27, 229-233.

Dewar, R.E., Ells, J.G., & Mundy, G. (1976). Reaction time as an index of traffic sign perception. Human Factors, 18, 381-392.

Paniati, J.F. (1988). Legibility and comprehension of traffic sign symbols. Proceedings of the Human Factors Society, 32, 568-572.

October 1

•1st half. Introduction to warnings and instructions.

Wogalter, M. S., & Silver, N. C. (1990). Arousal strength of signal words. Forensic Reports, forthcoming.

Wogalter, M. S., Brelsford, J. W., Desaulniers, D. R., and Laughery, K. R. (in press). Consumer product warnings: The role of hazard perception. Journal of Safety Research.

Young, S. L., & Wogalter, M. S. (in press). Comprehension and memory of instruction manual warnings: Conspicuous print and pictorial icons. Human Factors.

•2nd half. *Behavioral effectiveness of Warnings and Legal adequacy*

Wogalter, M.S., Godfrey, S.S., Fontenelle, G.A., Desaulniers, D.R., Rothstein, P.R., & Laughery, K.R. (1987). Effectiveness of warnings. Human Factors, 29, 599-612.

Wogalter, M.S., Allison, S.T., & McKenna, N.A. (1989). Effects of cost and social influence on warning compliance. Human Factors, 31, 133-140.

Peters, G.A. (1989). Legal adequacy of warnings in risk information systems. Products Liability Law Journal, 1, 109-147.

October 15

•1st half. *Auditory speech displays.*

Marics, M.A., & Williges, B.H. (1988). The intelligibility of synthesized speech in data inquiry systems. Human Factors, 30, 719-732.

Herlong, D.W., & Williges, B.H. (1988). Designing speech displays for telephone information systems. Proceedings of the Human Factors Society, 32, 215-218.

Mulligan, R.M., Whitten, W.B., & Tsao, Y.C. (1988). Parameters of information-rich auditory announcements. Proceedings of the Human Factors Society, 32, 242-246.

Wogalter, M. S., & Young, S. L. (in press). Behavioural compliance to voice and print warnings. Ergonomics.

•2nd half. *Auditory alarm and directional displays.*

Sorkin, R. D., Kantowitz, B. H., & Kantowitz, S. C. (1988). Likelihood alarm displays. Human Factors, 30, 445-459.

Calhoun, G.L., Janson, W.P., & Valencia, G. (1988). Effectiveness of three-dimensional auditory directional cues. Proceedings of the Human Factors Society, 32, 68-72.

Wenzel, E.M., Wightman, F.L., & Foster, S.H. (1988). A virtual display system for conveying three-dimensional acoustic information. Proceedings of the Human Factors Society, 32, 86-90.

October 22

•1st half. *Noise.*

Sanders, M. S., & McCormick, E. J. (1987). Human factors and systems. Human factors in engineering and design (Chap. 16, pp. 456-485). New York: McGraw-Hill.

Martin, R. C., Wogalter, M. S., & Forlano, J. G. (1988). Reading comprehension performance in the presence of unattended speech and music. Journal of Memory and Language, 27, 382-398.

•2nd half. *Hearing Protection.*

Casali, J.G. & Lam, S.T. (1986) Over-the-ear industrial hearing protectors: An assessment of comfort issues. Proceedings of the Human Factors Society, 30, 1428-1432.

Casali, J.G. & Epps, B.W. (1986) Effects of user insertion/donning instructions on noise attenuation of aural insert hearing protectors. Human Factors, 28, 195-210.

Casali, J. G. & Park, M. (1990). Attenuation performance of four hearing protectors under dynamic movement and different user fitting conditions. Human Factors, 32, 9-26.

October 29

•1st half. *Population stereotypes..*

Fitts, P. M., & Seeger, C. M. (1953). S-R compatibility: Spatial characteristics of stimulus and response codes. Journal of Experimental Psychology, 46, 199-210.

Sanders, M. S., & McCormick, E. J. (1987). Human factors in engineering and design (pp. 234-243). New York: McGraw-Hill.

Smith, S.L. (1981). Exploring compatibility with words and pictures. Human Factors, 23, 305-315.

Boles, D.B. & Dewar, R. (1986). Nationality and handedness differences in stereotypes for control movements. Proceedings of the Annual Conference of the Human Factors Association of Canada.

•2nd half. *The four-burner stove problem.*

Chapanis, A., & Lindenbaum, L.E. (1959). A reaction time study of four control-display linkages. Human Factors, 1, 1-7.

Shinar, D. (1978). Control-display relationships on the four-burner range: Population stereotypes versus standards. Human Factors, 20, 13-17.

Ray, R.D., & Ray, W.D. (1979). An analysis of domestic cooker control design. Ergonomics, 22, 1243-1248.

Osborne, D.W., & Ellingstad, V.S. (1987). Using sensor lines to show control-display linkages on a four-burner stove. Proceedings of the Human Factors Society, 31, 581-584.

November 5

•1st half. *Lighting and heat/cold stress.*

Sanders, M. S., & McCormick, E. J. (1987). Illumination. Human factors in engineering and design (Chap 14, pp. 389-426). New York: McGraw-Hill.

Sanders, M. S., & McCormick, E. J. (1987). Atmospheric conditions. Human factors in engineering and design (pp. 427-455). New York: McGraw-Hill.

•2nd half. *Transportation systems*

Casey, S. M., & Lund, A. K. (1987). Three studies of driver speed adaption. Human Factors, 29, 541-550.

Cicone, M. A., & Wells, J. K. (1988). Improper shoulder belt use by Maryland drivers. Human Factors, 30, 359-366.

MacGregor, D. C., & Slovic, P. (1989). Perception of risk in automotive systems. Human Factors, 31, 377-390.

Haber, R. N. (1987). Why low-flying fighter planes crash: Perceptual and attentional factors in collisions with the ground. Human Factors, 29, 519-532.

November 12

•1st half. Keyboards.

Michaels, S.E. (1971). Qwerty versus alphabetic keyboards as a function of typing skill. Human Factors, 13, 419-426.

Norman, D.A. & Fisher, D. (1982). Why alphabetic keyboards are not easy to use: Keyboard layout doesn't much matter. Human Factors, 24, 509-519.

•2nd half. Input devices and Fitts' Law.

Karat, J., McDonald, J.E. & Anderson, M. (1986). A comparison of menu selection techniques: Touch panel, mouse and keyboard. International Journal of Man-Machine Studies, 25, 73-88.

Pisoni, D.B. (1986). A brief overview of speech synthesis and recognition technologies. Proceedings of the Human Factors Society, 30, 1326-1330.

Card, S.K., English, W.K., & Burr, B.J. (1978). Evaluation of mouse, rate-controlled isometric joystick, step keys, and text keys for text selection on a CRT. Ergonomics, 21, 601-613.

Epps, B.W. (1986). Comparison of six cursor control devices based on Fitts' Law models. Proceedings of the Human Factors Society, 30, 327-331.

Arnaut, L.Y., & Greenstein, J.S. (1987). An evaluation of display / control gain. Proceedings of the Human Factors Society, 31, 437-441.

November 19

•1st half. Making computers friendly and text editing screen characteristics

Hayes, P.J. & Reddy, D.R. (1983). Steps toward graceful interaction in spoken and written man-machine communication. International Journal of Man-Machine Studies, 19, 231-284.

Neal, A.S., & Darnell, M.J. (1984). Text-editing performance with partial-line, partial-page, and full-page displays. Human Factors, 26, 431-441.

Silver, L.D. (1985). Displays, acquisition and performance. Proceedings of the Human Factors Society, 29, 620-624.

•2nd half. *Special Issues*

Chapanis, A. (1988). Some generalizations about generalization. Human Factors, 30, 253-268.

Ballay, J. M. (1987). An experimental view of the design process. In W. B. Rouse & K. R. Boff (eds.) System Design: Behavioral Perspectives on Designers, Tools, and Organizations. Elsevier Science Publishing.

November 26

•1st half. *Video vs. paper formats and visual fatigue*

Gould, J.D., Alfaro, L., Finn, R., Haupt, B., Minuto, A., & Salaun, J. (1987). Reading from CRT displays can be as fast as reading from paper. Human Factors, 29, 497-517.

Harpster, J.L., Freivalds, A., Shulman, G.L., & Leibowitz, H.W. (1989). Visual performance on CRT screens and hard-copy displays. Human Factors, 31, 247-257.

Smith, A.B., Tanaka, S., Halperin, W., & Richards, R.D. (1984). Correlates of ocular and somatic symptoms among video display terminal users. Human Factors, 26, 143-156.

Cushman, W.H. (1986) Reading from microfiche, a VDT, and the printed page: Subjective fatigue and performance. Human Factors, 28, 63-73.

•2nd half. *Documentation.*

Shneiderman, B. (1987) Printed manuals, online help, and tutorials. In Designing the User Interface: Strategies for Effective Human-Computer Interaction (Chapt. 9). Reading, Mass: Addison-Wesley.

Wogalter, M. S., & Post, M. P. (1989). Printed computer instructions: The effects of screen pictographs and text format on task performance. Proceedings of Interface 89. Santa Monica: Human Factors Society, 133-138.

Holt, R.W., Boehm-Davis, D.A., & Schultz, A.C. (1989). Multilevel structured documentation. Human Factors, 31, 215-228.

December 3

•1st half. *Anthropometry and workstations*

Sanders, M. S., & McCormick, E. J. (1987). Human factors in engineering and design (Chap 12, pp. 331-362). New York: McGraw-Hill.

Sanders, M. S., & McCormick, E. J. (1987). Human factors in engineering and design (Chap 13, pp. 363-386). New York: McGraw-Hill.

Hill, S.G. & Kroemer, K.H.E. (1986). Preferred declination of the line of sight. Human Factors, 28, 127-134.

•2nd half. *Workstation anthropometry II.*

Shute, S.J. & Starr, S.J. (1984). Effects of adjustable furniture on VDT users. Human Factors, 26, 157-170.

Bridger, R. S. (1988). Postural adaptations to a sloping chair and work surface. Human Factors, 30, 237-247.

Povlotsky, B., & Dubrovsky, V. (1988). "Recommended" versus "preferred" in design and use of computer workstations. Proceedings of the Human Factors Society, 32, 501-505.

Cornell, P., & Kokot, D. (1988). Naturalistic observation of adjustable VDT stand usage. Proceedings of the Human Factors Society, 32, 496-500.

December 10

•1st half. *Handle anthropometry.*

Schoenmarklin, R.W., & Marras, W.S. (1989). Effects of handle angle and work orientation on hammering: I. Wrist motion and hammering performance. Human Factors, 31, 397-411.

Schoenmarklin, R.W., & Marras, W.S. (1989). Effects of handle angle and work orientation on hammering: II. Muscle fatigue and subjective ratings of body discomfort. Human Factors, 31, 413-420.

•2nd half. *Pedal anthropometry*

Morrison, R.W., Swope, J.G. & Halcomb, C.G. (1986) Movement time and brake pedal placement. Human Factors, 28, 241-246.

Rogers, S. B., & Wierwille, W. W. (1988). The occurrence of accelerator and brake pedal actuation errors during simulated driving. Human Factors, 30, 71-81.

Schmidt, R.A. (1989). Unintended acceleration: A review of human factors contributions. Human Factors, 31, 345-364.