

PROJECT ADMINISTRATION DATA SHEET

ORIGINAL REVISION NO. _____

Project No. / (Center No.) G-42-628 R6165-1A0 GTRC/~~GTR~~ DATE 5 / 1 / 87

Project Director: Dr. Timothy A. Salthouse School/~~XXX~~ Psychology

Sponsor: DHHS/PHS/NIH/National Institute on Aging

Agreement No.: Grant No. 5 K04 AG00372-05

Award Period: From 5/1/87 To 4/30/88 (Performance) 7/31/88 Reports

Sponsor Amount: New With This Change Total to Date

Contract Value: \$ _____ \$ 53,395

Funded: \$ _____ \$ 53,395

Cost Sharing No. / (Center No.) G-42-321 / (F6165-1A0) Cost Sharing: \$ 2,095

Title: Processing Rate and Adult Age Differences in Cognition

ADMINISTRATIVE DATA OCA Contact E. Faith Gleason x4-4820

1) Sponsor Technical Contact: Richard L. Sprott, PH.D

Assoc. Director for Biomedical Research & Clinical Medicine

National Institute on Aging

9000 Rockville Pike

Bethesda, MD 20892

Military Security Classification: N/A

(or) Company/Industrial Proprietary: _____

2) Sponsor Issuing Office: Carol L. Tippery

Grants Management Officer

National Institute on Aging

Building 31, Room 5C39

9000 Rockville Pike

Bethesda, MD 20892

ONR Resident Rep. is ACO: _____ Yes No

Defense Priority Rating: _____

RESTRICTIONS

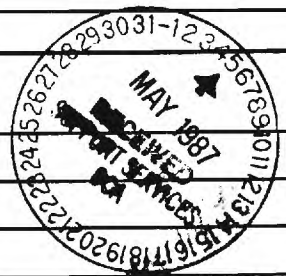
See Attached NIH Supplemental Information Sheet for Additional Requirements.

Travel: Foreign travel must have prior approval — Contact OCA in each case. Domestic travel requires sponsor

approval where total will exceed greater of \$500 or 125% of approved proposal budget category.

Equipment: Title vests with GIT, however none proposed nor authorized

COMMENTS:



COPIES TO: _____ SPONSOR'S I.D. NO. 02.108.001.87.023

Project Director
Research Administrative Network
Research Security Management

Procurement/GTRI Supply Services
Research Security Services

GTRC
Library

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

NOTICE OF PROJECT CLOSEOUT

Date 6/27/89

Project No. G-42-628

Center No. R6165-1A0

Project Director T. A. Salthouse

School/Lab Psych.

Sponsor DHHS/PHS/NIH/ National Institute on Aging

Contract/Grant No. 5K04 AG00372-05

GTRC XX GIT

Prime Contract No.

Title Processing Rate and Adult Age Differences in Cognition

Effective Completion Date 4/30/88 (Performance) 7/31/88 (Reports)

Closeout Actions Required:

- None
- Final Invoice or Copy of Last Invoice
- Final Report of Inventions and/or Subcontracts-Questionnaire sent to P/I
- Government Property Inventory & Related Certificate
- Classified Material Certificate
- Release and Assignment
- Other

Includes Subproject No(s).

Subproject Under Main Project No.

Continues Project No. G-42-620

Continued by Project No.

Distribution:

- | | |
|---|---|
| <input type="checkbox"/> Project Director | <input checked="" type="checkbox"/> Reports Coordinator (OCA) |
| <input type="checkbox"/> Administrative Network | <input checked="" type="checkbox"/> GTRC |
| <input type="checkbox"/> Accounting | <input checked="" type="checkbox"/> Project File |
| <input type="checkbox"/> Procurement/GTRI Supply Services | <input checked="" type="checkbox"/> Contract Support Division (OCA) |
| <input type="checkbox"/> Research Property Management | <input type="checkbox"/> Other <u> </u> |
| <input type="checkbox"/> Research Security Services | |

Final Report
NIA AG00146
"Processing Rate and Adult Age Differences in Cognition"
Timothy A. Salthouse

The major goal of the research conducted during this project was to investigate the influence of an age-related reduction in the rate of processing information on age differences in measures of cognitive functioning. Both the causes and the consequences of age-related slowing were to be examined because it is arguably the most reliable phenomenon in the literature in behavioral gerontology.

One important discovery, documented in the initial application and extended since then in several of my publications and in the research of others, is the support for the generalized slowing phenomenon in the form of nearly linear relations between the speeds of young and old adults. The causes of this nearly proportional slowing have not yet been determined, although several hypotheses such as different speed-accuracy tradeoffs and age-related increase in neural noise have been investigated. A relatively simple computer simulation program was constructed to explore the consequences at progressively more complex levels of changes in elementary aspects of processing, such as a slower rate of sending information from one unit to the next. The results of this project were consistent with the proportional slowing phenomenon, and motivated large-scale correlational analyses of the interrelations among age, measures of processing speed, and measures of a variety of types of cognitive functioning. Although this research has yielded interesting results, the difficulty of obtaining direct evidence of the mechanisms by which slower processing contributed to qualitative differences in cognition has led to a shift in focus to working memory as a possible mediator of age differences in cognition. This line of investigation is currently being pursued.

Another area of current research which evolved from research conducted during the grant period concerns the effects of extensive experience on age differences in cognition. The major project on this topic, investigating age and experience effects in transcription typing, revealed that skilled older typists can maintain high levels of proficiency despite slower perceptual-motor performance than equally skilled young typists. This is an important finding because it implies that the consequences of age-related slowing on higher-level functioning may be minimal when individuals are highly experienced in the relevant activities.

During the period of the Research Career Development Award additional funds were provided from three NIA grants, and a grant of \$33,000 from the University of Missouri. Products resulting from research during this period resulted in the publication (between the years 1984 and 1988 inclusive), of one book, 9 book chapters, and 21 articles in refereed journals, as well as 33 presentations to scientific audiences.

Documentation of Research Activity

(RESEARCH GRANTS)

"Maintenance of Typing Skill in Adulthood", Research grant from the National Institute on Aging (AG 04226), 7/1/84-6/30/86.

"Cross-Sectional Assessment of Cognitive Abilities Across the Adult Lifespan", Research grant from the University of Missouri Weldon Spring Research Fund, 1985-1986. (With D.H. Kausler).

"Adult Age Differences in Reasoning and Spatial Abilities", Research grant from the National Institute on Aging (AG 06826), 8/1/86-7/31/89.

"Effects of Age on Spatial Abilities Among Engineers", Research grant from the National Institute on Aging (AG 06858), 6/1/87-5/31/90.

(BOOK)

Salthouse, T.A. (1985). A Theory of Cognitive Aging. Amsterdam: North-Holland.

(CHAPTERS)

Salthouse, T.A. (1985) Speed of behavior and its implications for cognition. In J.E. Birren & K.W. Schaie (Eds.), Handbook of the Psychology of Aging. (2nd Ed.), New York: Van Nostrand Reinhold.

Salthouse, T.A. & Kausler, D.H. (1985). Memory methodology in maturity. In C.J. Brainerd & M. Pressley (Eds.), Basic Processes in Memory Development. New York: Springer-Verlag.

Salthouse, T.A. (1986). Functional age: Examination of a concept. In J.E. Birren, P.K. Robinson, & J. Livingston (Eds.), Age, Health, and Employment. New York: Prentice-Hall.

Salthouse, T.A. (1987). Age, experience, and compensation. In C. Schooler & K.W. Schaie (Eds.), Cognitive Functioning and Social Structures over the Life Course. Norwood, N.J.: Ablex.

Salthouse, T.A. (1988). Cognitive aspects of motor functioning. In J.A. Joseph (Ed.), Central Determinants of Age-Related Declines in Motor Function. New York: Annals of the New York Academy of Sciences, Vol. 515.

Salthouse, T.A. (1988). The role of experience in cognitive aging. In K.W. Schaie (Ed.), Annual Review of Gerontology, Vol. 7. New York: Springer.

Salthouse, T.A. (1988). The role of processing resources in cognitive aging. In M.L. Howe & C.J. Brainerd (Eds.), Cognitive Development in Adulthood. New York: Springer-Verlag.

Salthouse, T.A. (1988). Training = Controlled Social Structure? Comments on Willis' Paper. In K.W. Schaie & C. Schooler (Eds.), Social Structure and Aging: Psychological Processes. Hillsdale, N.J.: Erlbaum.

Salthouse, T.A. (1988). Effects of aging on verbal abilities: An examination of the psychometric literature. In L.L. Light & D.M. Burke (Eds.), Language and Memory in Old Age. New York: Cambridge University Press.

(ARTICLES)

Salthouse, T.A. (1984-February). The skill of typing. Scientific American, 250, 128-135.

Salthouse, T.A. (1984). Effects of age and skill in typing. Journal of Experimental Psychology: General, 113, 345-371.

Salthouse, T.A., Rogan, J.D., & Prill, K.A. (1984). Division of attention: Age differences on a visually presented memory task. Memory & Cognition, 12, 613-620.

Salthouse, T.A. (1985). Anticipatory processing in transcription typing. Journal of Applied Psychology, 70, 264-271.

Salthouse, T.A. & Lichty, W. (1985). Tests of the neural noise hypothesis of age-related cognitive change. Journal of Gerontology, 40, 443-450.

Salthouse, T.A. (1986). Perceptual, cognitive, and motoric aspects of transcription typing. Psychological Bulletin, 99, 303-319.

Salthouse, T.A. (1986). Effects of practice on a typing-like keying task. Acta Psychologica, 62, 189-198.

Salthouse, T.A., Kausler, D.H., & Saults, J.S. (1986). Groups versus individuals as the comparison unit in cognitive aging research. Developmental Neuropsychology, 2, 363-372.

Salthouse, T.A. & Prill, K.A. (1987). Inferences about age impairments in inferential reasoning. Psychology and Aging, 2, 43-51.

Salthouse, T.A. & Saults, J.S. (1987). Multiple spans in transcription typing. Journal of Applied Psychology, 22, 187-196.

Salthouse, T.A. (1987). Adult age differences in integrative spatial ability. Psychology and Aging, 2, 254-260.

Salthouse, T.A. (1987). Sources of age-related individual differences in block design tasks. Intelligence, 11, 245-262.

Salthouse, T.A. (1987). The role of representations in age differences in analogical reasoning. Psychology and Aging, 2, 357-362.

Salthouse, T.A. (1988). Initializing the formalization of theories of cognitive aging. Psychology and Aging, 3, 3-16.

Salthouse, T.A., Kausler, D.H., & Saults, J.S. (1988). Investigation of student status, background variables, and the feasibility of standard tasks in cognitive aging research. Psychology and Aging, 3, 29-37.

Salthouse, T.A. & Prill, K.A. (1988). Effects of aging on perceptual closure. American Journal of Psychology, 101, 217-238.

Kausler, D.H., Salthouse, T.A., & Saults, J.S. (1988). Temporal memory over the adult lifespan. American Journal of Psychology, 101, 207-215.

Kausler, D.H., Salthouse, T.A., & Saults, J.S. (1988). Frequency-of-occurrence memory over the adult lifespan. Experimental Aging Research, 13, 159-161.

Salthouse, T.A., Kausler, D.H., & Saults, J.S. (1988). Utilization of path analytic procedures to investigate the role of processing resources in cognitive aging. Psychology and Aging, 3, 158-166.

Salthouse, T.A. (1988). Resource-reduction interpretations of cognitive aging. Developmental Review, 8, 238-272.

Salthouse, T.A. (1988). The complexity of age X complexity functions: Comment on Charness and Campbell. Journal of Experimental Psychology: General, 117, 425-428.

PAPER PRESENTATIONS:

Salthouse, T.A. Transcription typing: A case study in age and expertise. International Society for the Study of Behavioural Development Meetings. Tours, France, July, 1985.

Salthouse, T.A. Age and skill interactions in the domain of typing. American Psychological Association Convention, Los Angeles, California. August, 1985.

Salthouse, T.A. & Prill, K. Age-related effects on perceptual closure. Gerontological Society Meetings. New Orleans, Louisiana, November, 1985.

Salthouse, T.A. Inferences about age effects in inferential reasoning. American Psychological Association Convention, Washington, D.C., August, 1986.

Salthouse, T.A. Representational factors contributing to age differences in geometrical analogy tasks. Psychonomic Society Meetings, New Orleans, Louisiana, November, 1986.

Salthouse, T.A. Sources of age differences in block design tasks. Gerontological Society Meetings, Chicago, Illinois, November, 1986.

Salthouse, T.A. Theoretical issues in aging and spatial cognition. Cognitive Aging Conference, Atlanta, Georgia, May, 1987.

Salthouse, T.A. Effects of aging on spatial memory. International Society for the Study of Behavioural Development. Tokyo, Japan, July, 1987.

Salthouse, T.A. New directions or old cul-de-sacs? Discussant comments on a symposium titled "Older but Wiser: New Directions in Life-Span Concepts of Cognition." International Society for the Study of Behavioural Development. Tokyo, Japan, July, 1987.

Salthouse, T.A. Aging effects in mental synthesis. Psychonomic Society Meetings, Seattle, WA., November, 1987.

Salthouse, T.A. Attention as a processing resource. Aging and Attention Workshop, Bethesda, MD., November, 1987.

Salthouse, T.A. Analyses of skilled action. International Congress of Psychology, Sydney, Australia, September, 1988.

Babcock, R.L., & Salthouse, T.A. Age effects in primary and working memory. Gerontological Society Meetings, San Francisco, California, November, 1988.

INVITED ADDRESSES:

"Progress report on the processing rate theory of cognitive aging", **Midwestern Psychological Association**. Chicago, Illinois, May, 1984.

"Speculations on the what, when, and why of mental aging", **American Psychological Association**. Toronto, Canada, August, 1984.

"Age, experience, and compensation", **Workshop in Intellectual Functioning, Social Structures, and Aging**. National Institute on Aging, Bethesda, Maryland, September, 1984.

"The role of experience in cognitive aging", **Max Planck Institute for Human Development and Education**, Berlin, May, 1985. **University of Erlangen**, Erlangen, West Germany, May, 1985.

"When does experience compensate for age?" **University of Waterloo**. Waterloo, Ontario, April, 1986.

"Cognitive aspects of motor functioning." **New York Academy of Sciences Conference on "Central Determinants of Age-Related Declines in Motor Function."** Rye, New York, October, 1986.

"Training = Controlled social structure? Comments on Willis' Paper." **Penn State Conference on Social Structure and the Psychological Aging Processes**. University Park, Pennsylvania, October, 1986.

"Effects of aging and expertise in cognitive functioning." **Georgia Consortium on the Psychology of Aging**, University of Georgia, Athens, Georgia, November, 1986.

"Do cognitive resources decline with age?" **Department of Psychology, University of Toronto**, Toronto, Ontario, January, 1987.

"Does experience compensate for age?" **Programme in Gerontology, University of Toronto**, Toronto, Ontario, January, 1987.

"Interactive effects of age and experience in cognitive functioning." **Department of Psychology, Emory University**, Atlanta, Georgia, February, 1987.

"Is functional age functional?" **APA Division 21 Mid-Year Symposium**. Washington, D.C., March, 1987.

"The status of a working-memory processing resource in cognitive aging." **Department of Psychology, University of Victoria**, Victoria, British Columbia, November, 1987.

"Aging Cognition", **COSALS Faculty Lecture**, Georgia Institute of Technology, Atlanta, Georgia, April, 1988.

"Coping with too many resources: Usage of processing resources concepts in cognitive aging." **Second Cognitive Aging Conference**, Atlanta, Georgia, April, 1988.

"An overview of cognitive aging." **Summer Institute in Developmental Psychology**, Schloss Reisenburg, Gunzburg, West Germany, July, 1988.

"Changes in Basic Cognitive Processes." **Master Lecture Series**, American Psychological Association Convention, Atlanta, Georgia, August, 1988.

"Interrelations of Age and Experience." **Institute of Gerontology, University of Michigan**, Ann Arbor, Michigan, September, 1988. **Department of Psychology, Washington University**, St. Louis, Missouri, October, 1988.