

CURRICULUM VITAE
Nelson Cowan

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Current Position: Curators' Professor, University of Missouri, Columbia

Research Specializations:

1. *Short-term or working memory*, including sensory and abstract components
2. *Childhood development* of short-term or working memory
3. Relations between *working memory and selective attention* in information processing

Teaching Specializations:

Cognition, Memory, Perception, Information Processing, and Cognitive Development

Biography: Born March 7, 1951, Washington, D.C. Married, 1 child, 2 stepchildren

Education:

Ph.D. 1980, University of Wisconsin, Madison (Psychology)
M.S. 1977, University of Wisconsin, Madison (Psychology)
B.S. 1973, University of Michigan, Ann Arbor (Independent Major, Neurosciences)

Doctoral Thesis: Toward an understanding of morphological segmentation in unfamiliar languages. *Dissertation Abstracts International*, 42, 398-B. Advisor: Philip A. Morse.

Professional Experience:

Current Position: Curators' Professor, University of Missouri, Department of Psychology (distinguished professor status).
2005- Director, Cognition & Neuroscience Training Area, Dept. of Psychological Sciences
1995-2000: Middlebush Professor of the Social Sciences, University of Missouri (honorific title to 1 professor every 5 years on the basis of research and teaching accomplishments.)

1994- : Professor, Department of Psychology, University of Missouri
2003, May: Visiting research scientist, Institute for Psychology, Budapest, Hungary
2000, Sept - Dec: Benjamin Meaker Visiting Professor, Institute for Advanced Studies,
University of Bristol, United Kingdom.
1999, August: Distinguished Visitor, University of Western Australia
1999, May: Visiting research scientist, University of Leipzig, Germany
1994-96: Director, Experimental Training Area, Dept. of Psychology
1991: Visiting Research Scientist (March through May), Psychology Department, University
of Helsinki, Finland (Collaboration with Risto Näätänen)
1989-94: Associate Professor, Dept. of Psychology, University of Missouri
1985-89: Assistant Professor, Psychology Department, University of Missouri
1982-85: Assistant Professor, Psychology Department, University of Massachusetts at
Amherst
1981-82: Postdoctoral Fellow, Psychology Department, New York University
Sponsor: Martin D.S. Braine

Honors and Awards:

Curator's Professor, University of Missouri. Appointment beginning Sept., 2004.
Doctor of Philosophy honoris causa (honorary Doctorate), University of Helsinki (Nov. 22,
2002; conferred June 6, 2003)
Charter Fellow, American Psychological Society, 1998
Fellow, American Psychological Association, 1999
Fellow, American Psychological Association, Division 3 (Experimental Psychology), 1998
Chancellor's Award for Outstanding Faculty Research and Creative Activity in the Behavioral
and Social Sciences, University of Missouri (1998)
Middlebush Professor of the Social Sciences, University of Missouri (1995-)
(Awarded to 1 professor at MU every 5 years, for research and teaching quality) (above)
Golden Chalk Award, for graduate teaching and education, University of Missouri (1999)
Editor's Award (with R. Gillam & J. Marler), American Speech, Language, and Hearing
Association, 1999, for Gillam et al. (1998)
Distinguished visiting professorships, Univ. of Bristol and Univ. of Western Australia (above)
New Investigator Research Award (1984)
Phi Kappa Phi Honor Society, University of Wisconsin Chapter
Sigma Xi, The Scientific Research Society
Sloan Scholar, University of Michigan, 1969-1973

Editorial and Professional Activities:

Associate Editor, *European Journal of Cognitive Psychology*, 2005 – 2008
Associate Editor, *Quarterly Journal of Experimental Psychology (A)*, 2001 - 2004
Associate Editor, *Journal of Experimental Psychology: Learning, Memory, and Cognition*,
1995-1999
Section Editor (Experimental Psychology), UNESCO, *Encyclopedia of Life-Support Systems*
Elected Member at Large, Executive Committee of Division 3 of the American Psychological
Association (2004-2007)
Program Committee, Chair of Cognitive Section, Midwestern Psychological Association,
1998 - 2000
Program Committee, Chair of Cognitive Section, American Psychological Society, 1999 -
2001
Program Committee, Chair of Division 3 (Experimental), American Psychological
Association, 2003 Meeting

Scientific Program Committee Member for the Second International Conference on Working Memory (ICWM-2), Kyoto, Japan, 2004.

Editorial Board Member (sometimes called Consulting Editor) for the following journals:

Journal of Experimental Child Psychology, 1999 -

Cognitive Development, 2000 -

Interpreting, 2000 -

Psychological Research, 1998 -

Psyche (a web journal), 1998 -

Journal of Experimental Psychology: Learning, Memory, & Cognition, 1993 - 1994

Psychonomic Bulletin & Review, 1993 – 1994 and 2003 -

Memory & Cognition, 2002 –

Canadian Journal of Experimental Psychology, 2005 - 2008

Scientific Advisory Committee Member for NIH center grant, Albert Einstein College of Medicine, "Clinical research center for communicative disorders," 1997 -

Consultant, NIH Grant to Daniel C. Javitt, "Early cortical processing dysfunction in schizophrenia." 1997-

Grant reviewing: Guest reviewer for NIH (1998, NIDCD, Communication Sciences), NIMH (Cognition, Emotion, & Personality Study Section); ad hoc grant reviewer for NSF, NIMH, The Air Force Office of Scientific Research, and the James S. McDonnell Foundation.

Recently, NIH BBBP-4 Study Section guest reviewer (February, 2002). Have served as a reviewer for British, Australian, and European granting agencies also.

Society Memberships:

Society for Research in Child Development (SRCD)

Midwestern Psychological Association (MPA) (Area Representative, 1992-2000)

American Psychological Society (APS, Charter Fellow)

American Psychological Association (APA, Fellow)

Psychonomic Society

Extramural Grant Awards:

Current funding:

Cowan, N., P.I. NIH R01 Award, NICHD, 2 R01 HD21338-15A1. Competing continuation, *The development of short-term memory for speech attributes..* 7/1/01 - 6/30/06.

Prior funding:

Cowan, N., P.I. (with co-PIs Scott Saults & Kenneth Sher). *Effects of acute alcohol intoxication on working-memory capacities of the focus of attention.* Alcoholic Beverage Medical Research Foundation, 6/1/03 – 5/31/05.

Preceptor for Hagglund, K., P.I., *The Missouri rehabilitation research training program.* NIH, 7/1/00 - 6/30/05.

Collaborator for Towse, J., P.I. (2003). *Response timing in children's working memory.* Economic and Social Research Council (ESRC), 11/6/03 – 11/5/04.

Cowan, N. Benjamin Meaker Fellowship, University of Bristol, United Kingdom, 9/00 – 12/00.

Cowan, N., P.I., NIH R01 Award (NICHD, R01 HD21338, Competing continuation, *The development of short-term memory for speech attributes.*). 8/1/96-7/31/2000.

Cowan, N., P.I., NIH R01 Award (Competing continuation, *The development of memory*

for speech.): 7/6/92-7/31/96.

Cowan, N., P.I., NIH R01 Award, 4/1/88-3/31/92, *The development of memory for speech.*

Cowan, N., P.I., NIH New Investigator Research Award, 6/01/84-5/31/87, *Memory for speech in preschool children.*

Associate Investigator: M.T. Maybery (Chief Investigator), D.M. Jones, & N. Cowan, *Working memory: Fundamental processes common to the verbal and spatial modalities?* Australian Research Council Grant, for 1999.

Sponsor for Ron Gillam, NIH/CIDA Clinical Investigator Development Award, 7/1/91-6/30/96, *Modality specific memory mechanisms in SLI [specifically language-impaired] children.*

Cowan, N. Postdoctoral Fellowship, NIMH, 1/22/81-9/1/82. *Memory factors in children's word order comprehension.* Sponsor: Martin D. S. Braine, New York University.

Books:

Cowan, N. (in press). *Working memory capacity.* Hove, East Sussex, UK: Psychology Press.

Cowan, N. (ed.) (1997). *The development of memory in childhood.* Hove, East Sussex, UK: Psychology Press. (Paperback edition: 1997)

Cowan, N. (1995). *Attention and memory: An integrated framework.* Oxford Psychology Series, No. 26. New York: Oxford University Press. (Paperback edition: 1997)

Journal Articles (116) and Book Chapters (28):

Cowan, N., Fristoe, N.M., Elliott, E.M., Brunner, R.P., & Saults, J.S. (in press). Scope of attention, control of attention, and intelligence in children and adults. *Memory & Cognition.*

Cowan, N., Kane, M.J., Conway, A.R.A., & Ispa-Cowan, A.J. (accepted for publication). Stupid brain! Homer's working memory odyssey. In A. Brown, *D'oh: The psychology of the Simpsons.* Dallas: BenBella Books.

Cowan, N., Morey, C.C., Chen, Z., & Bunting, M.F. (accepted for publication). What do estimates of working memory capacity tell us? In N. Osaka, R. Logie, & M. D'Esposito (eds.), *Working memory: Behavioural and neural correlates.* Oxford, U.K.: Oxford University Press.

Cowan, N., Naveh-Benjamin, M., Kilb, A., & Saults, J.S. (in press). Life-Span development of visual working memory: When is feature binding difficult? *Developmental Psychology.*

Chen, Z., & Cowan, N. (in press). Chunk limits and length limits in immediate recall: A reconciliation. *Journal of Experimental Psychology: Learning, Memory, and Cognition.*

Cowan, N., Elliott, E.M., Saults, J.S., Nugent, L.D., Bomb, P., & Hismjatullina, A. (in press). Rethinking speed theories of cognitive development: Increasing the rate of recall without affecting accuracy. *Psychological Science.*

- Cowan, N., Elliott, E.M., Saults, J.S., Morey, C.C., Mattox, S., Hismjatullina, A., & Conway, A.R.A. (2005). On the capacity of attention: Its estimation and its role in working memory and cognitive aptitudes. *Cognitive Psychology*, *51*, 42-100.
- Cowan, N. (in press). Within fluid cognition: Fluid processing and fluid storage? *Behavioral and Brain Sciences*. Commentary on C. Blair target article.
- Cowan, N., Morey, C.C., & Chen, Z. (in press). The legend of the magical number seven. In S. Della Sala (Ed.), *Tall tales about the brain: Things we think we know about the mind, but ain't so*. Oxford University Press.
- Elliott, E.M., Barrilleaux, K.M., & Cowan, N. (in press). Individual differences in the ability to avoid distracting sounds. *European Journal of Cognitive Psychology*.
- Cowan, N., Johnson, T.D., & Saults, J.S. (2005). Capacity limits in list item recognition: Evidence from proactive interference. *Memory*, *13*, 293-299.
- Yiend, J., Mathews, A., & Cowan, N. (2005). Selective attention tasks in clinical and cognitive research. In A. Wenzel and D.C. Rubin (eds.), *Cognitive methods and their application to clinical research*. Washington, D.C.: APA Books. (pp. 65 – 71)
- Cowan, N. (2005). Selective attention tasks in cognitive research. In A. Wenzel and D.C. Rubin (eds.), *Cognitive methods and their application to clinical research*. Washington, D.C.: APA Books. (pp. 73 – 96)
- Morey, C.C., & Cowan, N. (2005). When do visual and verbal memories conflict? The importance of working-memory load and retrieval. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *31*, 703-713.
- Bunting, M.F., & Cowan, N. (2005). Working memory and flexibility in awareness and attention. *Psychological Research*, *69*, 412-419.
- Elliott, E.M., & Cowan, N. (in press). Coherence of the irrelevant-sound effect: Individual profiles of short-term memory and susceptibility to task-irrelevant materials. *Memory & Cognition*.
- Jarrold, C., Cowan, N., Hewes, A.K., & Riby, D.M. (2004). Speech timing and verbal short-term memory: Evidence for contrasting deficits in Down syndrome and Williams syndrome. *Journal of Memory and Language*, *51*, 365-380.
- Cowan, N. (2005). Understanding intelligence: A summary and an adjustable-attention hypothesis. In O. Wilhelm & R.W. Engle (Eds.), *Handbook of understanding and measuring intelligence*. London: Sage. (pp. 469-488)
- Cowan, N., Beschin, N., & Della Sala, S. (2004). Verbal recall in amnesiacs under conditions of diminished retroactive interference. *Brain*, *127*, 825-834.
- Cowan, N., Saults, J.S., & Brown, G.D.A. (2004). On the auditory modality superiority effect in serial recall: Separating input and output factors. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *30*, 639-644.
- Winkler, I., & Cowan, N. (2005). From sensory to long term memory: Evidence from

- auditory memory reactivation studies. *Experimental Psychology*, 52, 3-20.
- Rouder, J.N., Morey, R.D., Cowan, N., & Pfaltz, M. (2004). Learning in a unidimensional absolute identification task. *Psychonomic Bulletin & Review*, 11, 938-944.
- Cowan, N., Chen, Z., & Rouder, J.N. (2004). Constant capacity in an immediate serial-recall task: A logical sequel to Miller (1956). *Psychological Science*, 15, 634-640.
- Towse, J., & Cowan, N. (2005). Working memory and its relevance for cognitive development. In W. Schneider, R. Schumann-Hengsteler, & B. Sodian (eds.), *Young children's cognitive development: Interrelationships among executive functioning, working memory, verbal ability, and theory of mind*. Mahwah, NJ: Erlbaum. (pp. 9-37)
- Cowan, N. (2005). Working-memory capacity limits in a theoretical context. In C. Izawa & N. Ohta (eds.), *Human learning and memory: Advances In theory and applications. The 4th Tsukuba international conference on memory*. Erlbaum. (pp. 155-175)
- Morey, C.C., & Cowan, N. (2004). When visual and verbal memories compete: Evidence of cross-domain limits in working memory. *Psychonomic Bulletin & Review*, 11, 296-301.
- Cowan, N. (2004). On the psychophysics of memory. In C. Kaernbach, E. Schröger, & H. Müller (eds.), *Psychophysics beyond sensation: Laws and invariants of human cognition*. Scientific Psychology Series. Mahwah, NJ: Erlbaum. (pp. 313-317)
- Della Sala, S., Cowan, N., Beschin, N., & Perini, M. (2005). Just lying there, remembering: Improving recall of prose in amnesic patients with mild cognitive impairment by minimizing interference. *Memory*, 13, 435-440.
- Cowan, N. (2003). Varieties of procedural accounts of working memory retention systems. *Behavioral and Brain Sciences*, 26, 731-732. (Commentary on target article by Ruchkin et al.)
- Cowan, N., Towse, J.N., Hamilton, Z., Saults, J.S., Elliott, E.M., Lacey, J.F., Moreno, M.V., & Hitch, G.J. (2003). Children's working-memory processes: A response-timing analysis. *Journal of Experimental Psychology: General*, 132, 113-132.
- Cowan, N. (2003). Comparisons of developmental modeling frameworks and levels of analysis in cognition: Connectionist and dynamic systems theories deserve attention, but don't yet explain attention. In J.P. Spencer & E. Thelen (Eds.) (2002). Connectionism and dynamic systems approaches to development. [Special issue] *Developmental Science*, 6, 440-447.
- Cowan, N. (2003). Preserving the spirit and respect of academia through traditions. *APS Observer*, 16, 10. (American Psychological Society)
- Gardiner, J.M., & Cowan, N. (2003). Modality effects. In J.H. Byrne, H. Eichenbaum, H. Roediger III, & R.F. Thompson (eds.), *Learning and Memory*. (2nd edition). New York, NY: Macmillan. (pp. 397-400)
- Cowan, N., Baddeley, A.D., Elliott, E.M., & Norris, J. (2003). List composition and the word length effect in immediate recall: A comparison of localist and globalist assumptions. *Psychonomic Bulletin & Review*, 10, 74-79.

- Crowder, R.G., & Cowan, N. (2003). Sensory memory. Revision by N. Cowan of first-edition entry by Robert G. Crowder. In J.H. Byrne, H. Eichenbaum, H. Roediger III, & R.F. Thompson (eds.), *Learning and Memory*. (2nd edition). Macmillan. (pp. 607-609)
- Cowan, N. (2002). Childhood development of working memory: An examination of two basic parameters. In P. Graf and N. Ohta, *Lifespan development of human memory*. Cambridge, MA: MIT Press. (pp. 39 – 57)
- Winkler, I., Korzyukov, O., Gumenyuk, V., Cowan, N., Linkenkaer-Hansen, K., Ilmoniemi, R.J., Alho, K., & Näätänen, R. (2002). Temporary and longer term retention of acoustic information. *Psychophysiology*, *39*, 530-534.
- Cowan, N. (2002). Experimental psychology and its implications for human development. *Encyclopedia of Life Support Systems* (EOLSS). Oxford, U.K. [<http://www.eolss.net>]
- Conway, A.R.A., Cowan, N., Bunting, M.F., Theriault, D.J., & Minkoff, S.R.B. (2002). A latent variable analysis of working memory capacity, short-term memory capacity, processing speed, and general fluid intelligence. *Intelligence*, *30*, 163-183.
- Cowan, N., Elliott, E.M., & Saults, J.S.. (2002). The search for what is fundamental in the development of working memory. In R. Kail & H. Reese (Eds.), *Advances in Child Development and Behavior*, *29*, 1-49.
- Cowan, N., Saults, J.S., Elliott, E.M., & Moreno, M. (2002). Deconfounding serial recall. *Journal of Memory and Language*, *46*, 153-177.
- Cowan, N. (2001). The magical number 4 in short-term memory: A reconsideration of mental storage capacity. *Behavioral and Brain Sciences*, *24*, 87-185.
- Included in the above: Cowan, N. (2001). Metatheory of storage capacity limits. *Behavioral and Brain Sciences*, *24*, 154-176. (Reply to commentaries)
- Elliott, E.M., & Cowan, N. (2001). Habituation to auditory distractors in a cross-modal, color-word interference task. *Journal of Experimental Psychology: Learning, Memory, & Cognition*, *27*, 654-667.
- Conway, A.R.A., Cowan, N., & Bunting, M.F. (2001). The cocktail party phenomenon revisited: The importance of working memory capacity. *Psychonomic Bulletin & Review*, *8*, 331-335. [Reprinted in B. Robinson-Riegler & G. Robinson-Riegler (Eds.) (2004). *Readings in Cognitive Psychology: Applications, Connections, and Individual Differences*. Boston: Pearson Education, Inc.]
- Cowan, N., Saults, S., & Nugent, L. (2001). The ravages of absolute and relative amounts of time on memory. In H.L. Roediger III, J.S. Nairne, I. Neath, & A. Surprenant (eds.), *The nature of remembering: Essays in honor of Robert G. Crowder*. Washington, D.C.: American Psychological Association. (pp. 315 - 330)
- Winkler, I., Schröger, E., & Cowan, N. (2001). The role of large-scale memory organization in the mismatch negativity event-related brain potential. *Journal of Cognitive Neuroscience*, *13*, 59-71.

- Cowan, N. (2000/01). Processing limits of selective attention and working memory: Potential implications for interpreting. *Interpreting*, 5, 117-146.
- Gomes, H., Molholm, S., Ritter, W., Kurtzberg, D., Cowan, N., & Vaughan, Jr., H.G. (2000). Mismatch negativity in children and adults, and effects of an attended task. *Psychophysiology*, 37, 807-816.
- Cowan, N., Rouder, J.N., & Stadler, M.A. (2000). Conjuring a work from the dream time of cognitive psychology. *American Journal of Psychology*, 113, 639-671.
- Cowan, N. (2000). Childhood development of some basic parameters of working memory. In E. Schröger, A. Mecklinger, & A.D. Friederici (eds.), *Working on working memory*. Leipzig Series in Cognitive Sciences 1. Leipzig: Leipziger Universitätsverlag.
- Cowan, N., Nugent, L.D., Elliott, E.M., & Sauls, J.S. (2000). Persistence of memory for ignored lists of digits: Areas of developmental constancy and change. *Journal of Experimental Child Psychology*, 76, 151-172.
- Gomes, H., Molholm, Christodoulou, C., Ritter, W. & Cowan, N. (2000). The development of auditory attention in children. *Frontiers in Bioscience*, 5, d108-120.
- Cowan, N., Nugent, L.D., Elliott, E.M., and Geer, T. (2000). Is there a temporal basis of the word length effect? A response to Service (1998). *Quarterly Journal of Experimental Psychology*, 53A, 647-660.
- Cowan, N., Nugent, L.D., & Elliott, E.M. (2000). Memory-search and rehearsal processes and the word length effect in immediate recall: A synthesis in reply to Service. *Quarterly Journal of Experimental Psychology*, 53A, 666-670.
- Brunner, R., & Cowan, N. (2000). The role of attention in the development of working memory. *McNair Journal*, Fall, 2000.
- Cowan, N., Sauls, J.S., Nugent, L.D., & Elliott, E.M. (1999). The microanalysis of memory span and its development in childhood. *International Journal of Psychology*, 34, 353-358. (Special Quebec Memory Conference issue)
- Cowan, N. (1999). An embedded-processes model of working memory. In A. Miyake & P. Shah (eds.), *Models of Working Memory: Mechanisms of active maintenance and executive control*. Cambridge, U.K.: Cambridge University Press. (pp. 62-101)
- Rinne, T., Gratton, G., Fabiani, M., Cowan, N., Maclin, E., Stinard, A., Sinkkonen, J., Alho, K., & Näätänen, R. (1999). Scalp-recorded optical signals make sound processing in the auditory cortex visible. *Neuroimage*, 10, 620-624.
- Ritter, W., Sussman, E., Deacon, D., Cowan, N., & Vaughan, H.G. (1999). Two cognitive systems simultaneously prepared for opposite events. *Psychophysiology*, 36, 835-838.
- Cowan, N. (1999). The differential maturation of two processing rates related to digit span. *Journal of Experimental Child Psychology*, 72, 193-209.
- Hulme, C., Newton, P., Cowan, N., Stuart, G., & Brown, G. (1999). Think before you speak: pause, memory search and trace reintegration processes in verbal memory span. *Journal*

- of Experimental Psychology: Learning, Memory, and Cognition*, 25, 447-463.
- Mueser, P.R., Cowan, N., & Mueser, K.T. (1999). A generalized signal detection model to explain rational variation in base rate use. *Cognition*, 69, 267-312.
- Cowan, N., Nugent, L.D., Elliott, E.M., Ponomarev, I., & Saults, J.S. (1999). The role of attention in the development of short-term memory: Age differences in the verbal span of apprehension. *Child Development*, 70, 1082-1097.
- March, L., Cienfuegos, A., Goldbloom, L., Ritter, W., Cowan, N., & Javitt, D.C. (1999). Normal time course of auditory recognition in schizophrenia, despite impaired precision of the auditory sensory ("echoic") memory code. *Journal of Abnormal Psychology*, 108, 69-75.
- Gomes, H., Sussman, E., Ritter, W., Kurtzberg, D., Cowan, N., & Vaughan Jr., H.G. (1999). Electrophysiological evidence of developmental changes in the duration of auditory sensory memory. *Developmental Psychology*, 35, 294-302.
- Cowan, N. (1998). Evidence against the global speed of processing theory of working memory. In M.A. Gernsbacher & S.J. Derry (Eds.), *Proceedings of the twentieth annual conference of the Cognitive Science Society*. Mahwah, NJ: Erlbaum. (p. 1211)
- Cowan, N. (1998). Children's memories according to fuzzy-trace theory: An endorsement of the theory's purpose and some suggestions to improve its application. *Journal of Experimental Child Psychology*, 71, 144-154.
- Cowan, N. (1998). What is more explanatory, processing capacity or processing speed? *Behavioral and Brain Sciences*, 21, 835-836. (Commentary on target article by Graham Halford)
- Cowan, N. (1998). Five enigmas regarding LaBerge's (1997) triangular-circuit theory of attention and self-referential theory of awareness. *Psyche*, 4 (08). (Note: This is a web journal.)
- Cowan, N. (1998). Visual and auditory working memory. *Trends in Cognitive Sciences*, 2, 77-78.
- Ritter, W., Gomes, H., Cowan, N., Sussman, E., & Vaughan, H.G., Jr. (1998). Reactivation of a dormant representation of an auditory stimulus feature. *Journal of Cognitive Neuroscience*, 10, 605-614.
- Saults, J.S., & Cowan, N. (1998). Developmental and individual differences in short-term memory. In N. Raz (ed.), *The other side of the error term: Aging and development as model systems in cognitive neuroscience*. Amsterdam: Elsevier. (pp. 155-196).
- Gillam, R., Cowan, N., & Marler, J. (1998). Information processing by school-age children with specific language impairment: Evidence from a modality effect paradigm. *Journal of Speech, Language and Hearing Research*, 41, 913-926.
- Cowan, N., Wood, N.L., Wood, P.K., Keller, T.A., Nugent, L.D., & Keller, C.V. (1998). Two separate verbal processing rates contributing to short-term memory span. *Journal of Experimental Psychology: General*, 127, 141-160.

- Elliott, E.M., Cowan, N., & Valle-Inclan, F. (1998). The nature of cross-modal, color-word interference effects. *Perception & Psychophysics*, *60*, 761-767.
- Cowan, N., Saults, J.S., & Nugent, L.D. (1997). The role of absolute and relative amounts of time in forgetting within immediate memory: The case of tone pitch comparisons. *Psychonomic Bulletin & Review*, *4*, 393-397.
- Cowan, N., & Wood, N.L. (1997). Constraints on awareness, attention, and memory: Some recent investigations with ignored speech, *Consciousness and Cognition*, *6*, 182-203.
- Wood, N.L., Stadler, M.A., & Cowan, N. (1997). Is there implicit memory without attention? A re-examination of task demands in Eich's (1984) procedure. *Memory & Cognition*, *25*, 772-779.
- Cowan, N., Wood, N.L., Nugent, L.D., & Treisman, M. (1997). There are two word length effects in verbal short-term memory: Opposed effects of duration and complexity. *Psychological Science*, *8*, 290-295.
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- Cowan, N. (1997). The development of working memory. In N. Cowan (ed.), *The development of memory in childhood*. Hove, East Sussex, UK: Psychology Press.
- Cowan, N., & Kail, R. (1996). Covert processes and their development in short-term memory. In S. Gathercole (ed.), *Models of short-term memory*. Hove, U.K: Erlbaum Associates, Ltd. (pp. 29-50)
- Cowan, N. (1996). Can we resolve contradictions between process dissociation models? *Consciousness and Cognition*, *5*, 255-259.
- Cowan, N., & Stadler, M.A. (1996). Estimating unconscious processes: Implications of a general class of models. *Journal of Experimental Psychology: General*, *125*, 195-200.
- Saults, J.S., & Cowan, N. (1996). The development of memory for ignored speech. *Journal of Experimental Child Psychology*, *63*, 239-261.
- Cowan, N. (1996). Short-term memory, working memory, and their importance in language processing. *Topics in language disorders*, *17*, 1-18. [Special issue: K.G. Butler & R.B. Gillam (eds.), "Working memory and language impairment: New perspectives."] reprinted in 1998 within *Memory and language impairment in children and adults: New perspectives*. Gaithersburg, MD: Aspen Publishers.
- Multhaup, K.S., Balota, D.A., & Cowan, N. (1996). Implications of aging, lexicality, and item length for the mechanisms underlying memory span. *Psychonomic Bulletin & Review*, *3*, 112-120.
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- Wood, N., & Cowan, N. (1995). The cocktail party phenomenon revisited: Attention and memory in the classic selective listening procedure of Cherry (1953). *Journal of Experimental Psychology: General*, *124*, 243-262.
- Cowan, N., & Greenspahn, E. (1995). Timed reactions to an object in apparent motion: Evidence on Cartesian and non-Cartesian perceptual hypotheses. *Perception & Psychophysics*, *57*, 546-554.
- Cowan, N. (1995). Memory theories from A to Z. *Contemporary Psychology*, *40*, 552-555. (Review of *Theories of Memory*, edited by A.F. Collins, S.E. Gathercole, M.A. Conway, & P.E. Morris)
- Keller, T.A., Cowan, N., & Saults, J.S. (1995). Can auditory memory for tone pitch be rehearsed? *Journal of Experimental Psychology: Learning, Memory, & Cognition*, *21*, 635-645.
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Invited Lectures and Symposia:

- Cowan, N., Elliott, E.M., Sauls, J.S., & Morey, C.C. (2005, August). *Working-memory capacity limits and adjusting attention*. Invited talk to be presented at the Eleventh Cognitive Science Association for Interdisciplinary Learning (CSAIL), Hood River, Oregon.

- Cowan, N. (2005, June). *Time limits and item limits in working memory*. Invited talk presented at the University of York and the University of Edinburgh.
- Cowan, N., Elliott, E.M., Saults, J.S., & Hismjatullina, A. (2005, April). *Does the speed of recall influence the quality of immediate recall?* Talk presented as part of the symposium by C. Jarrold, "Speed and Span: Timing Issues in the Development of Children's Working Memory," Biennial meeting of the Society for Research in Child Development, Atlanta.
- Cowan, N., & Engle, R.W. (2005, May). *On Four Aspects of Working Memory: Causation, Activation, Time, and Decision-making*. Invited Symposium, Midwestern Psychological Association annual meeting, Chicago.
- Cowan, N. (2005, May). *The mystery of time in working memory*. Talk presented as part of the invited symposium entitled "On Four Aspects of Working Memory: Causation, Activation, Time, and Decision-making," Midwestern Psychological Association annual meeting, Chicago.
- Cowan, N. (2005, January). *Working memory and adjustable attention*. Invited talk in a symposium to be presented to the Society for Applied Research in Memory and Cognition, Wellington, New Zealand.
- Cowan, N. (2005, February). *Working-memory Capacity and Attention*. Invited talk to be presented to the School of Behavioral and Brain Sciences, University of Texas, Dallas.
- Cowan, N. (2004, August). *Limits of Attention in Working-Memory Storage*. Invited address presented at the second International Conference on Working Memory, Kyoto, Japan.
- Cowan, N. (2004, August). *Child development as a portal to working memory processes*. Invited talk within a symposium entitled Aspects of Working Memory (Alan Baddeley, Chair). XXVIII International Congress of Psychology, Beijing, China.
- Cowan, N. (2004, August). *Attention limits in working memory*. Invited talk within a symposium entitled Attention and Memory (Neil Mulligan, Chair). XXVIII International Congress of Psychology, Beijing, China.
- Cowan, N. (2004, May). *Remembering what you're saying and saying what you're remembering: The difficulties of interpreting and translating as viewed by a cognitive psychologist*. Invited address presented at the 25th Educational Conference of the National Association of Judiciary Interpreters and Translators, Denver, CO.
- Cowan, N. (2004, May). *Working-memory Capacity and Adjustable Attention*. Invited address presented at the annual convention of the American Psychological Society, Chicago, IL.
- Cowan, N. (2004, April). Keynote address. *Methods to examine the growth of working-memory capacity*. Second European Working Memory Symposium (EWOMS-2), Dijon, France.
- Cowan, N. (2004, April). *What's left of the magical number 7? Some limits on immediate-memory capacity*. Invited address presented to the Midwestern Psychological Association, Chicago, IL.
- Cowan, N. (2004, February). *Measures of working memory and accounts of individual differences in aptitude*. Talk presented in the Cognition & Neuroscience colloquium series, University of Missouri, Columbia.
- Cowan, N. (2004, February). *Scholastic ability and the development of working-memory capacity*. Talk presented in the Developmental colloquium series, University of Missouri, Columbia.
- Cowan, N. (2003, October). *Identifying a capacity limit of working memory*. Invited talk presented at the Department of Psychology, University of York, England, U.K., and to the Department of Psychology, Lancaster University, England, U.K.
- Cowan, N. (2003, May). *Measuring working-memory capacity*. Invited talk presented at the Institute for Psychology, Hungarian Academy of Sciences, Budapest, Hungary. Presented also in Dijon, France and at the University of Helsinki, Finland in the same month.
- Cowan, N., & Saults, J.S. (2003, May). *Auditory sensory memory works better than visual sensory memory in immediate recall. Why?* Invited talk presented in the symposium, "Sensory memory and working memory" (organizer: Erich Schröger) as part of the Third International Workshop on Mismatch Negativity and Auditory Functions and Dysfunctions, Lyon, France.
- Cowan, N. (2003, January). *Working-memory capacity limits in a theoretical context*. Invited talk presented at the 4th Tsukuba International Conference on Memory (Human Learning and Memory: Advances in Theory and Application), Tsukuba, Japan.
- Cowan, N., Beschin, N., & Della Sala, S. (2002, October). *Memory disorder as vulnerability to interference*. Paper presented within a symposium chaired by S. Della Sala, Stimulus wars: Interference between stimuli in

- memory. Presented at the annual convention of the Memory Disorder Research Society, San Francisco.
- Cowan, N. (2002, May). *Measuring children's working memory capacity*. Invited talk presented at the International Workshop on Young Children's Cognitive Development: Interrelationships among Executive Functioning, Working Memory, Verbal Ability, and Theory of Mind, Castle Hirschberg, Germany.
- Cowan, N. (2002, March). *Resistance to interference in working memory*. Invited talk presented to the Department of Psychology, University of Illinois, Champaign-Urbana, IL.
- Cowan, N. (2002, January). *Development of working memory: Some key parameters*. Invited talk presented at the Center for Cognitive Science, Ohio State University, Columbus, OH.
- Cowan, N. (2001, December). *A comparison of auditory and visual working memory processes*. Invited talk presented to the Department of Psychology, Indiana University, Bloomington, IA.
- Cowan, N. (2001, August). *Structured freedom: Making the undergraduate research experience a success*. McNair Program, University of Missouri.
- Cowan, N. (2001, July). *Measures of the childhood development of short-term memory capacity limits*. Presented in a symposium entitled "The mechanisms of verbal short-term memory and its development," C. Hulme & M. Poirier, co-Chairs. Third International Conference on Memory, Valencia, Spain.
- Cowan, N. (2001, July). *In what sense is working memory (WM) an activated subset of long-term memory (LTM)?* Presented in a symposium entitled "The connection between working memory and long-term memory," E. Service, Chair. Third International Conference on Memory, Valencia, Spain.
- Cowan, N. (2001, July). *Processing limits of selective attention and working memory: Potential implications for interpreting*. Presented at "Complex cognitive processes: Simultaneous interpreting as a research paradigm." Second Ascona Workshop, Ascona, Switzerland.
- Cowan, N. (2001, May). *The magical number 3.5, plus or minus 0.5: Some old and some recent ideas about working memory capacity*. Keynote address of the Showme Mental State conference, University of Missouri, Columbia, MO.
- Cowan, N. (2000, Fall). *Childhood development of some basic parameters of working memory*. Presented by invitation at 12 sites: the Institute for Cognitive Sciences in Paris, Cardiff University, University of Warwick, University College London Institute for Cognitive Neuroscience, Royal Holloway University, University of York, University of Aberdeen, University of Bristol (*Benjamin Meaker Lecture*), Cambridge University (*Alan Baddeley Lecture*), University of Loughborough, University of Southampton, and Oxford University.
- Cowan, N. (2000, December). *Working memory parameters in the childhood development of working memory*. Keynote address to the annual meeting of the Mathematics, Statistics, and Computing Section of the British Psychological Society, London, UK.
- Cowan, N. (2000, September). *The working-memory storage capacity concept and its viability: Understanding nuances and overcoming nuisances*. Keynote address to the 17th annual meeting of the Cognitive Psychology Section of the British Psychological Society, Essex, England, UK.
- Cowan, N. (2000, July). *On working memory capacity: Is there a numerical limit?* Invited paper presented within a symposium on working memory capacity limits at the International Congress of Psychology, Stockholm, Sweden.
- Cowan, N. (2000, April). *Some basic parameters in the development of working memory in childhood*. Invited talk presented at the Psychology Department, University of Indiana, Bloomington.
- Cowan, N. (2000, February). *Some basic parameters in the development of working memory*. Invited talk presented at the Psychology Department, Washington University, St. Louis.
- Cowan, N. (2000, February). *Some basic parameters in the development of working memory*. Invited talk presented at the Psychology Department, University of California, Santa Cruz.
- Cowan, N. (1999, December). *Some basic parameters in the development of working memory*. Invited address to the Second Tsukuba International Conference on Memory, Tsukuba, Japan.
- Cowan, N. (1999, August). *Working memory development: Are there fundamental processing parameters that change with development?* Invited talk presented at the University of Western Australia, Perth, Australia.
- Cowan, N. (1999, August). *The relation between attention and memory*. Invited talk presented to the Centre for Clinical Research in Neuropsychiatry, University of Western Australia, Perth, Australia.
- Cowan, N. (1999, August). *Working memory development: Are there fundamental processing parameters that change with development?* Invited talk presented at the University of Queensland, St. Lucia, Australia.

- Cowan, N. (1999, June). *The ravages of absolute and relative amounts of time in short-term recall*. Invited paper presented at the Festschrift for Robert Crowder, Yale University, New Haven, CT.
- Cowan, N. (1999, May). *Working memory development: Are there fundamental processing parameters that change with development?* Invited talk presented at Humboldt University, Berlin.
- Cowan, N. (1999, May). *Working memory development: Are there fundamental processing parameters?* Invited paper presented at the Workshop on Working Memory, Institut für Allgemeine Psychologie, Leipzig, Germany.
- Cowan, N. (1999, April). *Attention and working memory*. Invited talk presented to the Psi Chi chapter at Westminster College, Fulton, MO.
- Cowan, N. (1999, April). *Working memory development: Are there fundamental processing parameters that change with development?* Invited talk presented at the Nathan Kline Institute for Psychiatric Research, Orangeburg, NY.
- Cowan, N. (1998, November). *The role of attention in short-term serial recall*. Invited paper presented at the Preconference on Attention and Memory, Dallas, TX.
- Cowan, N. (1998, April). *Children's memories of yestersecond: The development of immediate memory persistence, processing speed, and storage capacity*. Invited paper presented at the Department of Psychology, Washington University, St. Louis, MO.
- Cowan, N. (1998, July). *Children's memories of yestersecond: The development of immediate memory persistence, processing speed, and storage capacity*. Invited paper presented at the National Institutes of Health, Bethesda, MD.
- Cowan, N. (1997, July). *An embedded-processes model of working memory*. Invited paper presented at the Models of Working Memory Symposium, Boulder, CO.
- Cowan, N., & Gillam, R.B. (1997, May). *Working memory in children with and without language impairment*. Invited paper presented to the Midwestern Psychological Association, Chicago.
- Cowan, N. (1997, April). *Memories of yester-second: The role of decay in working memory*. Invited talk presented to the Psychology Department at the Georgia Institute of Technology, Atlanta.
- Cowan, N. (1997, April). *Decay and interference in short-term memory*. Invited paper presented as part of the Ellis-Battig Symposium of the Rocky Mountain Psychological Association annual conference, Reno.
- Cowan, N. (1997, February). *Memories of yester-second: The role of decay in working memory*. Invited talk presented to the Psychology Department at the University of Louisville.
- Cowan, N. (1996, July). Discussant, symposium entitled "The Organization of Memory Representations in Immediate Recall." International Conference on Memory, Padua, Italy.
- Cowan, N. (1996, July). *Separate rehearsal and retrieval mechanisms in the development of memory span*. Invited paper in a symposium entitled "Mechanisms of verbal short-term memory span and its development," International Conference on Memory, Padua, Italy.
- Cowan, N. (1995, November). Discussant, symposium entitled "Working Memory and Language." Annual convention of the Psychonomic Society, Los Angeles.
- Cowan, N. (1995, February). *The nature of auditory memory: Brain functioning and episodically related pitches (ERPs)*. Paper presented to the Department of Psychiatry, Albert Einstein College of Medicine.
- Multhaup, K.S., Balota, D.A., & Cowan, N. (1994, May). *Implications of aging, lexicality, and item length for the mechanisms underlying memory span*. Paper presented as part of a symposium: R. Engle, Chair, "New wrinkles on the articulatory loop," Midwestern Psychological Association, Chicago.
- Cowan, N., Wood, N.L., & Borne, D.N. (1994, May). *Reconfirmation of the short-term memory concept: Word-length effects in immediate versus through-list distractor recall*. Paper presented as part of a symposium: R. Engle, Chair, "New wrinkles on the articulatory loop," Midwestern Psychological Association, Chicago.
- Cowan, N. (1994, January). *Timing clues to the mechanisms of verbal short-term memory span*. Paper presented to the Psychology Department of the University of Texas, Austin.
- Cowan, N. (1993, October). *Response timing clues to the mechanisms of verbal short-term memory span*. Paper presented to the Psychology Department of Washington University, St. Louis.
- Cowan, N. (1993, May). *Controversies concerning short-term memory and selective attention*. Paper presented at the University of Helsinki, Finland.

- Cowan, N. (1992, October). *The timing of processes contributing to verbal short-term memory*. Paper presented to the Psychology Department of the University of Kansas, Lawrence, KS.
- Cowan, N. (1992, May). *Sensory memory, its traits, and its role in information processing*. Invited address presented at the Tenth International Conference on Event-Related Potentials of the Brain (EPIC X), Eger, Hungary.
- Cowan, N. (1991, November). *Activation, attention, and short-term memory*. Paper presented as part of a symposium entitled, "Short-term memory: Where do we stand?" Annual meeting of the Psychonomic Society, San Francisco, CA.
- Cowan, N. (1991, May). *Speakers' access to the phonemic structure of the syllable in word games*. Paper presented to the Experimental Psychology Laboratory of the Universite' Libre de Bruxelles, Brussels, Belgium.
- Cowan, N. (1991, April). *Memory for speech with and without attention and rehearsal*. Paper presented to the Psychology Department of the University of Helsinki, Finland, and to the Low Temperature Laboratory, Otaneimi, Finland.
- Cowan, N. (1990, November / December). *Memory for speech with and without attention and rehearsal*. Paper presented at 4 universities in Great Britain: Oxford, Manchester, Cardiff, and Cambridge
- Cowan, N. (1990, May). *How would you describe the information processing system?* Invited paper, Midwestern Psychological Association, Chicago, IL.
- Cowan, N. (1989, April). *Talking backward: An informative, unusual language skill*. Department of Psychology, University of Missouri, Rolla.
- Cowan, N. (1988, April). Moderator, paper session: *Concepts and categories*. Annual convention of the Midwestern Psychological Association, Chicago, IL.
- Cowan, N. (1987, May). Moderator, invited symposium: *Lexical acquisition, retention, and processing in children*. (Includes Cowan, N., *The development of rehearsal and phonological memory*.) Annual convention of the Midwestern Psychological Association, Chicago, IL.
- Cowan, N. (1986, April). *Auditory memory*. Workshop on Complex Sound Perception, Sarasota, Florida.
- Cowan, N. (1985, November). *Echoic storage in infancy*. Department of Human Development, University of Kansas, Lawrence, KS.
- Cowan, N. (1985, October). *A model of auditory sensory storage and integration*. Department of Psychology, Washington University, St. Louis, MO.
- Cowan, N., & Leavitt, L. A. (1985, August). *Evidence from fluent backward talkers on the development of speech representation*. University of Wisconsin Pediatrics Lecture Series, Madison, WI.
- Cowan, N. (1984, December). *Temporal properties of auditory memory*. Institute for Sensory Research, Syracuse University, Syracuse, NY.
- Cowan, N. (1984, January). *Studies in auditory memory development*. Haskins Laboratories, New Haven, CT.
- Cowan, N. (1984, January). *Identifying phonemes and syllables: Evidence from people who rapidly reorder speech*. Department of Psychology, Yale University, New Haven, CT.
- Cowan, N. (1983, November). *Identifying phonemes and syllables: Evidence from people who rapidly reorder speech*. Central Institute for the Deaf, St. Louis, MO.
- Cowan, N. (1983, November). *Studies in auditory memory development*. Department of Psychology, Washington University, St. Louis, MO.
- Cowan, N. (1983, February). *Identifying phonemes and syllables: Evidence from backward talkers*. Cognitive Science Group, University of Massachusetts/Amherst, MA.
- Cowan, N. (1981, November). *Processing of linguistic units: Evidence from fluent backward talkers*. New York Psycholinguistics Circle, New York, NY.

Conference Presentations:

- Cowan, N., Chen, D., Morey, C.C., Bunting, M.F., & Saults, J.S. (2005, June). *What is the capacity limit of consciousness awareness?* Paper presented at the annual convention of the Association for the Scientific Study of Consciousness, Pasadena, CA.
- Dewar, M., Della Sala, S., & Cowan, N. (2005, June). *Forgetting due to retroactive interference: A fuse of*

- Müller and Pilzecker's (1900) early insights into everyday forgetting and recent research on anterograde amnesia.* TENNET, an annual convention of Theoretical and Experimental Neuropsychology, Montreal.
- Sussman, E., Winkler, I., Cowan, N., Khan, F.J., & Ellis, M.A. (2005, April). *Electrophysiological evidence for detection and storage of multiple feature patterns in auditory cortex.* Paper presented at the annual convention of the Cognitive Neuroscience Society, New York.
- Bunting, M.F., & Cowan, N. (2004, November). *Working-memory retrieval takes attention: Effects of distraction under time pressure.* Poster presented at the annual meeting of the Psychonomic Society, Minneapolis.
- Morey, C.C., & Cowan, N. (2004, November). *Evidence of cross-domain attention limits in working memory.* Poster presented at the annual meeting of the Psychonomic Society, Minneapolis.
- Colflesh, G.J.H., Bunting, M.F., Cowan, N., & Conway, A.R.A. (2004, May). *Working memory capacity affects how to-be-ignored information is processed.* Poster presented at the annual convention of the American Psychological Society, Chicago.
- Bunting, M., & Cowan, N. (2004, May). *Bye-bye buffers: Temporary storage is (partially) a matter of attention.* Poster presented at the annual convention of the American Psychological Society, Chicago.
- Morey, C.C., & Cowan, N. (2004, May). *When do visual and verbal working-memory tasks conflict?* Poster presented at the annual convention of the American Psychological Society, Chicago.
- Beschin, N., Cowan, N., & Della Sala, S. (2003, May). *Gli effetti dell'interferenza retroattiva in amnesia anterograda possono essere ridotti.* 3° Congresso Nazionale Disabilità Trattamento Integrazione, Padova, Italy.
- Cowan, N., Elliott, E.M., & Saults, J.S. (2003, April). *Development of working memory depends on the measure: Attentional and strategic aspects of working memory.* Paper presented at the biennial convention of the Society for Research in Child Development, Tampa, FL.
- Elliott, E.M., & Cowan, N. (2002, November). *Attentional processes in the disruption of serial recall by irrelevant sounds.* Poster presented at the annual convention of the Psychonomic Society, Kansas City, MO.
- Beschin, N., Cowan, N., & Della Sala, S. (2002, October). *Prose memory in amnesia under very low interference conditions.* Joint meeting of the French and Italian Neuropsychology Societies, Paris. Abstract appears in *Revue Neuropsychologique*.
- Beschin, N., Cowan, N., Della Sala, S., and Perini, M. (2002, September). *Low interference conditions improve amnesia in MCI.* Paper presented to the annual meeting of SIN, the Societa' Italiana di Neurologia, Italian Society of Neurology, Naples. Abstract: *Neurological Sciences*, (2002), 23, S126.
- Cowan, N., Beschin, N., & Della Sala, S. (2002, May). *Just lying there, remembering.* Paper presented at the Showme Mental State conference, Department of Psychology, Washington University.
- Cowan, N., Beschin, N., & Della Sala, S. (2002, July). *Just lying there, remembering: Questioning the boundary between short- and long-term memory on the basis of minimal-interference testing conditions of amnesiacs.* Paper presented at the Quebec'02 Conference on Short-term/Working Memory, Quebec, Canada.
- Elliott, E.M., & Cowan, N. (2002, April). *Don't talk or play music: Multiple mechanisms of short-term memory interference from speech and tones.* Paper presented at the annual convention of the Midwestern Psychological Association, Chicago, IL.
- Cowan, N., Saults, J.S., & Elliott, E.M. (2001, November). *A comparison of auditory and visual working-memory processes.* Paper presented at the annual convention of the Psychonomic Society, Orlando, FL.
- Cowan, N., Towse, J.N., Hamilton, Z., Saults, J.S., & Elliott, E.M. (2001, September). *Timing of processing and recall of a sentence-span task in children.* Poster presented at the 12th Conference of the European Society for Cognitive Psychology and the 18th Annual Conference of the British Psychological Society, Cognitive Psychology Section (joint meeting), Edinburgh, Scotland, UK.
- Brunner, R., & Cowan, N. (2000, February). *Working Memory: Exploring the nature of capacity limits and the role of unattended measures of capacity.* McNair Scholars Conference, University of Missouri.
- Geer, T., & Cowan, N. (2000, February). *Training children to group items in memory span tasks.* McNair Scholars Conference, University of Missouri.
- Berti, S., Schröger, E., Cowan, N., & Winkler, I. (2000, April). *Aufmerksamkeit und auditorisches Gedächtnis: eine EKP-Studie.* Vortrag auf der 42. Tagung experimentell arbeitender Psychologen, Braunschweig. (Germany)

- Rinne, T., Gratton, G., Fabiani, M., Cowan, N., Maclin, E., Stinard, A., Sinkkonen, J., Alho, K., & Naatanen, R. (1999). Scalp-recorded optical signals elicited by sound processing in the visual cortex. *Psychophysiology*, 36, S96 (Abstract).
- Conway, A., Cowan, N., Bunting, Therriault, & Minkoff. (1999, November). *Memory capacity, processing speed, and fluid intelligence: Is working memory capacity = Spearman's g?!* Paper presented at the annual convention of the Psychonomic Society, Los Angeles, CA.
- Elliott, E.M., & Cowan, N. (1999, November). *Adaptation to auditory distractors in a cross-modal, color-word interference task.* Paper presented at the annual convention of the Psychonomic Society, Los Angeles, CA.
- Cowan, N. (1999, April). *Different rates of processing develop at different rates.* Paper presented at the Showme Mental State conference, Columbia, MO.
- Cowan, N. (1999, April). *The differential maturation of two processing speeds related to digit span.* Paper presented at the biennial convention of the Society for Research in Child Development, Albuquerque, NM.
- Conway, A.R.A., Cowan, N., & Bunting, M.F. (1998, November). *Working memory capacity and the cocktail party effect: Don't gossip about a low span behind his back.* Paper presented at the annual convention of the Psychonomic Society, Dallas, TX.
- Cowan, N. (1998, June). *Wait a second! The meaning of pauses between words in spoken responses within memory span tasks.* Paper presented at the Showme Conference, Washington University, St. Louis.
- Hulme, C., Newton, P., Cowan, N., Stuart, G., & Brown, G. (1998, June). *The effects of item length and lexicality on short-term memory: A response timing analysis.* Paper presented at the International Conference on Short-term Memory, Quebec, Canada.
- Elliott, E.M., & Cowan, N. (1998, April). *The resilience of cross-modal Stroop-like interference.* Paper presented at the annual meeting of the Midwestern Psychological Association, Chicago.
- Cowan, N., Nugent, L.D., Elliott, E.M., Ponomarev, I., & Sauls, J.S. (1998, June). *Working memory span for ignored digits.* Paper presented at the International Conference on Short-term Memory, Quebec, Canada.
- Gomes, H., Sussman, E., Ritter, W., Kurtzberg, D., Cowan, N., & Vaughan, H. G., Jr. (1996, November). *Developmental changes in an electrophysiological measure of short term memory.* Paper presented to the Society for Neuroscience, Washington, D.C..
- Wood, N.L., Stadler, M.A., & Cowan, N. (1995, November). *Memory without attention in Eich's (1984) procedure? Not so fast!* Paper presented at the annual convention of the Psychonomic Society, Los Angeles, CA.
- Wood, N., & Cowan, N. (1995, May). *Direct and indirect tests of information in attended versus ignored auditory channels.* Paper presented at the annual convention of the Midwestern Psychological Association, Chicago, IL.
- Cowan, N., Wood, N.L., & Keller, T.A. (1995, April). *Why is speaking rate correlated with memory span?* Paper presented at the biennial convention of the Society for Research in Child Development, Indianapolis.
- Cowan, N., Keller, T., Hulme, C., Roodenrys, S., McDougall, S., & Rack, J. (1994, July). *Response timing clues to the mechanisms of age and word length effects on memory span.* Paper presented at the International Conference on Working Memory, Magdalene College, Cambridge, U.K.
- Keller, T.A., Cowan, N. (1994, May). *Can auditory sensory information be rehearsed?* Paper presented at the annual convention of the Midwestern Psychological Association, Chicago.
- Wood, N., & Cowan, N. (1994, May). *Moray revisited: Attention shifts to one's name in an ignored auditory channel.* Paper presented at the annual convention of the Midwestern Psychological Association, Chicago.
- Winkler, I., Cowan, N., Csépe, V., Czigler, I., Teder, W., & Näätänen, R. (1993, October). *Deactivation and reactivation of auditory sensory memory traces as reflected by the mismatch negativity ERP component.* Paper presented at the annual meeting of the Society for Research in Psychophysiology, Rotach-Egern, Germany.
- Saults, J.S., & Cowan, N. (1993, March). *Development of memory for unattended spoken words.* Paper presented at the biennial convention of the Society for Research in Child Development, New Orleans, LA.
- Keller, T.A., & Cowan, N. (1993, March). *Developmental increase in the duration of auditory memory for tones.* Paper presented at the biennial convention of the Society for Research in Child Development, New Orleans, LA.
- Wood, N., & Cowan, N. (1992, November). *Attention shifts to a subtle physical change during selective*

- listening*. Paper presented at the annual convention of the Psychonomic Society, St. Louis, MO.
- Day, L., & Cowan, N. (1992, November). *The absence of phonological similarity effects in phonologically disordered children*. Paper presented at the annual convention of the American Speech-Language Hearing Association (ASHA), San Antonio, TX.
- Gillam, R., Cowan, N., & Day, L. (1992, November). *Memory functions in specifically language impaired and normally-achieving children*. Paper presented at the annual convention of the American Speech-Language Hearing Association (ASHA), San Antonio, TX.
- Cowan, N., & Leavitt, L.A. (1990, April). *Speakers' access to the phonological structure of the syllable in word games*. Paper presented at the 26th regional meeting of the Chicago Linguistic Society, parasession on the Syllable in Phonetics and Phonology, Chicago, IL.
- Cowan, N., Day, L., Sauls, J.S., Flores, L., Johnson, T., & Keller, T. (1991, July). *Output delay effects on serial recall*. Paper presented at the International Conference on Memory, University of Lancaster, Lancaster, England, U.K.
- Cowan, N., Keller, T.A., & Sauls, J.S. (1989, November). *Does silent strategic processing affect echoic memory?* Paper presented at the annual convention of the Psychonomic Society, Atlanta, GA.
- Cowan, N., Lichty, W., & Grove, T. (1987, August). *Memory for unattended speech during silent reading*. Paper presented to the Second International Conference on Practical Aspects of Memory, Swansea, Wales, U.K.
- Cowan, N., & Leavitt, L. A. (1987, July). *Children who can talk backward: 5 years later*. Paper presented at the Fourth International Congress for the Study of Child Language, Lund, Sweden.
- Cowan, N., Cartwright, C., Winterowd, C., & Sherk, M. (1987, April). *A bridge between the speech memory systems of young children and adults*. Paper presented at the biennial meeting of the Society for Research in Child Development, Baltimore, MD.
- Cowan, N. (1986, November). *Evidence of structure within the vowel system in speech memory*. Paper presented at the annual convention of the Psychonomic Society, New Orleans, LA.
- Cowan, N. (1985, November). *Quantitative aspects of auditory sensory storage, integration, and processing*. Paper presented at the annual convention of the Psychonomic Society, Boston, MA.
- Cowan, N., Daly, T., & Kielbasa, L. A. (1985, April). *Temporal properties of echoic memory in preschool children*. Paper presented at the biennial meeting of the Society for Research in Child Development, Toronto, Ontario, Canada.
- Cowan, N., & Cowan, P. R. (1983, November). *Auditory memory across 20 seconds in preschool children*. Paper presented at the annual convention of the Psychonomic Society, San Diego, CA.
- Cowan, N., Tamis-Le Monda, C., & Braine, M. D. S. (1983, April). *Children's knowledge of semantic categories implied but not stated*. Paper presented at the biennial convention of the Society for Research in Child Development, Detroit, MI.
- Cowan, N., & Leavitt, L. A. (1982, November). *Natural algorithms for language play*. Paper presented at the annual convention of the Psychonomic Society, Minneapolis, MN.
- Cowan, N., Suomi, K., & Morse, P. A. (1982, March). *Temporal properties of echoic storage in infancy*. Paper presented at the International Conference on Infant Studies, Austin, TX.
- Petrovich-Bartell, N., Cowan, N., & Morse, P. A. (1981, August). *Perceptual and acoustic attributes of infant distress vocalizations*. Paper presented at the Second International Congress for the Study of Child Language, Vancouver, British Columbia.
- Cowan, N., & Leavitt, L. A. (1981, August). *Talking backward: Speech play in late childhood*. Paper presented at the Second International Congress for the study of Child Language, Vancouver, British Columbia.
- Cowan, N. (1981, August). *Toward an understanding of morphological segmentation*. Paper presented at the annual convention of the American Psychological Association, Los Angeles, CA.
- Cowan, N., & Leavitt, L. A. (1981, May). *Juggling acts with linguistic units*. Paper presented at the annual convention of the Chicago Linguistic Society, IL.
- Cowan, N., Suomi, K., & Morse, P. A. (1981, April). *Echoic storage in infant perception*. Paper presented at the biennial convention of the Society for Research in Child Development, Boston, MA.
- Goodsitt, J., Morse, P. A., Cowan, N., & Ver Hoeve, J. N. (1981, April). *Infant speech perception in a multisyllabic world*. Paper presented at the biennial convention of the Society for Research in Child

Development, Boston, MA.

Cowan, N., Leavitt, L. A., Massaro, D. W., & Kent, R. D. (1980, April). *Speaking backwards: A case study.*

Paper presented at the annual convention of the Acoustical Society of America, Atlanta, GA.

Cowan, N., & Morse, P. A. (1979, June). *Influence of task demands on the categorical versus continuous perception of vowels.* Paper presented at the annual convention of the Acoustical Society of America, Boston, MA.

University Service:

University of Massachusetts

Member, Graduate Affairs Committee, Department of Psychology

University of Missouri

Director, Cognition & Neuroscience Training Area (2005-present)

Director, Experimental Training Area (1994 - 1996)

Chair, neuroscience symposium committee (2005)

Chair, Departmental Human Subjects Committee (9/86-9/90 & 9/91-9/92)

Chair, Arts & Science Human Subjects Committee (9/86-9/90)

Chair, Search Committee in Developmental Psychology (1988-89)

Chair, Search Committee in Experimental Psychology (1991-92)

Chair, Search Committee in Cognitive Neuroscience (1997-98)

Chair, 2 faculty members' Promotion & Tenure Committees (1992-94)

Chair, 3 faculty member's promotion to Full Professor (1995- 2003)

Chair, Space Committee (1992-1993)

Chair, Centennial Celebration, Part I (1998)

Member, Experimental Training Committee (1985-2000)

Member, Cognition and Neuroscience Training Committee (2000 - present)

Member, Search Committee in Cognitive Neuropsychology (1986-87)

Member, Search Committee in Experimental Psychology (1987-88)

Member, Departmental Long Range Planning Committees (10/87-5/90)

Member, Personnel Committee (1989 - present)

Member, Departmental Chair Evaluation Committee (1992-93)

Member, Committee for the Curriculum on Undergraduate Education (1994-1996)

Member, Departmental Self-study Committee (1990, 1995)

Member, Arts & Science Faculty Awards Committees (1997-1999; 2003)

Member, Foreign Travel Committee, University of Missouri (1998-99)

Co-Chair, Cognitive Neuroscience Senior Search (1994-95)

Acting Associate Chair, Department of Psychology (Winter, 1994)

Member, History and Future Directions Committee (1996-97)

Member, MU Presidential Award for Research and Creativity (1999)

Elected Member, Faculty Council, University of Missouri (2000-2002)

Elected Member, Advisory Committee, Department of Psychological Sciences (2001-02)

Teaching Experience:

University of Wisconsin-Madison

(Assistantships including discussion or laboratory sections)

Introductory Psychology

Experimental Psychology

Developmental Psychology

New York University

Developmental Psychology

University of Massachusetts at Amherst

Applied and Basic Cognitive Development (Graduate Level, team taught)
Auditory Perception Seminar
Child Behavior and Development
Independent Readings in Developmental Psychology
Language Development Seminar
Perceptual Development Seminar
Psychology as a Natural Science
Seminar in Developmental Psychology

University of Missouri

Advanced Seminar in Information Processing
Cognitive Psychology (both graduate and undergraduate versions)
Human Senses (laboratory course)
Perception
Perception and Thought
Research Methods
Research Seminar in Experimental Psychology
Seminar in Cognitive Development
Seminar in Working Memory
Seminar in Memory & Attention
Discussion leader for Ethical Conduct of Research (Biochemistry Dept.)

Mentoring Activity

Doctoral Students and Current Positions

J. Scott Saults, Ph.D., 1992

Research Associate, University of Missouri

Timothy A. Keller, Ph.D., 1994

Senior Research Associate, Carnegie Mellon University

Linda S. Day, Ph.D., 1995

Assistant Professor, Communication Sciences and Disorders, University of Missouri

Noelle Wood, Ph.D., 1996

Project Manager, Rhode Island Department of Mental Health

Emily M. Elliott, Ph.D., 2001

Assistant Professor, Louisiana State University

Postdoctoral Fellows and Current Positions

Emily Elliott (2001-2002)
Assistant Professor, Louisiana State University

Michael Bunting (2003-2005)
Research Scientist at the Center for the Advanced Study of Language,
University of Maryland, College Park, MD.

Extramural Committee Member

Opponent, Doctoral Defense of István Winkler, University of Helsinki, Finland, June 2, 1993.

Reader, Doctoral Defense of Patrick Wilken, University of Melbourne, Australia, 2001

Committee Member, Habilitation of Valérie Camos, University of Bourgogne, Dijon, France, December 19, 2003.