

VITA

Name: Rachel Keen Clifton

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Birth Date: October 5, 1937

Place of Birth: Burkesville, Kentucky

Marital Status: Married, two children

Education:

<u>School</u>	<u>Degree</u>	<u>Date</u>	<u>Major</u>
Berea College, Berea, KY	B.A.	1959	Elementary Education
University of Minnesota, Minneapolis, MN	M.A.	1960	Child Psychology
University of Minnesota, Minneapolis, MN	Ph.D.	1963	Child Psychology
University of Wisconsin, Madison, WI	NICHD Postdoctoral fellow	1963-1965	
University of Iowa, Iowa City, Iowa	NICHD Postdoctoral fellow	1966	

Experience:

University of Iowa, Research Associate, Institute for Child Development and Behavior, 1966-1968 (half-time).

University of Massachusetts, Assistant Professor, 1968-1973 (half-time).

University of Massachusetts, Associate Professor, 1973-1976 (half-time).

University of Massachusetts, Professor, 1976 - present (half-time until 1979).

Stanford University, Visiting Professor, 1975-1976.

University of Sussex, Brighton, England, Visiting Professor, 1981-1982.

MIT, Research Laboratory of Electronics, Cambridge, MA, Visiting Professor, 1988-1989.

MRC-Applied Psychology Unit, Cambridge, England, Visiting Professor, 1989-1990.

University of Edinburgh, Scotland, Visiting Professor, 1995-1996.

Consulting and Editorial Work:

1. Member of editorial board for Psychophysiology, 1969-1972; for Developmental Psychology, 1974-1976, and 1986-1988; for Infant Behavior & Development, 1977-1981; for Journal of Experimental Child Psychology, 1983-1985; for Developmental Psychobiology, 1986-1990.
2. Associate editor for Psychophysiology, 1972-1975.
3. Associate editor for Child Development, 1977-1979.
4. Editor, Monographs of the Society for Research in Child Development, 1993-1999.
5. Member of Experimental Psychology Study Section, National Institutes of Health, 1974-1977.
6. Member of Board of Directors, 1975-1978, and Publications Board, 1978-1981, for Society for Research in Psychophysiology.

7. Member of Boyd R McCandless Awards Committee, 1978-1979, Division 7 of APA.
8. Member of Committee to select "Young Psychophysiological Award", Society for Psychophysiological Research, 1979-1980.
9. Member of Social & Behavioral Science Research Advisory Committee for March of Dimes, 1978-1981.
10. Secretary for Society for Research in Child Development, 1979-1985.
11. Member of Cognition, Emotion, and Personality Research Review Committee, National Institute of Mental Health, 1983-1987.
12. Member of Credentials Committee, Division 7, American Psychological Association, 1985-1987.
13. Member of the Forum on Research Management of the Federation of Behavioral, Psychological, and Cognitive Sciences, 1986-1988.
14. Secretary-Treasurer of the Federation of Behavioral, Psychological, and Cognitive Sciences, 1987-1989.
15. Member of NIH Study Section, Human Development, 1990-1994.
16. Member of Executive Board of the International Society for Infancy Research, 1994-1998.
17. AAAS Electorate Nominating Committee, Section J, Psychology, 1994-1997.
18. APA Committee on Scientific Awards, 1995-1997; chair, 1996-1997.

Honors:

1. Phi Kappa Phi, 1958, Berea College.
2. Predoctoral fellow, National Institute of Mental Health, 1961-1963; postdoctoral fellow, National Institute of Child Health & Human Development, 1963-1966.
3. University of Massachusetts Distinguished Faculty Award, fall, 1988.
4. Research Scientist Award, National Institute of Mental Health, 1981-2001.
5. Fellow of Division 6 and 7, American Psychological Association.
6. Fellow of American Association of the Advancement of Science.
7. Distinguished Alumna Award, Berea College, 1994.
8. President-Elect, International Society for Infant Studies, 1996.

Grants Received:

National Institute of Mental Health, MH18107, "Heart rate conditioning in the human infant", 1969, \$6000. (NIMH Small Grant program)

Faculty Research Grant from University of Massachusetts, 1969, \$1000.

National Institute of Child Health and Human Development, HD06753, "Classical conditioning of heart rate in human infants", 1972-1975, \$81,617.

National Institute of Child Health and Human Development, HD06753, "Auditory competence and learning in human infants", 1977-1980.

March of Dimes, "Habituation to auditory and tactile stimuli in low birthweight infants", (Co-Investigator with Edward Tronick, PI), 1978-1980.

March of Dimes, "Sensory and defensive thresholds in prematurely born infants", (Co-Investigator with Edward Tronick, PI), 1980-1982.

Biomedical Research Support Grant, RR07048, "Auditory perception in human infants", 1980-1981, \$5000.

National Science Foundation, BNS 810354, "Complex auditory processing in human infants," 1981-1983, \$69,997. (with Marsha Clarkson).

Biomedical Research Support Grant RR07048-17, "Complex auditory processing in children with temporal lobe epilepsy", 1982-1983, \$4,992.

National Science Foundation, BNS 83-04419, "Complex auditory processing in human infants", 1983--1986, \$164,828. (with Marsha Clarkson)

National Institute on Deafness and Other Communication Disorders, DC00362, "Development of sound localization in infants", 1987-1990, \$167,486.

National Institute of Child Health and Human Development, "Small Instrumentation grant program," 1988-1989, \$23,753.

National Science Foundation, BNS 9912543, "The precedence effect as a dynamic process", 1988-1991, \$97,825. (with Richard Freyman).

National Institute of Child Health and Human Development, "Reaching and Cognition in infancy", 1991-1995, \$270,809; 1995-1999.

National Institute of Deafness and Communication Disorders, "The precedence effect as a dynamic process", 1992-1995, \$147,519. (with Richard Freyman)

March of Dimes, "Contingency learning and retention in preterm infants", 1995-1997, \$36,497; (with Nathalie Goubet).

National Institute of Mental Health, MH00332, "Auditory competence and learning in human infants", 1981-1986; 1986-1991; 1991-1996; 1996-2001. (Research Scientist Award)

National Science Foundation, Co-PI (PI, Neil Berthier), "Learning and intelligent systems: Developmental motor control in real and artificial systems", 09/01/97 - 08/31/00. \$625,000.

National Science Foundation, Co-Investigator (PI, Rod Grupen), "A facility for cross disciplinary research on sensorimotor development in humans and machines. 7/97 - 6/02. \$920,598.

Invited Conference Presentations:

Conference on Cardiovascular Psychophysiology, University of North Carolina, Chapel Hill, N.C., 1972, funded by National Science Foundation.

Conference on Habituation: Comparative and Developmental Approaches, Holderness, N.H., 1974, funded by the Society for Research in Child Development.

Minnesota Symposium on Child Psychology, 1976.

Brown County Conference on "Genetic and Experiential Factors in Perceptual Development, 1979, funded by NSF and the Sloan Foundation.

Conference on Auditory Development during Infancy, University of Toronto, 1981.

Winter Conference on Current Issues in Developmental Psychology, Hawk's Cay, Florida, 1986; 1988.

Conference on Perceptual Development, Wollongong, Australia, 1988.

Conference on The Development and Neural Bases of Higher Cognitive Functions, sponsored by the National Institute of Mental Health, the McDonnell Foundation, and the University of Pennsylvania, at the Sugarloaf Conference Center, Philadelphia, PA, May 20-24, 1989.

Conference on Cognitive models of Speech Processing, Sperlonga, Italy, June, 1990.

Conference on Developmental Psychoacoustics, University of Washington, Seattle, WA in August, 1991, sponsored by the American Psychological Association.

Conference on Binaural and Spatial Hearing, Wright Patterson Air Force Base, Dayton, Ohio, in September, 1993, sponsored by the United States Air Force.

Professional Associations:

Society for Research in Child Development
International Society for Infancy Studies
Acoustical Society of America
American Association for the Advancement of Science (fellow)
American Psychological Association (fellow of Divisions 6 and 7)
American Psychological Society (fellow)
International Society for Developmental Psychobiology

Publications (in chronological order):

Stevenson, H.W., Keen, R.E., & Knights, R. (1963) Parents and strangers as reinforcing agents for children's performance. Journal of Abnormal and Social Psychology, 67, 183-186.

Keen, R. E. (1964) The effects of auditory stimuli on sucking behavior in the human neonate. Journal of Experimental Child Psychology, 1, 348-354.

Keen, R.E., Chase, H.H., & Graham, F.K. (1965) Twenty-four-hour retention by neonates of an habituated heart rate response. Psychonomic Science, 2, 265-266.

Graham, F.K. & Clifton, R.K. (1966) Heart rate change as a component of the orienting response. Psychological Bulletin, 65, 305-320. (This article was selected as a "Citation Classic" by Current Contents, 1978, 21, 16.)

Clifton, R.K. & Graham, F.K. (1968) Stability of individual differences in heart rate activity during the newborn period. Psychophysiology, 5, 37-50.

Clifton, R.K., Graham, F.K., & Hatton, H.M. (1968) Newborn heart rate response and response habituation as a function of stimulus duration. Journal of Experimental Child Psychology, 6, 265-278.

Graham, F.K., Clifton, R.K., & Hatton, H.M. (1968) Habituation of heart rate response to repeated auditory stimulation during the first days of life. Child Development, 39, 35-52.

Clifton, R.K. & Meyers, W.J. (1969) The heart rate response of four month old infants to auditory stimuli. Journal of Experimental Child Psychology, 7, 122-135.

Clifton, C.E., Clifton, R.K., Meyers, W.J., & Miller, R. (1970) Cardiac responses to attended and ignored stimuli. Psychonomic Science, 18, 361-362.

Clifton, R.K. (1971) Development dimensions: Review of Reese and Lipsitt (Eds.), Advances in child development and behavior, Volume 5. In Contemporary Psychology, 16, 507-508.

- Clifton, R.K., Meyers, W.J., & Solomons, G. (1972) Methodological problems in conditioning the head turning response of newborn infants. Journal of Experimental Child Psychology, 13, 29-42.
- Clifton, R.K., Siqueland, E., & Lipsitt, L. (1972) Conditioned head turning in human newborns as a function of conditioned response requirements and states of wakefulness. Journal of Experimental Child Psychology, 13, 43-57.
- Pomerleau-Malcuit, A., & Clifton, R.K. (1973) Neonatal heart rate response to tactile, auditory, and vestibular stimulation in different states. Child Development, 44, 485-496.
- Clifton, R.K. (1974) Cardiac orienting and conditioning in infants. In P.A. Obrist, J. Brener, L. DiCara, & A. Black (Eds.), Cardiovascular psychophysiology: Current issues in response to mechanisms, biofeedback, and methodology. Chicago: Aldine Press, pp. 479-504.
- Clifton, R.K. (1974) Heart rate conditioning in the newborn infant. Journal of Experimental Child Psychology, 18, 9-21.
- Appleton, T., Clifton, R.K., & Goldberg, S. (1975) The development of behavioral competencies in infants. In F. Horowitz, M. Hetherington, S. Scarr-Salapatek, & A. Siegel (Eds.), Review of child development research. Volume 4. University of Chicago Press, pp. 101-186.
- Pomerleau-Malcuit, A., Malcuit, G., & Clifton, R.K. (1975) An attempt to elicit cardiac orienting and defense responses in the newborn to two types of facial stimulation. Psychophysiology, 12, 527-535.
- Gregg, C., Clifton, R.K., & Haith, M. (1976) A possible explanation for the frequent failure to find cardiac orienting in the newborn infant. Developmental Psychology, 12, 75-76.
- Clifton, R.K. & Nelson, M.N. (1976) Developmental study of habituation in infants: The importance of paradigm, response system, and state of the organism. In T.J. Tighe & R.N. Leaton (Eds.), Habituation: Neurological, comparative, and developmental approaches. Hillsdale, NJ: Erlbaum Press, pp. 159-205.
- Clifton, R.K. & Nelson, M.N. (1977) Arousal systems in infants: Habituation. In B. B. Wolman (Ed.), International encyclopedia of neurology, psychiatry, psychoanalysis, and psychology. Volume 2, pp. 123-127.
- Nelson, M.N. & Clifton, R.K. (1977) Arousal systems in infants: Conditioning. In B.B. Wolman (Ed.), International encyclopedia of neurology, psychiatry, psychoanalysis, and psychology. Volume 2, pp. 118-122.
- Clifton, R.K. (1978) The effects of behavioral state and motor activity on infant heart rate. In A. Collins (Ed.), Minnesota Symposia on Child Psychology, Volume 11. Hillsdale, NJ: Lawrence Erlbaum Press, pp. 64-97.
- Nelson, M.N., Clifton, R.K., Dowd, J., & Field, T. (1978) Cardiac responding to auditory stimuli in newborn infants: Why pacifiers should not be used when heart rate is the major dependent variable. Infant Behavior and Development, 1, 277-290.

- Field, T., Dempsey, J., Hatch, J., Ting, G., & Clifton, R. (1979) Cardiac and behavioral responses to repeated tactile and auditory stimulation by preterm and term neonates. Developmental Psychology, 15, 406-416.
- Dowd, J., Clifton, R., Anderson, D., & Eichelman, W. (1980) Children perceive large-disparity random dot stereograms more rapidly than adults. Journal of Experimental Child Psychology, 29, 1-11.
- Clifton, R.K., Morrongiello, B.A., Kulig, J., & Dowd, J.M. (1981) Developmental changes in auditory localization. In R. Aslin, J. Alberts, & M. Peterson (Eds.), The development of perception: Psychobiological perspectives. Volume 1. Audition, somatic perception and the chemical senses. New York: Academic Press, pp. 141-160.
- Clifton, R.K., Morrongiello, B.A., Kulig, J., & Dowd, J. (1981) Newborns' orientation toward sound: Possible implications for cortical development. Child Development, 52, 833-838.
- Morrongiello, B., Clifton, R., & Kulig, J. (1982) Newborn cardiac and behavioral orienting responses to sound under varying precedence-effect conditions. Infant Behavior and Development, 5, 249-259.
- Clarkson, M., Morrongiello, B., & Clifton, R. (1982) Stimulus-presentation probability influences newborn head orientation to sound. Perceptual & Motor Skills, 55, 1239-1246.
- Krafchuk, E., Tronick, E., & Clifton, R. (1983) Behavioral and cardiac responses to sound in preterm neonates varying in risk status and a hypothesis of their paradoxical reactivity. In T.M. Field & A.M. Sostek (Eds.), Infants born at risk: Physiological and perceptual processes. Grune & Stratton, pp. 99-128.
- Morrongiello, B., Kulig, J., & Clifton, R. (1984) Developmental changes in auditory temporal perception. Child Development, 55, 461-471.
- Robson, R., Morrongiello, B., Best, C., & Clifton, R. (1984) Trading relations in the perception of speech by five-year-old children. Journal of Experimental Child Psychology, 37, 231-250.
- Clifton, R., Morrongiello, B., & Dowd, J. (1984) A developmental look at an auditory illusion: The precedence effect. Developmental Psychobiology, 17, 519-536.
- Morrongiello, B.A. & Clifton, R.K. (1984) Effects of sound frequency on behavioral and cardiac orienting in newborn and five-month-old infants. Journal of Experimental Child Psychology, 38, 427-446.
- Clifton, R.K. (1985) The precedence effect: Its implications for developmental questions. In S. Trehub & B. Schneider (Eds.), Auditory development in infancy. NY: Plenum, pp. 85-99.
- Clarkson, M.G., Clifton, R.K., & Morrongiello, B.A. (1985) The effects of sound duration on newborns' head orientation. J. of Experimental Child Psychology, 39, 20-36.
- Clarkson, M.G. & Clifton, R.K. (1985) Infant pitch perception: Evidence for responding to pitch

categories and the missing fundamental. Journal of Acoustical Society of American, 1521--1528.

Muir, D. & Clifton, R. (1985) Infants' orientation to the location of sound sources. In G. Gottlieb & N. Krasnegor (Eds.) Measurement of audition and vision in the first year of postnatal life: A methodological overview. Norwood, NJ: Ablex, pp. 171-194.

Ashmead, D.H., Clifton, R.K., & Reese, E.P. (1986) Development of auditory localization in dogs: Single source and precedence effect sounds. Developmental Psychobiology, 19, 91-104.

Myers, N., Clifton, R., & Clarkson, M. (1987) When they were very young: Almost-threes remember two years ago, Infant Behavior & Development, 10, 123-132.

Ashmead, D.H., Clifton, R.K., & Perris, E. E. (1987) Precision of auditory localization in human infants. Developmental Psychology, 23, 641-647.

Clifton, R. K. (1987) Breakdown of echo suppression in the precedence effect. Journal of Acoustical Society of America, 82, 1834-1835.

Clifton, R., Gwiazda, J., Bauer, J., Clarkson, M., & Held, R. (1988) Growth in head size during infancy: Implications for sound localization. Developmental Psychology, 24, 477-483.

Clarkson, M. G., Clifton, R.K., & Perris, E. E. (1988) Infant timbre perception: Discrimination of frequency envelopes. Perception and Psychophysics, 43, 15-20.

Perris, E. E. & Clifton, R. K. (1988) Reaching in the dark toward sound as a measure of auditory localization in infants. Infant Behavior & Development, 11, 473-491.

Muir, D. W., Clifton, R.K., & Clarkson, M. G. (1989) The development of a human auditory localization response: A U-shaped function. Canadian Journal of Psychology, 43, 199-216.

Clifton, R.K. & Freyman, R.L. (1989) Effect of click rate and delay on breakdown of the precedence effect. Perception and Psychophysics, 46, 139-145.

Clarkson, M. G., Clifton, R. K., Swain, I.U., & Perris, E. E. (1989) Stimulus duration and repetition rate influence newborns' head orientation toward sound. Developmental Psychobiology, 22, 683-705.

Perris, E. E., Myers, N. A., & Clifton, R. K. (1990) Long-term memory for a single infancy experience. Child Development, 61, 1796-1807.

Clarkson, M.G. & Clifton, R.K. (1991) Acoustic determinants of newborn orienting. In M. J. S. Weiss & P. R. Zelazo (Eds.), Newborn attention: Biological constraints and the influence of experience. Norwood, NJ: Ablex. pp. 99-119.

Clifton, R.K., Perris, E., & Bullinger, A. (1991) Infants' perception of auditory space. Developmental Psychology, 27, 187-197.

- Clifton, R. K., Rochat, P., Litovsky, R., & Perris, E. (1991) Object representation guides infants' reaching in the dark. Journal of Experimental Psychology: Human Perception and Performance 17, 323-329.
- Clarkson, M. G., Swain, I., Clifton, R. K., & Cohen, K. (1991) Newborns' head orientation toward trains of brief sound. Journal of Acoustical Society of America, 89, 2411-2420.
- Freyman, R.L., Clifton, R.K., & Litovsky, R.Y. (1991) Dynamic processes in the precedence effect. Journal of Acoustical Society of America, 90, 874-884.
- Litovsky, R.Y. & Clifton, R.K. (1992) Use of sound pressure level in auditory distance discrimination. Journal of Acoustical Society of America, 92, 794-802.
- Clifton, R. K. (1992) The development of spatial hearing in human infants. In L.A. Werner and E.W. Rubel (Eds.), Developmental psychoacoustics. Washington, D.C.: American Psychological Association. Pp. 135-157.
- Clifton, R. K., Muir, D. W., Ashmead, D. H., & Clarkson, M. G. (1993) Is visually guided reaching in early infancy a myth? Child Development, 64, 1099-1110.
- Swain, I.U., Zelazo, P. R., & Clifton, R. K. (1993) Newborn memory for speech sounds retained over 24 hours. Developmental Psychology, 29, 312-323.
- Clifton, R. K., Freyman, R. L., Litovsky, R. Y., & McCall, D. (1994) Listeners' expectations about echoes can raise or lower echo threshold. Journal of Acoustical Society of America, 95, 1525--1533.
- Clifton, R., Rochat, P., Robin, D., & Berthier, N. (1994) Multimodal perception in human infants. Journal of Experimental Psychology: Human Perception & Performance, 20, 876-886.
- Shinn-Cunningham, B. G., Zurek, P. M., Durlach, N. I., & Clifton, R. K. (1995) Cross-frequency interactions in the precedence effect. Journal of Acoustical Society of America, 98, 164-171.
- Clarkson, M. G. & Clifton, R. K. (1995) Infants' pitch perception: Inharmonic tonal complexes. Journal of Acoustical Society of America, 98, 1372-1379.
- Berthier, N., Clifton, R., Gullipalli, V., McCall, D., & Robin, D. (1996) Visual information and object size in the control of reaching. Journal of Motor Behavior, 28, 187-197.
- Robin, D., Berthier, N., & Clifton, R. (1996) Infants' predictive reaching for moving objects in the dark. Developmental Psychology, 32, 824-835.
- Clifton, R. K. & Freyman, R. L. (1997) The precedence effect: Beyond echo suppression. In Robert H. Gilkey & Timothy R. Anderson (Eds.), Binaural and spatial hearing in real and virtual environments, Mahwah, NJ: Lawrence Erlbaum Associates. PP. 233-255.
- Clifton, R. K. & Berman, P. W. (1997) Preface to Attention and orienting: Sensory and motivational processes, P. J. Lang, R. F. Simons, & M. T. Balaban (Eds.), Mahwah, NJ: Lawrence

Erlbaum Associates. Pp. ix-xiv.

Bertenthal, B. I. & Clifton, R. K. (1998) Perception and action. In W. Damon, D. Kuhn, and R. Siegler (Eds.), Handbook of child psychology, Vol. 2: Cognition, perception, and language. New York: Wiley.

Schilling, T. H. & Clifton, R. K. (in press) Nine-month-old infants learn about a physical event in a single session: Implications for infants' understanding of physical phenomena. Cognitive Development.

Goubet, N. & Clifton, R. K. (1998) Object and event representation in 6 1/2 month-old infants. Developmental Psychology, 34, 63-76.

McCall, D. M., Freyman, R. L., & Clifton, R. K. (in press) Sudden changes in spectrum of an echo cause a breakdown of the precedence effect. Perception & Psychophysics.

Freyman, R. L., McCall, D. M., & Clifton, R. K. (in press) Intensity discrimination for precedence effect stimuli. Journal of Acoustical Society of America. May, 1997.

McCarty, M. E., Clifton, R. K., & Collard, R. R. (submitted) Problem solving in infancy: The emergence of an action plan. Cognition.