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This Week's Citation Classic

Dember W N & Earl R W. Analysis of exploratory, manipulatory, and curiosity behaviors. *Psychol. Rev.* 64:91-6, 1957.
[University of Michigan, Ann Arbor, MI]

Exploration, manipulation, and curiosity are classified in the category of attention. Two determinants of attention, temporal and spatial change, are identified and symbolically represented in Coombsian terminology. Stimuli arouse attention through their ability to increase the perceiver's level of complexity. [The *Social Sciences Citation Index*® (*SSCI*®) indicates that this paper has been cited in over 150 publications since 1966.]

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"This article was one of several products of a close collaboration with Robert W. Earl when we were graduate students in psychology at the University of Michigan in the early- and mid-1950s. We both worked in Edward L. Walker's lab on the phenomenon of spontaneous alternation behavior in rats. In essence, if rats enter one arm of a T-maze on a given trial, they are highly likely to enter the other arm on the next trial, at least until differential reinforcement leads to their consistently choosing one of the arms. We saw conventional rewards as transforming an inherent pattern of variability into one of stereotypy. We began to think of animals and people as being highly responsive to stimulus change, and stimulus change in turn as underlying a variable we dubbed complexity. Calling on the measurement theory of Clyde H. Coombs, we noted that organisms as well as stimuli could be assigned a complexity measure. An organism's complexity, the ideal, corresponds to the value of the most complex stimulus which the organism can comfortably process. An organism will prefer to interact with stimuli closest to the ideal, generating an inverted U-shaped preference function.

"During that period, our thinking was honed by hours of discussion and sometimes dispute with Walker. Only much later did I come to realize that Walker's resistance was intended not only to get us to think more clearly but also to strengthen our resolve to prove him wrong.

"The *Citation Classic* was initially written in an effort to clarify our ideas for an undergraduate student who wished to do her senior thesis[1] under my direction. I wrote a draft over one weekend; Earl revised and improved it. In a fit of grandiosity, we submitted it to *Psychological Review* and were stunned and delighted when we learned that it had been accepted for publication. A direct test of the theory, actually completed before the theory took final form, was also published.[2] For his dissertation,[3] Earl applied the theory to the choices made by adolescent boys of puzzles to work on, and also added the vital concept of the pacer stimulus—that is, a stimulus just a little more complex than the ideal. It is pacers, we believe, that make the world interesting by providing a vehicle for increasing one's complexity.

"Earl and I were fortunate in subsequent years to have had a number of superb graduate students who further tested and extended the theory. We also were gratified to find our mentor, Walker, developing and testing his own version of the theory, and recently telling the complexity story in considerable detail and with great charm.[4]

"The ideas expressed in our article were 'in the air.' We synthesized them and presented them in a simple, formal manner. I believe our notions caught on and were cited because they appeared at the right time in the right place, were broadly applicable, and were essentially correct."

1. **Dember W N & Millbrook B A.** Response by rats to the greater of two brightness changes. *Psychol. Rep.* 2:465-7, 1956.
2. **Dember W N, Earl R W & Paradise N.** Response by rats to differential stimulus complexity. *J. Comp. Physiol. Psychol.* 50:514-18, 1957.
3. **Earl R W.** *Problem-solving and motor skill behaviors under conditions of free-choice.* PhD dissertation. Ann Arbor, MI: University of Michigan, 1957.
4. **Walker E L.** *Psychological complexity and preference: a hedgehog theory of behavior.* Monterey, CA: Brooks/Cole, 1980. 569 p.