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Technical Report 580

A BIBLIOGRAPHY ON THE USE  
OF INFORMATION THEORY  
IN PSYCHOLOGY (1967-1981)

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Research Institute for the Behavioral and Social Sciences  
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**Technical Report 580**

**A BIBLIOGRAPHY ON THE USE  
OF INFORMATION THEORY  
IN PSYCHOLOGY (1967-1981)**

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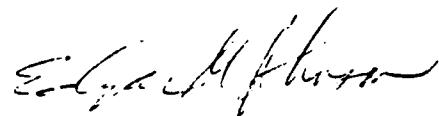
**FOREWORD**

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Information theory has proven to be a fruitful paradigm for the evaluation of human performance in systems development. The value of the 1967, 1970 Information Theory Bibliographies by Johnson was limited only by the limitations of the period covered. This limitation has been assuaged by the present publication which updates a researcher's most valuable tool, the gathering of critical references into one place.

This Technical Report extends and updates the previous bibliographies on Information Theory and thereby provides a convenient source of information from which researchers may proceed.

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A BIBLIOGRAPHY ON THE USE OF INFORMATION THEORY  
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## INTRODUCTION

Since Shannon's first formal treatise on information theory was formulated more than three decades ago, the terminology and the various measures of information theory have become firmly ingrained in psychology. In fact, information theory provided the initial impetus to the information-processing approach to psychology, which has since tended to dominate considerations of the basic underlying behavioral processes. Although the initial high hope that information theory would offer some universal measure of human performance capacity has generally been abandoned, the various metrics of information theory have turned out to be useful as quantitative measures of human information processing in a variety of task situations. Evidence of the potential usefulness of information theory for psychological measurements is provided by the more than 1600 such applications reported to date.

In his survey covering the period 1948-1966, Johnson (1967, 1970)\* lists a total of 942 studies using information-theory measures in psychology. The present bibliography identifies another 661 such publications for the period 1967-1981. As in Johnson's bibliography, the present one attempts to index the articles according to various areas of psychology.

\* Johnson, E. M. A Bibliography on the Use of Information Theory in Psychology (1948-1966). U. S. Army Human Engineering Laboratories, Aberdeen Proving Ground, Maryland, December 1967; with an Addendum, December 1970.

## SCOPE

This bibliography is limited to those articles that use information-theory measures in psychology, and does not include articles that simply use the verbal terminology of information theory. Of the various texts and survey articles dealing with information theory, only those discussing its relevance to psychology have been included in this bibliography. Also, of the substantial number of published studies using the well-known Fitts' paradigm and index of difficulty for motor control tasks, only those studies that have used the information-theoretic interpretation of this index and the "bits per movement" unit of measurement have been included in the bibliography.

A couple of additional restrictions were imposed. First, the literature search was confined to journals, texts and reports in the English language. Second, theses and dissertations were excluded.

## CONDUCT OF THE SEARCH

Computerized literature searches served as the starting point for the project. The following databases (and coverage periods) were used:

PSYCINFO -- Psychological Abstracts Information Service (1967-81)

SCISEARCH -- Science Citation Index and Current Contents (1974-81)

INSPEC -- Information Services in Physics, Electrotechnology, Computers and Control (1969-81)

ERIC -- Educational Resources Information Center (1967-81)

NIMH (NCMHI) -- National Clearinghouse for Mental Health Information (1969-81)

Managements Contents (1974-81).

The reference lists of the relevant articles from the computerized search were then screened for additional articles. Furthermore, the laborious process of manual search was carried out for a number of journals, especially those journals that appeared from the computerized search and from Johnson's bibliography to have relatively many relevant articles. The annual conference proceedings of the Human Factors Society and the International Conference on Cybernetics and Society were also searched manually. Finally, some of the most frequent

contributors of relevant articles were contacted personally for possible additional publications of relevance.

#### METHOD OF INDEXING

An attempt was made to classify each article according to the most appropriate category or area of psychology. A similar set of major categories and subcategories as that used by Johnson has also been adopted for the present bibliography. Cross-coding between categories is used to some extent. Thus, for example, if some variant of Hick-Hyman's law of reaction time is used in Sternberg's memory scanning paradigm as part of a study of aging, the article is coded to three categories: "choice reaction time", "retention" and "age". In general, coding is primarily by area of application of information theory rather than by substantive content of an article.

When using the bibliography, consult the Index to identify descriptors of interest, then turn to Facsimile of Subject Matter File to locate the report accession numbers relevant to those descriptors.

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