

# STATISTICS MEETS PSYCHOLOGY

## *The Inspiration of John van de Geer*



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## Fortuna & Sapientia:

Old idea of  
Chance and Knowledge  
in opposition  
(source: Petrarca, ed. 1524)

## Statistics:

Chance processes are  
a *resource* for the scientist,  
to distinguish random  
from systematic variability



# Paradigm Shifts in Psychology

**A:**

**Nature + Nurture**



**Variability of  
Mind and Behavior**

*Retrospective explanations:* Correlational method

**B:**

**Stimulus**



**Black  
Box**



**Response**

*Behaviorism:* Simple experiments (often without statistics)

**C:**

**Stimulus  
Variability**



**Cognitive and  
Motivational  
processes**



**Response  
Variability**

*"Cognitive Revolution":* Complex Designs

# John van de Geer

(1926-2008)

Wrote the first *Annual Review* paper about the emerging cognitive revolution (upon invitation)

## COGNITIVE FUNCTIONS<sup>1,2</sup>

BY JOHN P. VAN DE GEER AND JOSEPH M. F. JASPARS

*University of Leiden, Leiden, The Netherlands*

Although this is the first chapter on Cognitive Functions ever written for the Review, previous volumes did have something to say about the subject. This is true at least since 1957 when 'cognition,' after a few preceding inconclusive attempts, definitely entered the Subject Index. If one traces these references one will find not only instances where 'cognition' is incidentally mentioned, but often enough one comes across complete sections under such headings as Cognitive Theories, Cognitive Styles, Cognitive Functions, and Cognitive Development. They appear in a diversity of chapters: Social Psychology, Group Dynamics, Personality Structure, Learning, Psychology in the USSR, and Developmental Psychology. This suggests that a chapter on cognitive functions may cover almost the whole of psychology. One becomes fortified in this view by noting the variety of topics that in a publication may shelter behind a title which includes the word 'cognition.' As an example we may mention a recent volume of readings collected under the title *The Cognitive Processes* (84). This anthology encompasses all complex human activities; it ranges from Motivation, via Neobehaviorism, Information Processing, and Computer Models, to Personality and Cognitive Development.

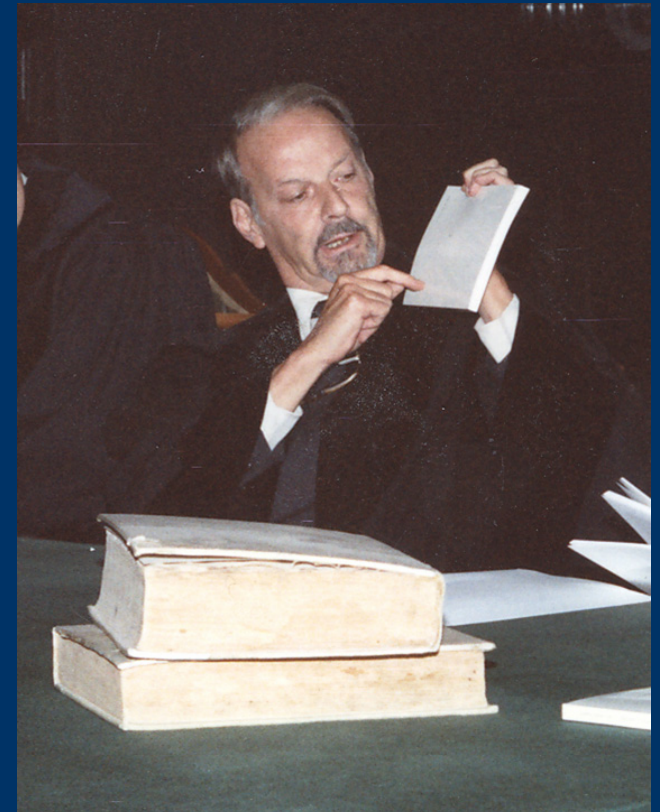
*Annual Review of Psychology*, 17 (1966), 145-176

## Career

- 1947: started study Psychology in Leiden (professor Chorus 1<sup>st</sup> chair)
- 1949: teaching assistant in statistics, learning, perception & thinking
- 1957: Ph.D. “A Psychological Study of Problem Solving”
- 1963: chair in experimental psychology and statistics
- 1970: chair in data theory & mathematical psychology
- 1987: retired

## Some Additional Affiliations:

- Institute for Perception TNO Soesterberg (1960-1970)
- Shelter Home for Female Juveniles (1953-1963)
- Center for Advanced Study in the Behavioral Sciences, Stanford (1968)





# John's Ideas About Consulting and Teaching

- a) **Discovery goes by trial and error**: the hypothetical-deductive process that scientists use to learn about nature is also valid in applied psychology, psychological counseling and consultation;
- b) **Learning must be contextualized**: instruction is more efficient if interactive and personalized—Van de Geer started programmed instruction for teaching statistics to psychology students;
- c) **Formalization helps**: often many names exist for the same concepts and methods → switch to the language of mathematics;
- d) **Cross-fertilization**: what we have learned to use in one context (e.g., psychology) should have good application in other contexts as well (e.g., political science).  
Same for biology ↔ psychology, ...

## Conclusions

1. John van de Geer influenced all major experimental psychologists in the Netherlands by his critical way of thinking and strong methodological skills.
2. He also influenced a whole generation of quantitative psychologists (home and abroad) by his analytical mind and strong sense of synthesis.
3. After founding of the Department of Data Theory, he thought that the natural next goal was to set up a cooperative effort joining behavioral and social statistics with biostatistics, mathematical statistics, agricultural statistics, and more.
4. As all godfathers, he always was ahead of his time...