Comparing the Sensitivity of Two Taxometric Techniques in Detecting the Schizotypal Taxonomy

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Meehl's Schizotypy

Meehl proposed a genetic diathesis for schizophrenia (Schizotaxia), which he argued would lead to the development of a distinctive personality organization (Schizotypy). In this inherently taxonic model, accurately detecting the underlying taxonomy is critical.

Taxometric Search

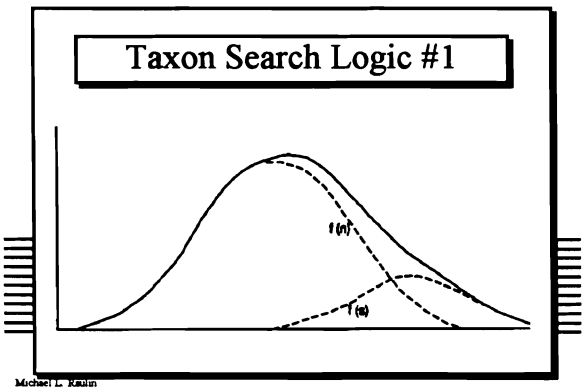
- Taxometric Search Techniques developed by Meehl and Colleagues, each based on Expected Mathematical Relationships if an Underlying Taxonomy Exists
- In this Study
  - MAXSLOPE (maximum slope technique)
  - MAXCOV (maximum covariance technique)

Search Process

- Referring to Taxon Search Logic Slides 1-7
  - (1) We assume that we have one or more moderately valid indicators (mean difference between taxa, but considerable overlap) or an underlying taxonomy as shown in Slide 1
  - (2) We want to identify the optimal classification score (termed HITMAX because it maximizes the number of correct classifications), which is where the curves cross

Search Process

- (3) We will use a sliding interval as shown in Slide 3.
- (4) As we move the interval to the right, the proportion of schizotypes in the interval increases.
- (5) At HITMAX, the proportion of schizotypes is .50
- (6) Beyond HITMAX, schizotypes outnumber the non-schizotypes.


Taxon Search Logic #1
f (n)
f (s)
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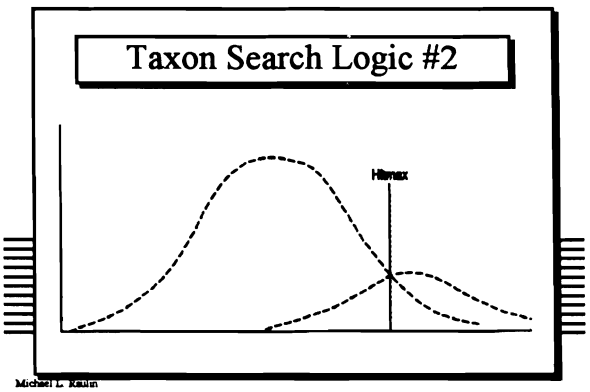
Taxon Search Logic #2
Hmax
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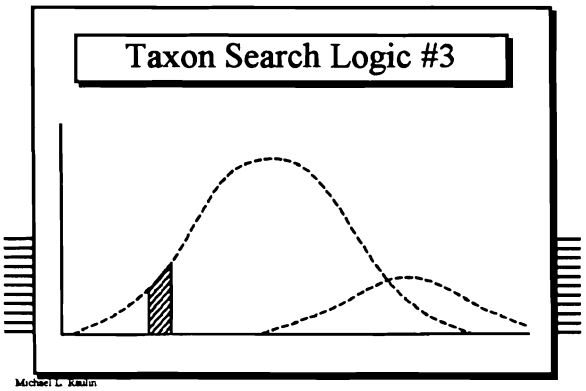
Taxon Search Logic #3
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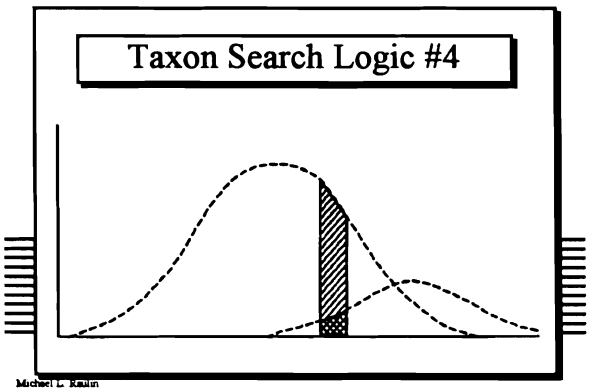
Taxon Search Logic #4
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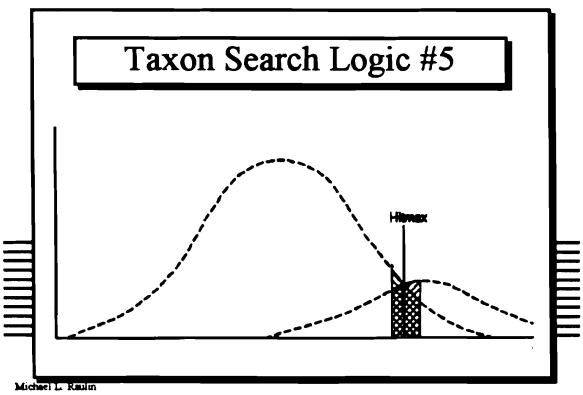
Taxon Search Logic #5
Hmax
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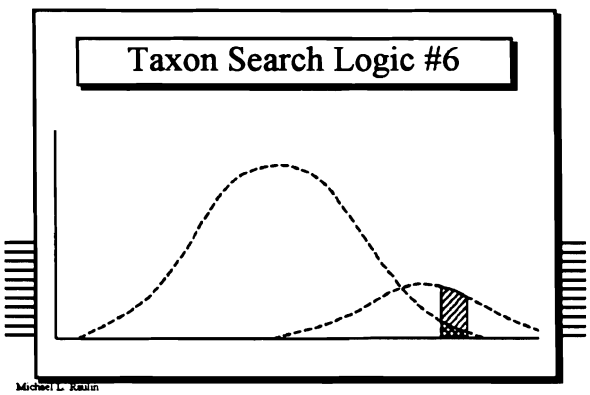
Taxon Search Logic #6
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Search Process

- Remember that we do not have the distributions indicated by the dotted lines
- We have only what is shown in Slide 7
- We do not know
  - whether the underlying distributions exist
  - the parameters of the distributions
- Task: Find mathematical criterion to identify HITMAX if taxons exist

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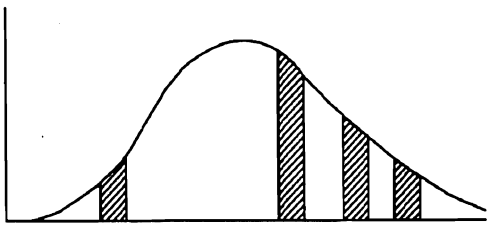
Taxon Search Logic #7



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Sample and Measures

- 5255 Subjects
  - 2752 Males
  - 2503 Females
- Completed Protocols and Low Infrequency Scores
- Perceptual Aberration
- Magical Ideation
- Cognitive Slippage
- Infrequency Scale

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MAXCOV

- Requires 3 Indicators that are Pairwise Uncorrelated Within Taxa
- Procedure
  - Sliding Interval on Input Variable (X)
  - Compute Cov_{YZ} for Subjects in Each X Interval
  - Largest Covariance Found at HITMAX

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MAXCOV Results

- Each Input Variable Detected a HITMAX
- Base Rate Estimates ranged from 7 to 10%
- Consistent with
  - Each Other
  - Other Data (Korfine & Lenzenweger, 1995; Lenzenweger & Korfine, 1992)
  - Expected Values from Genetic Models

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MAXSLOPE Procedure

- Like MAXCOV, a Sliding Interval is Used
- Requires Two Moderately Valid Indicators
- For Each Interval on X, Compute the Slope of the Regression Line Predicted Y from X
- Slope is Maximal near HITMAX, where the Taxon Mixture is 50/50
- With 3 Indicators, 6 Analyses are Possible

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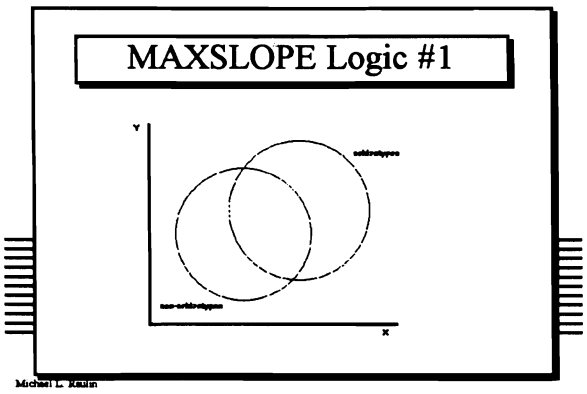
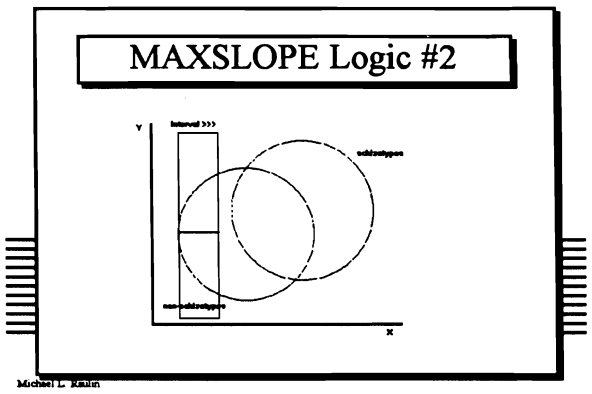
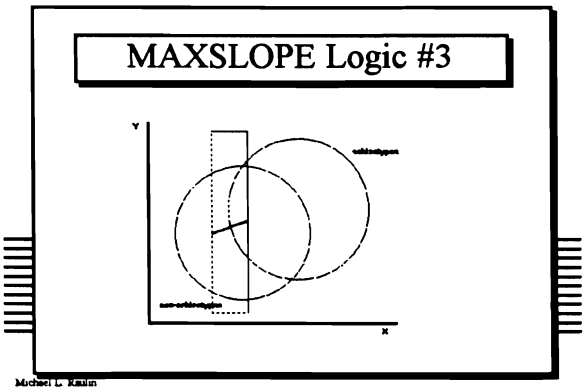
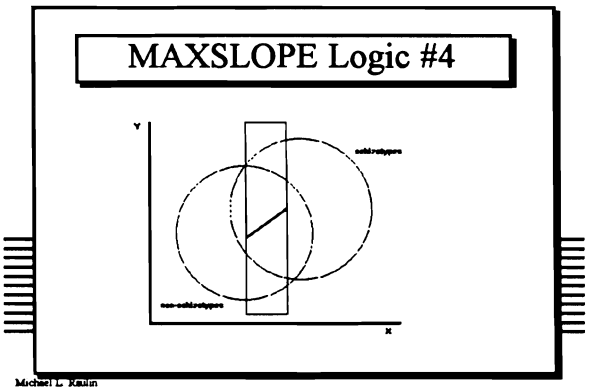
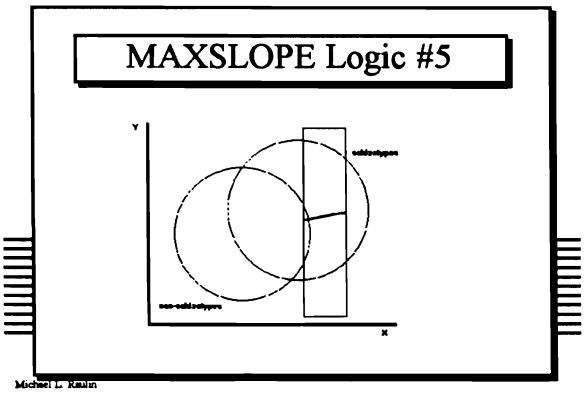
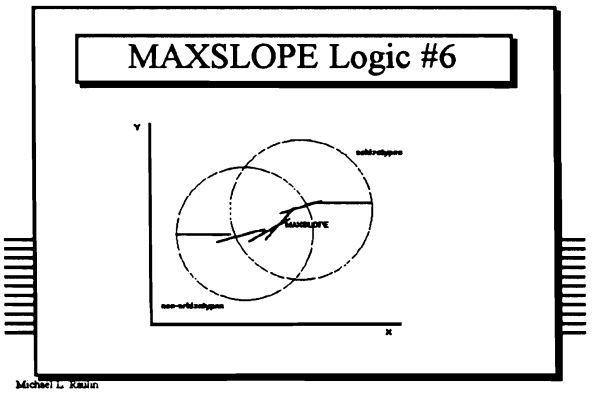

MAXSLOPE Logic #1


MAXSLOPE Logic #2


MAXSLOPE Logic #3


MAXSLOPE Logic #4


MAXSLOPE Logic #5


MAXSLOPE Logic #6

HITMAX Estimates

	MAXCOV	MAXSLOPE1	MAXSLOPE2
Perceptual Aberration	19	15	15
Magical Ideation	24	21	21
Cognitive Slippage	24	24	24

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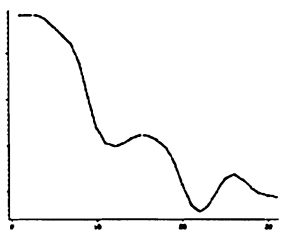
Perceptual Aberration



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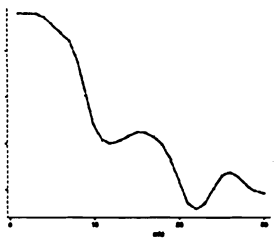
Perceptual Aberration



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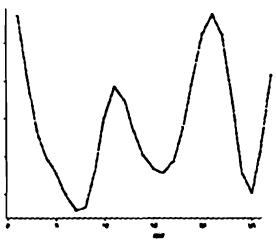
Magical Ideation



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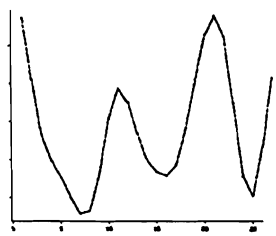
Magical Ideation



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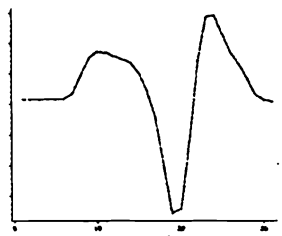
Cognitive Slippage



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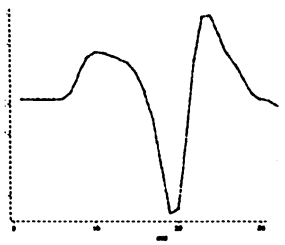
Cognitive Slippage



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Summary of Findings #1

- The slope curves are NOT as expected
  - Especially the early part of the curve
  - If you ignore the early part of each curve, we get a pattern similar to the MAXCOV curves
    - » rise to a peak, but always with a dip before the highest peak
    - » highest peak is a reasonable location for HITMAX
    - » Excellent agreement on HITMAX location for the MAXCOV and MAXSLOPE procedures

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Summary of Findings #2

- Although the curves are not consistent with the theory, they do not appear to be random
- Base rate estimates from the MAXSLOPE procedure are clearly wrong (some exceeding the maximum range of 0-1)

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Conclusions

- These data raise questions about the hypothesized taxonomy of schizotypy
- However, excluding the inexplicable first part of each curve, there is remarkable overlap between MAXCOV and MAXSLOPE estimates of HITMAX
- MAXSLOPE poor at estimating base rate
- More Monte Carlo studies needed

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