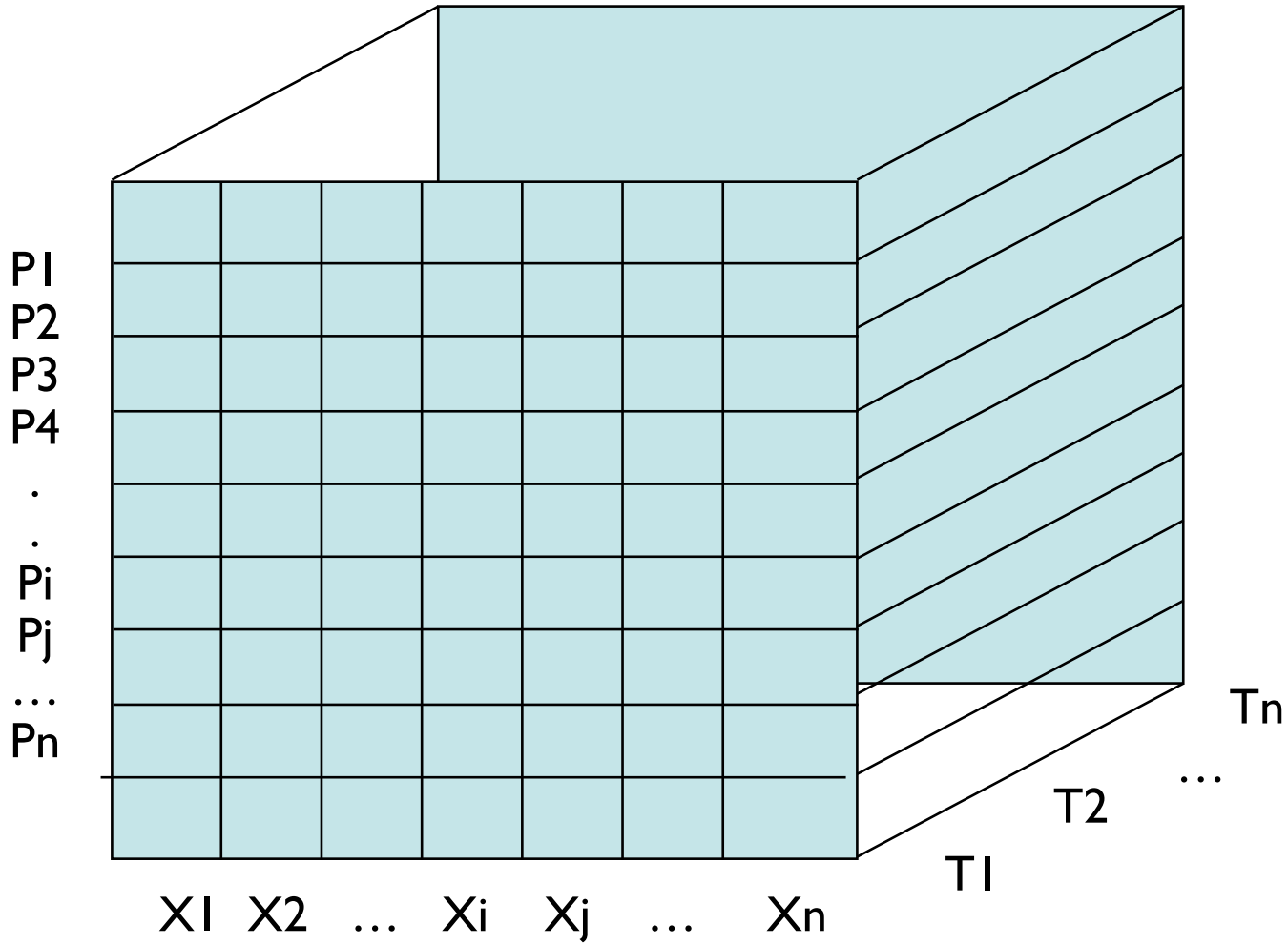
The data box

Multiple ways of assessment

The data box: measurement across time, situations, items, and people



Cattell's data box

Integrating People, Variables, and Occasions

- Person x Variables
  - Variables over People, fixed Occassion (R)
  - People over Variables, fixed Occasion (Q)
- Person x Occasions
  - People over Occasions, fixed Variable (S)
  - Occasions over People, fixed Variable (T)
- Variables x Occassions
  - Variables over Occasions, fixed People (O)
  - Occasions over Variables, fixed People (P)

Traditional measures

- Individuals across items
  - correlations of items taken over people to identify dimensions of items which are in turn used to describe dimensions of individual differences
    - Ability
    - Non-cognitive measures of individual differences
      - stable: trait
      - unstable: state
- INDSCAL type comparisons of differences in structure of items across people
- 3 Mode Factor Analysis

Other ways of measurement

- Example of measurement of the structure of mood
  - between subjects
  - within subjects

Introversion/Extraversion as one dimension of affect/behavior space

- Personality trait description
  - Introversion/Extraversion
  - Neuroticism Stability
- Affective Space
  - Positive Affect
  - Negative Affect
- Behavior
  - Activation and Approach
  - Inhibition and Avoidance

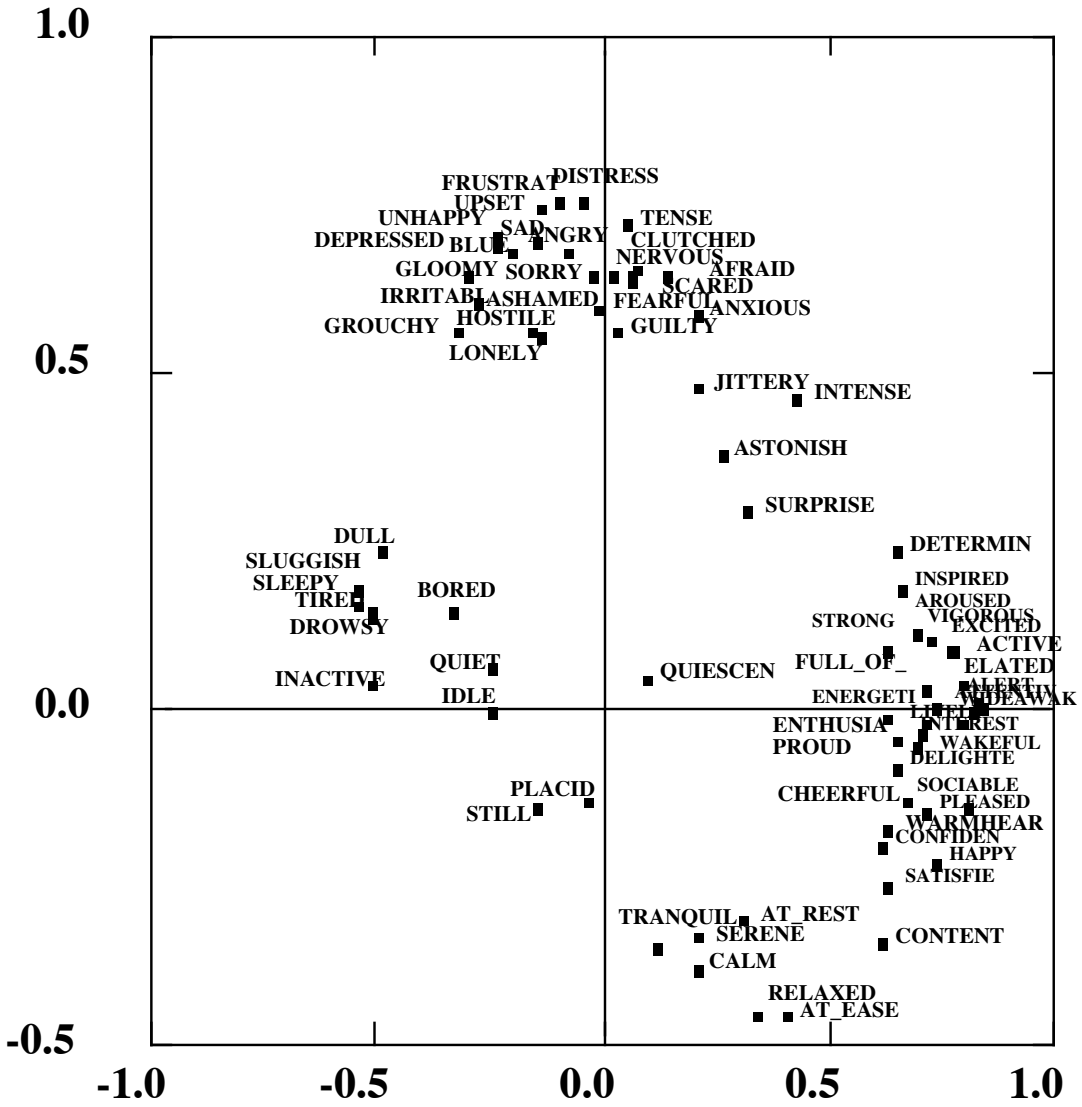
Personality and Emotions

- Standard model
  - Dimensional model of personality
    - Particularly Extraversion and Neuroticism
  - Dimensional model of emotions
    - Positive Affect and Negative Affect
  - Dimensional congruence
    - Extraversion and Positive Affectivity
    - Neuroticism and Negative Affectivity

Measuring the dimensions of affect

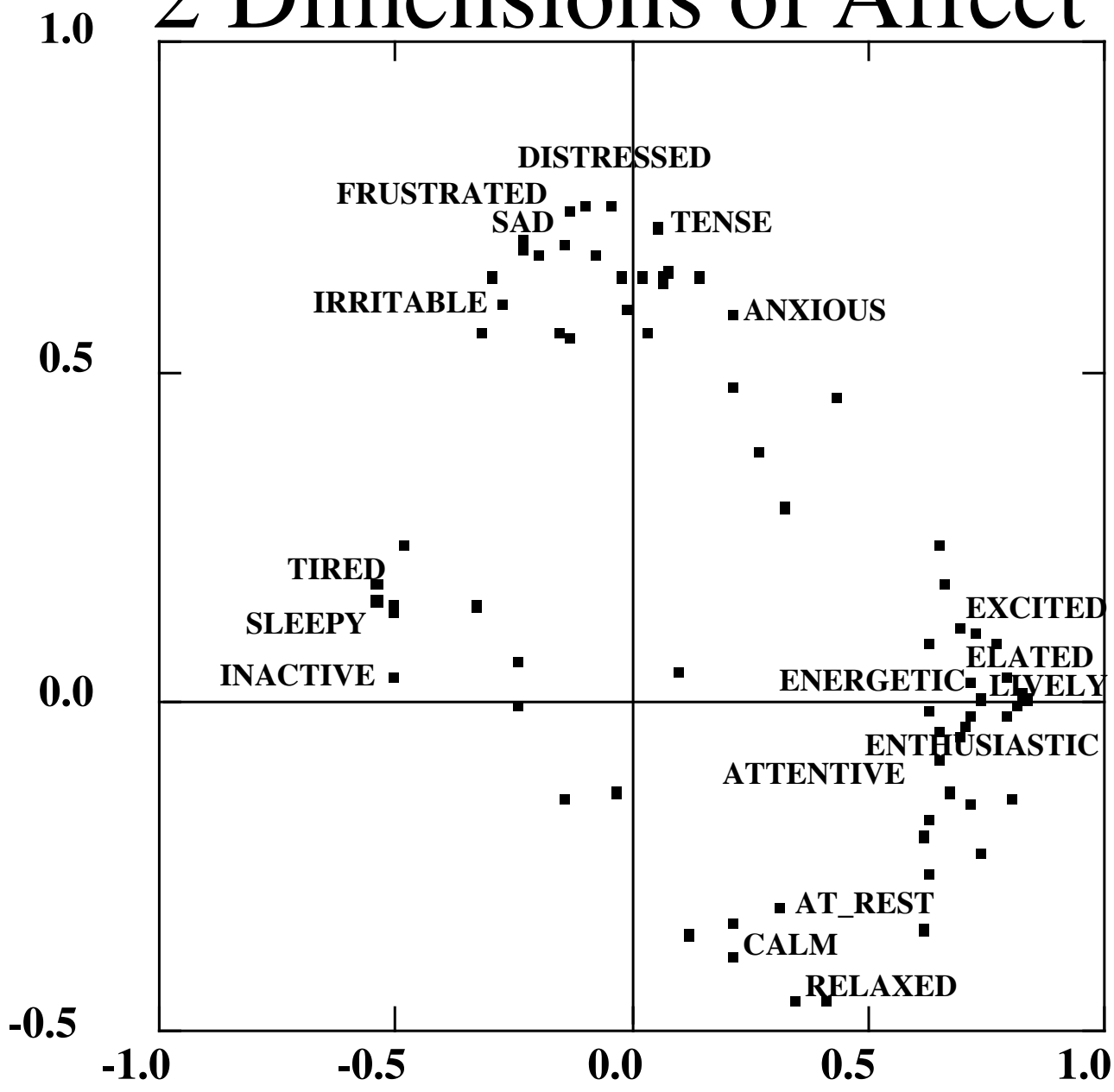
- Motivational state questionnaire (MSQ)
  - 70-72 items given as part of multiple studies on personality and cognitive performance
  - Items taken from
    - Thayer's Activation-Deactivation Adjective Checklist (ADACL)
    - Watson and Clark Positive Affect Negative Affect Scale (PANAS)
    - Larsen and Diener adjective circumplex
  - MSQ given before and after various mood manipulations
    - Structural data is from before
- Structural results based upon factor analyses of correlation matrix to best summarize data

2 Dimensions of Affect



Energetic Arousal/Positive Affect

2 Dimensions of Affect



Representative MSQ items (arranged by angular location)

Item	EA-PA	TA-NA	Angle
energetic	**0.8**	0.0	1
elated	**0.7**	0.0	2
excited	**0.8**	0.1	6
anxious	0.2	**0.6**	70
tense	0.1	**0.7**	85
distressed	0.0	**0.8**	93
frustrated	-0.1	**0.8**	98
sad	-0.1	**0.7**	101
irritable	-0.3	**0.6**	114
sleepy	**-0.5**	0.1	164
tired	**-0.5**	0.2	164
inactive	**-0.5**	0.0	177
calm	0.2	**-0.4**	298
relaxed	0.4	**-0.5**	307
at ease	0.4	**-0.5**	312
attentive	**0.7**	0.0	357
enthusiastic	**0.8**	0.0	358
lively	**0.9**	0.0	360

Personality and Emotions

- Standard model
  - Dimensional model of Personality
    - Behavioral Activation/Approach <-> Extraversion
    - Behavioral Inhibition <-> Neuroticism
  - Dimensional model of Emotions
    - Positive Affect
    - Negative Affect
    - Arousal?
  - Dimensional congruence
    - Extraversion, Approach, and Positive Affectivity
    - Neuroticism, Inhibition, and Negative Affectivity

Personality measurement: snapshot or movie?

- Cross sectional measurement of a person is similar to a photograph-- a snapshot of a person at an instant.
- Appropriate measurement requires the integration of affect, behavior, and cognition across time.

Personality and affect: within subject measurements

- High frequency sampling: the example of body temperature

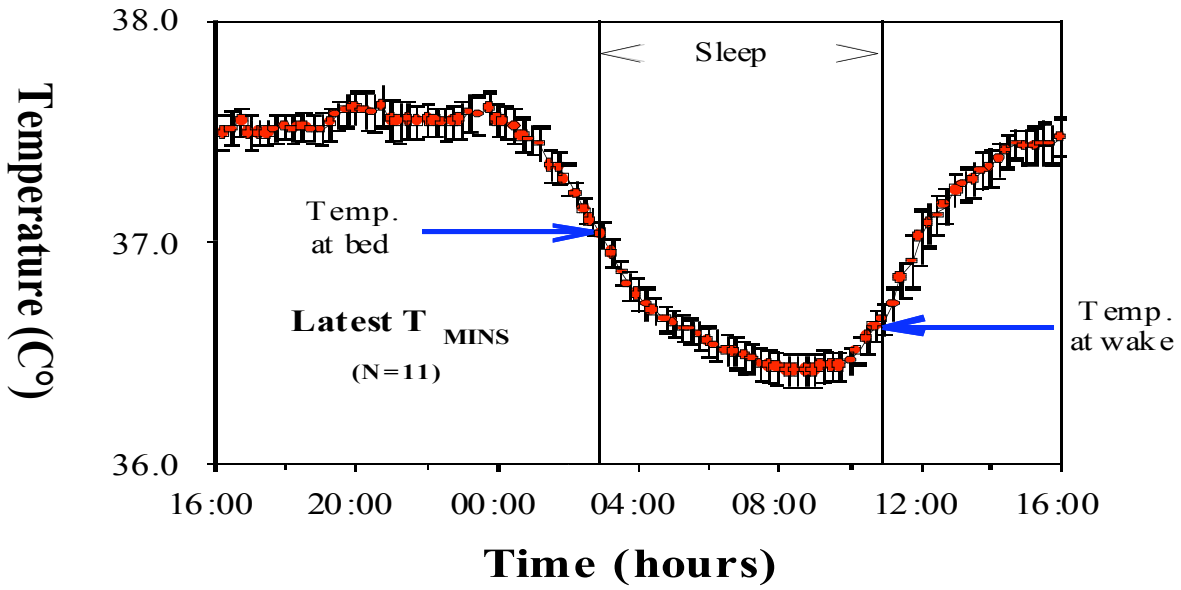
- Low frequency sampling: palm pilot sampling of affect

Within subject diary studies-1

- Very High Frequency (continuous) measurements
  - Physiological assays
    - Cortisol
    - Body temperature <--
      - Core body temperature collected for ≈ 2 weeks
      - Data taken by aggregating subjects from multiple studies conducted by Eastman and Baehr on phase shifting by light and exercise

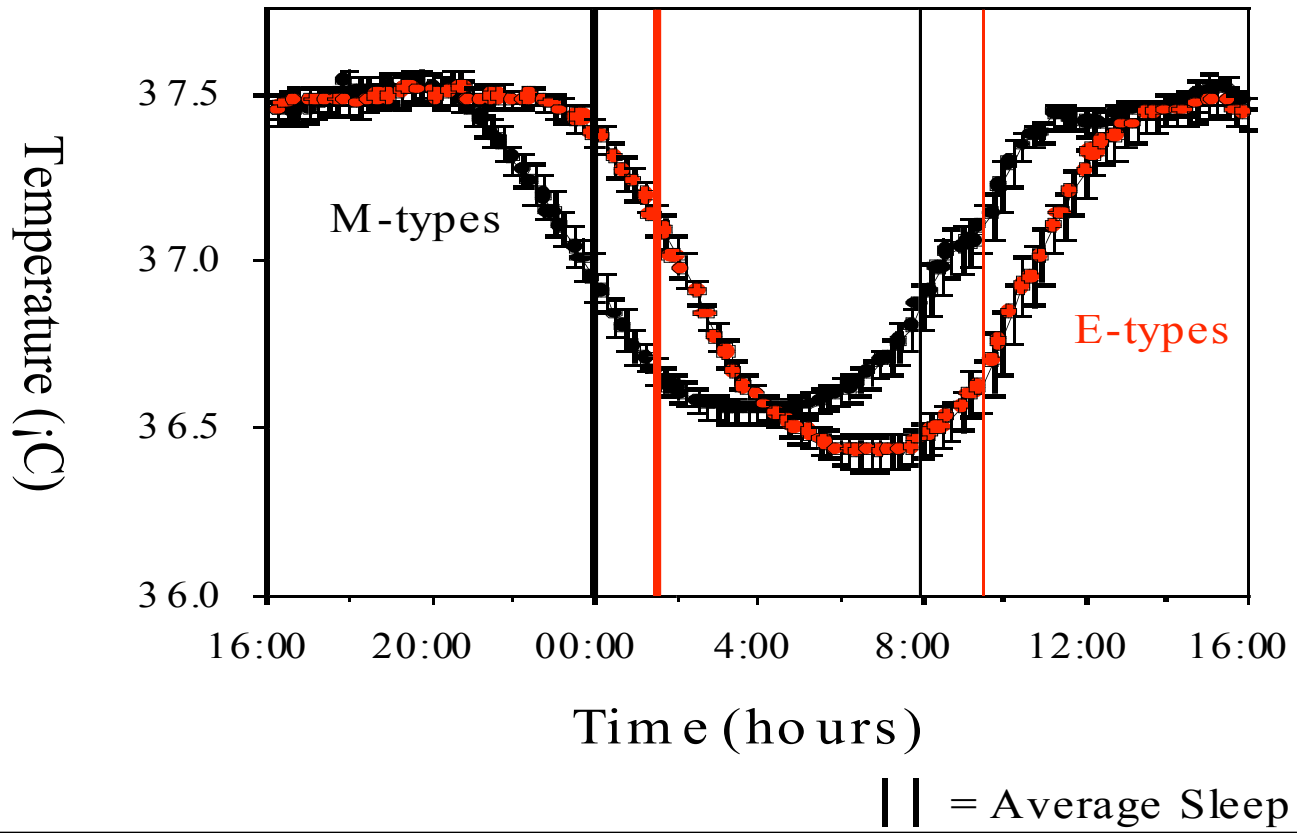
Body Temperature as f(time of day)

(Baehr, Revelle & Eastman, 2000)



Morningness/Eveningness and BT

(Baehr, Revelle and Eastman, 2000)



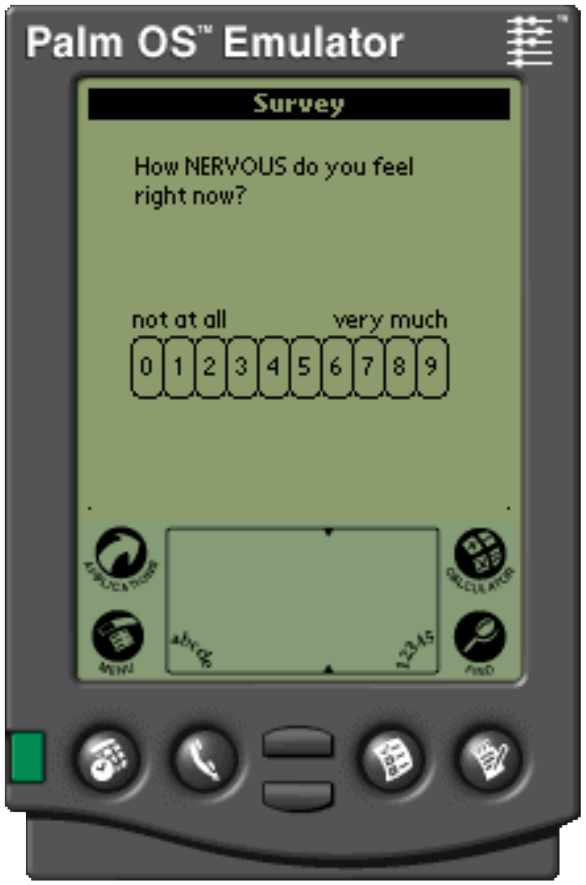
Within subject diary studies-2

- Measures
  - Check lists
  - Rating scales
- High frequency sampling <--
  - Multiple samples per day
- Low frequency sampling
  - Once a day
  - Sometimes at different times

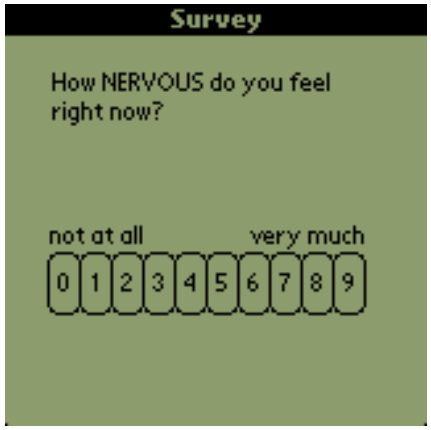
High frequency measures of affect

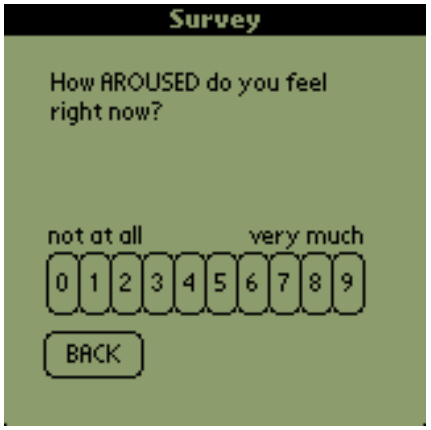
- Measures taken every 3 hours during waking day for 6-14 days
- Paper and pencil mood ratings
  - Short form of the MSQ -- Visual Analog Scale
  - Sampled every 3 hours
- Portable computer (Palm) mood ratings <--
  - Short form of the MSQ
  - Sampled every 3 hours

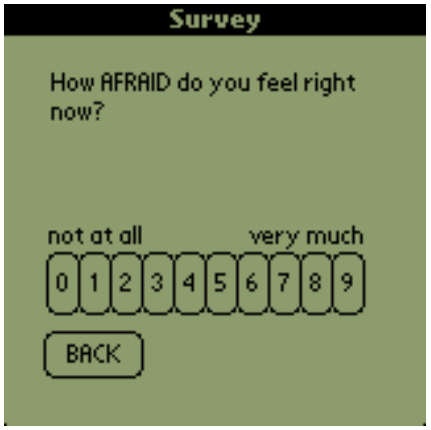
Palm Affect Survey

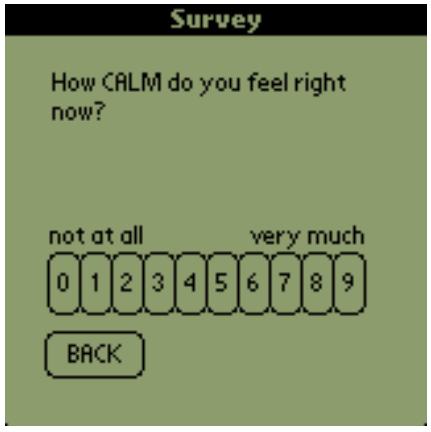


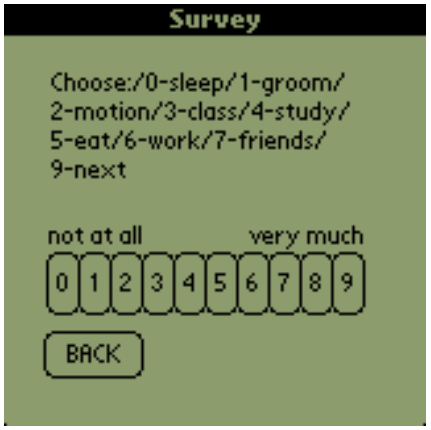
Palm affect and activity survey

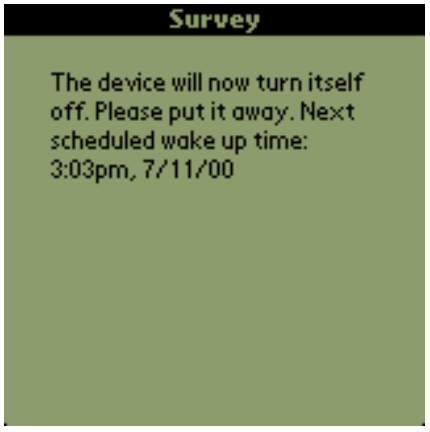












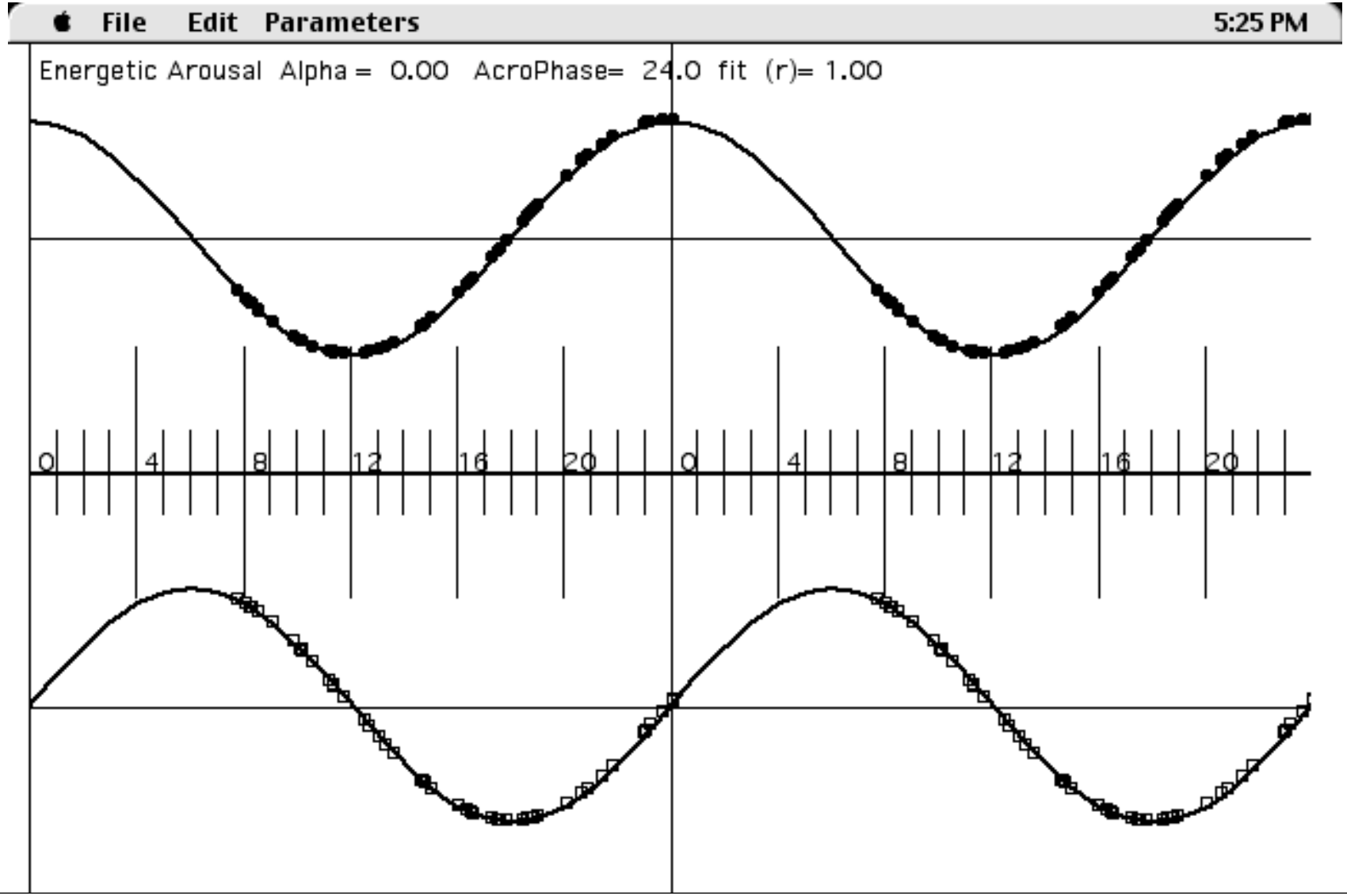
Traditional measures

- Mean level
  - Energetic arousal
  - Tense arousal
  - Positive affect
  - Negative affect
- Variability
- Correlation across measures (Synchrony)

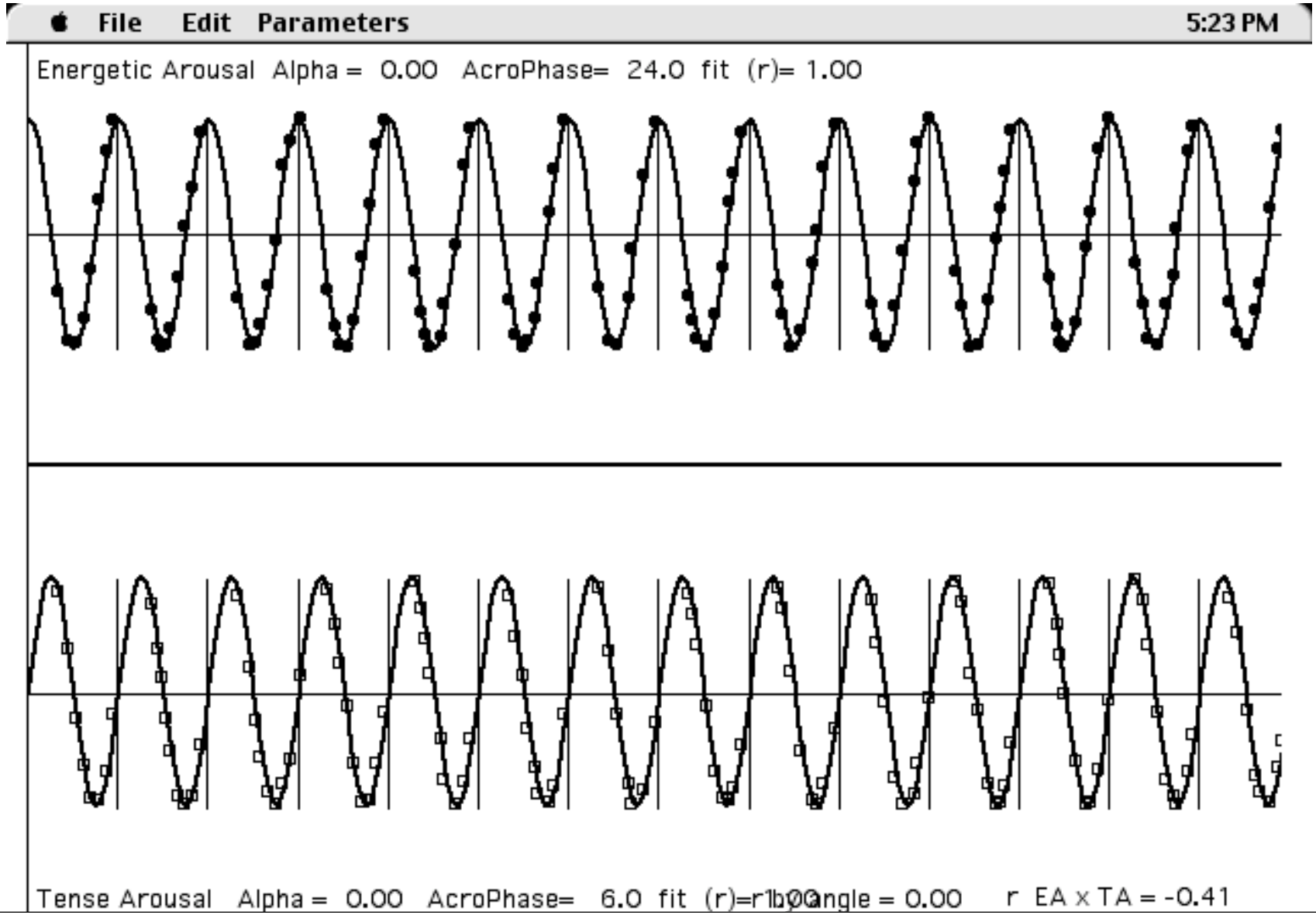
Phasic measures of affect

- Fit 24 hour cosine to data
  - Iterative fit for best fitting cosine
  - Permutation test of significance of fit
- Measure
  - Fit (coherence)
  - Amplitude
  - Phase

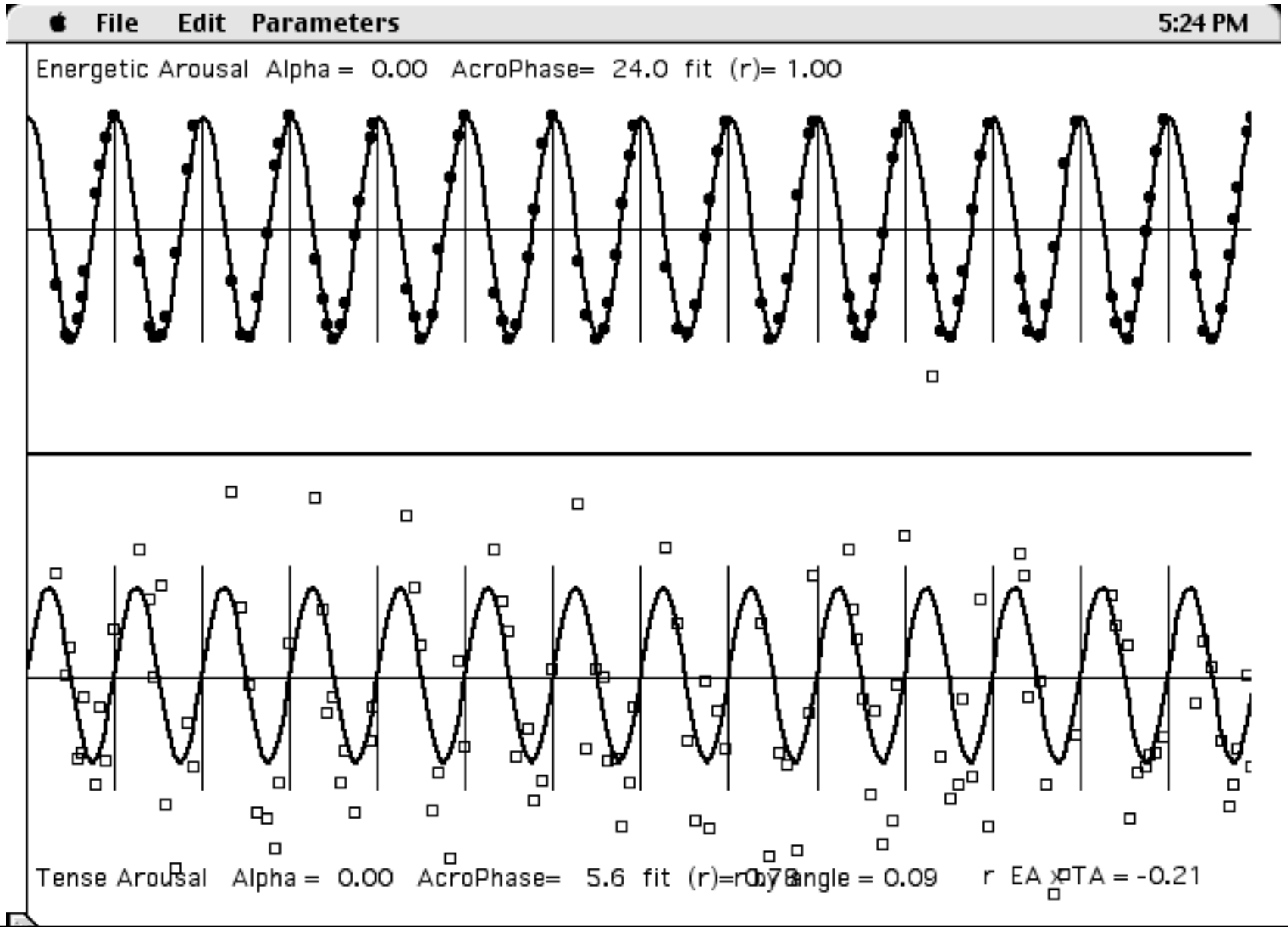
Affective rhythms can differ in phase (simulation - double plotted to show rhythm)



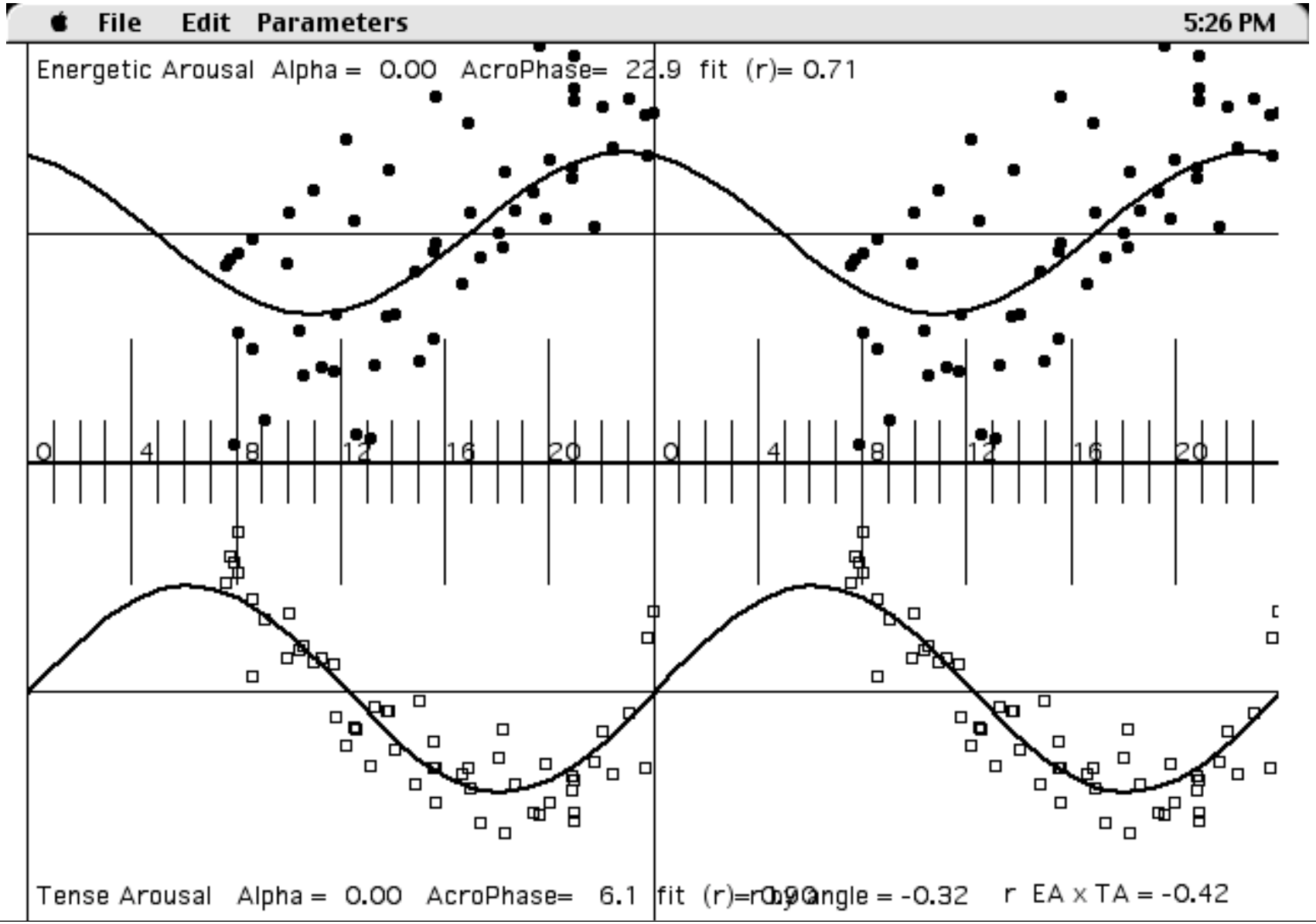
Phase differences of simulated daily data

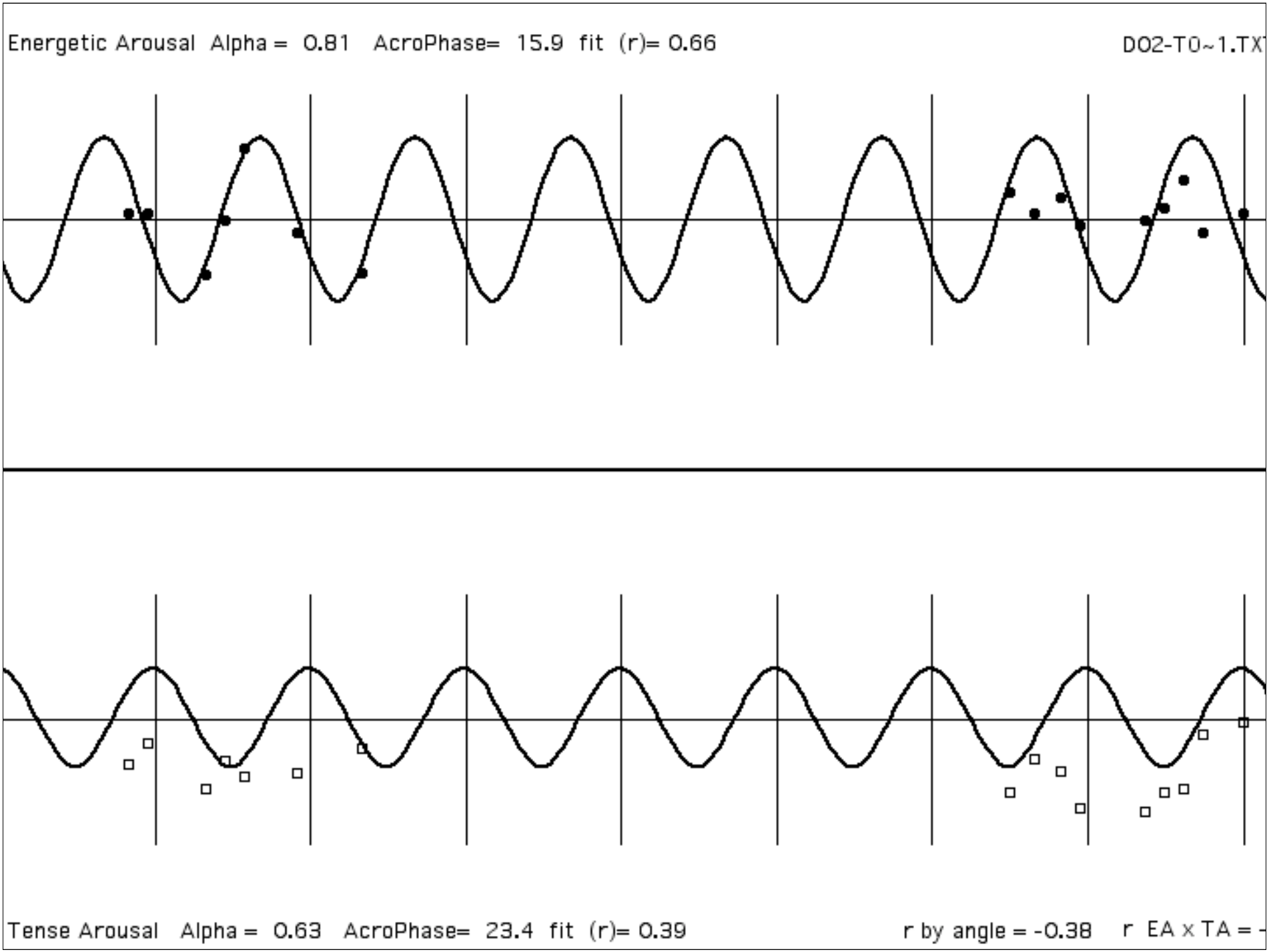


Differences in coherence (fit) simulated daily data



Phase and Coherence differences (simulated data -- double plotted)

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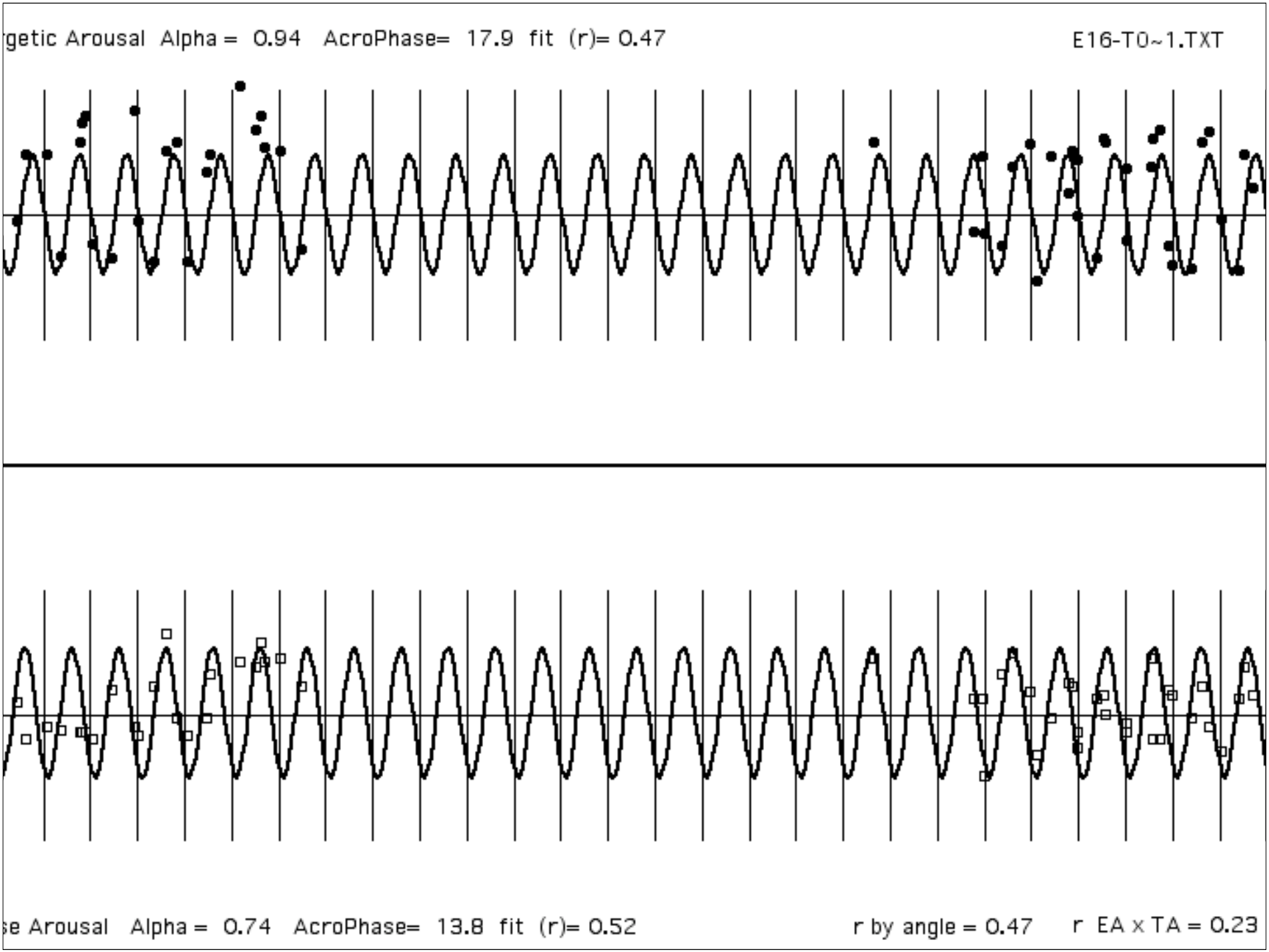
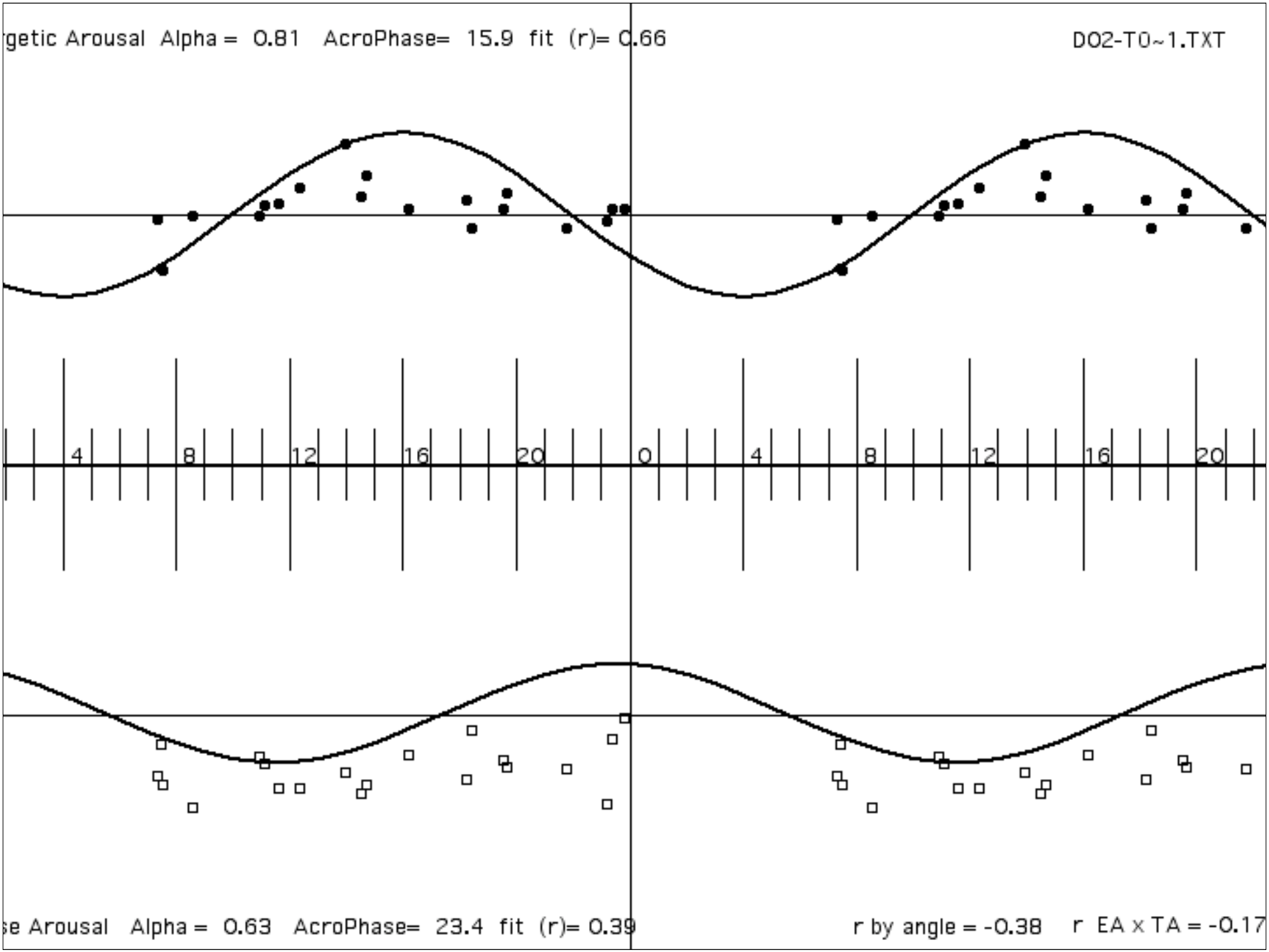
DO2-T0~1.TX
Tense Arousal Alpha = 0.63 AcroPhase= 23.4 fit (r)= 0.39
r by angle = -0.38
r EA x TA = -


getic Arousal Alpha = 0.94 AcroPhase= 17.9 fit (r)= 0.47
E16-T0~1.TXT
se Arousal Alpha = 0.74 AcroPhase= 13.8 fit (r)= 0.52
r by angle = 0.47
r EA x TA = 0.23


getic Arousal Alpha = 0.81 AcroPhase= 15.9 fit (r)= 0.66
DO2-T0~1.TXT
4
8
12
16
20
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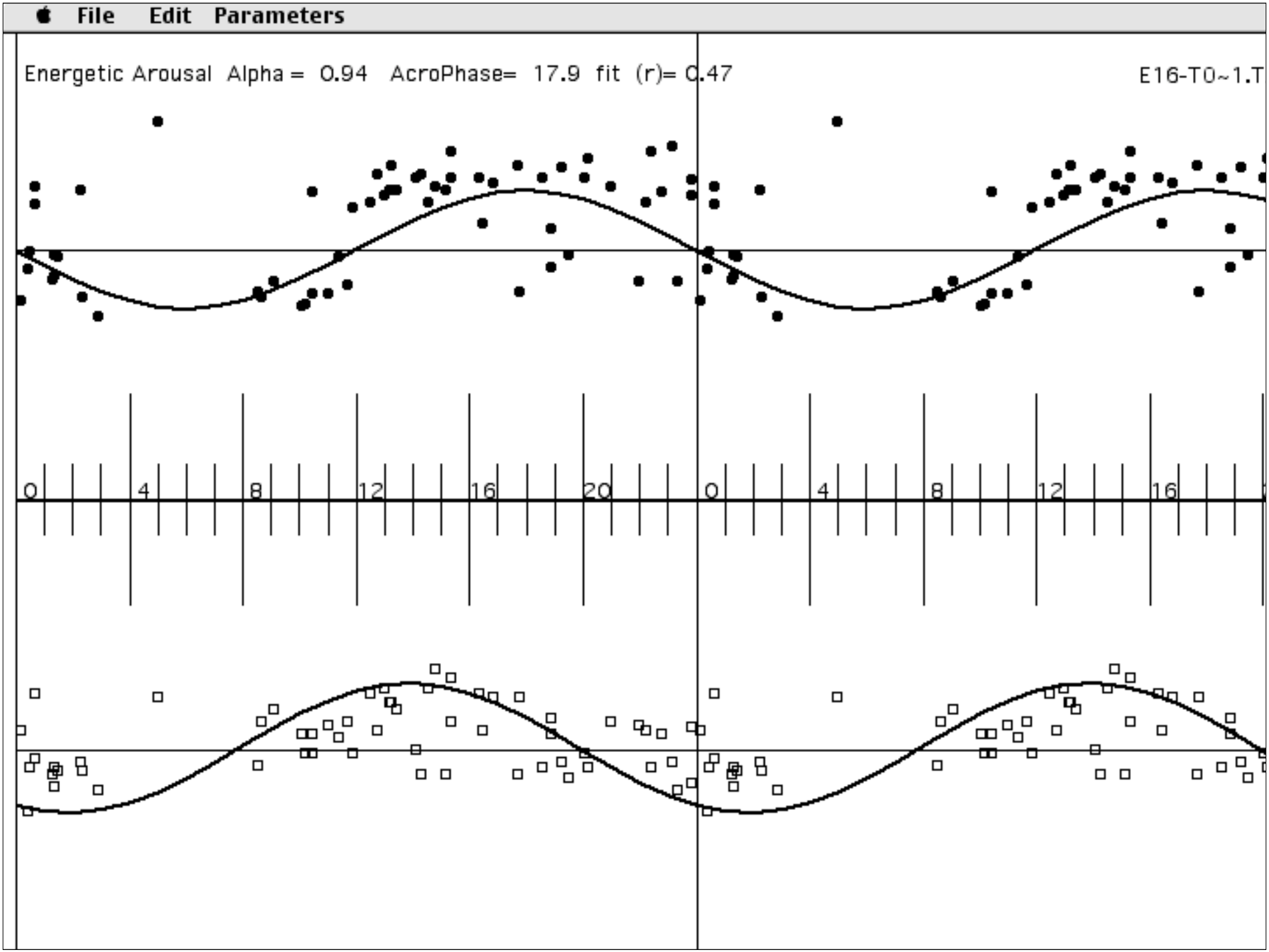
se Arousal Alpha = 0.63 AcroPhase= 23.4 fit (r)= 0.39
r by angle = -0.38
r EA x TA = -0.17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Energetic Arousal Alpha = 0.94 AcroPhase= 17.9 fit (r)= 0.47
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Multi-level analysis of patterns of affect across time-1: Method

- Within subject estimates of basic parameters
  - Level
  - Scatter (variability)
  - Phase
  - Coherence (fit)
- Between subject measures of reliability
  - Week 1/Gap/Week 2

Multi-level analyses of affect-2: 1-2 week Test-Retest Reliability

	VAS-1	VAS-2	Palm
Energetic Arousal	.67	.81	.82
Tense Arousal	.68	.57	.81
Fit EA	.55	.41	.07
Fit TA	.61	.25	.17
Phase EA	.69	.36	.58
Phase TA	.39	.25	.36
EA -TA Synchrony	.63	.48	.35

Affective rhythms and cognitive performance-1

- Design:High frequency diary study of affect combined with a low frequency study of reaction time
- Subjects: 28 NU undergraduate voluneteers
- Method:
  - 1 week diary study 5 times a day
  - Simple reaction time once a day at 5 different times using a Mac program at home

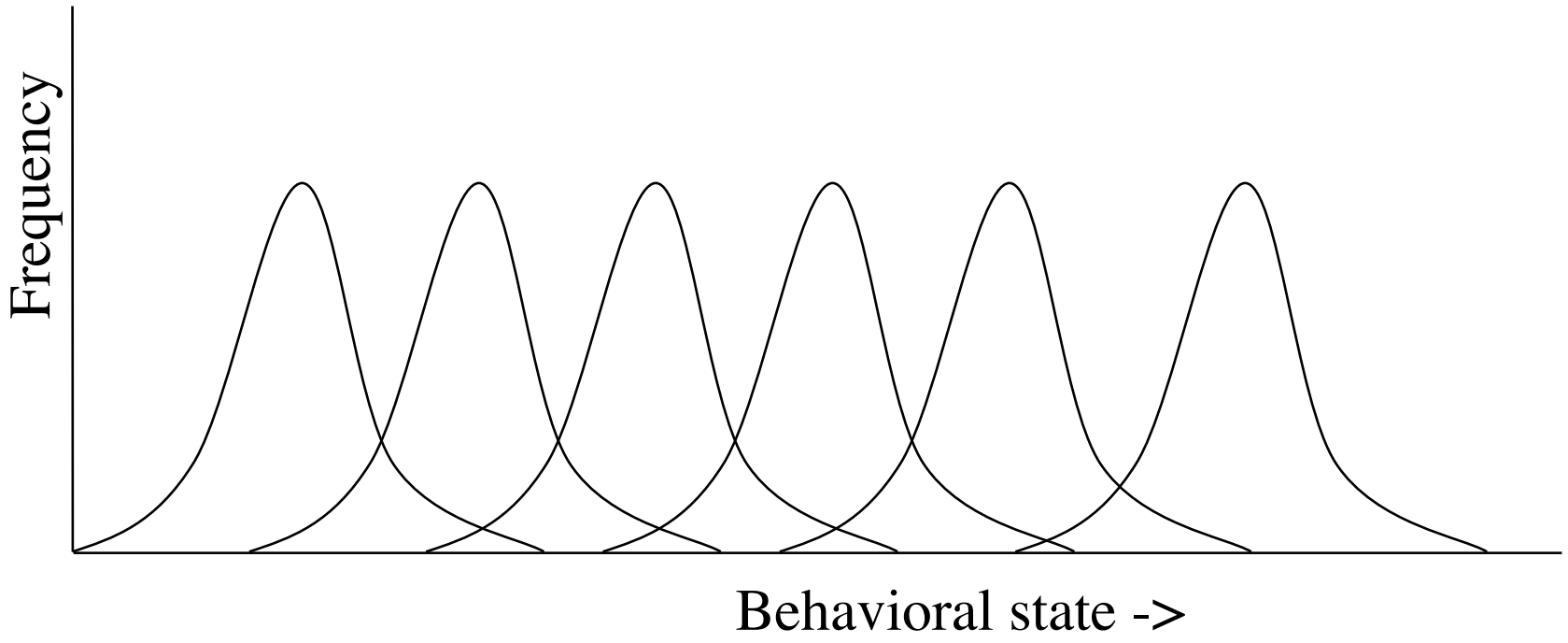
Affective rhythms and cognitive performance-2

- Low negative correlations of RT with concurrent measures of Energetic Arousal
- Stronger negative correlations of RT with Cosine fitted Energetic Arousal
- => Diurnal variation in RT may be fitted by immediate and patterns of arousal

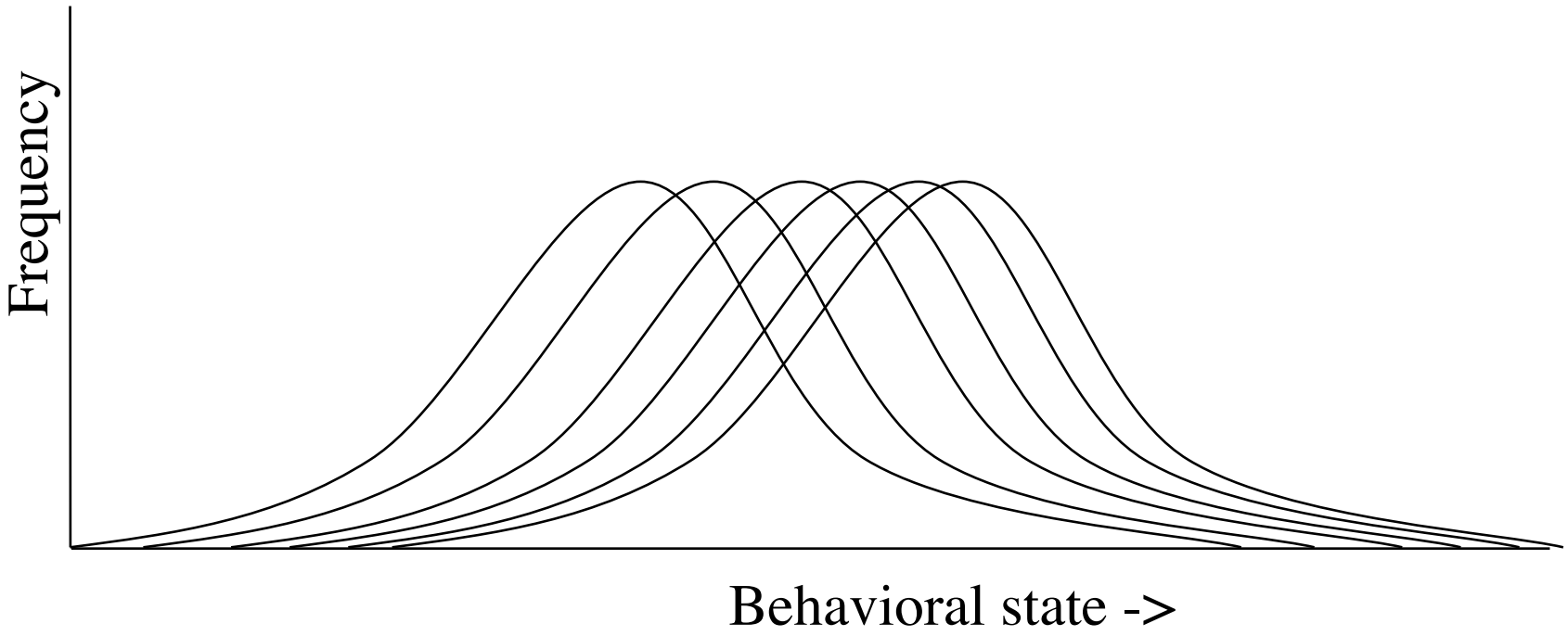
Behavioral variation over time

- William Fleeson and studies of personality variability over time
- Personality traits and personality states
- Traits as aggregated states

Model 1:
large between individual differences



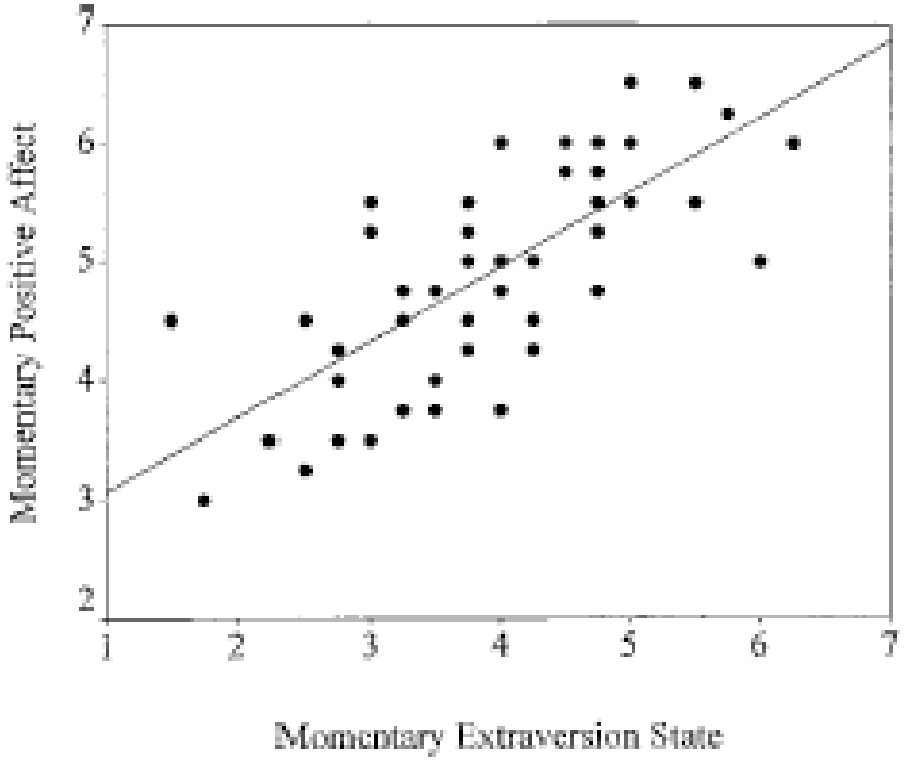
Model 2:
small between individual differences



Stability of trait means and variances

- Fleeson examined within and between day levels of behaviors and affects
- Low correlations of single measurement with other single measurements
- High correlations of means over multiple days with similar means over different days
- High correlations of variability over multiple days with similar estimates over different days

Extraversion and Affect



Positive Affect and acting Extraverted