Approach Motivation- Beyond Extraversion

Extraversion and Positive Affect

Positive Affect and Approach

Variability in Behavior and Affect

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

Gray's hypothesis
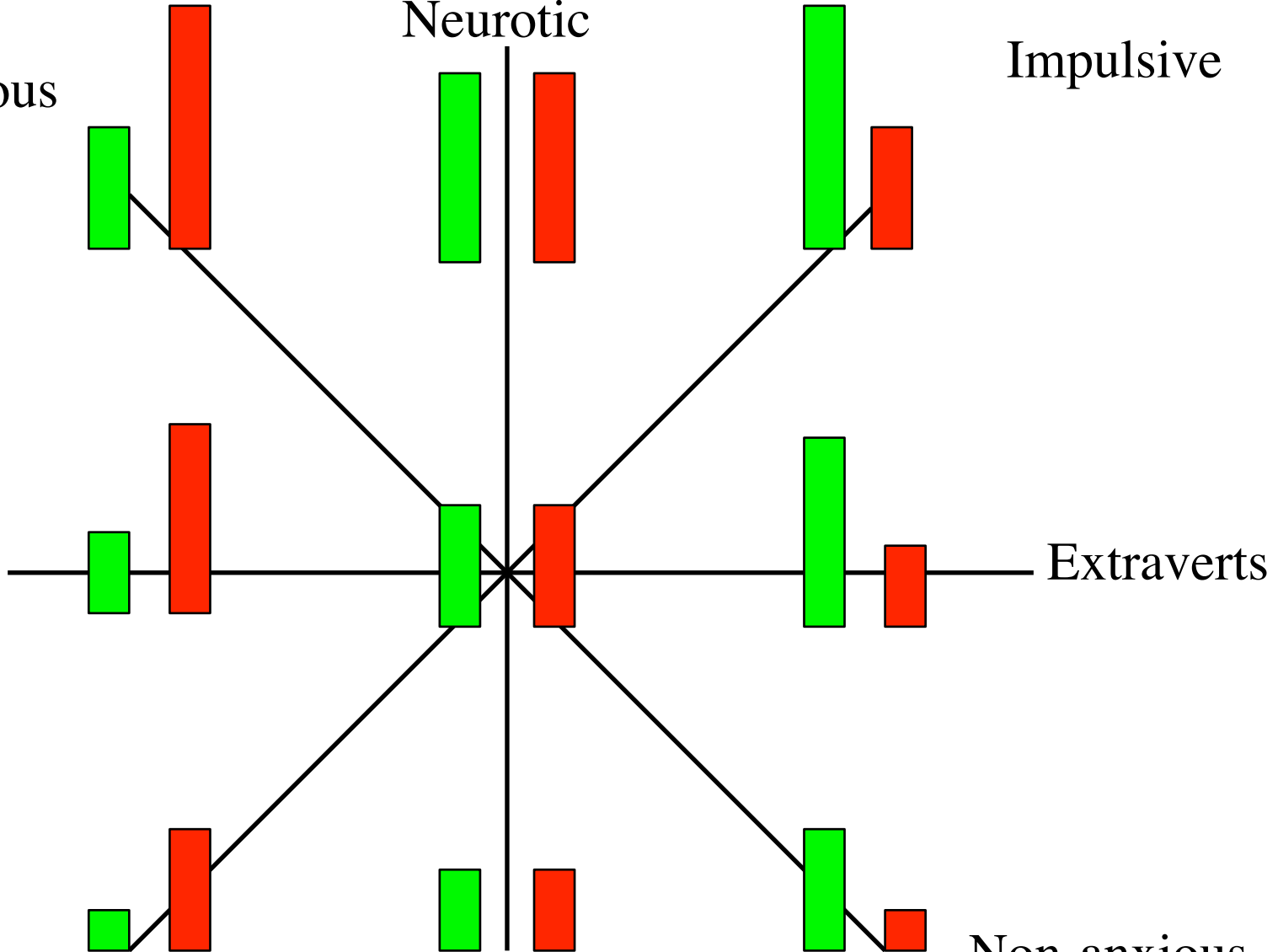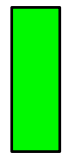
Personality and Emotions

- 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

Dimensional analyses of personality

- Descriptive
  - Folk descriptive
  - Natural language
- Causal
  - Biological mechanisms

Dimensional models of affect and emotion

- "Primary" Emotions?
  - Fear. Anger, Joy, Sadness, Disgust
- Secondary Emotions
  - Shame, guilt
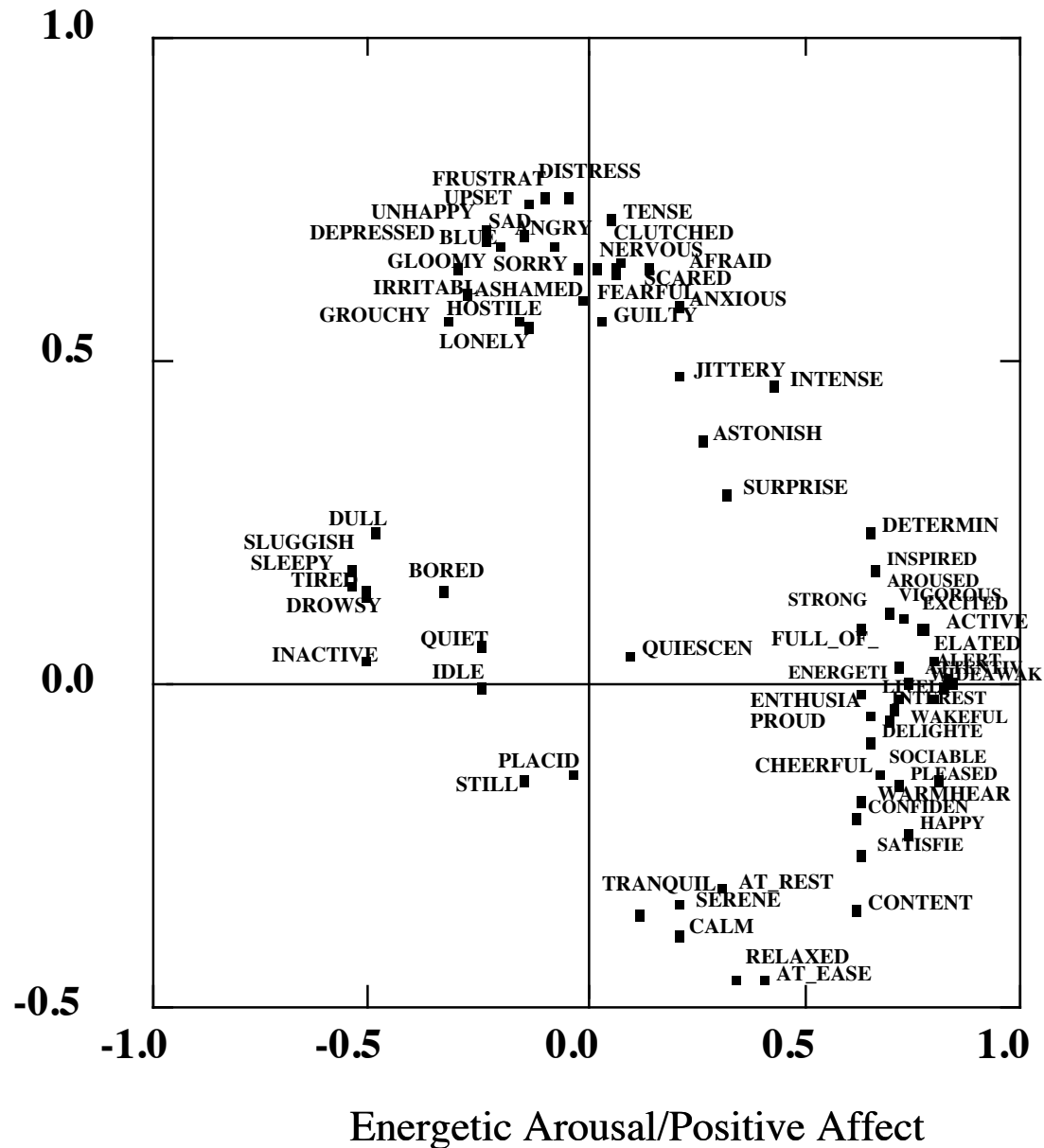- Dimensional representations of primary emotions

Multiple formulations of the measurement of affect

- Two dimensional models
  - Affective Valence and Arousal (Russell et al.)
  - Positive and Negative Affect (Tellegen, Watson & Clark)
  - Energetic and Tense Arousal (Thayer)
- Multidimensional models
  - Pleasantness-unpleasantness, rest-activation, relaxation-attention (Wundt)
  - Energetic Arousal, Tense Arousal, and Hedonic Tone (Matthews)
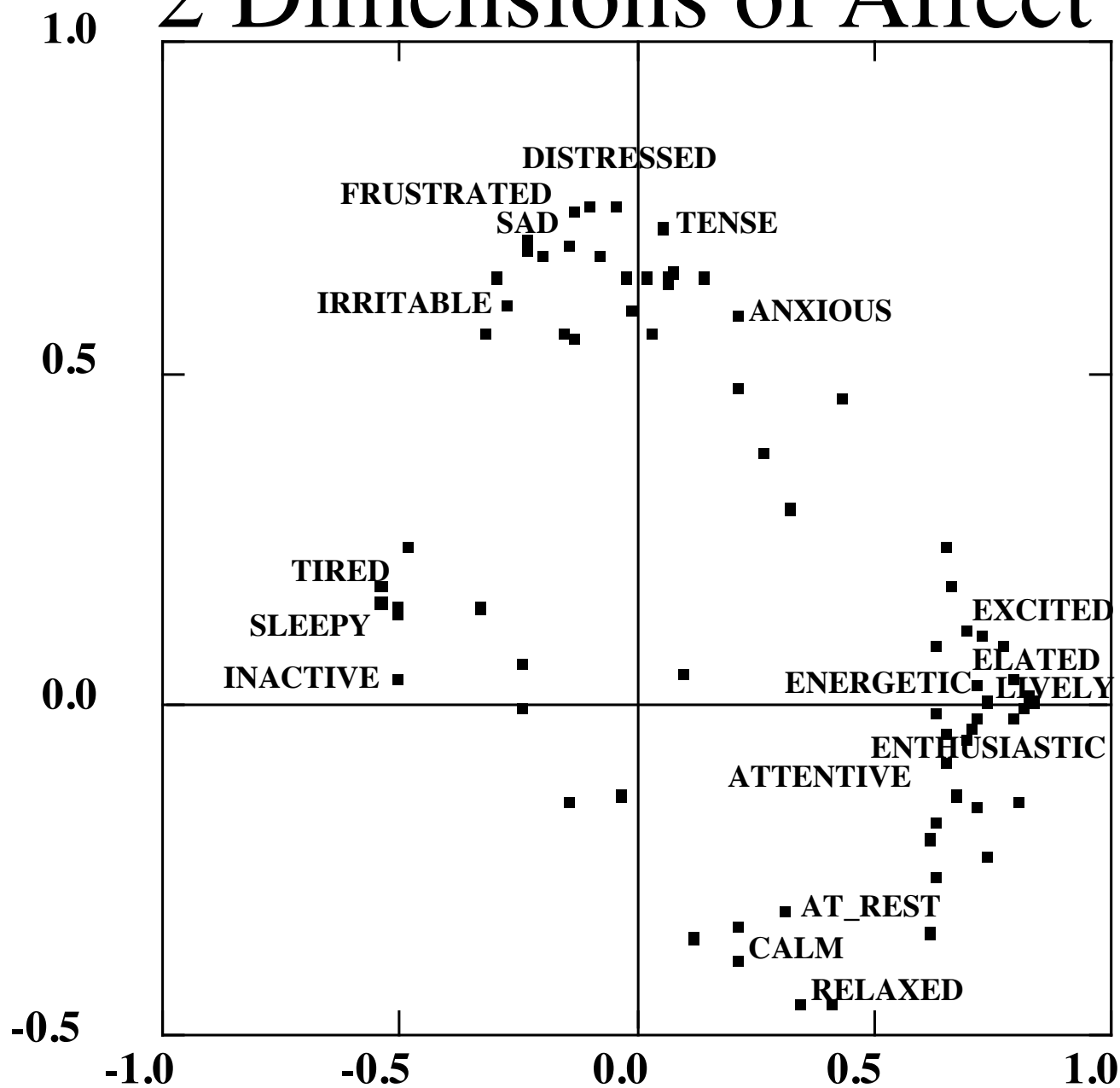 - Hierarchical models (Watson and Tellegen)

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

Scatter plot titled "2 Dimensions of Affect" with y-axis ranging from -0.5 to 1.0 and x-axis labeled "Energetic Arousal/Positive Affect" ranging from -1.0 to 1.0.

Labels plotted include: FRUSTRAT, DISTRESS, UPSET, UNHAPPY, SAD, ANGRY, TENSE, CLUTCHED, DEPRESSED, BLUE, NERVOUS, AFRAID, GLOOMY, SORRY, SCARED, IRRITABL, ASHAMED, FEARFUL, ANXIOUS, GROUCHY, HOSTILE, GUILTY, LONELY, JITTERY, INTENSE, ASTONISH, SURPRISE, DULL, DETERMIN, SLUGGISH, INSPIRED, SLEEPY, AROUSED, TIRED, BORED, VIGOROUS, STRONG, EXCITED, DROWSY, ACTIVE, FULL_OF_, ELATED, INACTIVE, QUIET, QUIESCEN, ALERT, IDLE, ENERGETI, AWIDEAWAK, LIVELY, INTEREST, ENTHUSIA, WAKEFUL, PROUD, DELIGHTE, PLACID, SOCIABLE, STILL, CHEERFUL, PLEASED, WARMHEAR, CONFIDEN, HAPPY, SATISFIE, TRANQUIL, AT_REST, SERENE, CONTENT, CALM, RELAXED, AT_EASE

2 Dimensions of Affect

DISTRESSED
FRUSTRATED
SAD   TENSE
IRRITABLE   ANXIOUS

TIRED
SLEEPY   EXCITED
INACTIVE   ELATED
ENERGETIC LIVELY
ENTHUSIASTIC
ATTENTIVE

AT_REST
CALM
RELAXED

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

Science and instrumentation

- Many of the leaps in science followed changes in instrumentation
  - Telescopes and theories of the universe
    - Gallileo/Newton
  - Ships allowed for larger sample frames
    - Darwin/Wallace
  - Sonar showed variation in ocean sea floor
  - Satellite imaging of earth "removes" the water
  - Radio Astronomy theories of big bang

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Taking advantage of newer technologies in psychology

- Much of science advances when the instruments change
  - computers
    - reaction time
    - Average evoked potentials
  - Imagining by combining multiple signals
    - MRI/PET/CAT/MEG
  - ambulatory assessment using PDA/cell phones
  - computer programs to analyze complex data sets

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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

- Replacing Palm Pilots with cell phone -- text messaging

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)
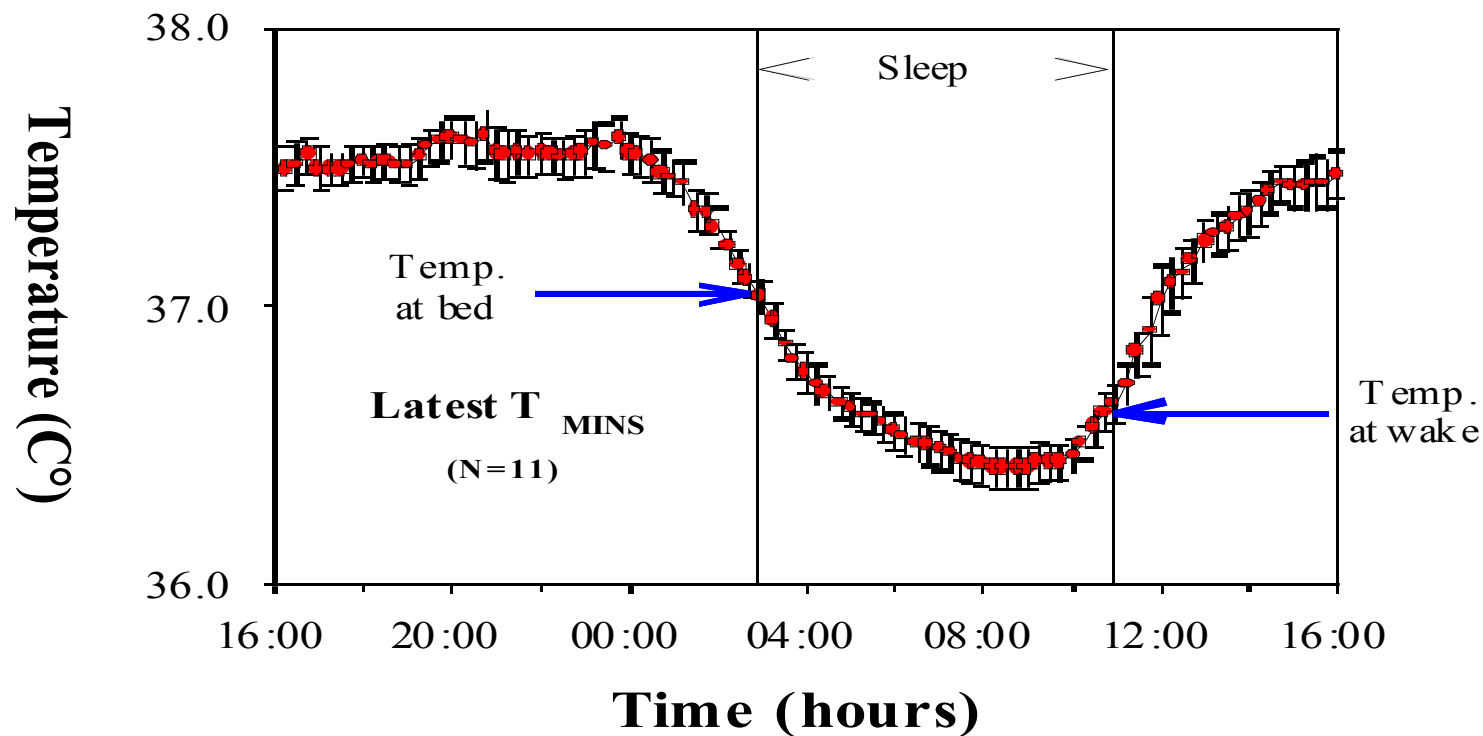
Morningness/Eveningness and BT
(Baehr, Revelle and Eastman, 2000)
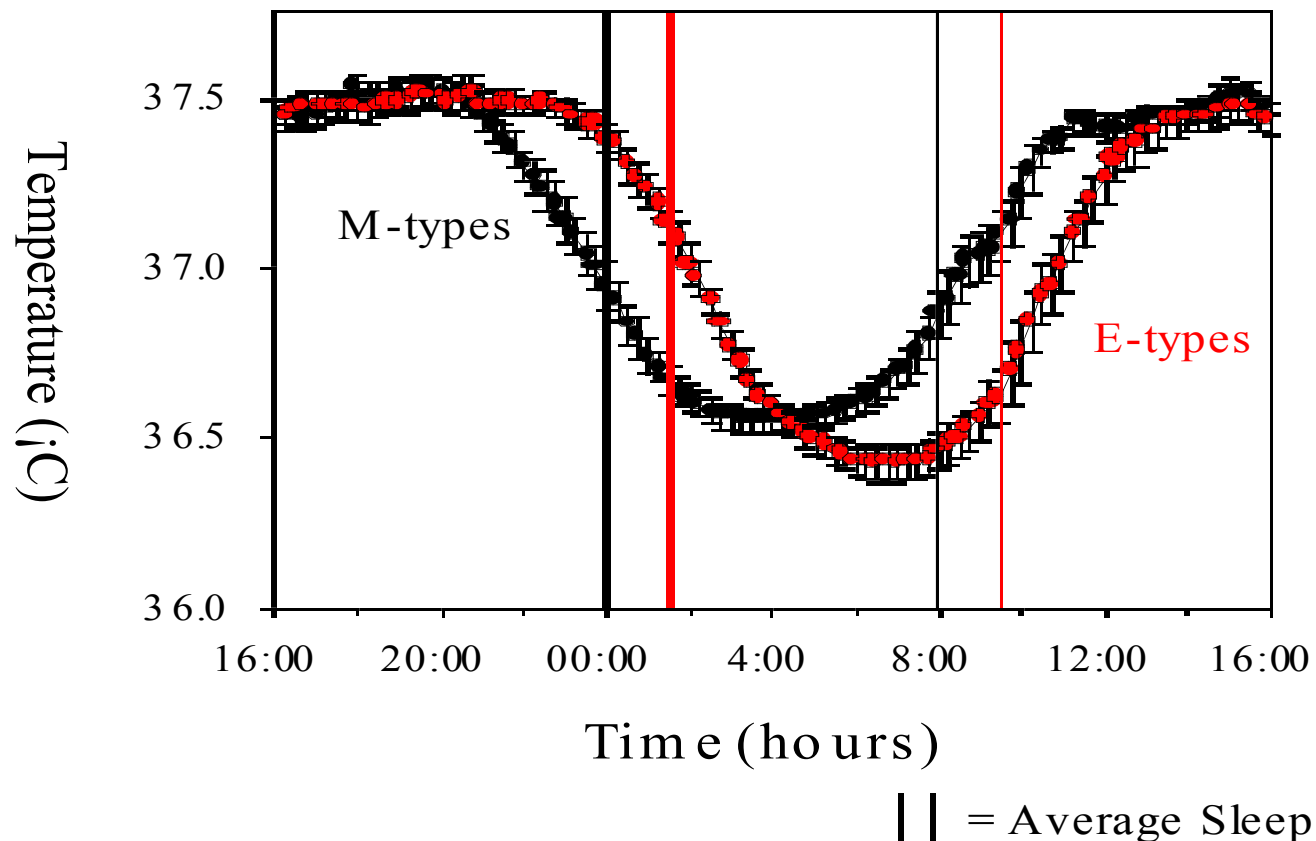
Within subject diary studies-2

- 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
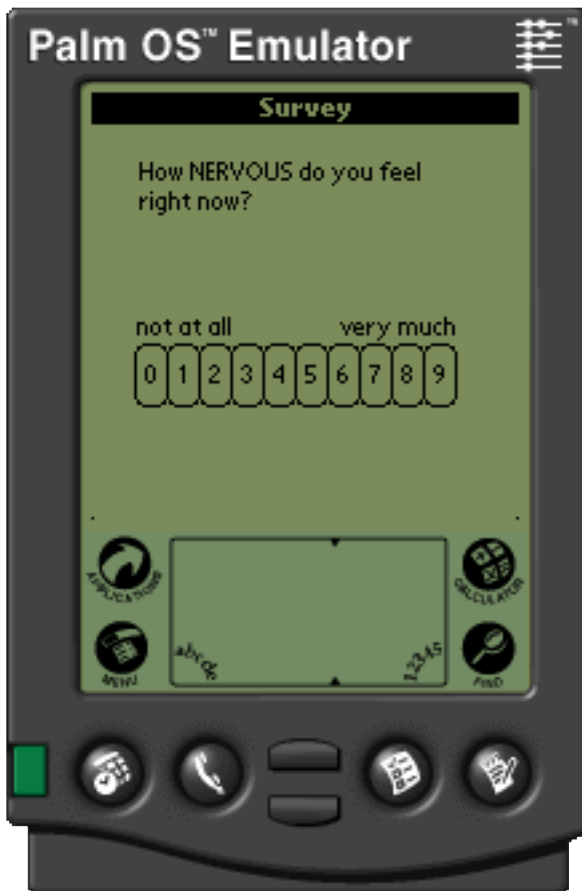
Palm affect and activity survey

Survey

How NERVOUS do you feel right now?

not at all   very much

0 1 2 3 4 5 6 7 8 9

Survey

How AROUSED do you feel right now?

not at all   very much

0 1 2 3 4 5 6 7 8 9

BACK

Survey

How AFRAID do you feel right now?

not at all   very much

0 1 2 3 4 5 6 7 8 9

BACK

Survey

How CALM do you feel right now?

not at all   very much

0 1 2 3 4 5 6 7 8 9

BACK

Survey

Choose:/0-sleep/1-groom/
2-motion/3-class/4-study/
5-eat/6-work/7-friends/
9-next

not at all   very much

0 1 2 3 4 5 6 7 8 9

BACK

Survey

The device will now turn itself off. Please put it away. Next scheduled wake up time: 3:03pm, 7/11/00

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
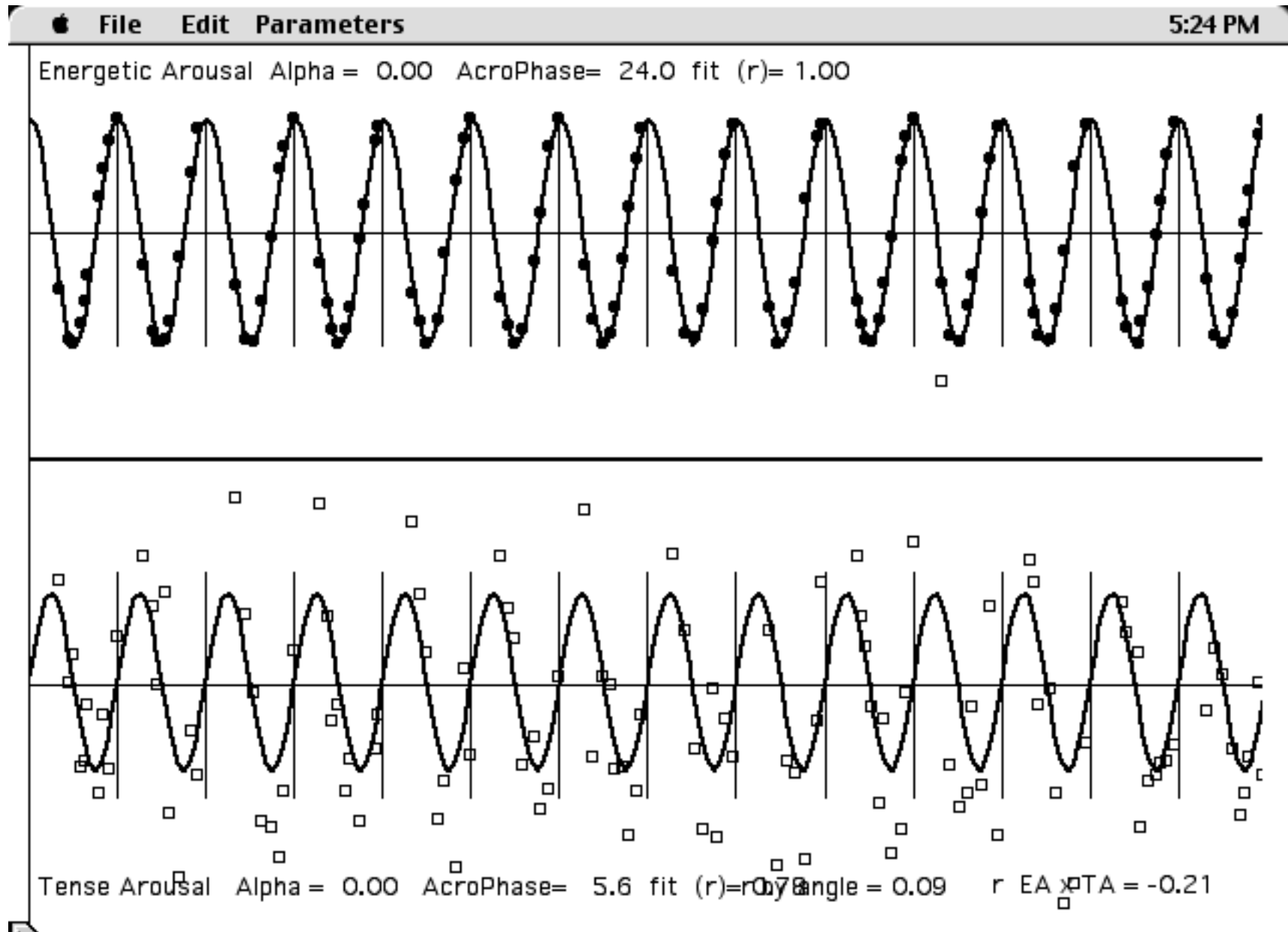 - Fit (coherence)
  - Amplitude
  - Phase

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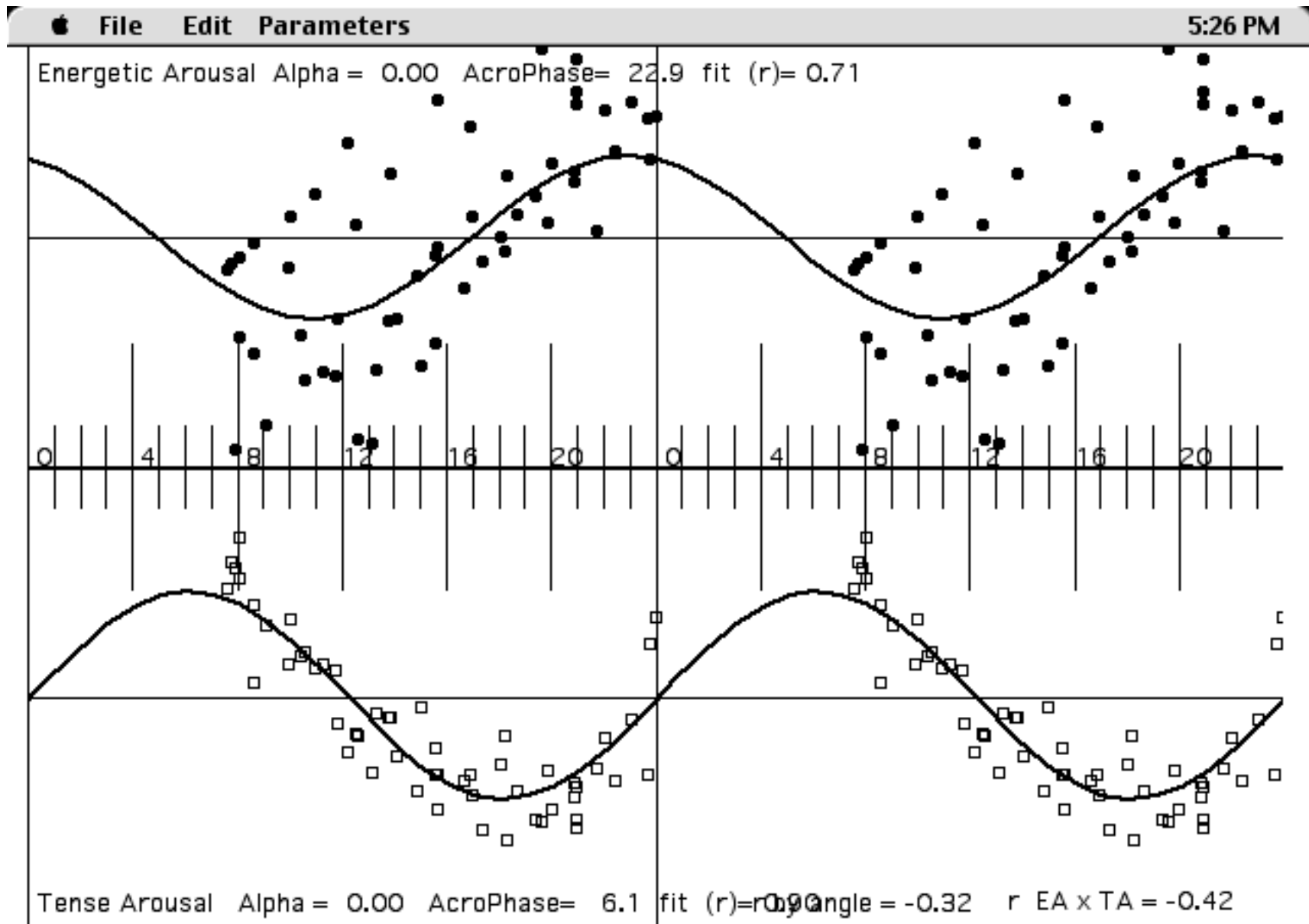## (simulation - double plotted to show rhythm)

Energetic Arousal Alpha = 0.00 AcroPhase= 24.0 fit (r)= 1.00
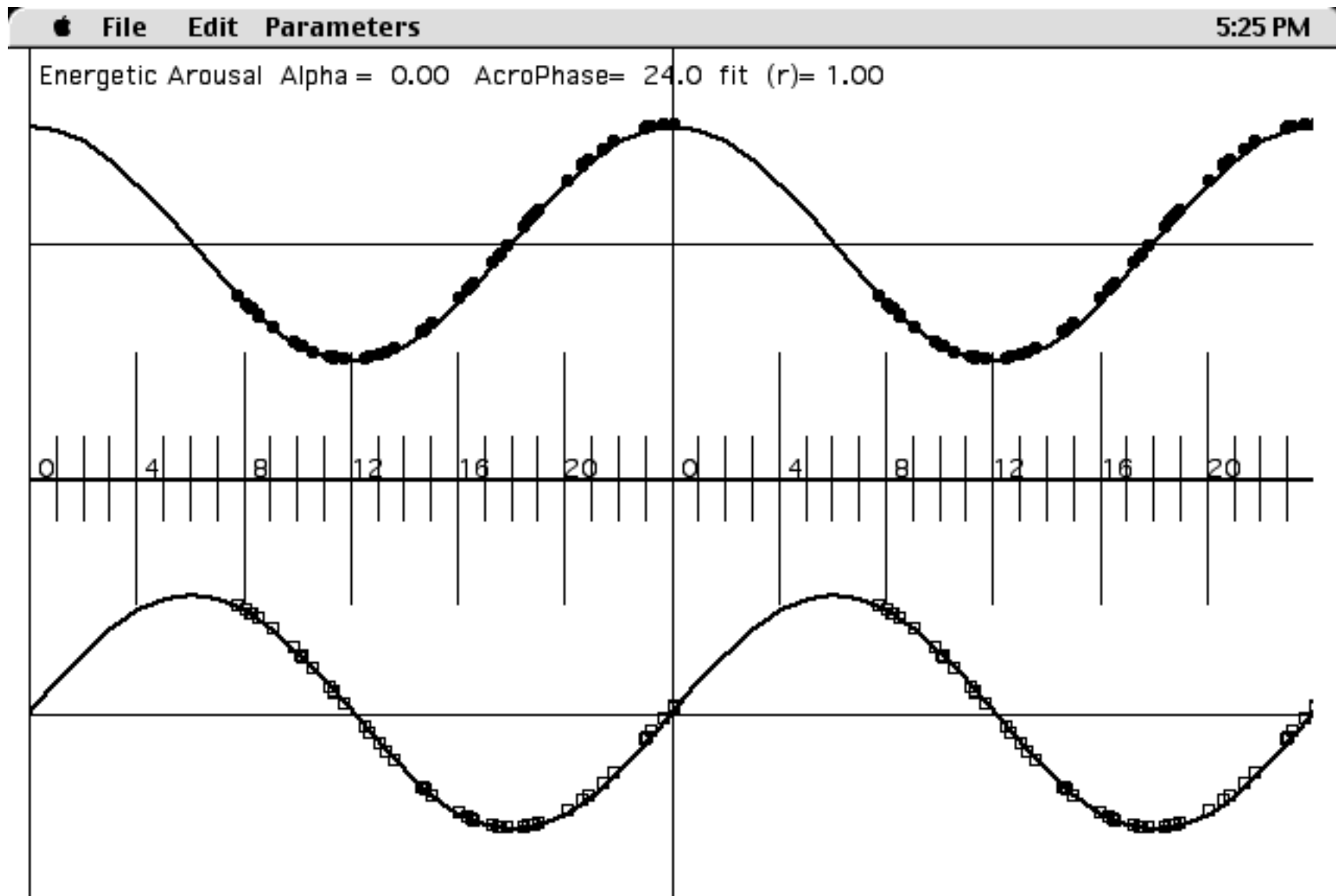
Phase differences of simulated daily data
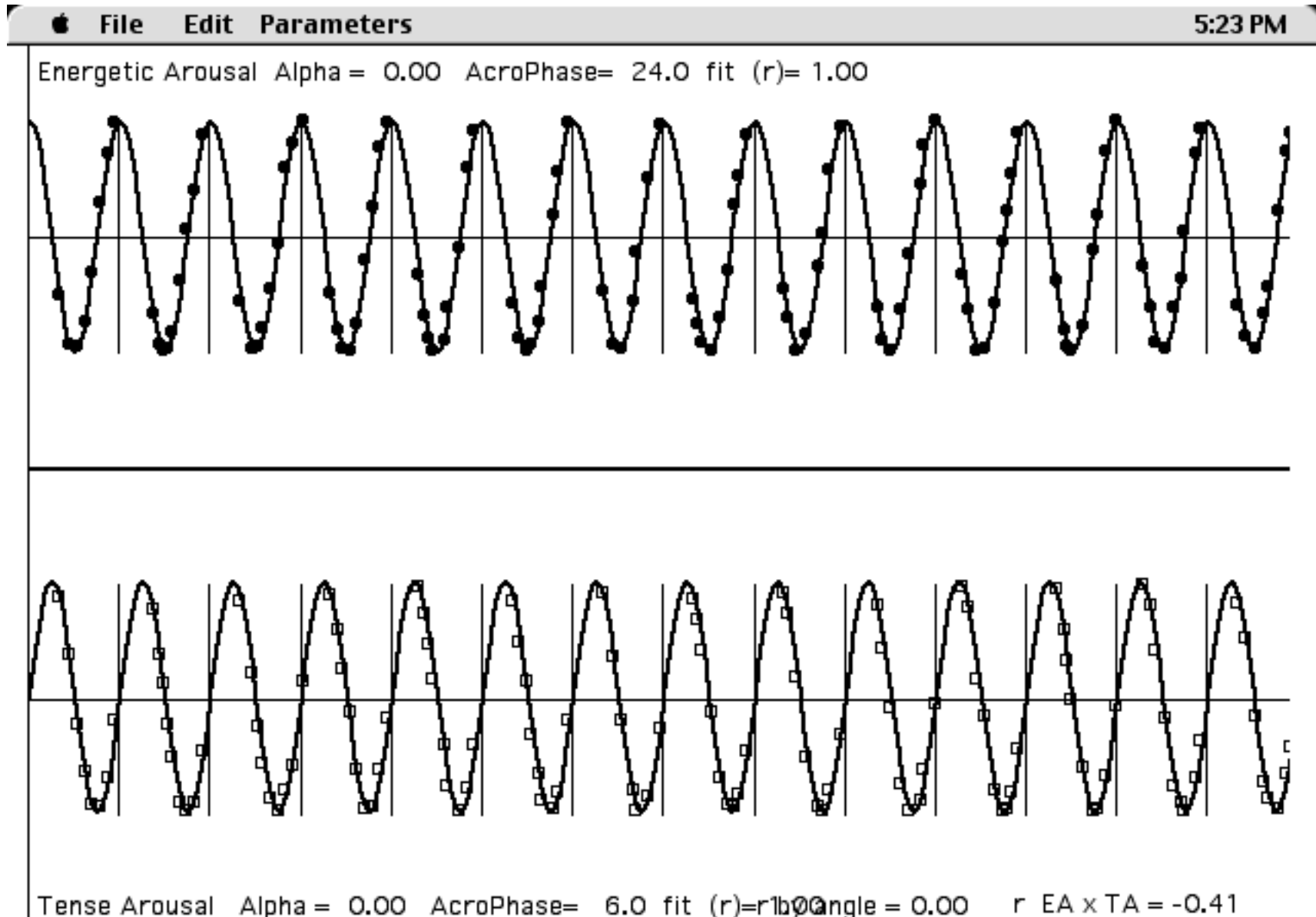
Differences in coherence (fit) simulated daily data

File   Edit   Parameters   5:24 PM

Energetic Arousal Alpha = 0.00   AcroPhase= 24.0 fit (r)= 1.00

Tense Arousal   Alpha = 0.00   AcroPhase= 5.6 fit (r)=r by angle = 0.09   r EA x TA = -0.21

Phase and Coherence differences
(simulated data -- double plotted)
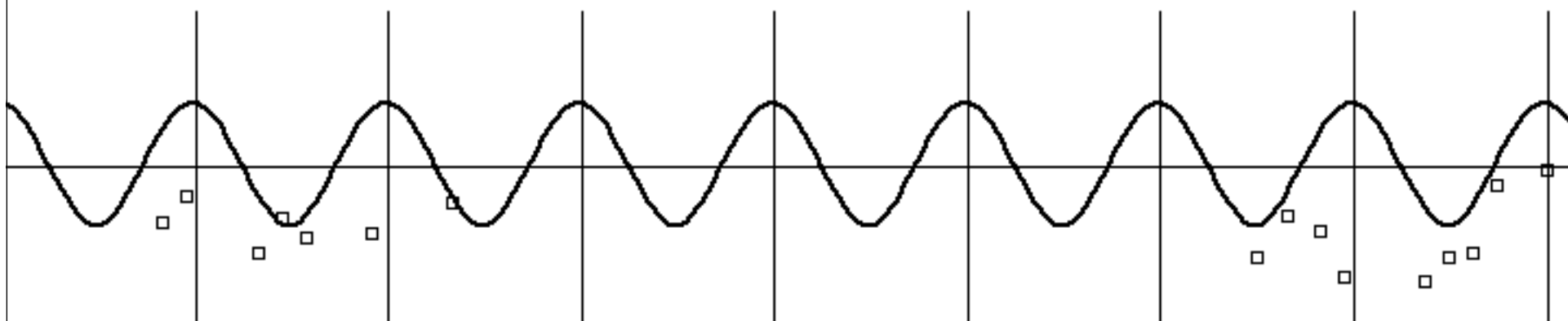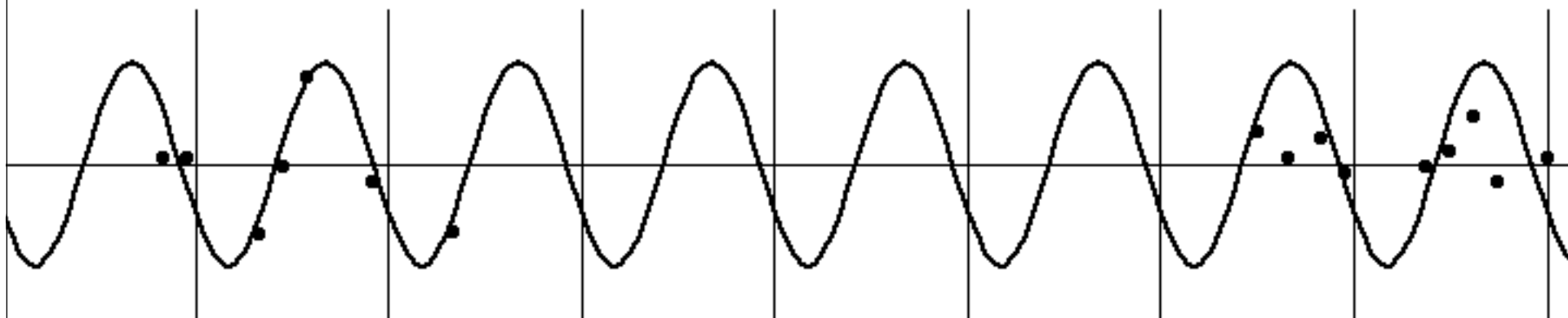
File   Edit   Parameters   5:26 PM

Energetic Arousal Alpha = 0.00 AcroPhase= 22.9 fit (r)= 0.71

Tense Arousal   Alpha = 0.00 AcroPhase= 6.1 fit (r)=r 0.90angle = -0.32   r EA x TA = -0.42

Energetic Arousal Alpha = 0.81 AcroPhase= 15.9 fit (r)= 0.66   DO2-T0~1.TXT

Tense Arousal Alpha = 0.63 AcroPhase= 23.4 fit (r)= 0.39   r by angle = -0.38 r EA x TA = -

rgetic Arousal Alpha = 0.94   AcroPhase= 17.9 fit (r)= 0.47   E16-TO~1.TXT
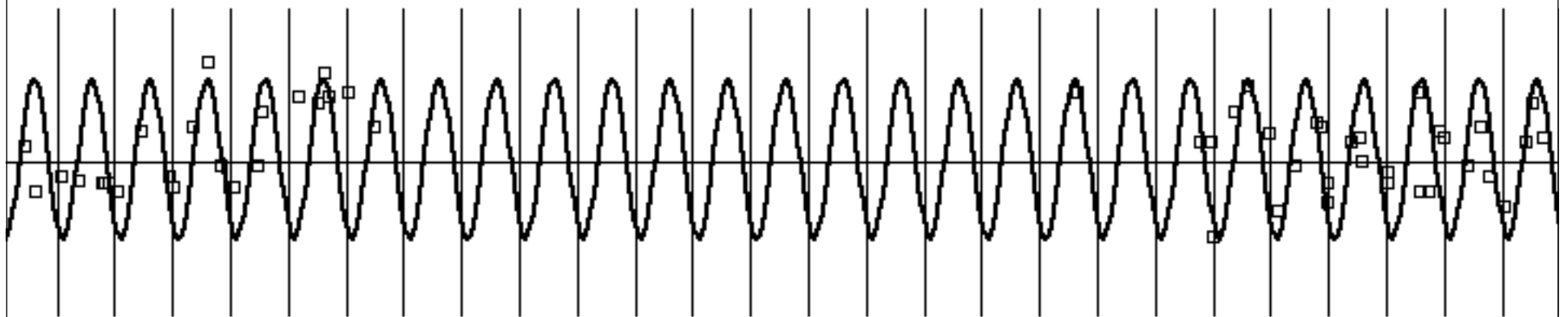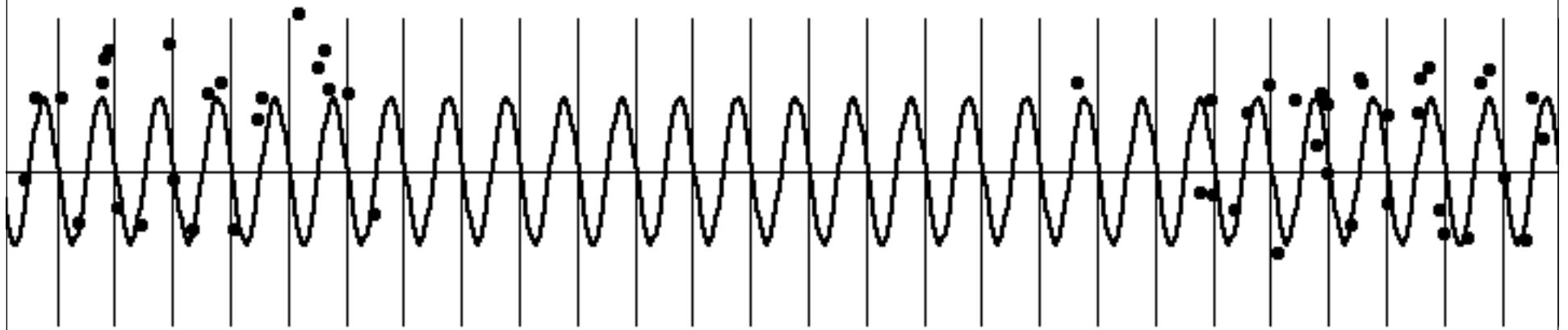
se Arousal   Alpha = 0.74   AcroPhase= 13.8 fit (r)= 0.52   r by angle = 0.47   r EA x TA = 0.23
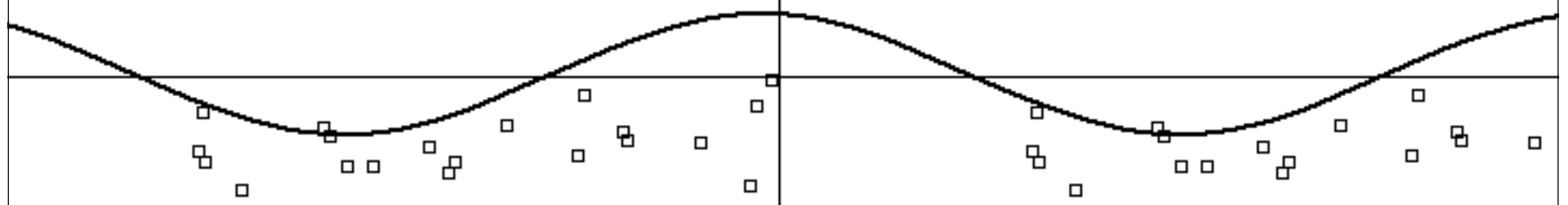
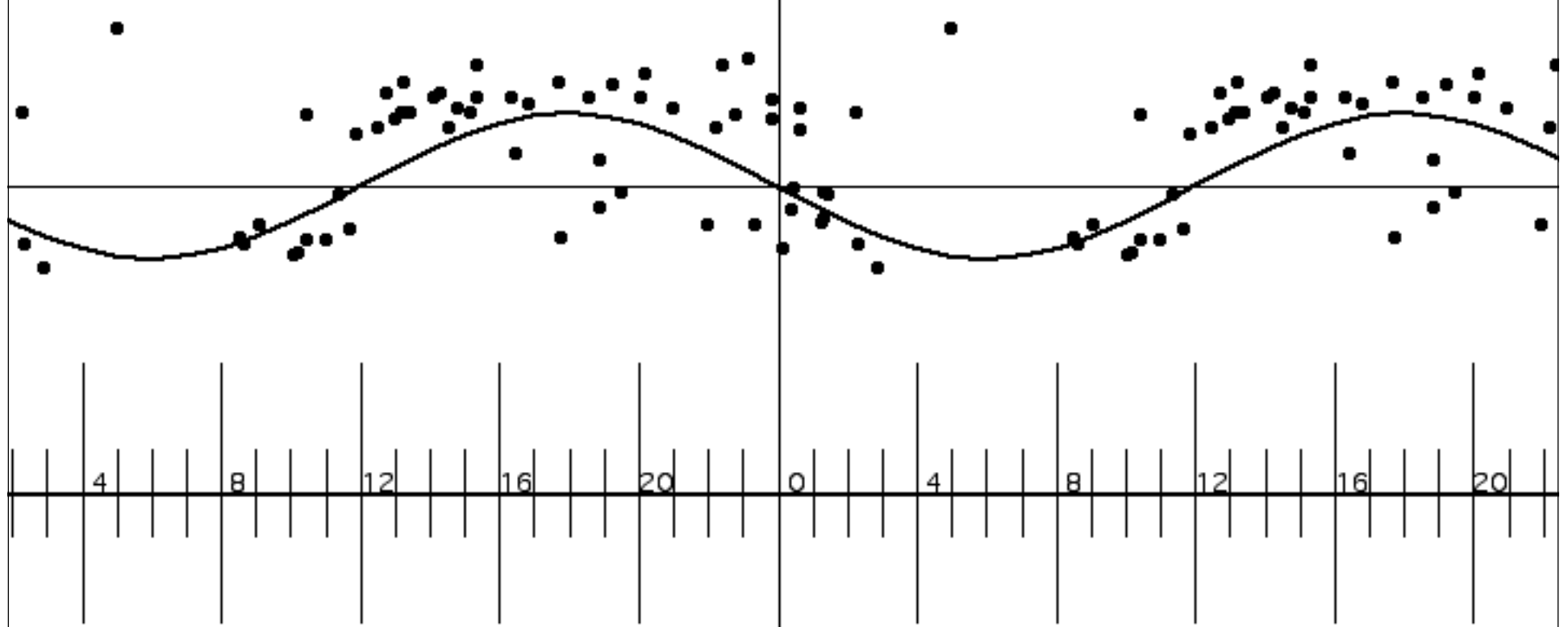rgetic Arousal Alpha = 0.81 AcroPhase= 15.9 fit (r)= 0.66

DO2-T0~1.TXT
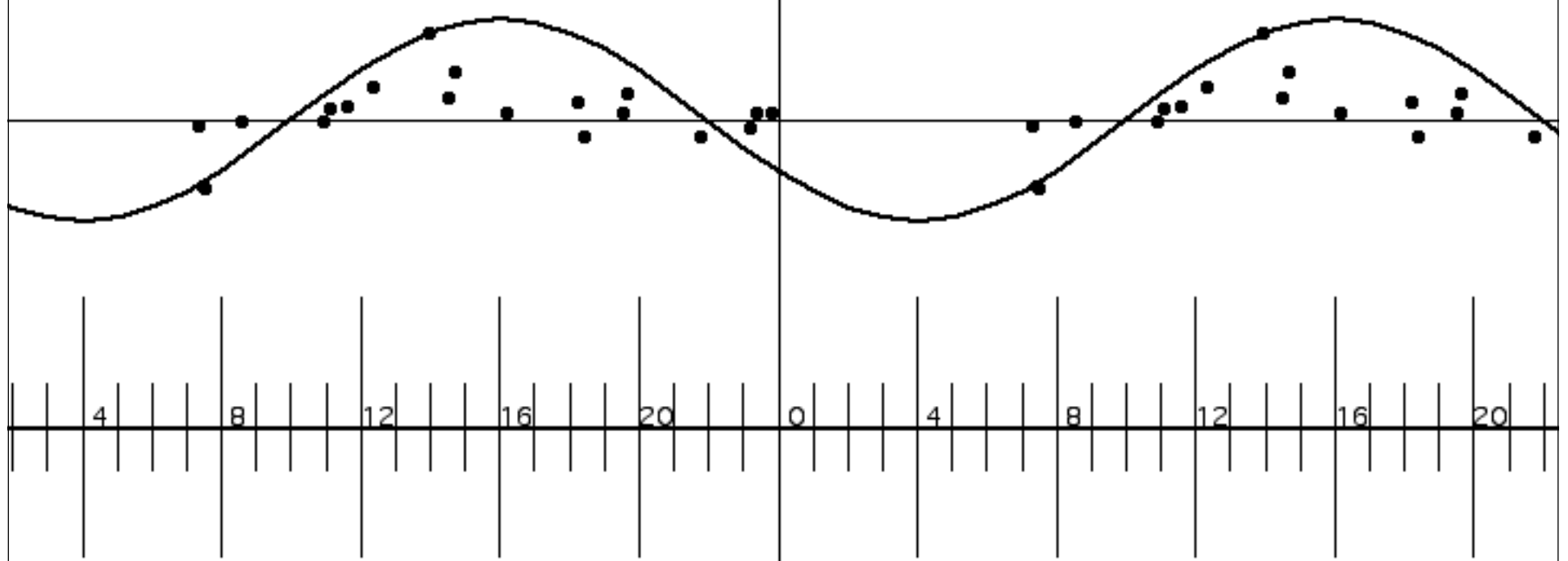
se Arousal Alpha = 0.63 AcroPhase= 23.4 fit (r)= 0.39

r by angle = -0.38   r EA x TA = -0.17

getic Arousal Alpha = 0.94 AcroPhase= 17.9 fit (r)= 0.47

E16-T0~1.TXT

4   8   12   16   20   0   4   8   12   16   20

se Arousal Alpha = 0.74 AcroPhase= 13.8 fit (r)= 0.52

r by angle = 0.47   r EA x TA = 0.23

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

Affective synchrony and personality

- ## Cell phone: text messaging study
    - The Dynamic Relationships of Affective Synchrony to Perceptions of Situations
    - Joshua Wilt, Katherine Funkhouser, and William Revelle (2011)

- ## Data collected using cell phone text messaging

What predicts synchrony?

A multilevel model:

$$EA_{ij} = \beta_{0i} + \beta_{1i}TA_{ij} + r_{ij}$$

$$\beta_{0i} = \gamma_{00} + \mu_{0i}$$

$$\beta_{1i} = \gamma_{10}$$

Combine into one equation

$$EA_{ij} = \gamma_{00} + \mu_{0i} + \gamma_{10}TA_{ij} + r_{ij}$$

Compare with

$$EA_{ij} = \gamma_{00} + u_{0i} + \gamma_{10}TA_{ij} + u_{1i}TA_{ij} + r_{ij}$$
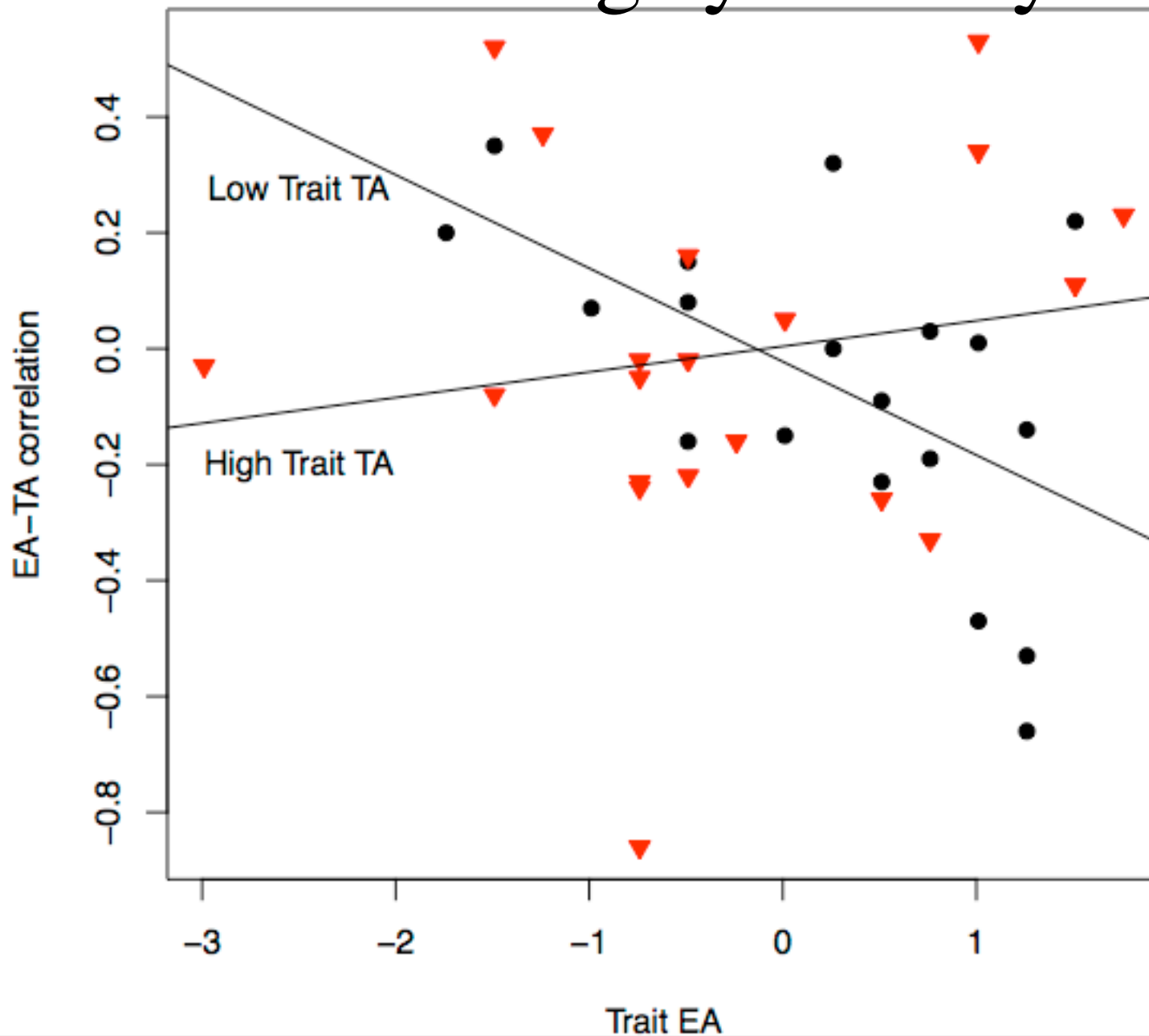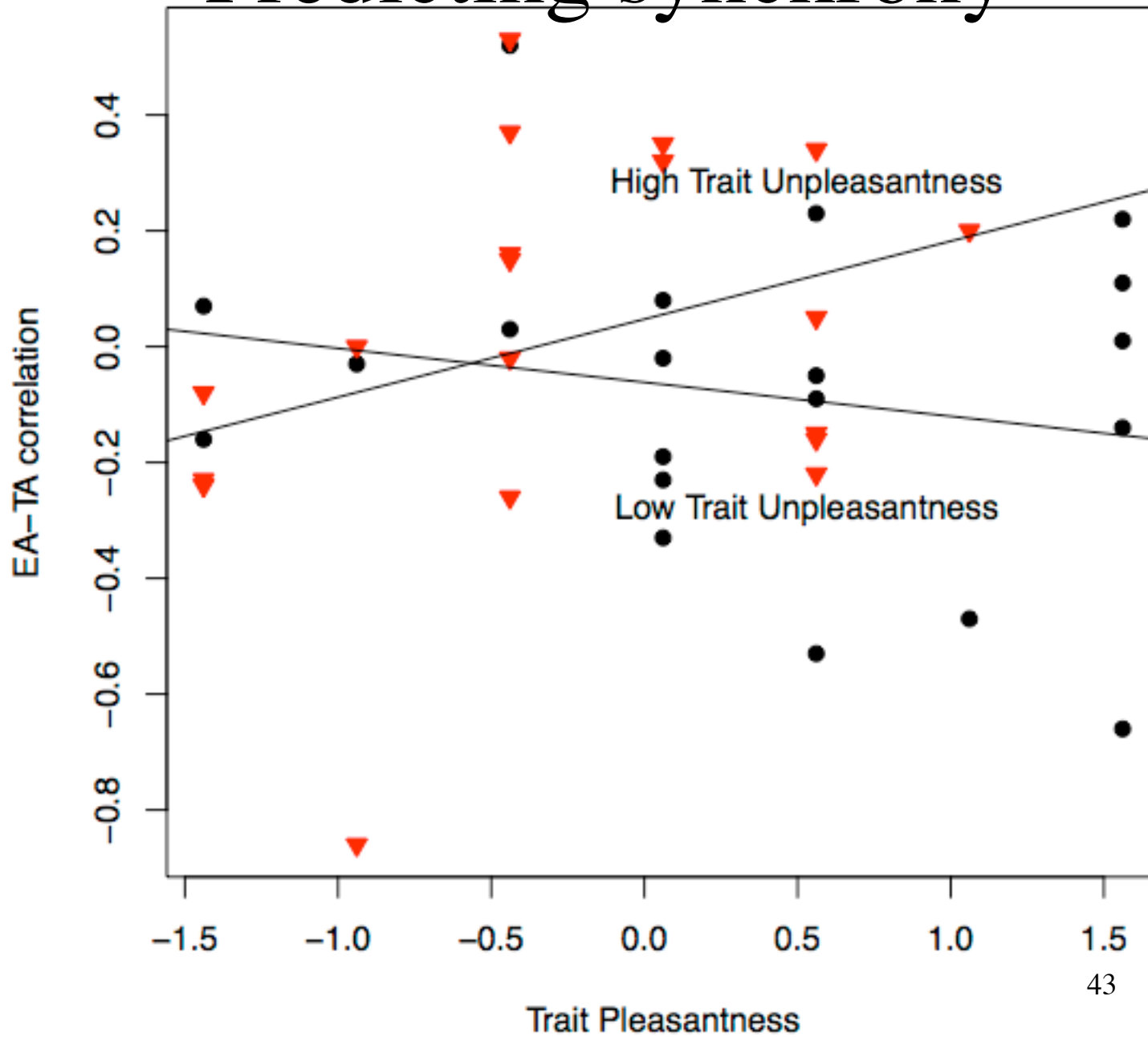
Correlating with subjects correlations
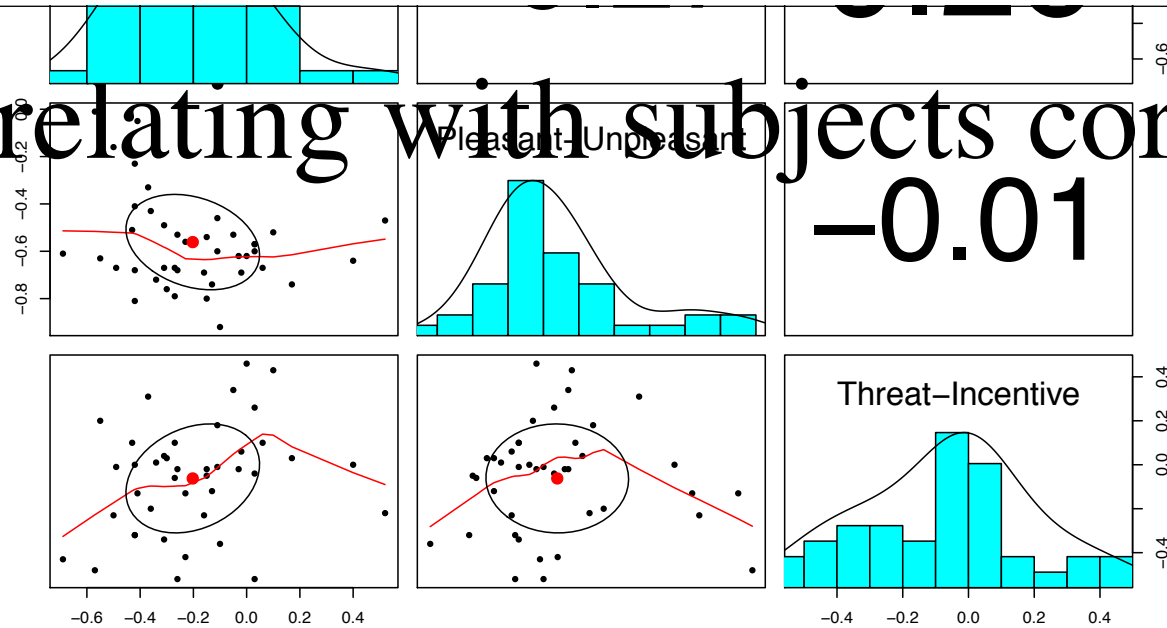
Figure 1: The diagonal shows histograms of the within-subject relationships (correlations) between variables. The between-subjects relationships of within-subject associations are shown below the diagonal as scatter plots and above the diagonal as Pearson correlations. For example, the between-subjects relationship between within-person EA-TA associations and within-person Pleasant-Unpleasant associations is shown as a scatter plot in the second row of the first column and as a correlation in the first row of the second column. The best fitting LOESS regression and the correlational ellipse are shown. LOESS is a robust smoother based on local polynomial regression.
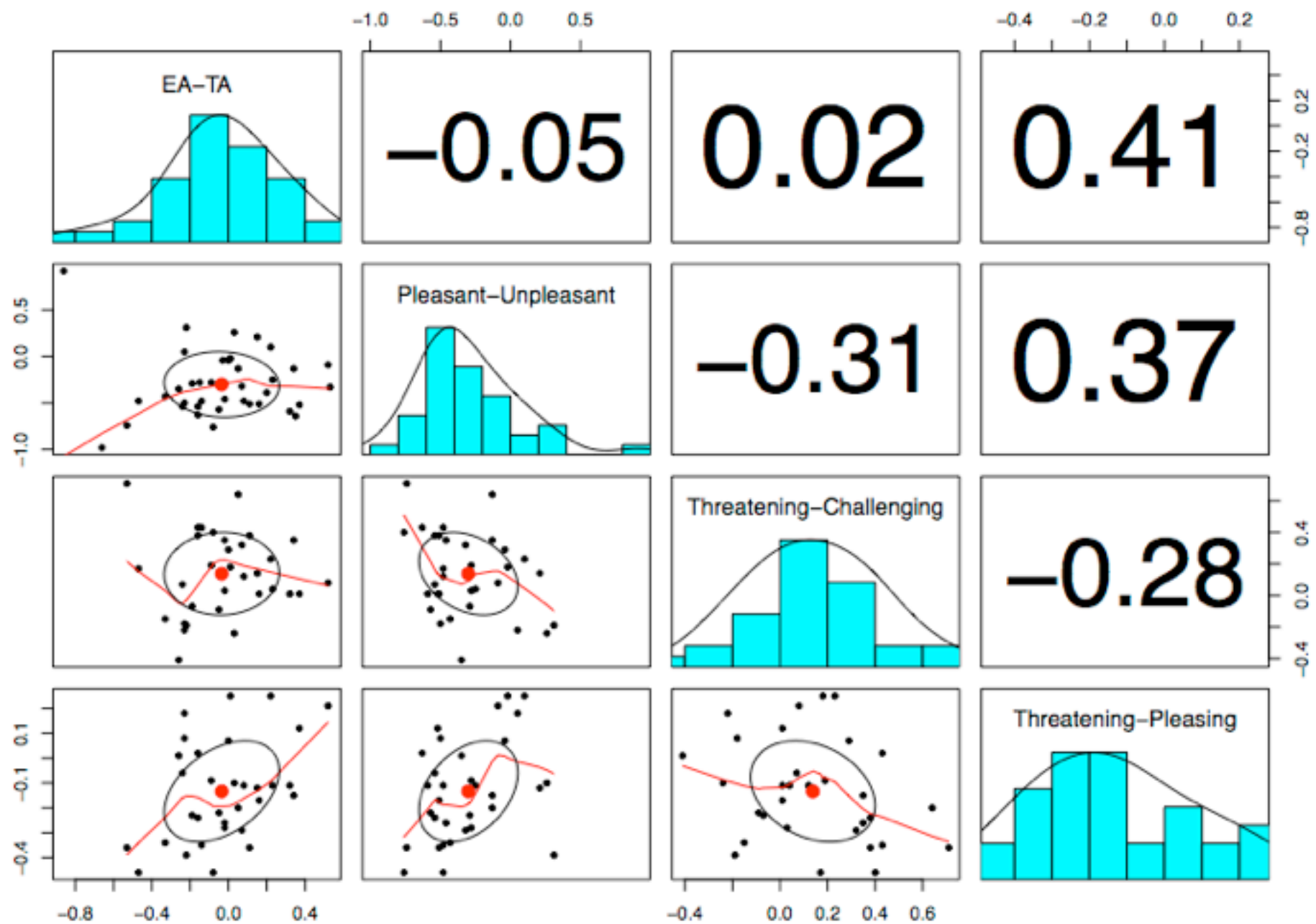
Predicting synchrony

Predicting synchrony

Figure axes: y-axis "EA–TA correlation" (−0.8 to 0.4), x-axis "Trait Pleasantness" (−1.5 to 1.5). Labels: "High Trait Unpleasantness" and "Low Trait Unpleasantness".
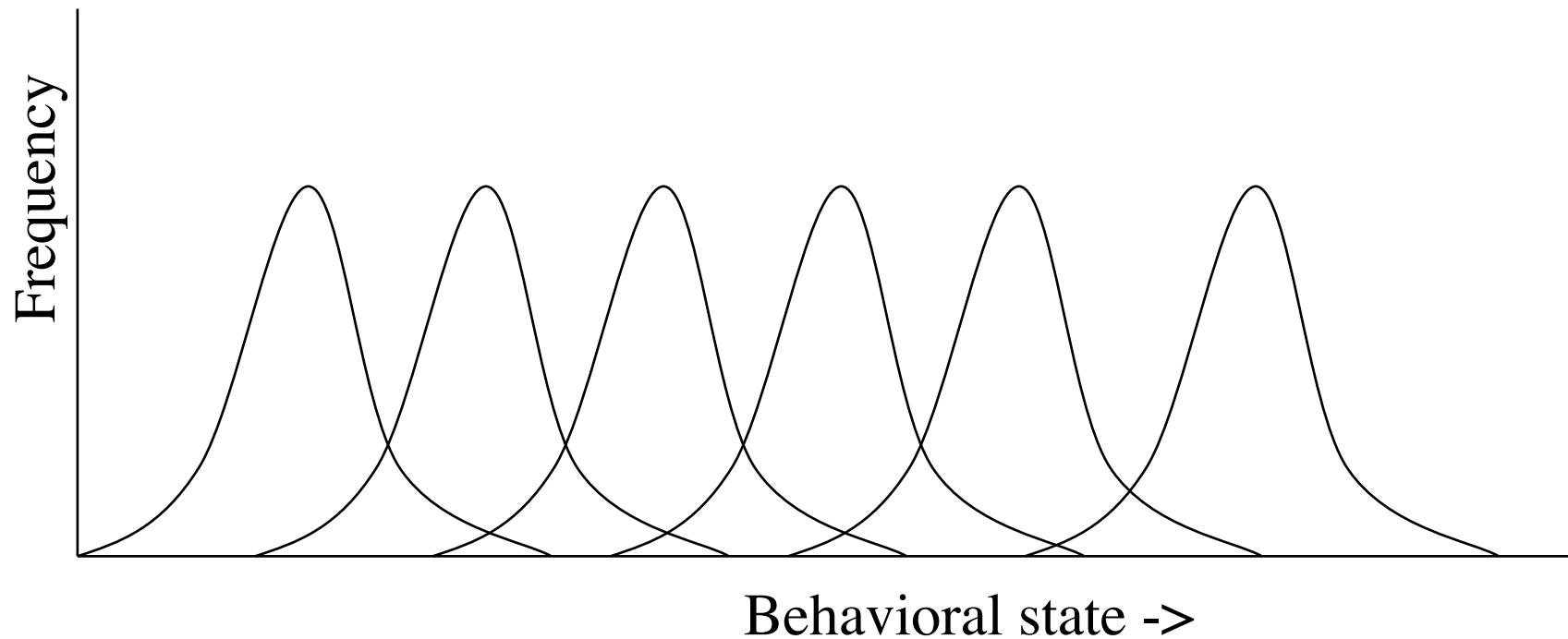
Behavioral variation over time

- William Fleeson and studies of personality variability over time

- Personality traits and personality states

- Traits as aggregated states
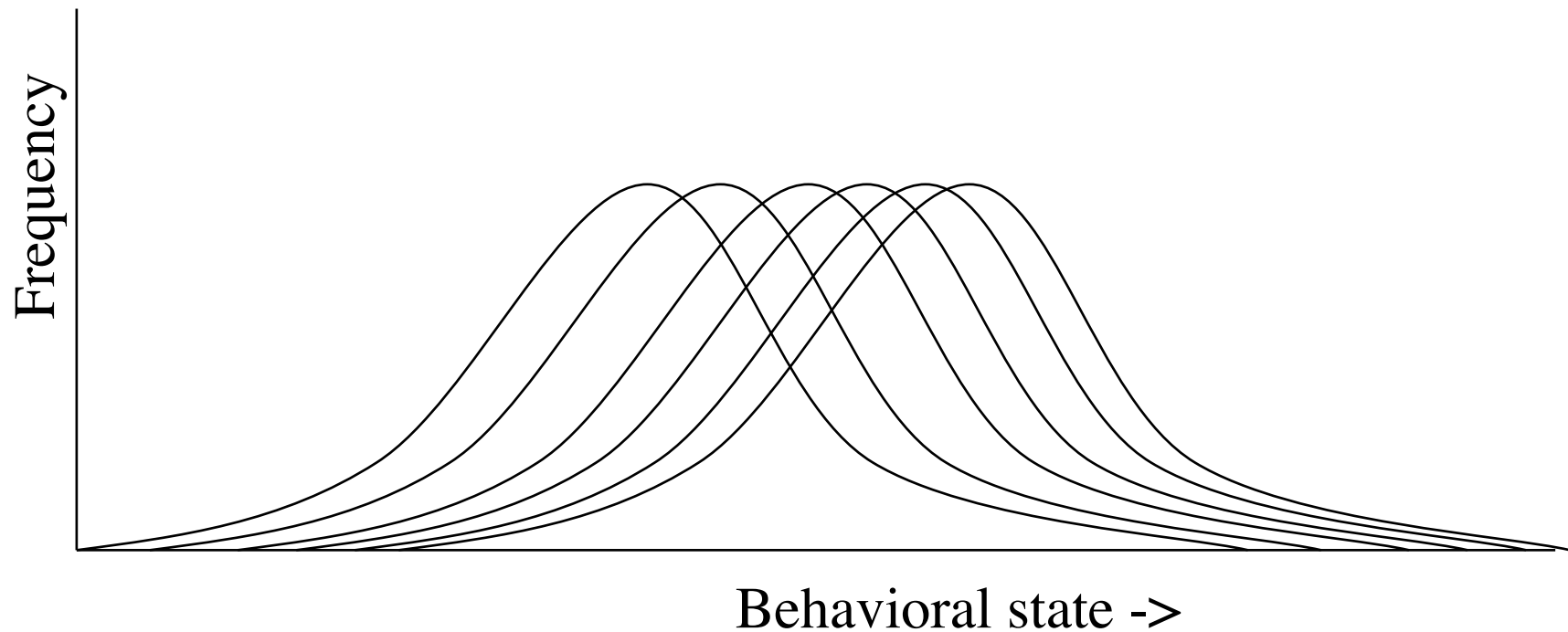
# Behavioral Variability:
Model 2:
small between individual differences
# large within individual differences

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

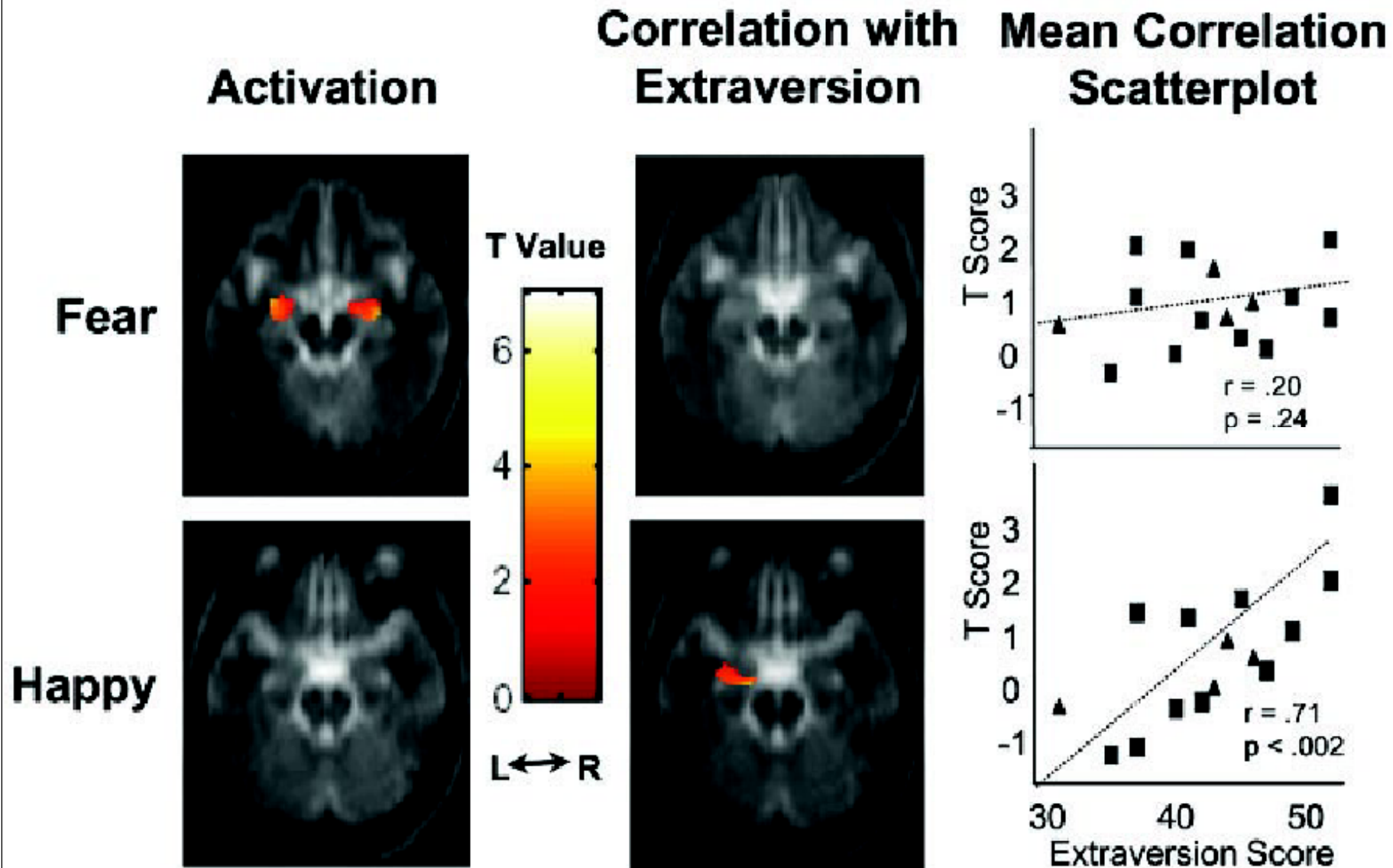- High correlations of variability over multiple days with similar estimates over different days

Extraversion and Affect
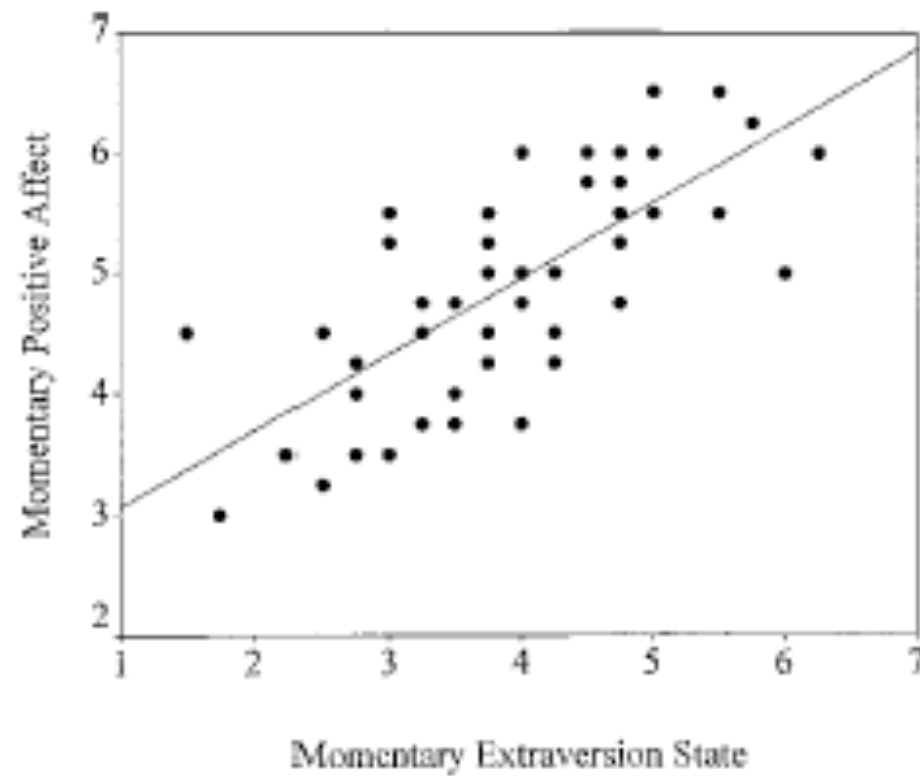
Positive Affect and acting Extraverted
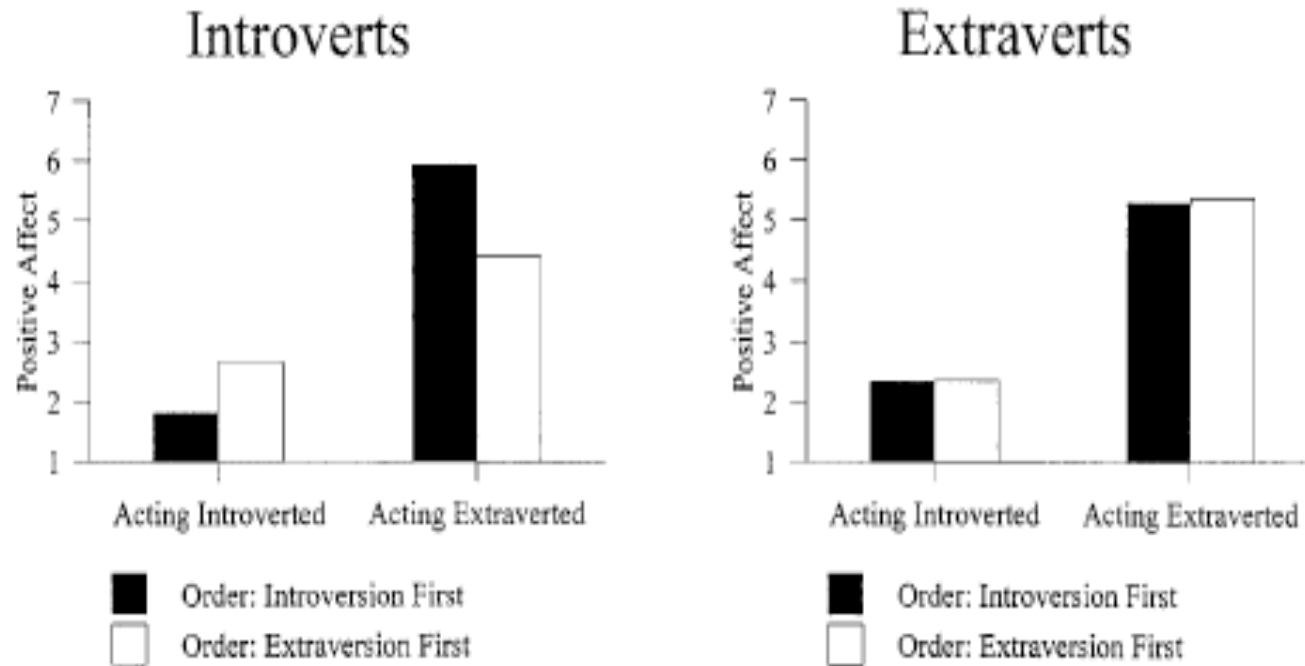
Affect and Extraversion: Brain imagining (Canli et al., 2002)
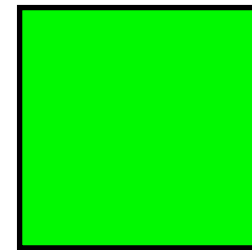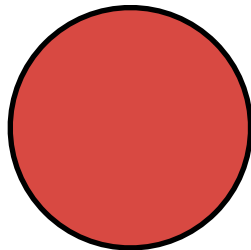
Original Gray Model

- Behavioral Activation/Approach System
  - Sensitive to cues for reward/lack of punishment
  - associated with Impulsivity/Extraversion/ Positive Affect
- Behavioral Inhibition System
  - Sensitive to cues for punishment/lack of reward
  - Associated with Anxiety/Neuroticism
- Measures: BIS/BAS scales

Reinforcement Sensitivity Theory
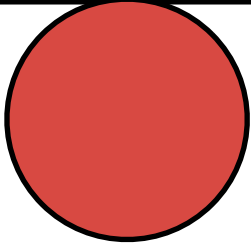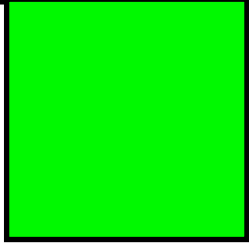
- Behavioral Activation/Approach System
  - Sensitive to <u>cues</u> for reward (dopamine ?)
  - ?sensitive to reward (endorphines ?)
- Flee/Freeze/Fight System
  - Sensitive to threats and cues for punishment
  - Leads to avoidance (perhaps active, perhaps passive)
- Behavioral Inhibition System
  - resolves conflicts between BAS/FFFS

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Trait Affect versus Cognitive Semantics: Effects on Categorization
(Weiler, 1992)
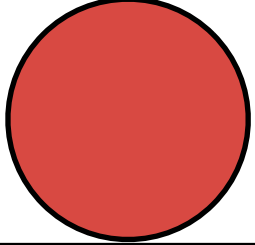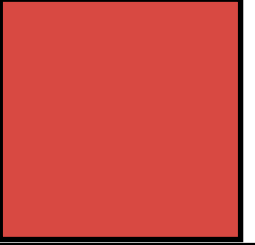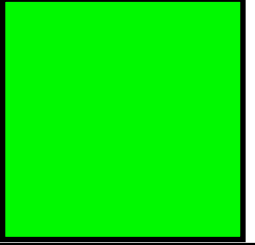
- Analogy of color blind vs. shape blind individual doing similarity judgement

- Which of these belong together, which is not the same? (The Sesame Street Game)

Weiler, M.A (1992) Sensitivity to affectively valenced stimuli. Unpublished doctoral dissertation, Northwestern University, Evanston, IL.

Weiler task: Categorization by Affect versus Cognitive

Affect A	Affect B	Neutral B
Positive A	Positive B	Neutral B
Negative A	Negative B	Neutral B

Weiler task: Categorization by Affect versus Semantics

Affect A	Affect B	Neutral B
Fall Down (- A)	Drown (- B)	Swim (B)
Hug (+ A)	Smile (+ B)	Face (B)

Sample Triplets

Baseball	Bullet	Knife
Brutal	Useless	Strong
Car wreck	Final Exam	Football game
Comedy	Failure	Tragedy
Broiled Steak	Chocolate cake	Fried Liver
Candy	Acorn	Apple
Carnival	Parade	Procession
Cupcake	Lifesaver	RollAids

Weiler model -- adapted from J.A. Gray

- Personality traits reflect differential sensitivities to positive and negative aspects of the environment

- Sensitivity to positive cues independent of sensitivity to negative cues

- Sensitivity to positive cues should increase categorization based upon positive affect

- Sensitivity to negative cues should increase categorization based upon negative affect

Sensitivity to Pleasant
Sensitivity to Unpleasant

-0.56	0.02	The beauty of sunsets is greatly over-rated.
-0.55	-0.06	I prefer to take my bath or shower as quickly as possible just to get it over with.
-0.51	0.09	The warmth of an open fireplace doesn't especially sooth or calm me.
0.51	0.11	When I pass by a bakery, I just love the smell of fresh baking breads or pastries.
0.5	-0.04	Beautiful scenery can touch something deep and strong inside me.
0.47	-0.22	I have been fascinated with the dancing of flames in a fire place.
-0.45	0.12	I don't find anything exhilarating about a thunderstorm.
0.44	0.05	Having my back massaged feels wonderful to me.
0.18	**0.52**	I am always adjusting the thermostat, or wishing I could.
0.15	**0.49**	It is very annoying to me when a radio isn't tuned quite right.
0.15	**0.49**	I find body odor extremely offensive.
0.15	**0.48**	I find it very disappointing when something doesn't taste as good as I thought it would.
-0.05	**-0.47**	Bad odors have seldom bothered me.
0.12	**0.46**	Even the smallest piece of gravel in my shoe just drives me crazy until I can get it out
-0.09	**0.44**	I have terrible feelings when I am not sure I will succeed.
0.31	**0.42**	It is important to me to get the water temperature just right when I take a bath or shower.

Sensitivities to pleasantness/ unpleasantness and categorization

	Sense+	Sense-	Pairs +	Pairs -	Val+	Val -
S+	*0.85*					
S-	0.03	*0.78*				
P+	0.26	-0.15	--			
P-	0.13	0.24	-0.01	--		
V+	0.53	-0.09	0.45	-0.04	*0.90*	
V-	-0.01	-0.40	-0.08	-0.23	-0.24	*0.89*

alpha reliabilities on diagonal

Effect of traits on classification

	Sens +	Sens -	Pairs +	Pairs -
Mood +	**0.35**	-0.13	0.19	0.20
Mood -	**-0.30**	0.13	-0.06	-0.20
Ext	**0.25**	-0.06	**0.29**	-0.09
Soc	**0.31**	-0.11	**0.23**	-0.10
Imp	0.13	0.02	**0.24**	0.02
Surg	**0.43**	0.02	0.17	-0.08
Agree	**0.29**	-0.06	0.09	-0.20
Intellect	**0.35**	0.07	-0.03	-0.01
Neurot	-0.17	**0.35**	-0.07	0.06
Stability	0.18	**-0.24**	-0.09	-0.10
Consc	0.15	**0.23**	-0.15	0.01
Psychot	**-0.35**	0.04	0.17	-0.02

Personality, Affect and Categorization: 5 examples

1. Trait and State Affect bias -> Cognitive Bias
2. **Trait & State Affect -> Cognitive Bias**
3. Cognitive Representation -> Behavioral Variability
4. Trait Cognitive -> Cognitive Bias:
5. Affect -> Cognitive Bias

Trait and State Affect -> Categorization
(Rogers & Revelle, 1998)

- Differential susceptibilities to positive and negative affective states have been proposed to underlie two major personality dimensions, Extraversion and Neuroticism, respectively. Concurrently, the influence of emotional states on cognitive processes has been heavily researched in clinical and social psychology. Four studies bridged these areas by investigating the relations between Extraversion, Neuroticism, and the evaluation of affectively pleasant, unpleasant, and neutral word pairs. Specifically measured were affectivity ratings, categorization according to affect, judgments of associative strength, and response latencies. A strong, consistent cognitive bias toward affective as opposed to neutral stimuli was found across participants. Although some biases were systematically related to personality and mood, effects of individual differences were present only under specific conditions. The results are discussed in terms of a personality/mood framework and its implications for cognitive functioning.

Rogers, G. and Revelle, W. (1998) Personality, mood, and the evaluation of affective and neutral word pairs. *Journal of Personality and Social Psychology, 74,* 1592-1605

# Trait and State Affect -> Categorization
(Rogers & Revelle, 1998)

- Trait: Extraversion, Neuroticism

- Positive and Negative Affect induction (Movies)

- Categorization and associative strength

  - variation on the Weiler task

  - RT and choice between two pairs of words

    - which pair is more "similar"

Which pair is more similar?

art	beauty		knife	kill
truth	honesty		grief	death
family	friends		devil	satan
dream	fantasy		sin	hell
stars	heaven		hate	despise
baby	cute		anger	rage
ocean	beach		starving	hunger
won	victory		larceny	thief
rose	smell		criminal	prison
dancing	fun		war	gun

Pleasantness choice = f(E x N)
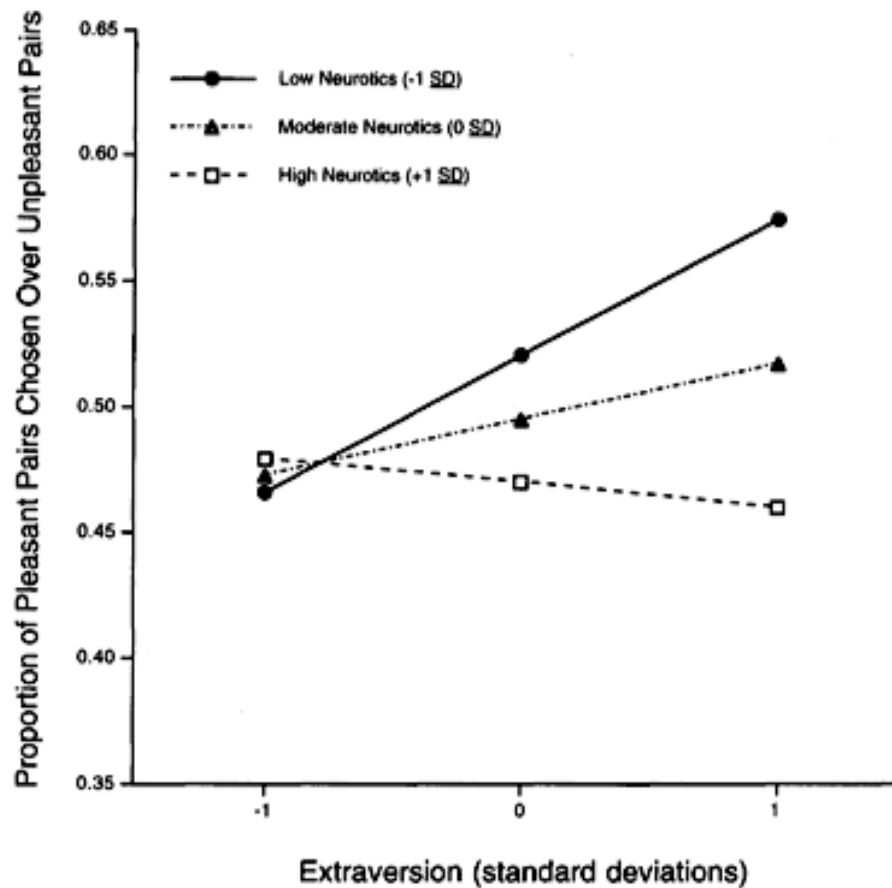
Categorization of similarity: effect of valence on choice and RT

Choice
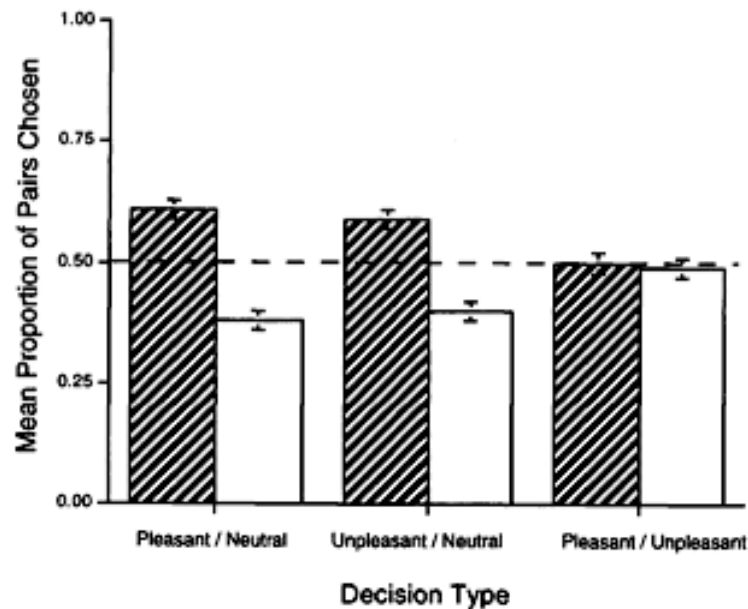
RT
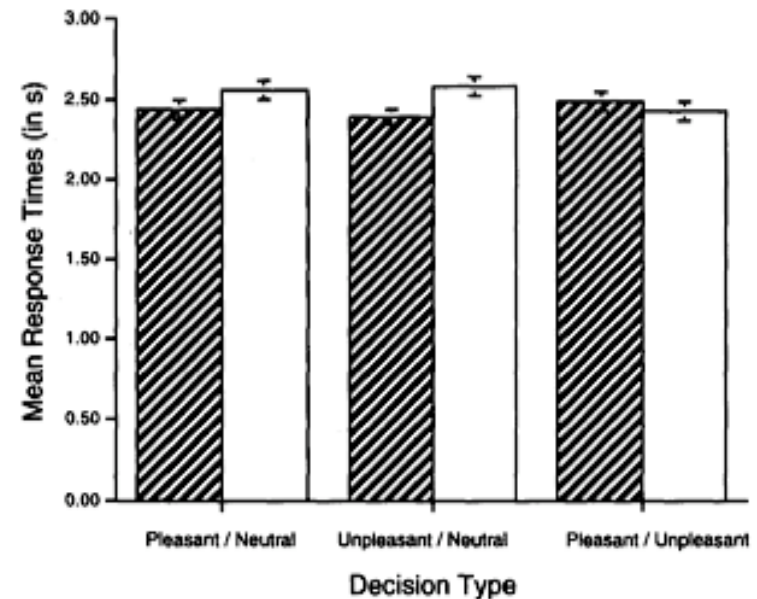
Affect and breadth of processing: Categorization
(Gaspar and Clore, 2002)

- Positive Affect broadens, Negative Affect narrows the focus of attention

- Induction of Affect by Autobiographical Memories

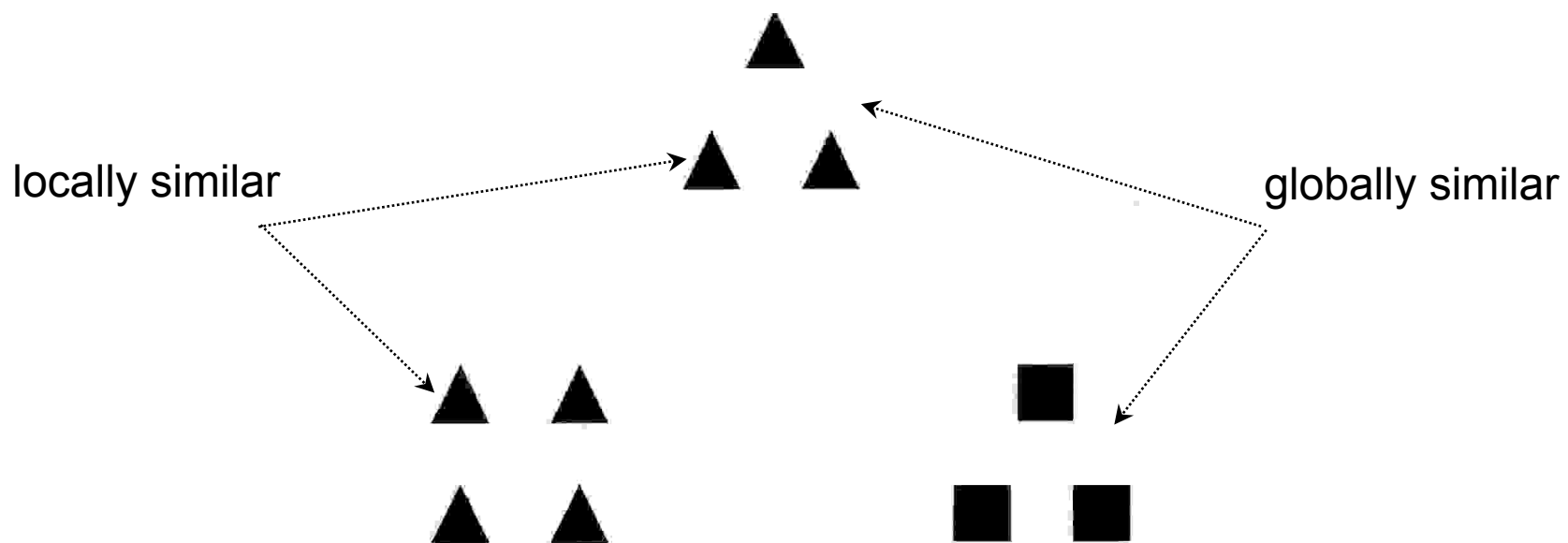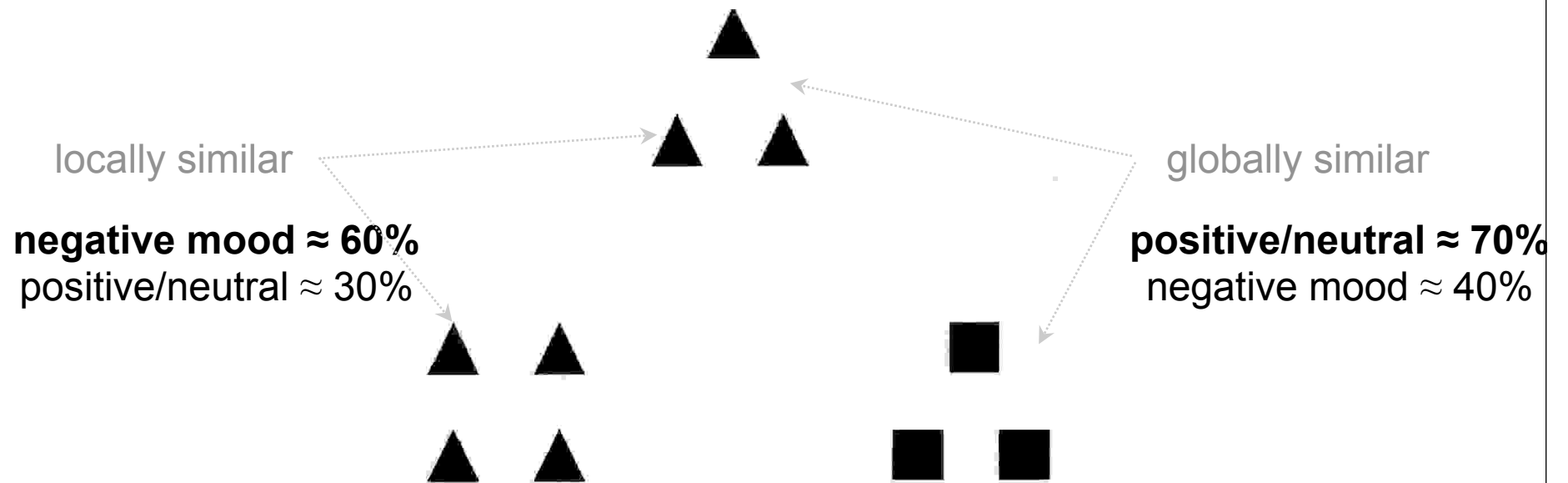- Categorization of objects by superordinate or subordinate characteristics

Gasper, K., & Clore, G. L. (2002). Attending to the big picture: Mood and global versus local processing of visual information, *Psychological Science*, 13, 34-40.

Affect and Attention (Reactive)

- mood induction (autobiographical event)
- which comparison figure is more similar to target ?
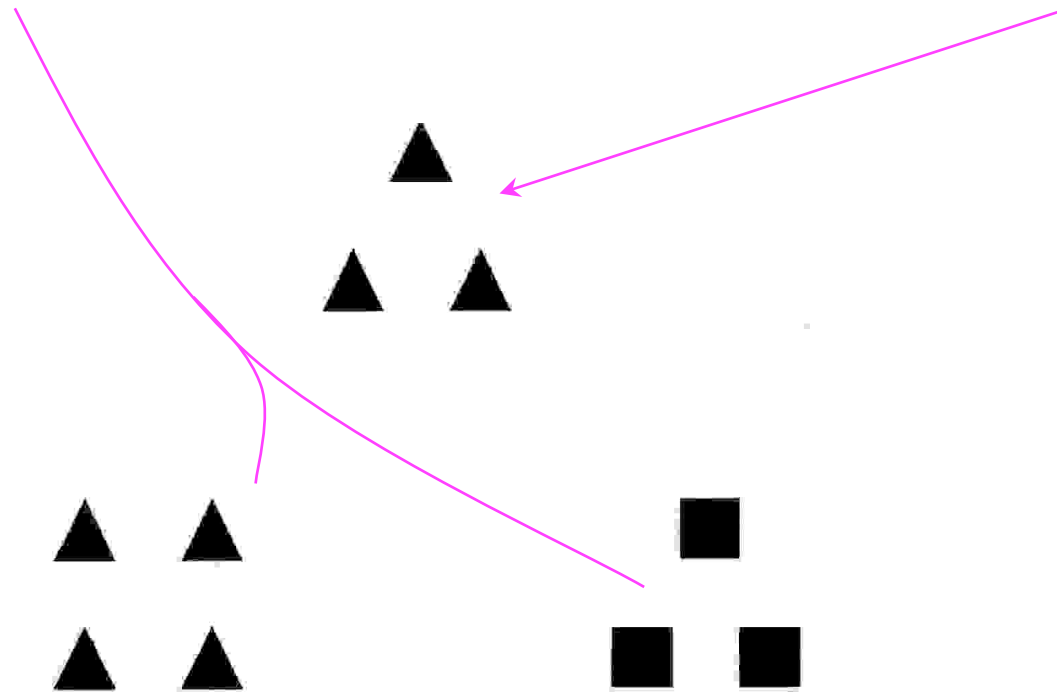
Gasper, K., & Clore, G. L. (2002). Attending to the big picture: Mood and global versus local processing of visual information, *Psychological Science, 13*, 34-40.

Affect and Attention

locally similar

globally similar

Affect and Attention (Reactive)

locally similar

globally similar

negative mood ≈ 60%
positive/neutral ≈ 30%

positive/neutral ≈ 70%
negative mood ≈ 40%

Smillie et al., 2012

- The association between Introversion-Extraversion and Positive Affect

  - Generally, E's are higher on PA than Is.

  - But, is this a sensitivity to rewards or to cues for rewards?

  - If for rewards, then rewarding movies should make them differentially happier

  - If cues for reward, then only if they have to do something for the reward will they show greater PA.

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Consider the effect of just pleasant stimuli

- Movie data suggest that Extraverts do not respond differentially to positive stimuli
- But making subjects work for reward does lead to positive affect

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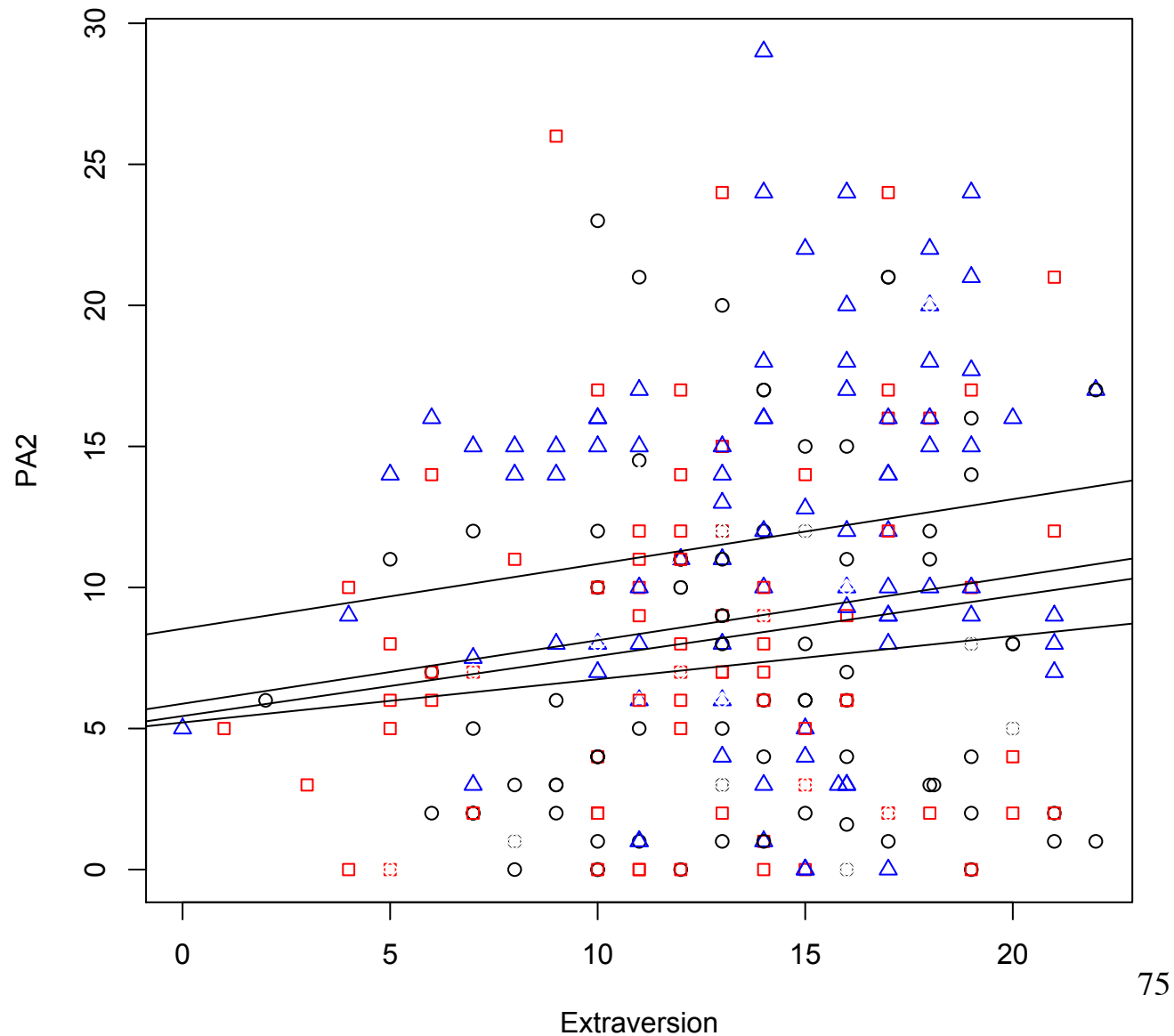# Induce Positive Affect by films

- Four movie conditions
  - Concentration camp film (depression)
  - Halloween (fear)
  - Parenthood (Positive affect)
  - Nature film (control)
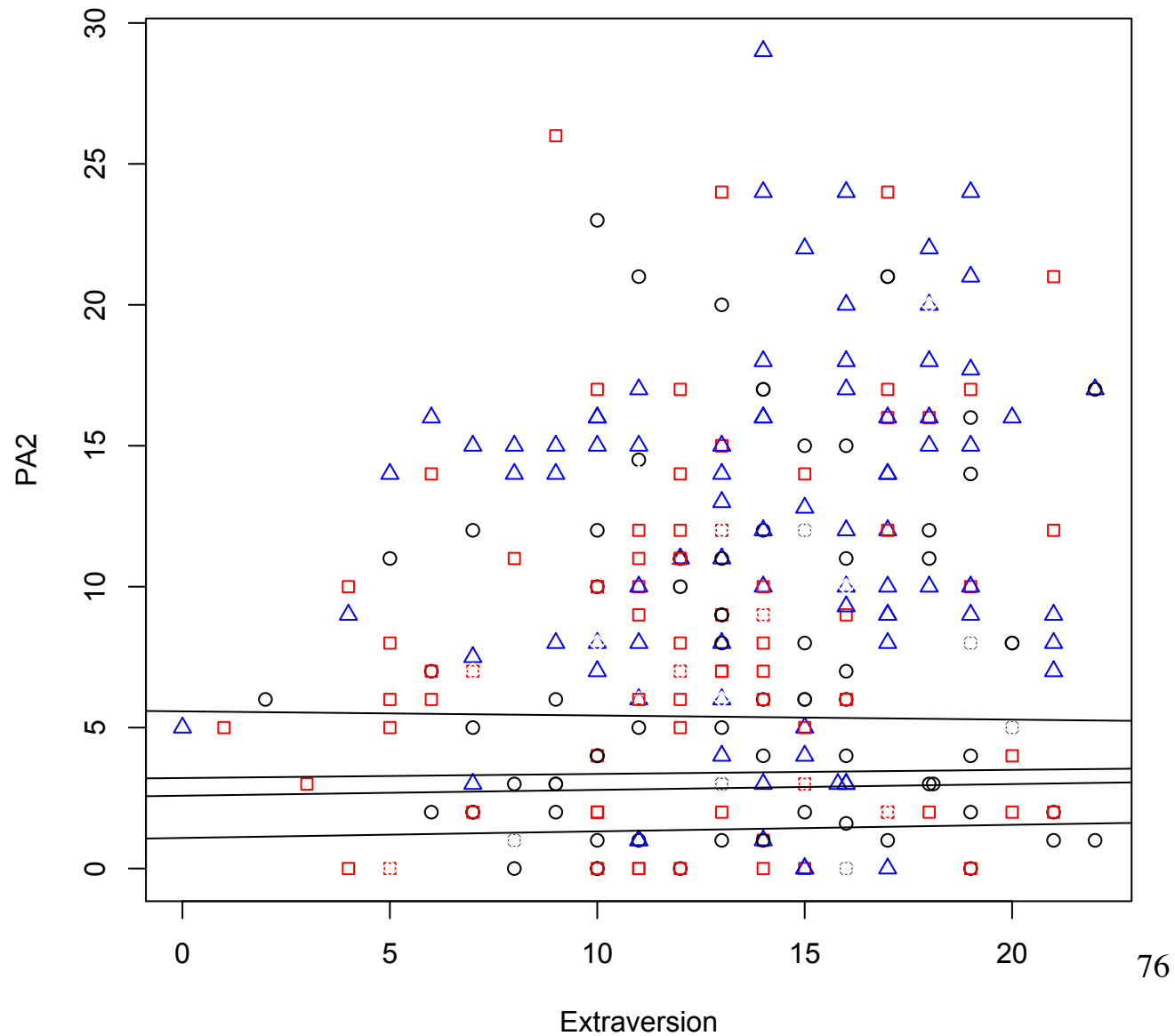
Effect of films on affect

74
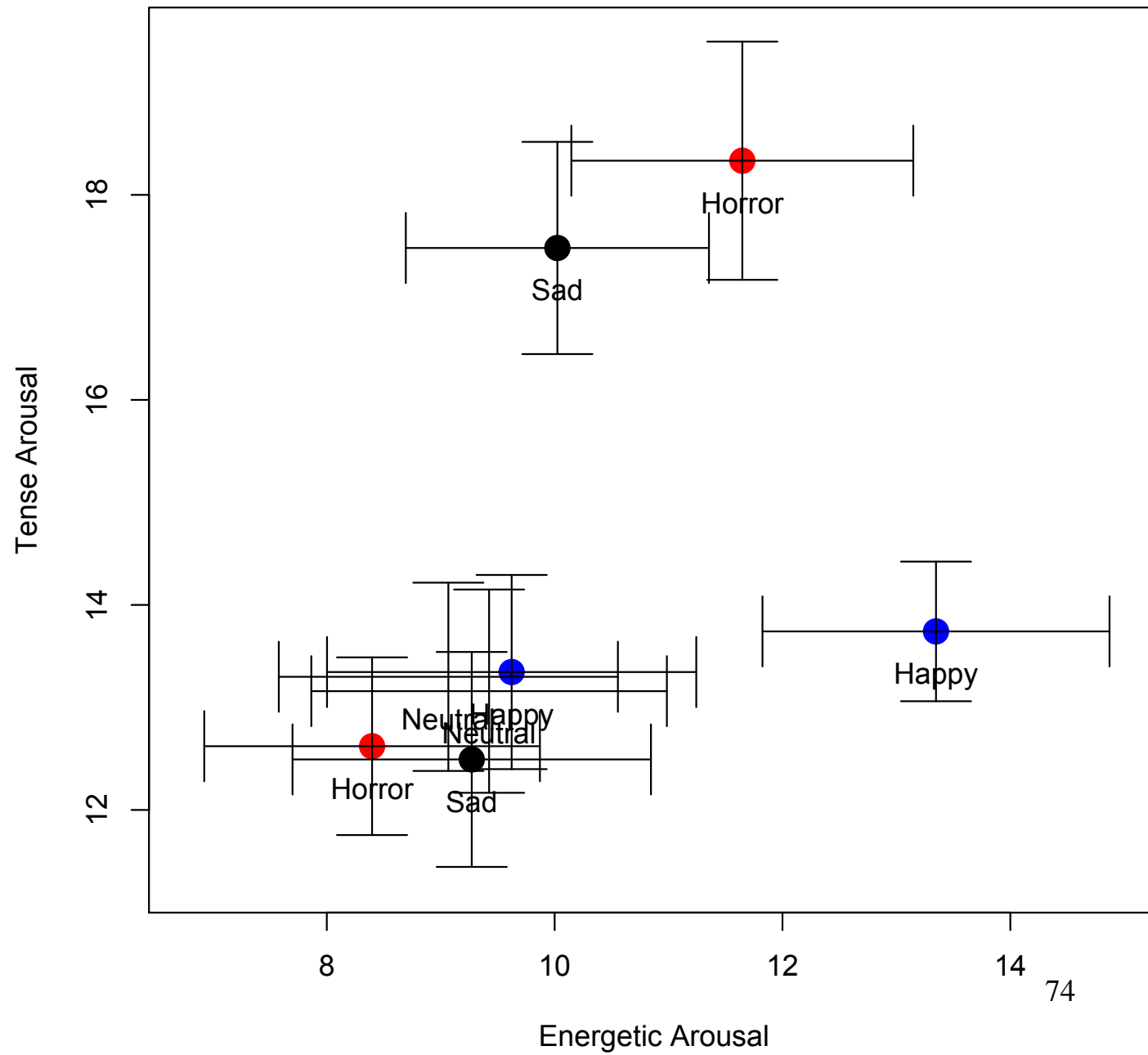
Affect by extraversion and film

Positive Affect Varies by Extraversion and Film Condition
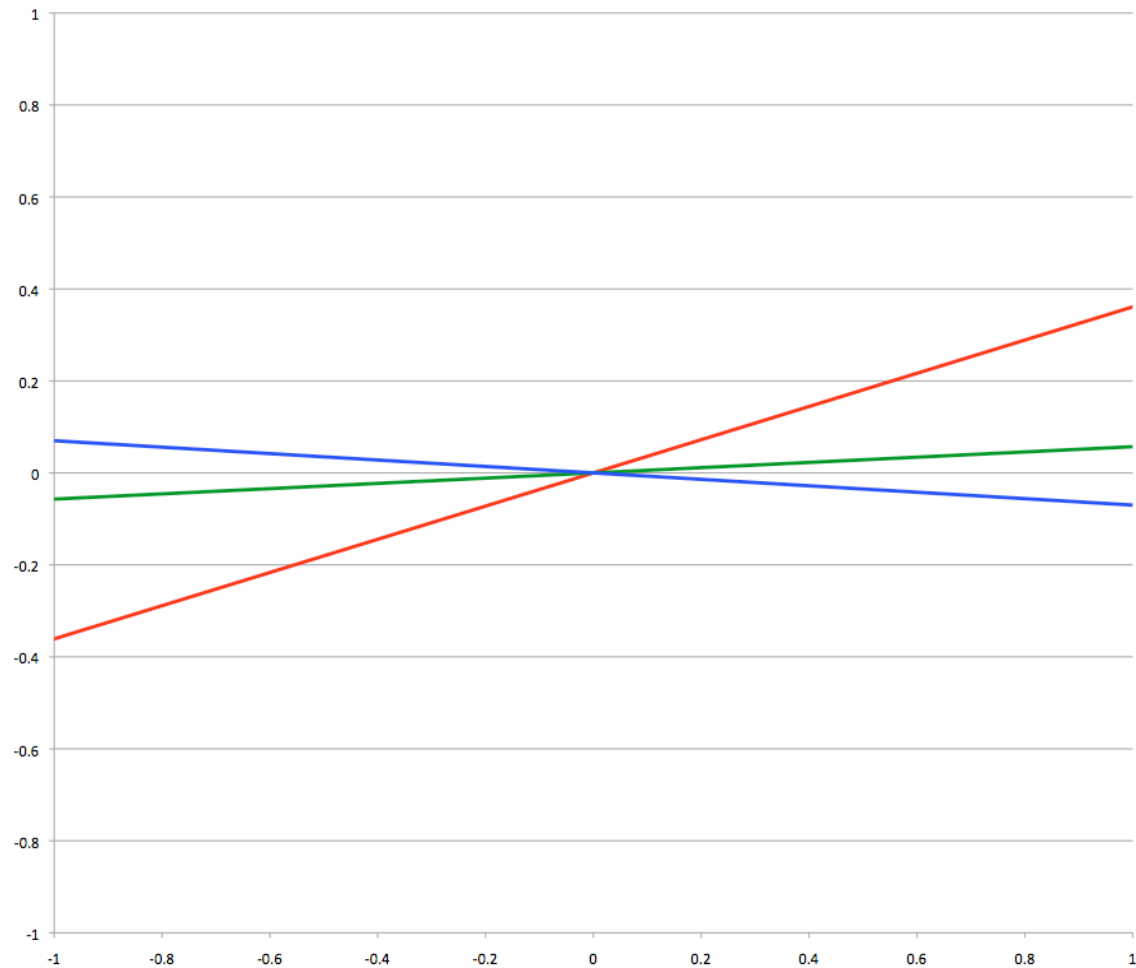
Controlling for pretest

Positive Affect Varies by Extraversion and Film Condition

Appetitive vs control

Extraversion reconsidered

- Important dimension of approach related behavior

- How much is positive affect, how much is approach behavior

- Does approach lead to positive affect