

Shhhhhh....Can't you See I am
TRYING to get some SLEEP?
Tales in the Land of Insomnia

Pacific Northwest Neuropsychological
Society

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Objectives

- Review the stages of sleep
- Discuss the various types of sleep disorders
- Neuropsychological and treatment considerations of sleep disorders

Stages of NREM Sleep

- Much debate exists -- hard to identify at times from a very relaxed state
- Varies across the night as to time spent in each stage
- Varies by age
- *And* more variability seen as individuals age -- infants, children, young adults have more predictable pattern

Stage 1

- 1-7 minutes
- Low arousal threshold
- A transitional stage of sleep
- Should constitute roughly 2-5% of sleep
- Increased levels suggest severely disrupted sleep
- Disruption occurs in transfer from working memory to longer term storage

Stage 2

- Signaled by K complexes and sleep spindles on EEG
- Tends to last 10 to 25 minutes
- More intense stimuli required to produce arousal -- low level may evoke a K complex without awakening
- 45 to 55% of sleep

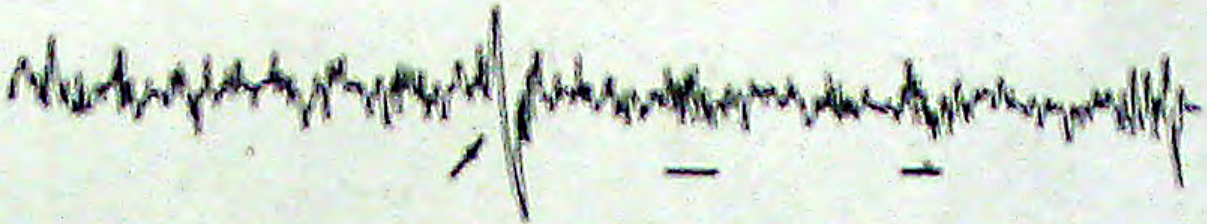
Stage 3 and Stage 4 -- SWS

- Stage 3-Slowly increasing presence of high-voltage slow wave activity on EEG (>20% <50%) and is only present for a few minutes in first cycle
 - 3 to 8% of overall sleep
- Stage 4-these waves account for >50% of tracing and can be present for 20-40 min in first cycle
 - 10 to 15% of overall sleep

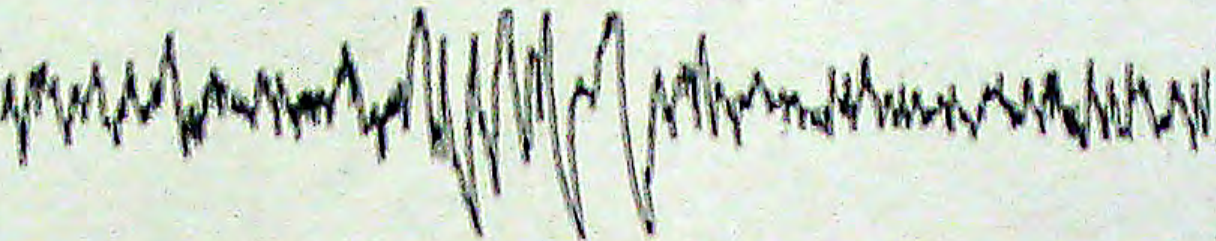
STAGE 1



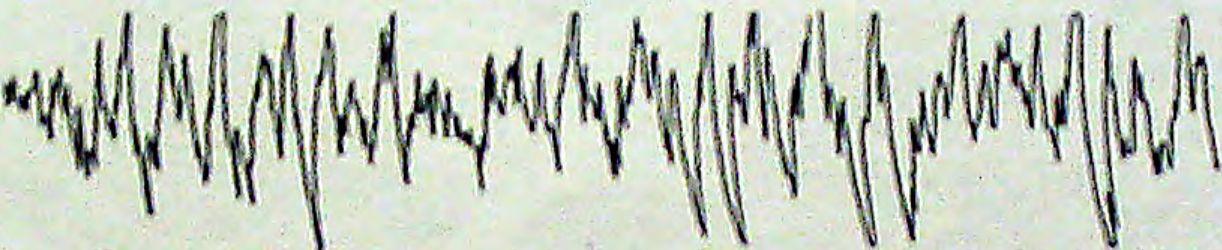
STAGE 2



STAGE 3

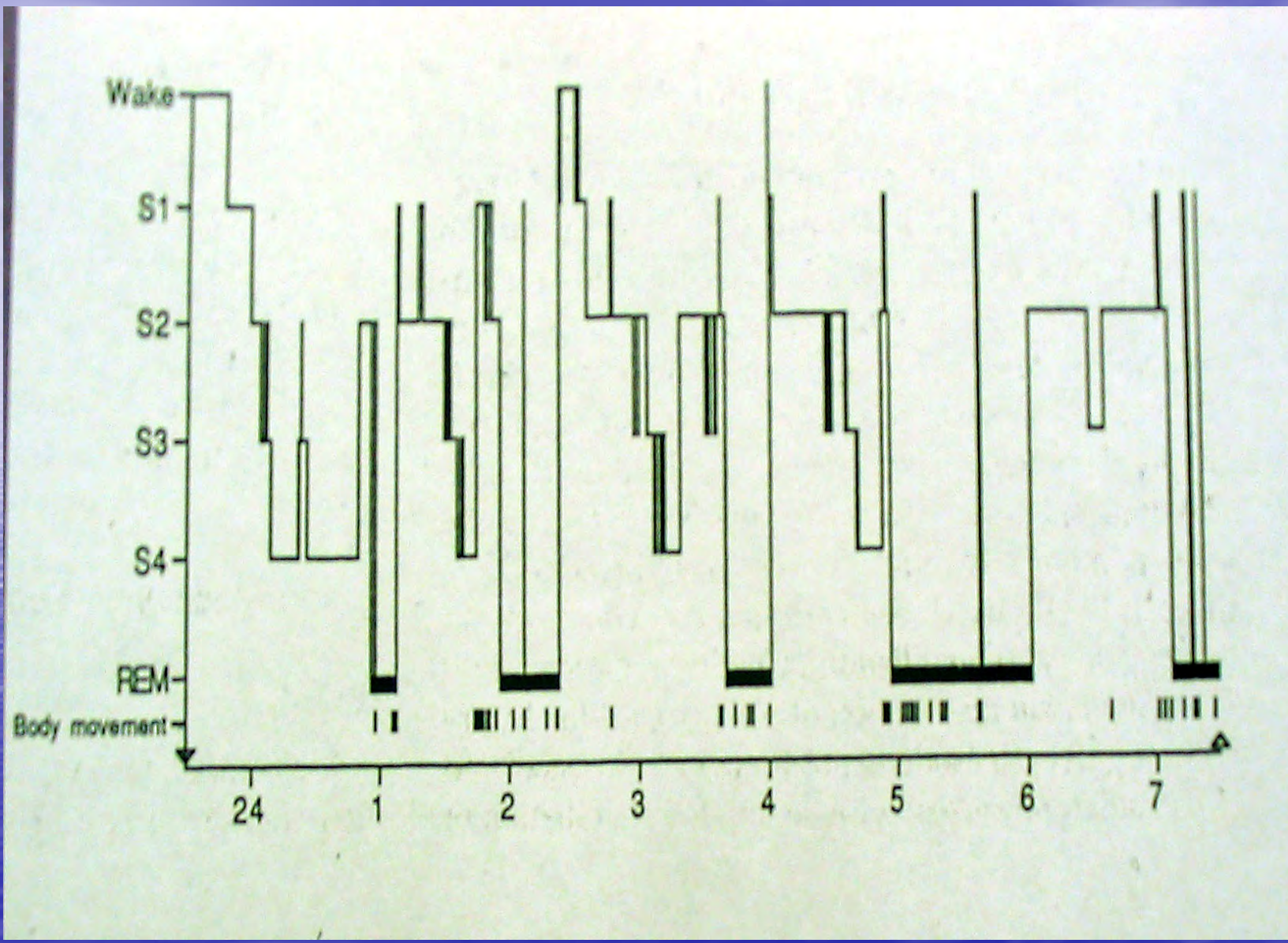


STAGE 4



REM Sleep

- Occurs roughly 4 to 6 times during the night
- Expected to increase in duration with subsequent sleep cycles through the night
- Greatest in the last one third of night
- Usually is 20-25% of sleep
- Associated with circadian rhythms and oscillation of body temperature





DEMO

The background is a blue gradient with a sun on the left side, creating a bright reflection on the water surface. The text is centered in the upper half of the image.

What is Insomnia?

RAISING DUCAN

BY CHRIS BROWNE



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11-14 Chris

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A Simple Definition, A Complex Problem

- "Difficulty in initiating and/or maintaining sleep"
- "An experience of inadequate or poor quality sleep characterized by difficulty falling asleep, ...maintaining sleep, waking up too early in the morning, nonrefreshing sleep"
- "Tiredness, lack of energy, difficulty concentrating, irritability"
- NOT a disease, but a complaint with many possible causes



Diagnosis Is Key

- Determine the cause before trying to treat
- What is producing and maintaining the problem
- This can be frustrating for the patient with insomnia but crucial to success

Sleepiness

- Decreased ability to maintain wakeful, alert status
- Increased likelihood of falling asleep
- The solution is sleep

Fatigue

- **Mental or physical exhaustion:** extreme tiredness or weariness resulting from physical or mental activity
- **Physiology inability to respond to stimulus:** temporary inability of an organ or part such as a muscle or nerve cell to respond to a stimulus and function normally, following continuous activity or stimulation
- **Inability to respond to situation:** temporary inability of somebody to respond to a situation as a result of overexposure or excessive activity



Epworth Sleepiness Scale (ESS)

- What is the chance of dozing when...
 - sitting and reading
 - watching television
 - sitting inactive in a public place
 - passenger in a car for an hour w/o break
 - lying down in afternoon to rest
 - sitting and talking to someone
 - sitting quietly after an alcohol free lunch
 - while stopped in traffic



Fatigue Severity Scale (FSS)

- During the Past Week
 - My motivation is lower when I am fatigued
 - Exercise brings on my fatigue
 - I am easily fatigued
 - Fatigue interferes with my physical function
 - Fatigue causes frequent problems for me
 - My fatigue prevents sustained physical functioning
 - Fatigue interferes w/carrying out duties and responsibilities
 - Fatigue is among my 3 most disabling symptoms
 - Fatigue interferes with my work, family or social life



Models of Insomnia

- Psychological distress
 - Anxiety, depression, severe psychopathology
 - Physiological changes observed with these states
- Learned helplessness
- Physiological arousal
- Inadequate sleep hygiene



Models, Continued...

- Cognition and the racing mind
- Primary sleep disorders
 - Apnea
 - Limb movements
- Physiological condition
- Circadian rhythm disorders



How To Evaluate

- Retrospective questionnaires, diaries, logs
- Interviews
- Prospective logs
- Actigraphy
- Laboratory analysis



Adjustment Insomnia a.k.a Transient Insomnia

- Temporarily experienced insomnia due to a specific cause
 - Unfamiliar environment
 - Poor environment
 - Expectancies
 - Life events
 - Jet Lag
 - Shift work
 - Substance use



Primary Insomnia

- Insomnia as a basic root problem
- Broken down into 3 categories
 - Psychophysiological insomnia
 - Sleep-state misperception
 - Idiopathic insomnia
- Basically Hyperaroused individuals with faster EEGs

Psychophysiological Insomnia

- Often referred to as *learned* or *behavioral*
- Exhibit excessive daily worries about not being able to fall or stay asleep w/o anxiety about other ADL
- Extreme effort and attention paid to falling asleep with apprehension that efforts will fail



Psychophysiological Insomnia

- Try too hard to fall asleep, but do so easily in other settings
- Paradoxical improvement in different settings
- Increased somatized tension around sleep
- Difficult to differentiate from generalized anxiety disorder, depression



Sleep-state Misperception

- Can only be diagnosed in the laboratory
- Individual believes they are getting far less sleep than indicated by laboratory parameters

Idiopathic Insomnia

- Life-long inability to obtain adequate sleep
- May be organically hyperaroused
- Rarely uncomplicated
- PSG shows severe insomnia w/increased latency, reduced efficiency and frequent awakenings.

Impact of Sleep Deprivation

- The effects of Sleep Deprivation are mediated by multiple sources
 - Individual Characteristics
 - Environmental Circumstances
 - How they are evaluated (test traits)

Individual Characteristics

- Prior Sleep Amount and Distribution
- Length of Time Awake
- Arousal Level
- Age
- Personality
- Psychopathology

Environmental Circumstances

- Activity
- Light
- Noise
- Temperature
- Posture
- Drugs
- Interest
- Motivation
- Personal History

Test Traits

- Length of Test
- Knowledge of Results
- Test Pacing
- Proficiency Level
- Difficulty of Task
- Short Term Memory Requirements
- Type of Test

Affects on Brain Function

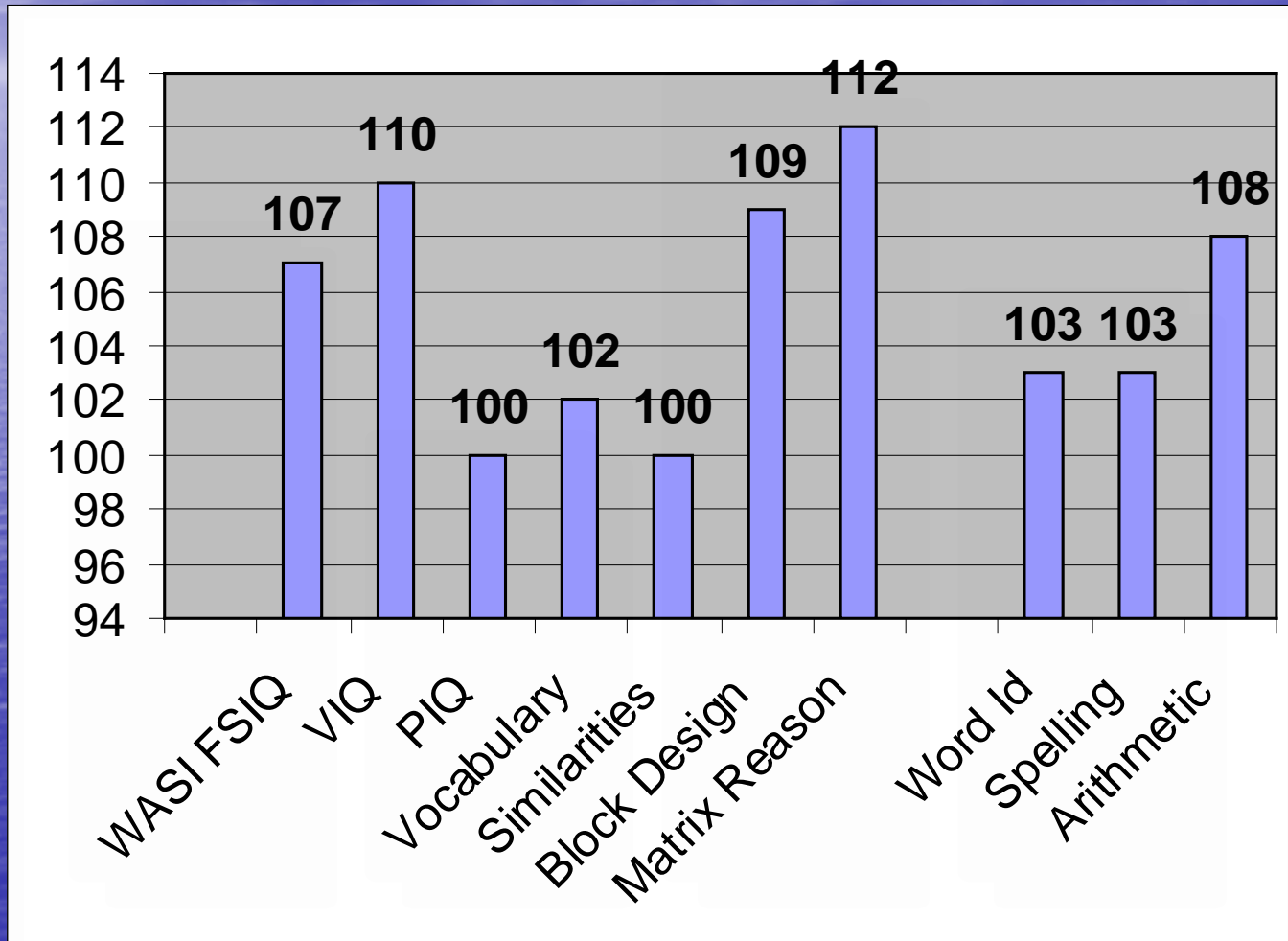
- 53% of chronic insomniacs complain of memory problems
- Increased risk of motor vehicle accidents and decreased socialization
- Self-fulfilling prophecies
- The mind that won't turn off



Medical and Psychiatric Causes of Insomnia

- Anxiety
- Depression
- Chronic Pain
- Alcoholism
- Parkinsons
- Dementia/Delirium
- GERD
- COPD
- Asthma
- Diabetes
- Thyroid
- Artherosclerotic Cardiovascular Disease

A Case Example



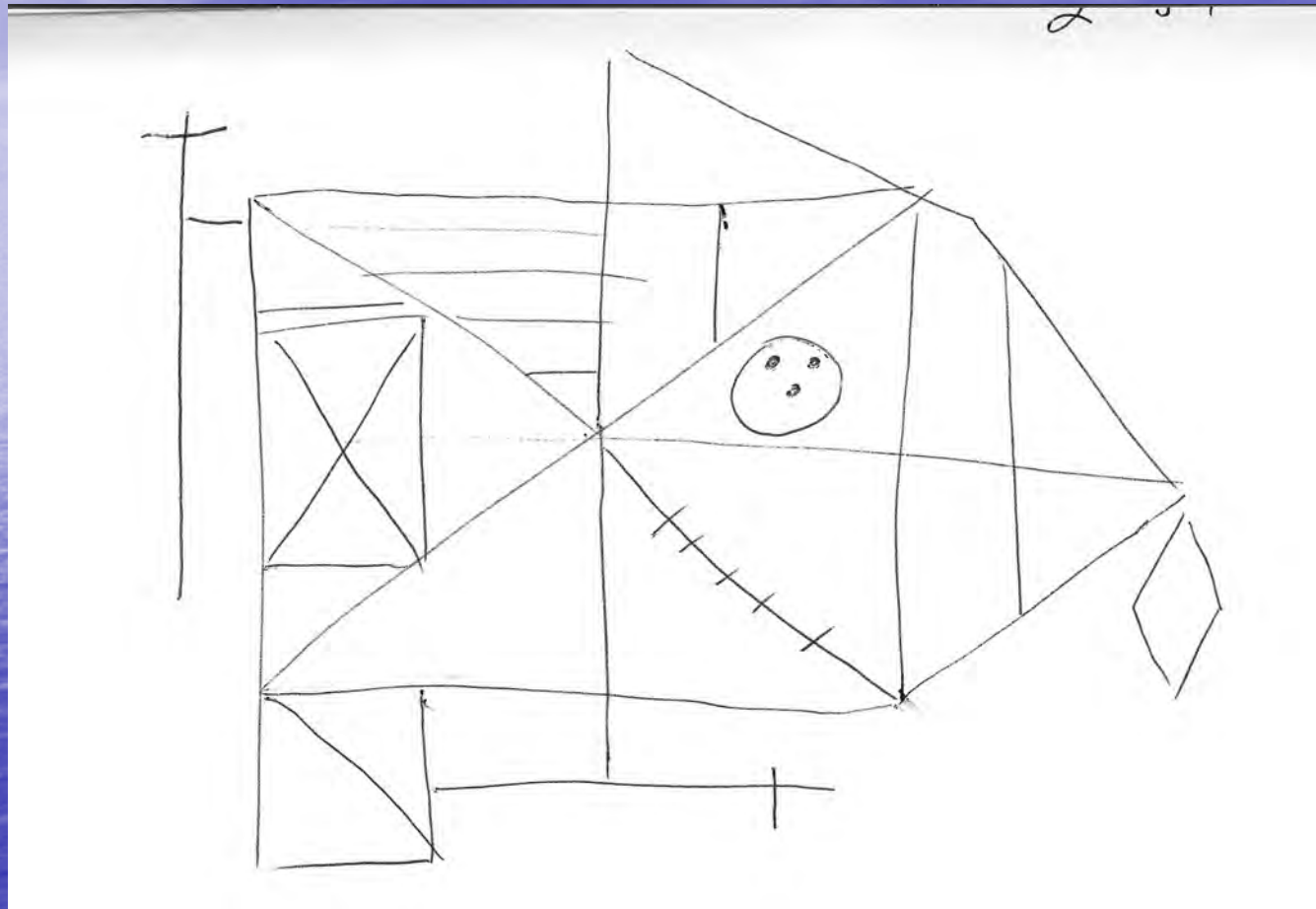
Language and Visual Spatial

<i>DKEFS</i>	<i>Age SS</i>	<i>Hooper</i>	<i>Total</i>
Letter	12		28
Category	10	<i>Rey</i>	<i>Copy</i>
Switching	17		36
Accuracy	16		
<i>Boston</i>	<i>Total</i>		
Correct	56		
<i>PPVT-III</i>	<i>Stnd</i>		
	111		

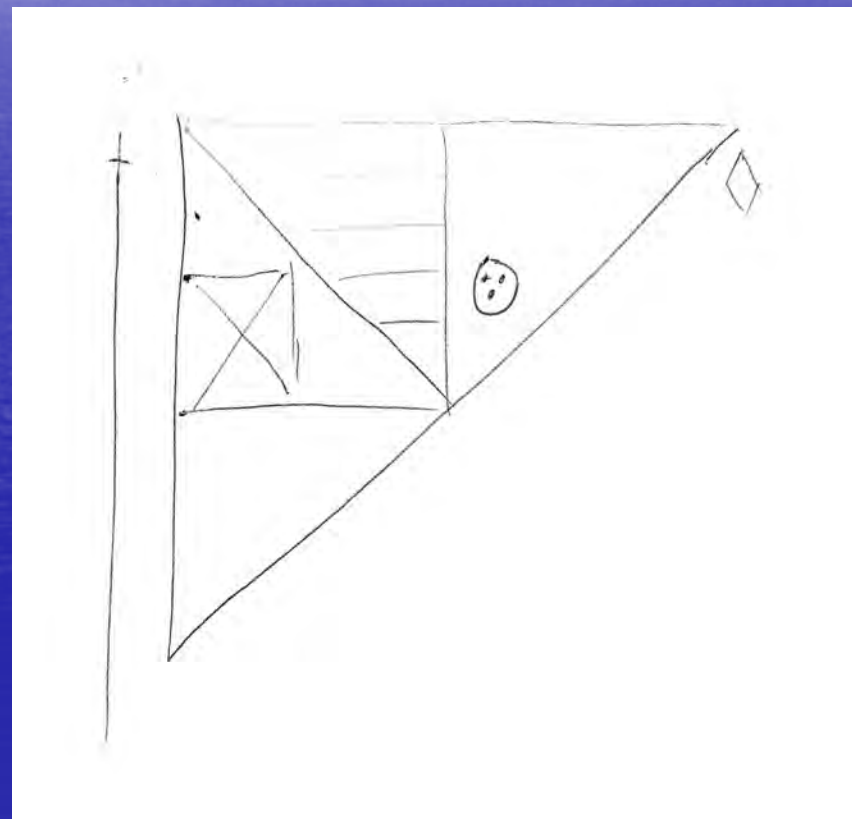
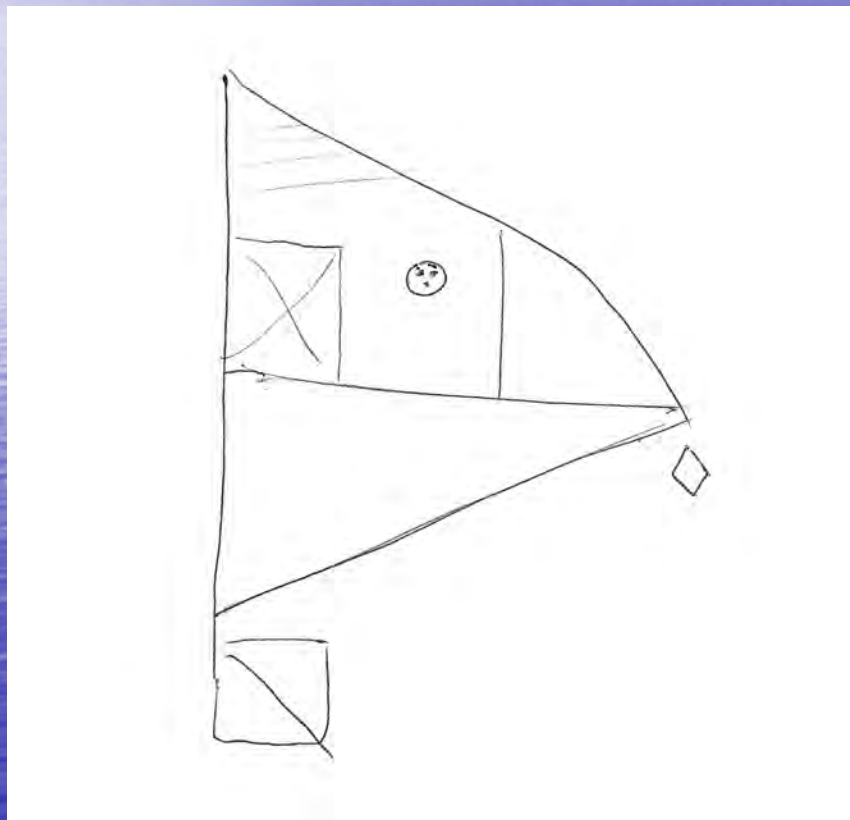
CVLT-2

Trial 1	5 (-1)	L-Free	4 (-3)
Trial 2	5 (-2)	L-Cued	5 (-2.5)
Trial 3	8 (-1.5)	Total T	26
Trial 4	6 (-3)	Recogn	14 (-1)
Trial 5	6 (-3)	Forced	16/16
Trial B	4 (-1.5)		
S-Free	5 (-2)		
S-Cued	5 (-2.5)		

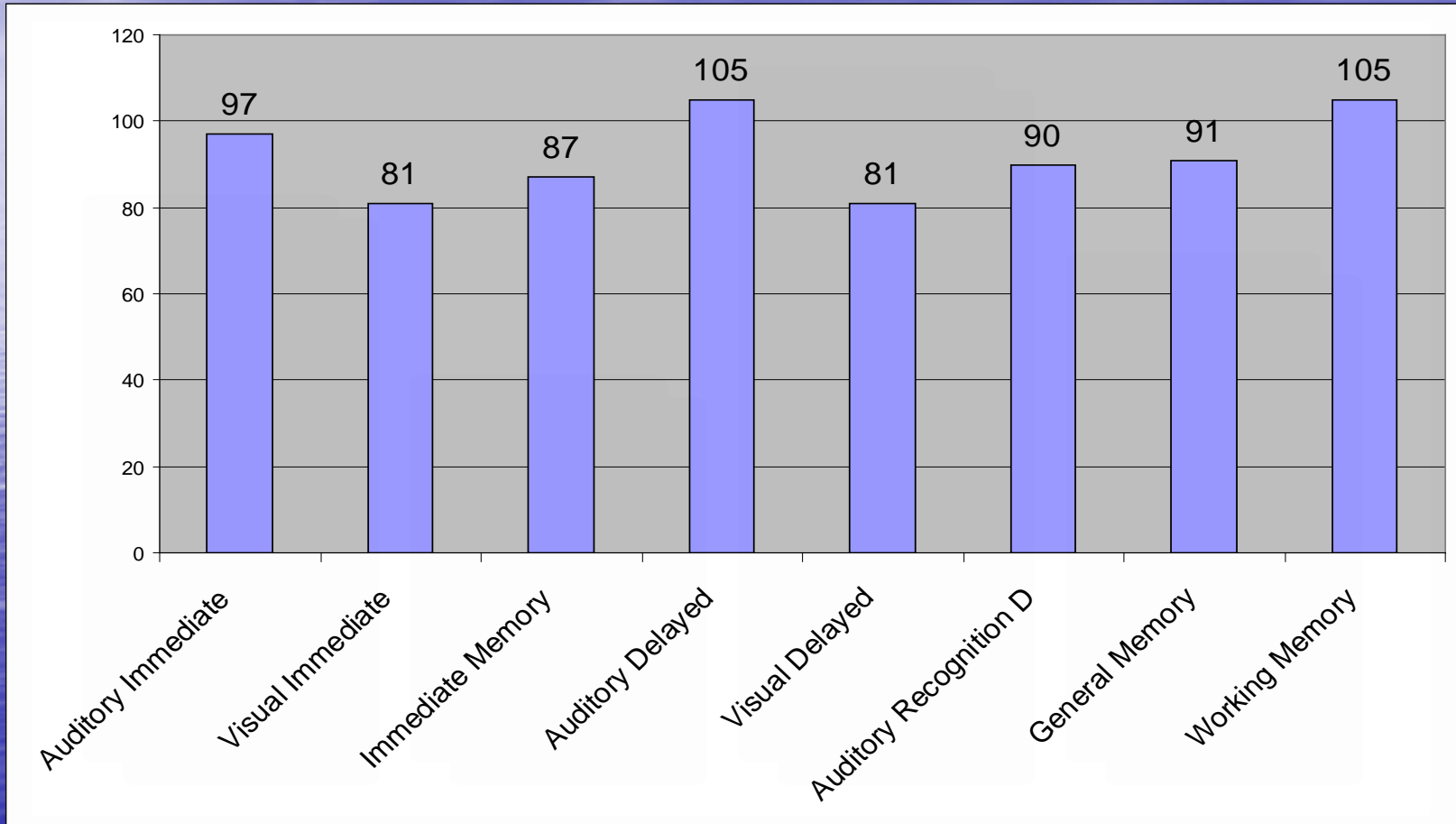
Rey Complex Figure



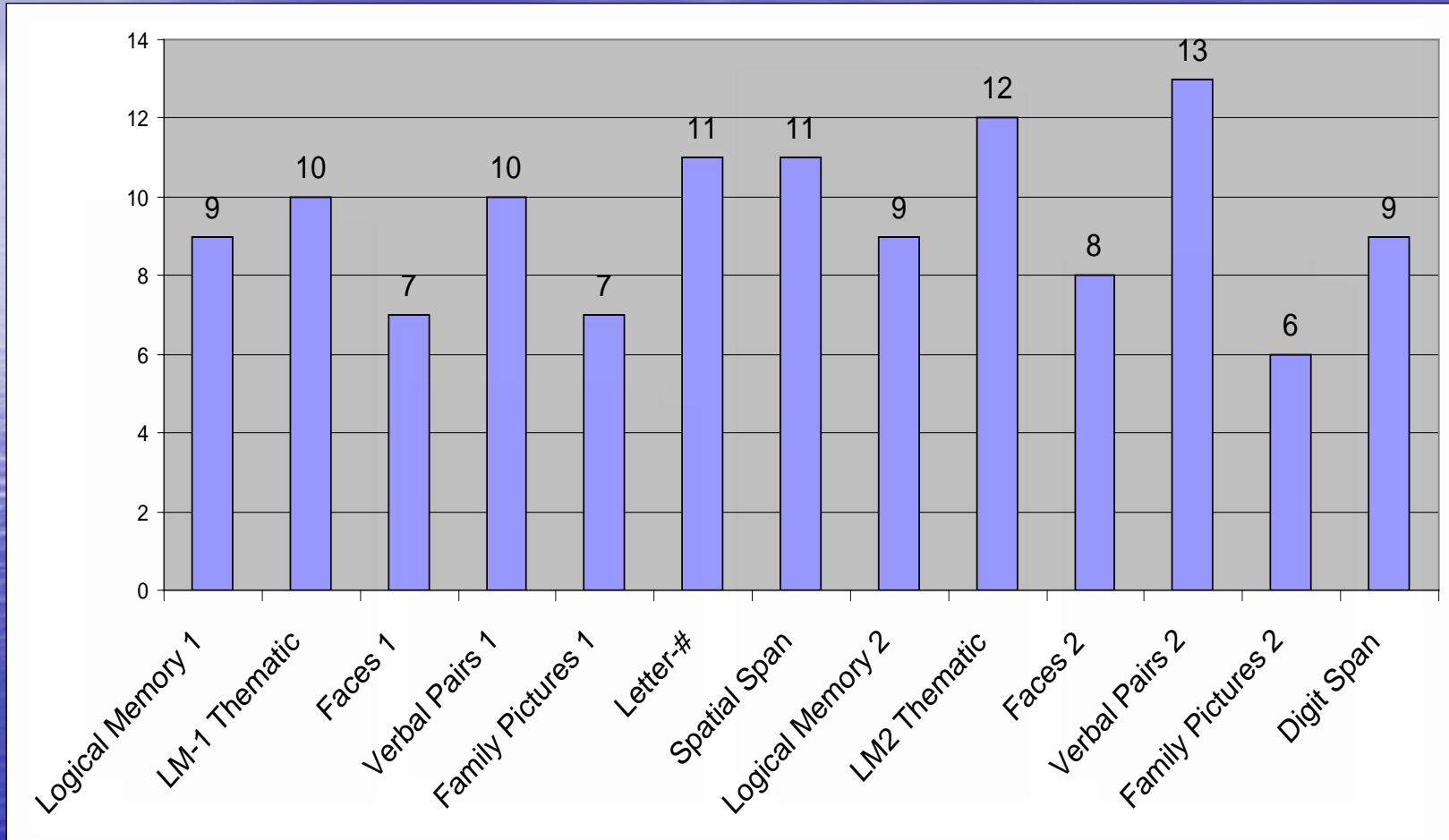
Immediate and Delayed



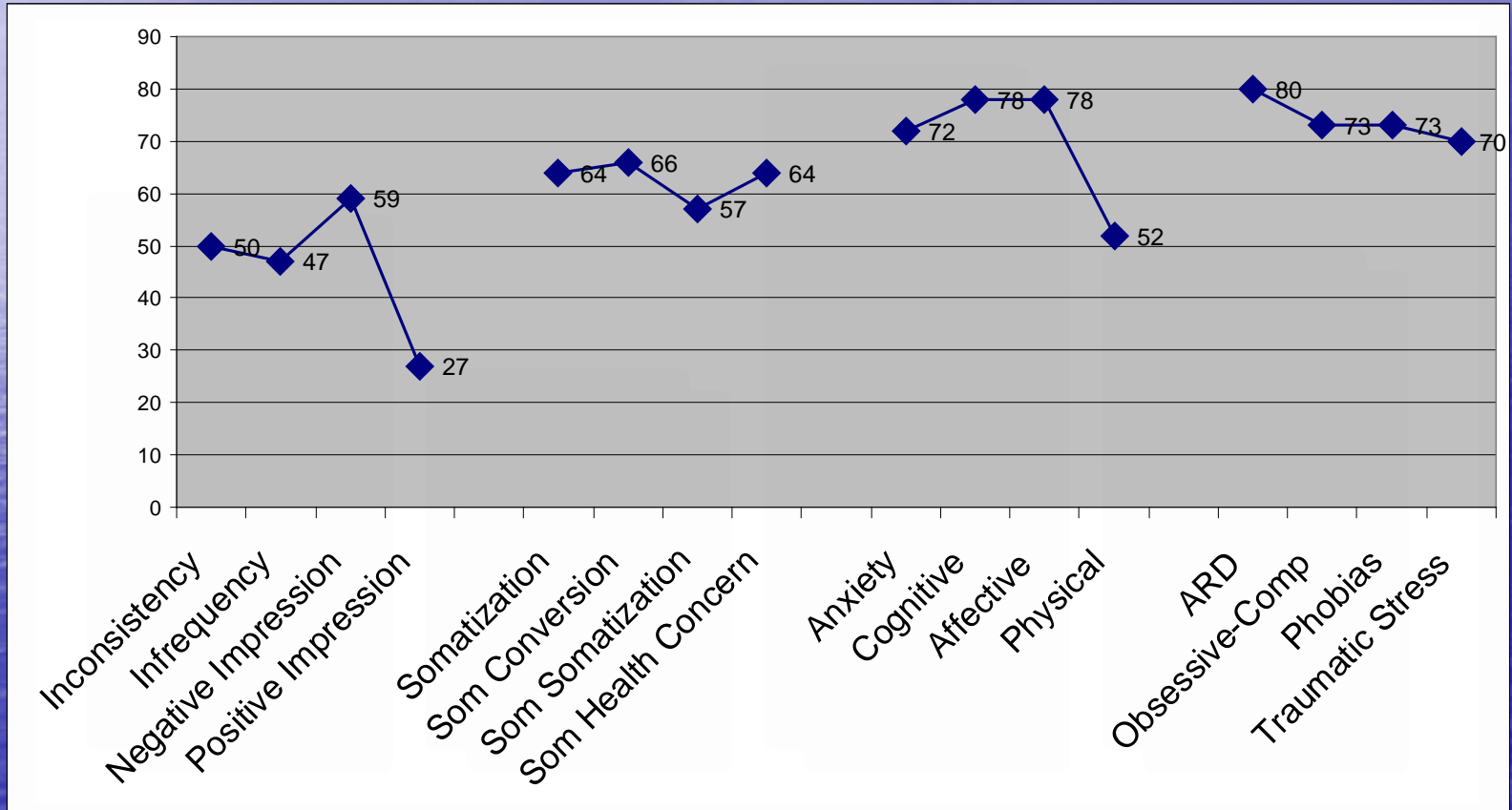
WMS-3



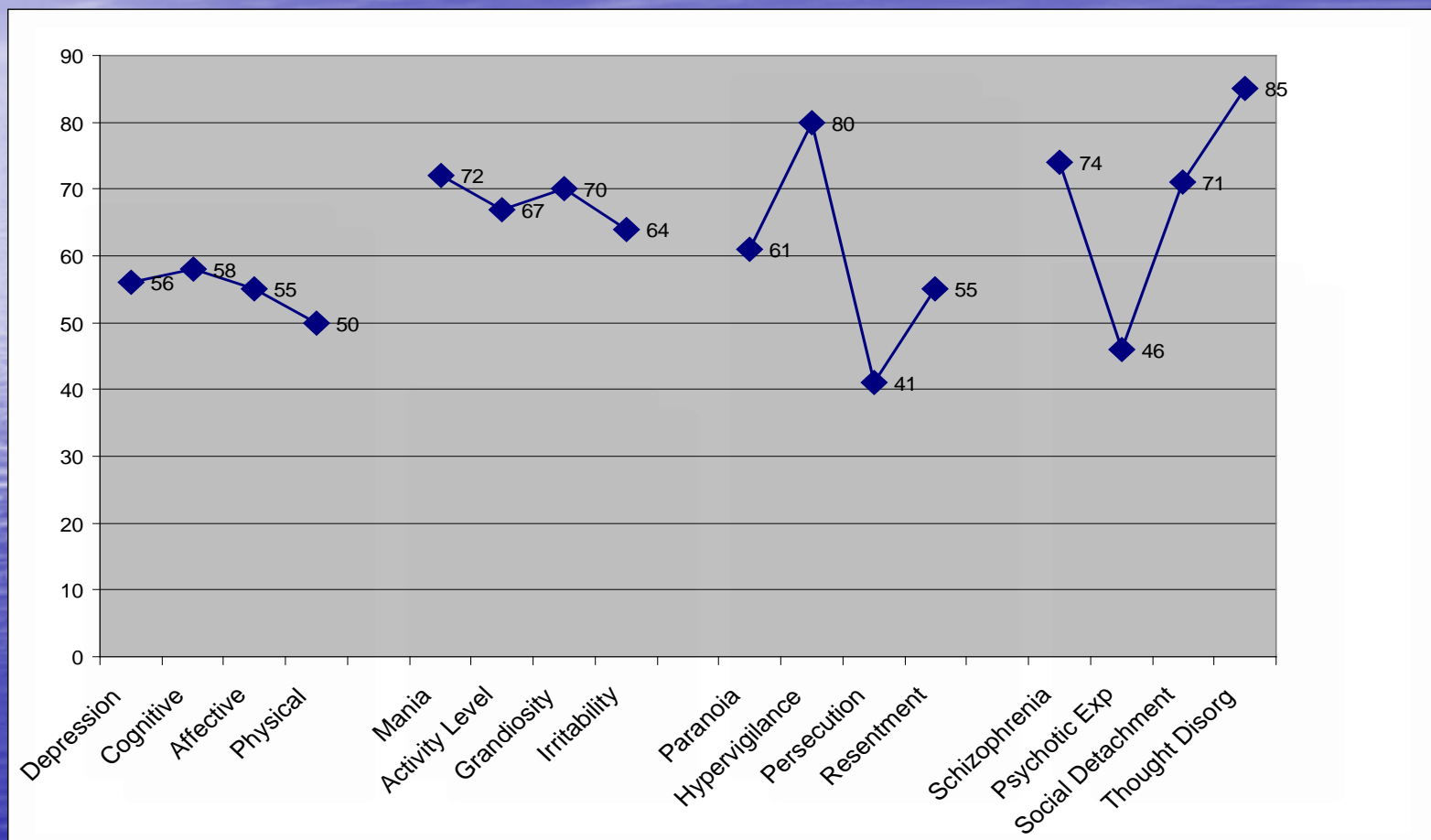
WMS-3...



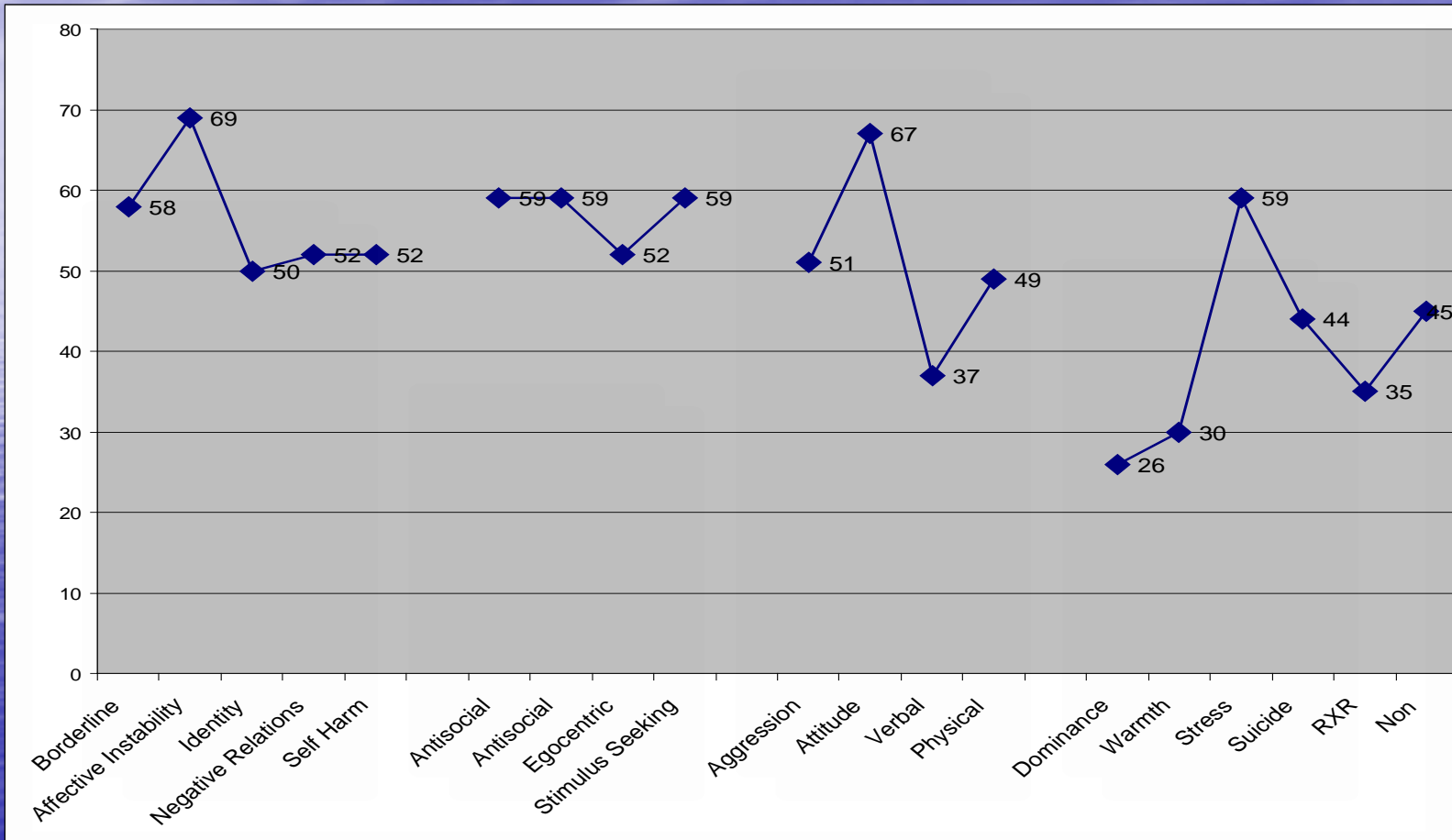
PAI



PAI Scales Continued



And One More





Traumatic Brain Injury

- Complaints of insomnia in Post-Acute TBI patients range from 27% to 56% with some estimates of greater...this is compared with 10-17% of U.S. population
- Recovery of REM sleep has been postulated to be associated with cognitive recovery

Other Head Injury

- In acute TBI insomnia is thought to be linked to neurologic causes
- Research has suggested that in post-acute patients insomnia is best predicted by depression level and injury severity especially when there is a history of milder brain injuries



More on TBI

- Adolescents with a history of mild TBI showed decreased sleep efficiency with more wake time (noted both for frequency of awakenings and length of time)
- Other studies have suggested that this fairly prevalent
- Impact on attention and concentration

More on TBI and Sleep

- Studies suggest that decreased REM sleep in patients with history of brain injury was sensitive measure of damage
- It is also a potential indicator of increased risk for the development of post-traumatic epilepsy

Selected TBI References

- Factors associated with insomnia among **post-acute traumatic brain injury** survivors. **Brain Inj** 2000 Jul;**14(7):659-67**
- Long-term **sleep disturbances** in adolescents after minor head **injury**.**Pediatr Neurol** 2001 Feb;**24(2):129-34** Kaufman Y; Tzischinsky O; Epstein R; Etzioni A; Lavie P; Pillar G
- The influence of **traumatic brain** lesion on **sleep** architecture.**Sb Lek** 2000;**101(3):233-9** (ISSN: 0036-5327)Busek P; Faber J
- **Sleep disturbances** and their management in patients with **brain injury**.**J Head Trauma Rehabil** 2002 Aug;**17(4):335-48**

Seizure Disorders

- Seizures occur extensively during sleep or on awakening in a substantial proportion of patients with epilepsy.
- Interictal epileptiform discharges are also influenced by sleep and sleep deprivation.
- Sleep deprivation influences not only the occurrence but also the symptomatology of epileptic seizures.
- Sleep architecture and daytime alertness are influenced by seizures and antiepileptic medications.

Seizures and Sleep

- Primary sleep disorders must be considered when seizures are well controlled.
- Sleep Hygiene issues cannot be ignored!
- Mood issues and self impressions



Types of Seizures and Sleep

- Patients with Simple and Complex Partial seizures show more sleep disturbances when compared w/ patients with generalized seizures (and controls)
- Even day time seizure activity may increase sleep difficulties at nights

Select Seizure and Insomnia References

- The relationship between sleep and epilepsy. *Semin Pediatr Neurol* 2001 Dec;8(4):241-50 Kotagal P
- Sleep-related epilepsy. *Curr Neurol Neurosci Rep* 2003 Mar;3(2):167-72 (ISSN: 1528-4042) Bazil CW
- Sleep complaints and epilepsy: the role of seizures, antiepileptic drugs and sleep disorders. *J Clin Neurophysiol* 2002 Dec;19(6):514-21 Foldvary-Schaefer N
- Sleep and epilepsy. *Semin Neurol* 2002 Sep;22(3):321-7 Bazil CW
- Self-reported sleep disorder symptoms in epilepsy. *Epilepsia* 1984 Aug;25(4):434-7 Hoeppepner JB; Garron DC; Cartwright RD

Chronic Fatigue Syndrome (CFS)

- Medically Unexplained
- Of new onset
- Of 6-months duration
- Not due to ongoing exertion
- Not relieved by rest
- Significant reduction in previous levels of functioning

Fibromyalgia

- Fatigue
- Difficulty Sleeping
 - Estimates in some articles suggest up to 20% of these pts have sleep apnea (N. Lee Smith, M.D.)
- "Hurts all Over"
- Headache, Neck/Back Ache
- Weakness
- Unusual sensory experiences
- Tender Points

Fibromyalgia Pts and Sleep Stages

- Alpha Wave Intrusions in Stage 4 sleep
 - Deep pain stimulation in controls can mimic this effect
- Tend to show sleep patterns similar to those observed in patients with depression (less deep sleep)
- Implications for SSRI treatment—
Sertraline and Citalopram thought to improve deep sleep (i.e., decrease alpha wave intrusions)

Sleep Management for CFS/FMS

- Rule out other sleep disturbances
- Melatonin, Phototherapy, Sleep Hygiene
- OTC
- Multiple Medications
 - Tricyclic Antidepressants
 - Antipsychotics
 - Antidepressants
 - Muscle Relaxants
- Cognitive Behavioral Therapy

Weight and Loss of Sleep

- When individuals do not get enough sleep this interrupts the amount of energy available to them. To restore balance in the body system the body will not feel satisfied and attempt to compensate for lack of energy from sleep with empty calorie consumption.



OUCH!!!!

- Pain during the day results in stress on the body that interferes with ability to sleep at night
- Increase difficulties initiating sleep
- Interrupt ability to maintain sleep state
- Can be further complicated by weight issues and cognition

I'm so Blue...

- May be a symptom of depression or a separate issue that can remain after improvement of mood functioning
- Interferes with ability to initiate and maintain sleep
- Psychological pain and discomfort
- Interruptions in REM Sleep



Anxiety

- For certain individuals stress sends a no-sleep signal to the body.
- Certain neurochemicals are released in our brain, resulting in heightened vigilance and arousal
- In General anxiety disorder people are going to have a certain amount of difficult sleeping.
- Panic disorders disrupt sleep if they occur near bedtime or even during sleep.
- A vicious cycle

Insomnia and Aging

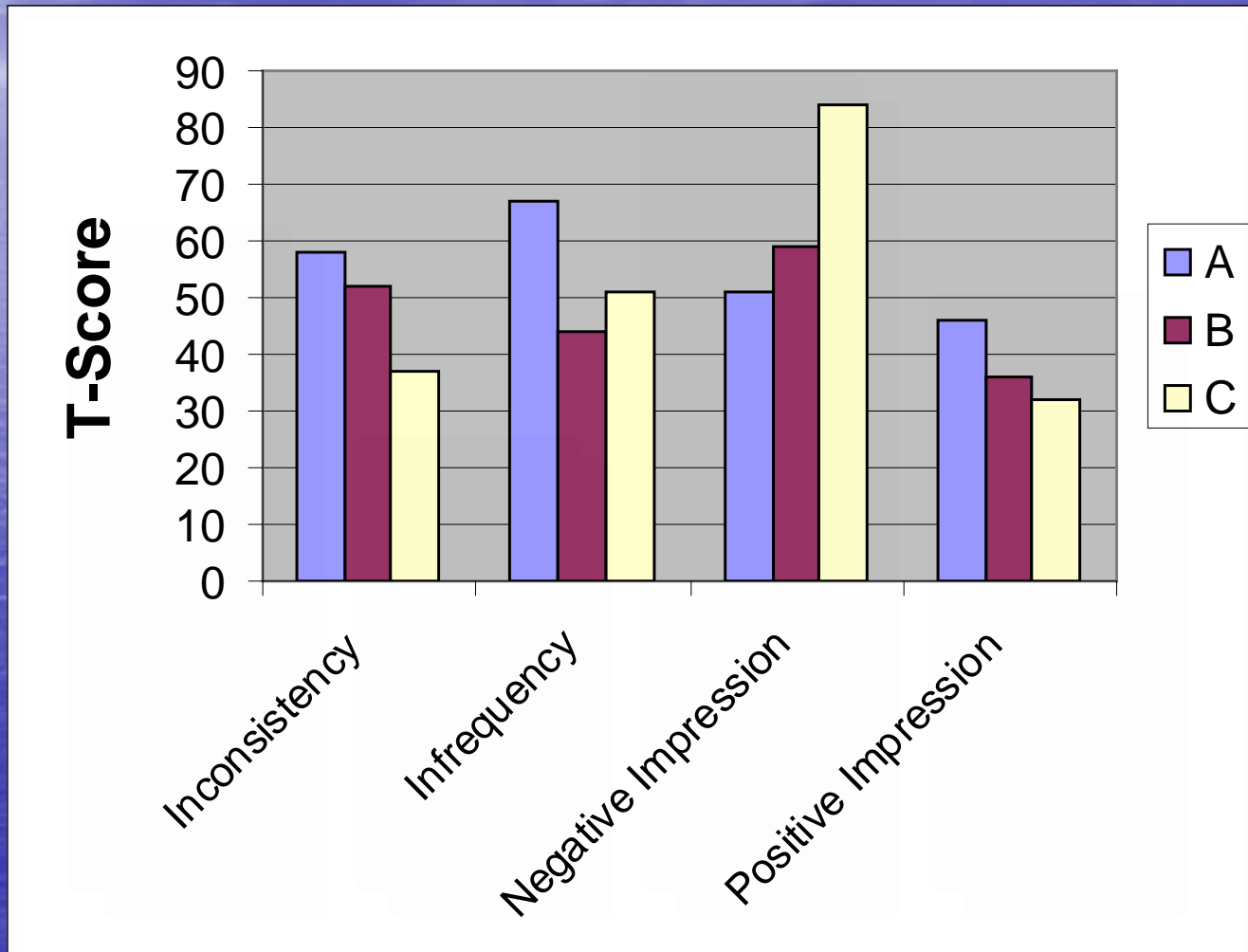
- Change in sleep architecture that accompanies normal aging
- Less time is spent in deep sleep. This may result in increased nighttime awakenings, shallow, fragmented sleep, and a higher probability of being awakened factors
- More napping during the day due to this and retirement and the concomitant isolation
- Decreased physical and mental stimulation



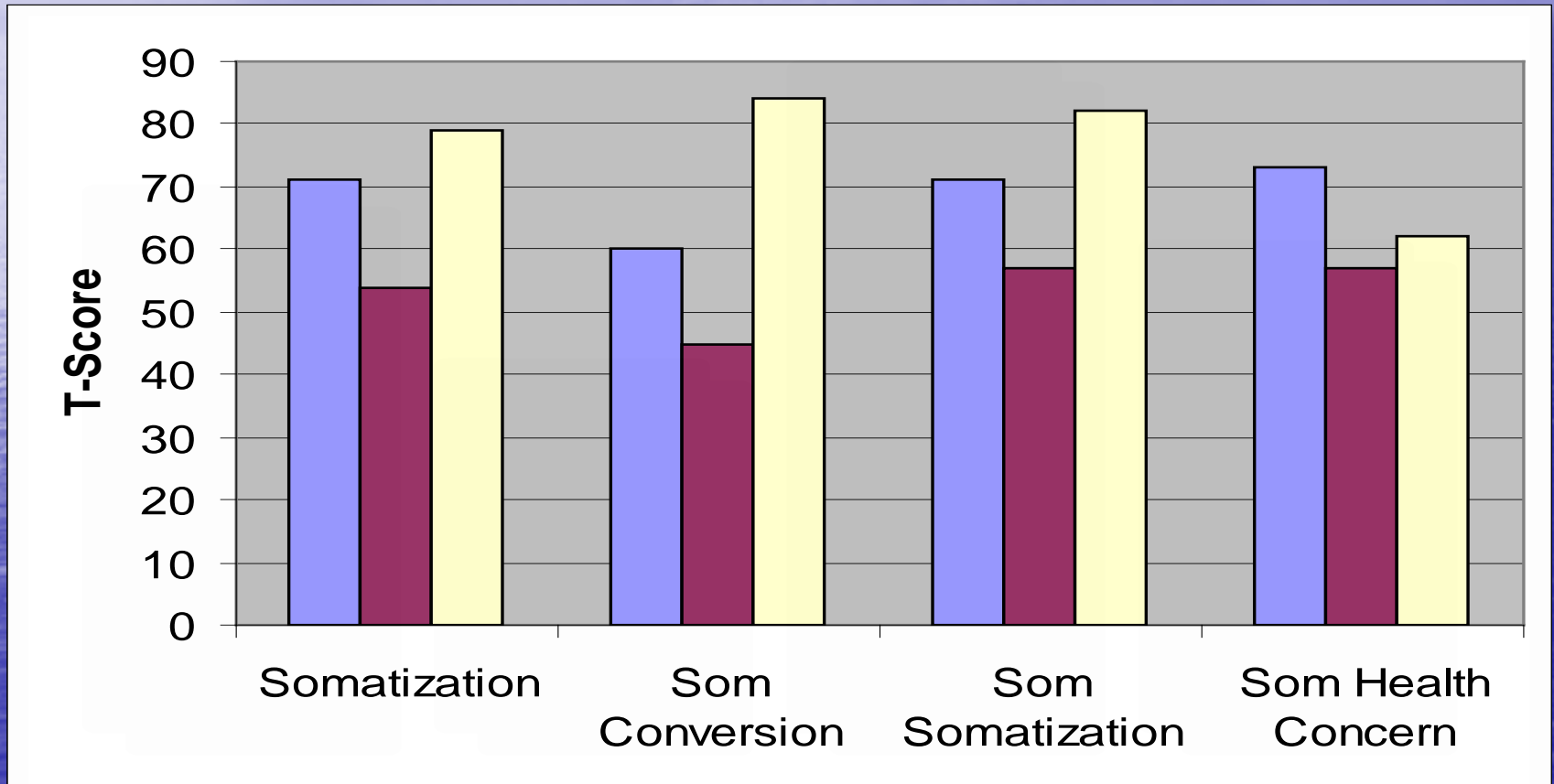
Menopause

- Changing hormonal levels, and symptoms such as hot flashes can result in disruptions in sleep continuity
- The falloff in estrogen levels and in the metabolites of estrogen have been implicated in causing sleep disturbance in perimenopausal and postmenopausal women. The physiological effect of these hormones and their loss in bringing about hot flashes and sleep disruption is a key factor.
- Evidence suggests that the frequency of sleep disordered breathing increases in the postmenopausal women.

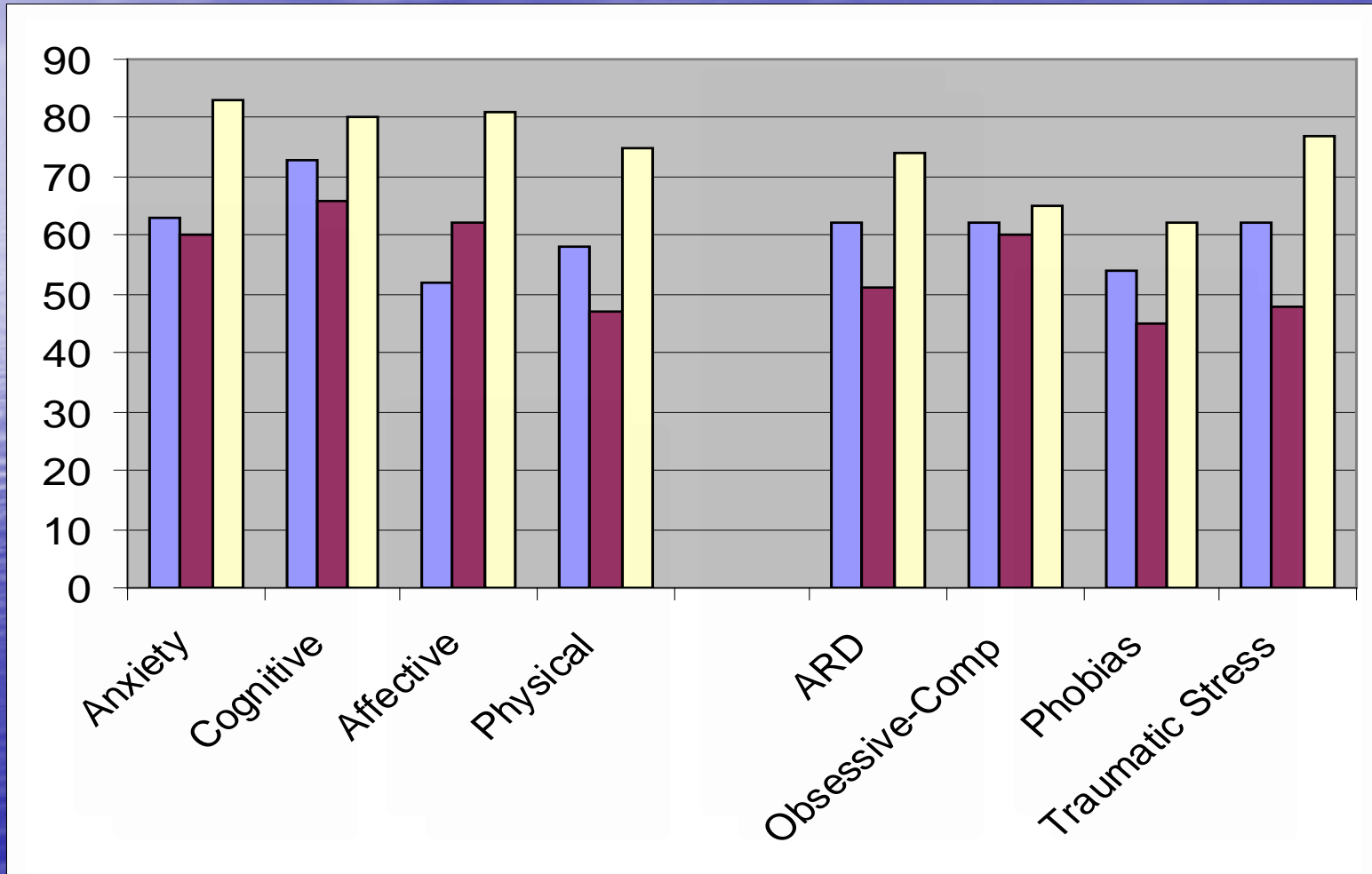
Some Case Examples



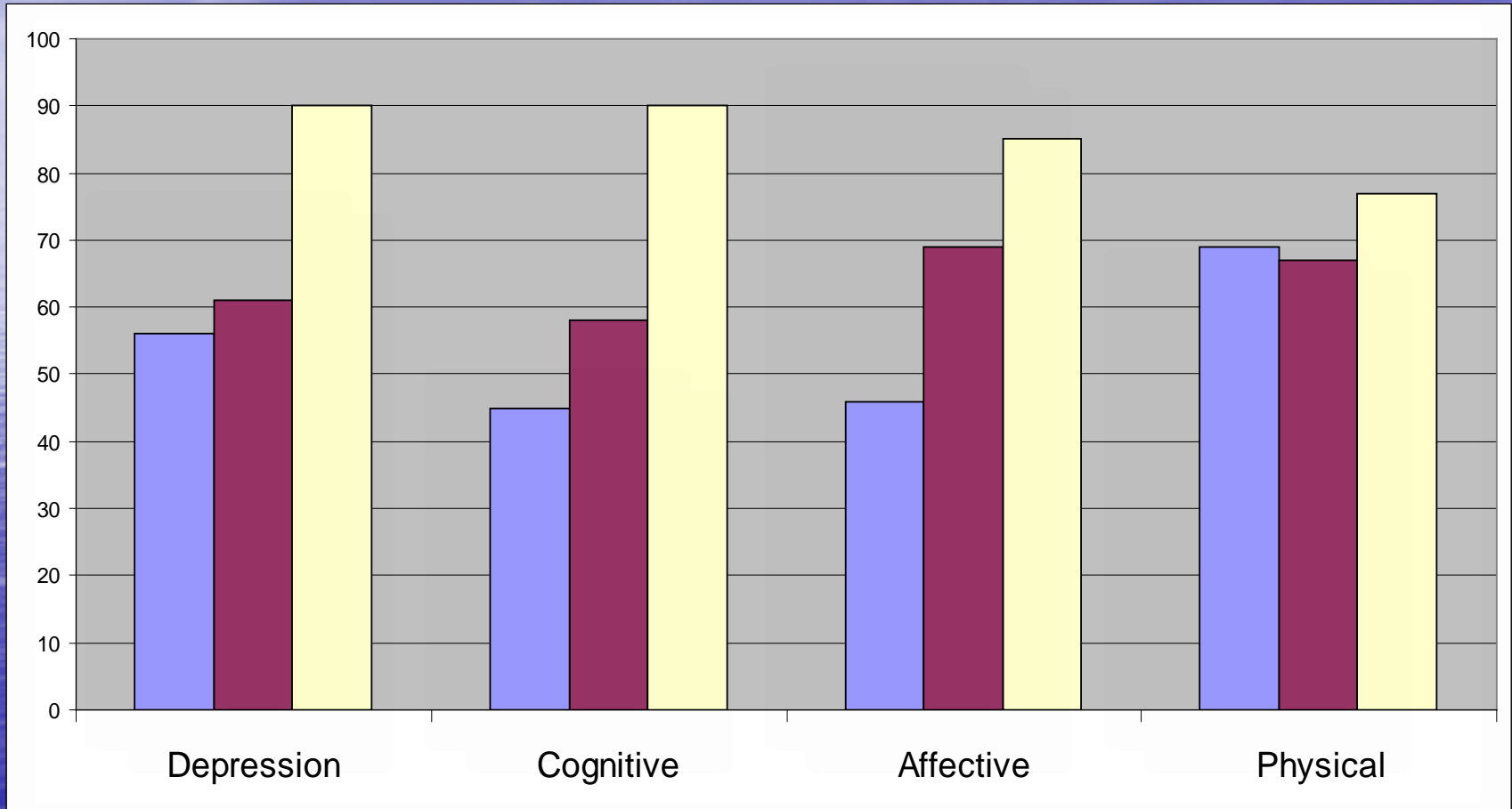
Somatization



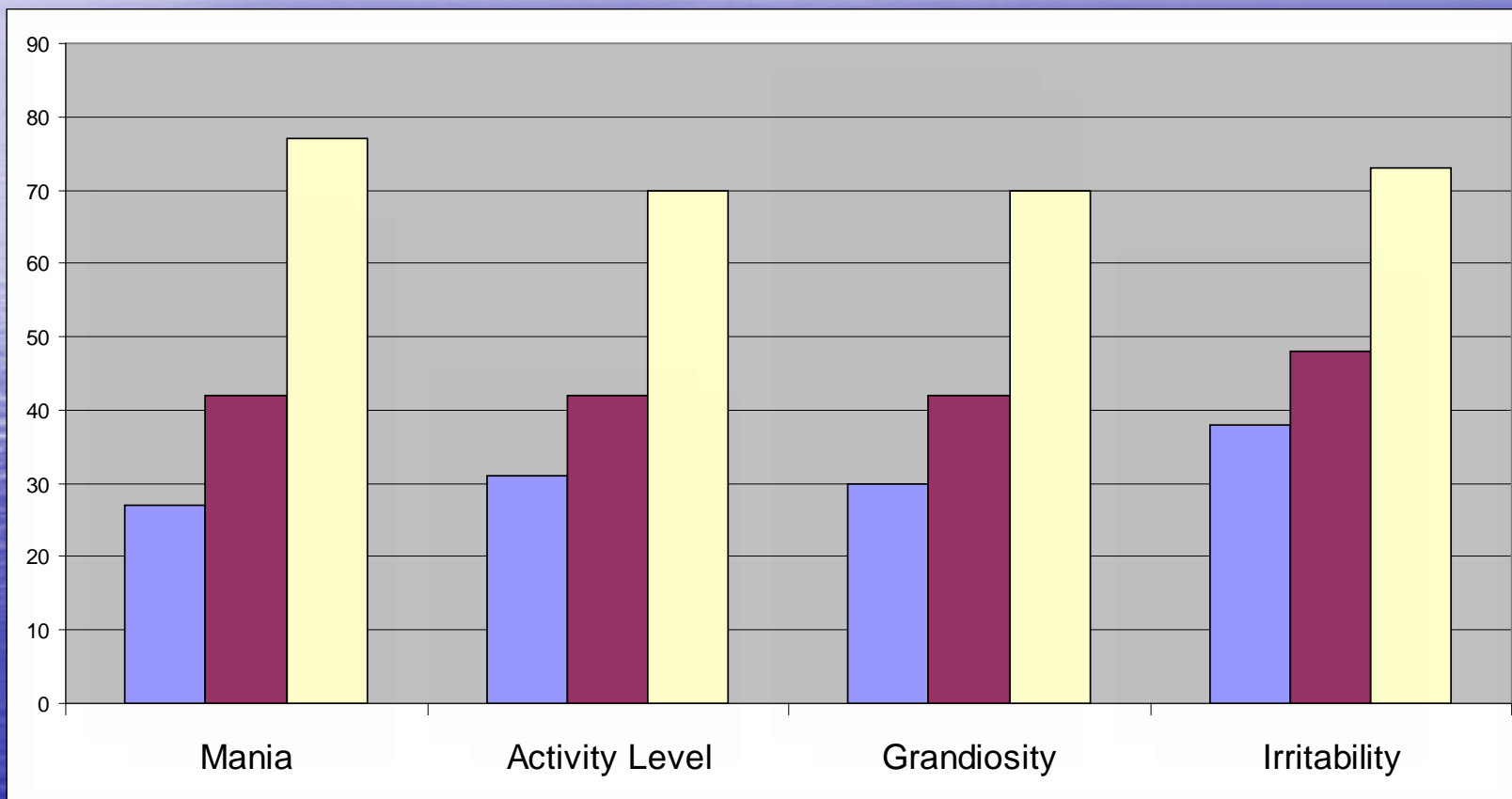
Anxiety and Related Disorders



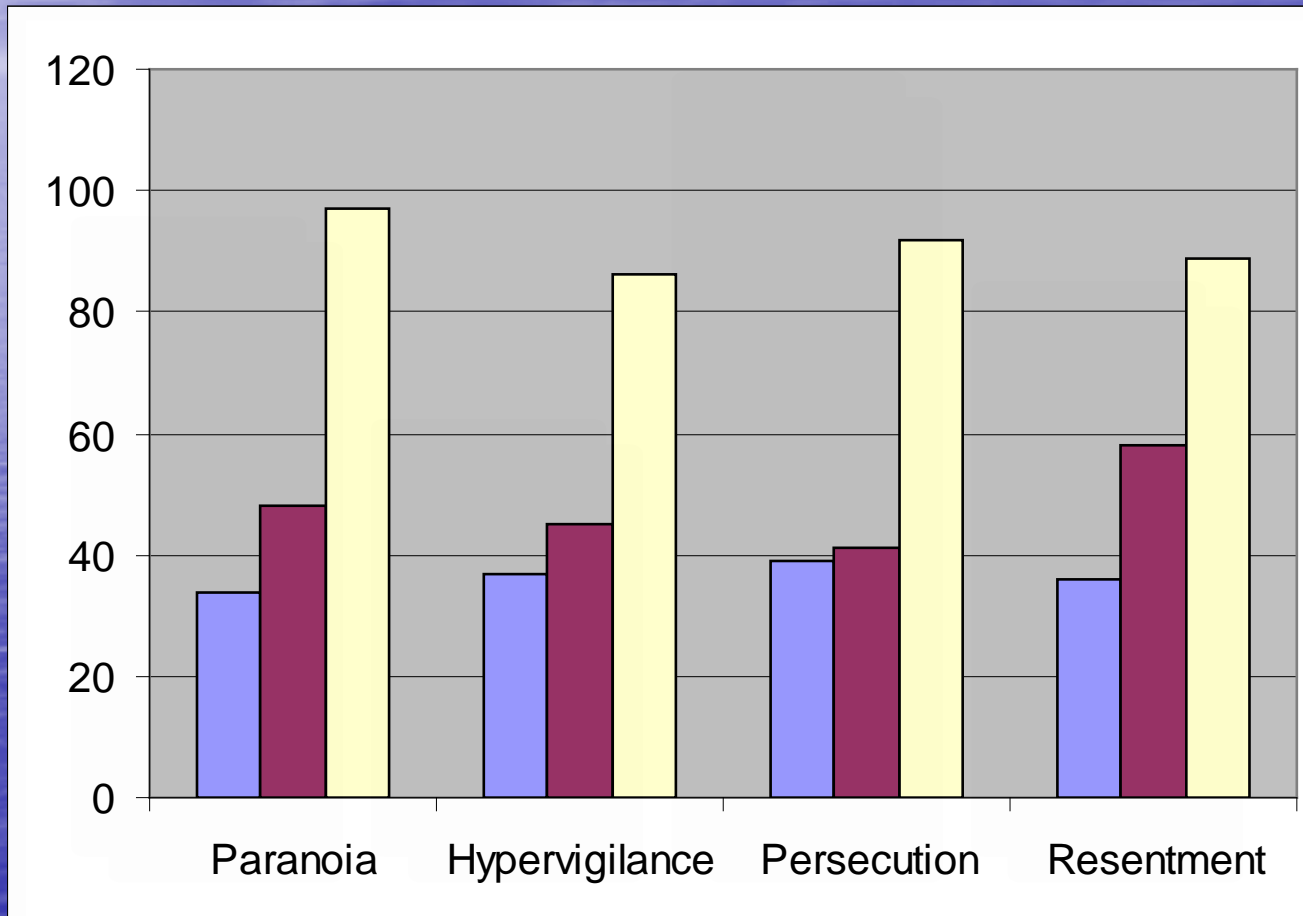
Depression Scales



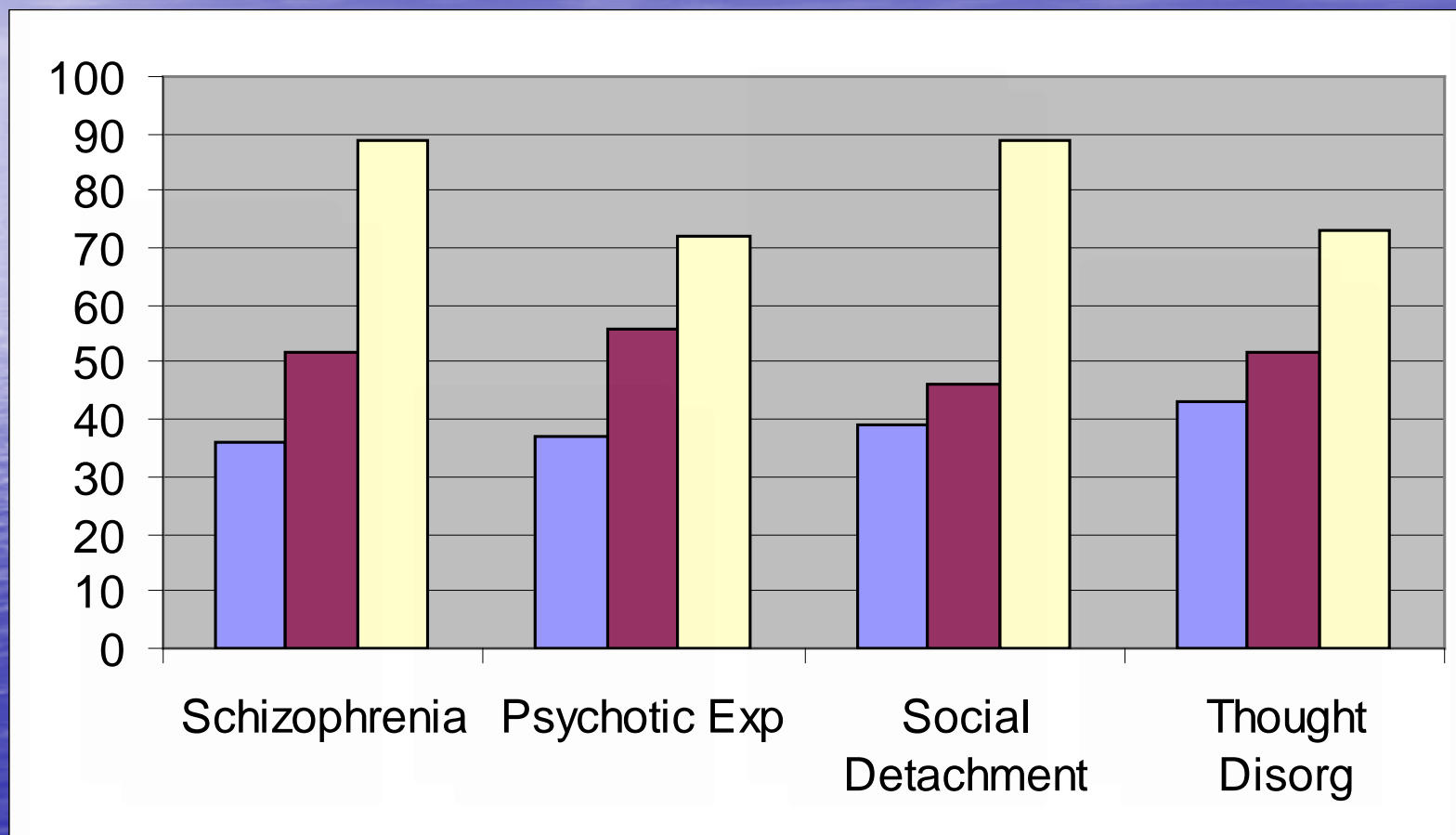
Mania Scales



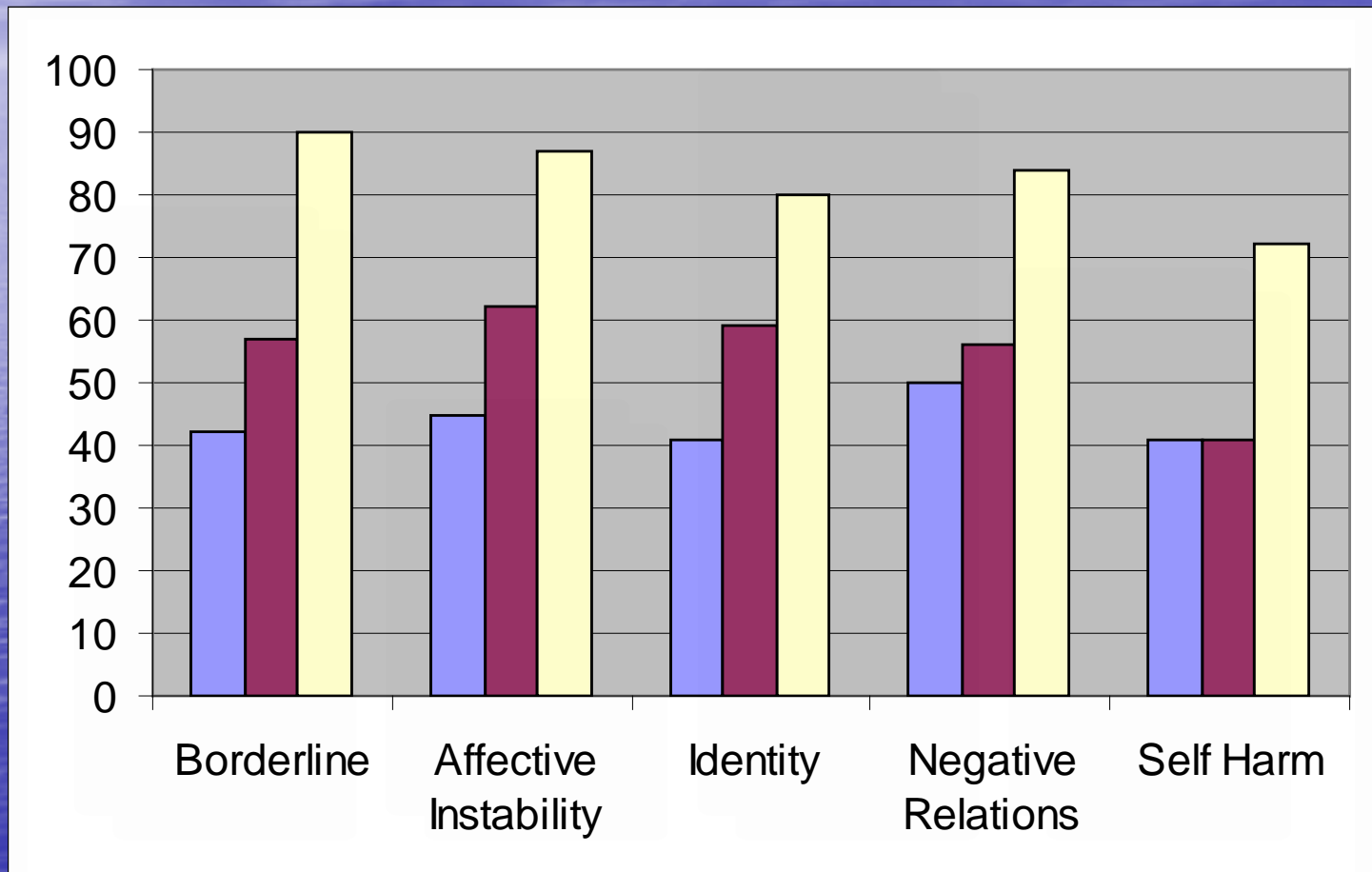
Paranoia



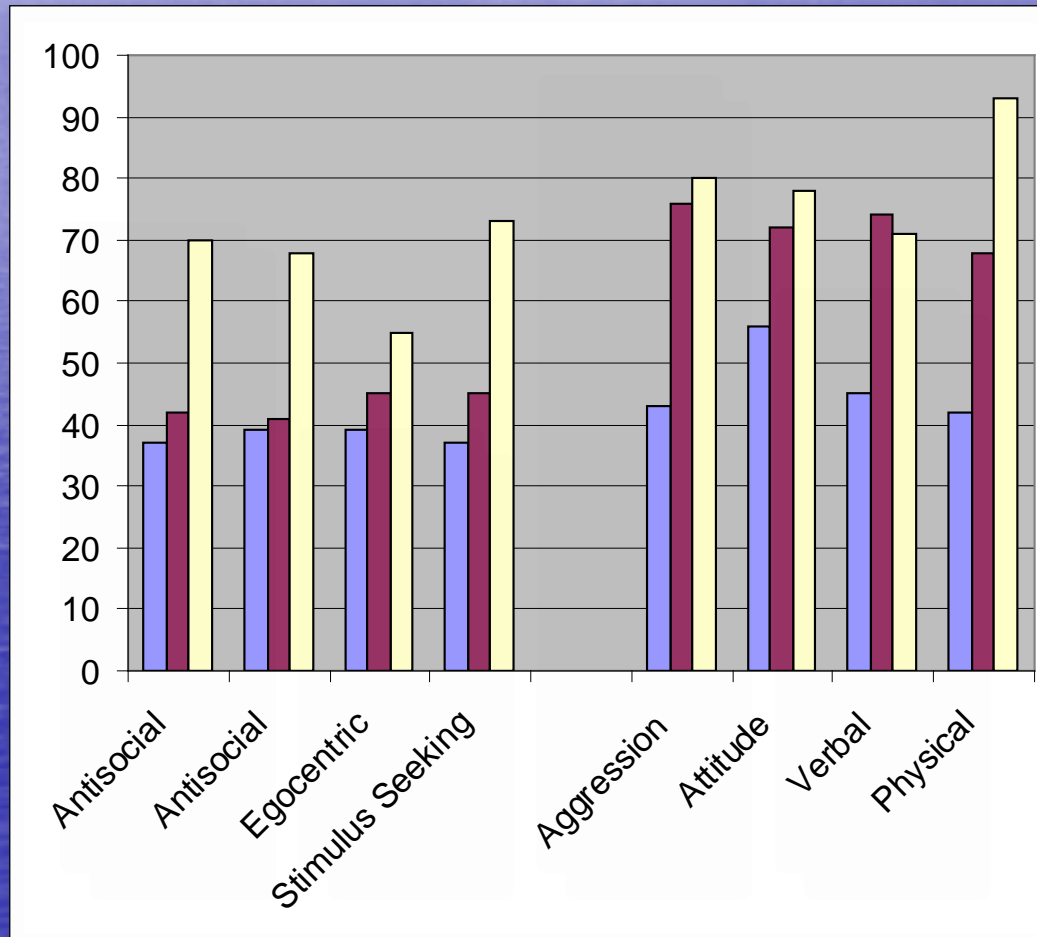
Schizophrenia



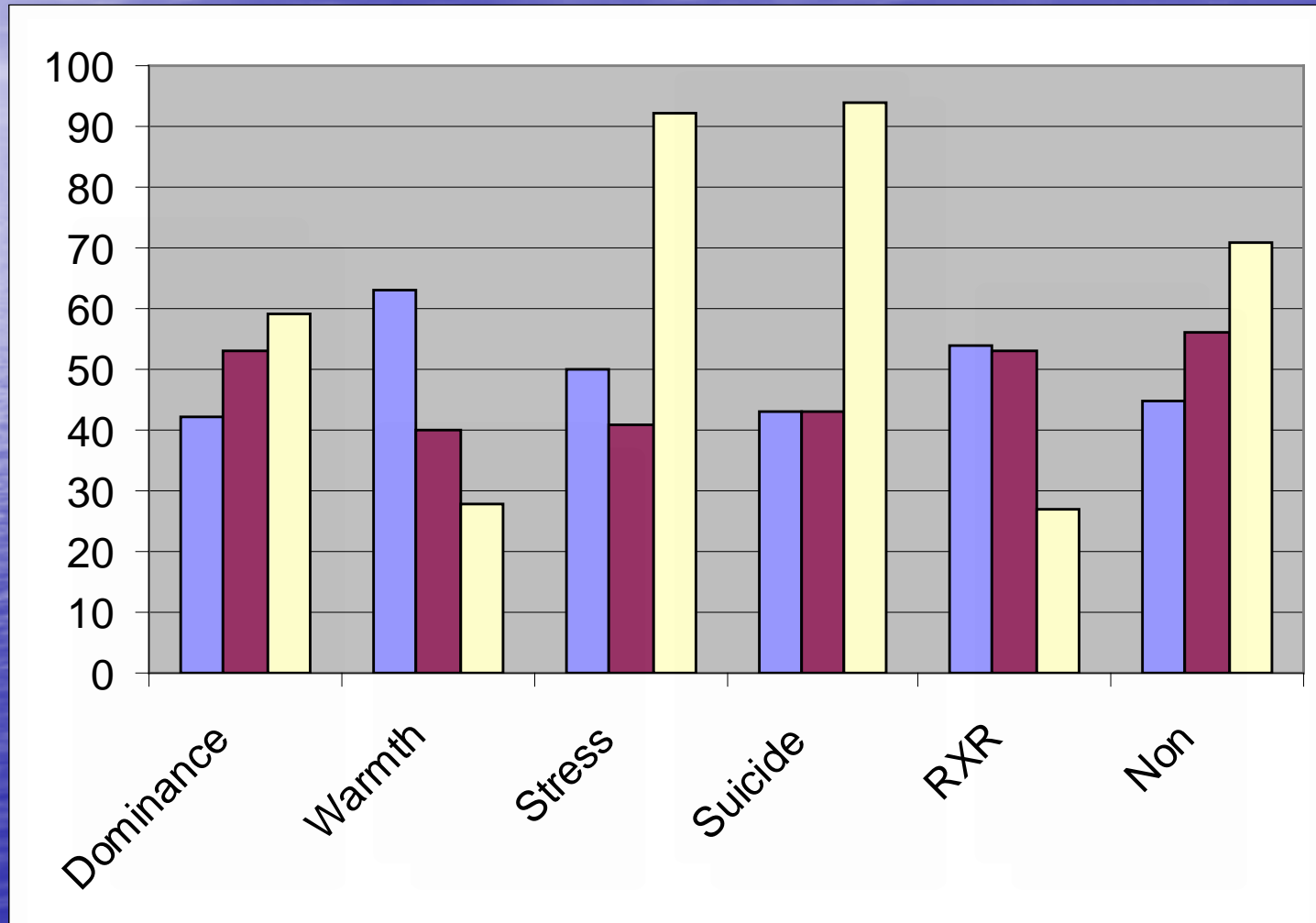
Over the Borderline...



Antisocial and Aggression



Various Scales



Behavioral Treatments for Insomnia

Perspectives and Techniques from
the Psychotherapy Office

PEANUTS

SOMETIMES I LIE AWAKE AT NIGHT AND
I ASK, "WHERE HAVE I GONE WRONG?"



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THEN A VOICE SAYS TO ME, "THIS IS
GOING TO TAKE MORE THAN ONE NIGHT"



Treatment Strategies

- A chest of possibilities
- Not a magic pill
- Differences between causes, types and treatment



Sleep Hygiene: Part 1

- More than a simple list of tools
- Helping patients utilize the basics when they feel like they have tried EVERYTHING
- Lists are great, but customization works better
- How may health factors, medications affect individuals efforts



A Compilation of Instructions

- Avoid naps
- Restrict time in bed
- Regular exercise
- Hot bath 2 hours before bedtime
- Your bed is only for sex and sleep
- Regular sleep time everyday
- Avoid bright lights when getting up at night
- 30-minutes of sunlight in the morning



Habitual Problems

- Caffeine
 - How much is too much
 - When is too late
- Ethanol
 - Self medicating and counter-productive
- Nicotine
 - Soothing and arousing

Environmental Controls

- What do you think of your bedroom?
 - Decorating for relaxation
- What are you doing in your bedroom?
 - Bill paying and homework
- Lighting
 - Too light
- Sound
 - Too loud at predictable intervals



Exercise for Your Health

- Expectations
 - Weight loss
 - Relaxation
- Timing
 - In the morning or at night
- Types
 - Yoga vs. Running



Stress Management: More Than Just at Bedtime!

- Learning how to recognize your stress and stressors
- Practicing relaxation throughout the day instead trying to "turn off" only at bedtime
- Finding ways to let go when you are stressed about not sleeping
- Determining expectations/opinions about relaxation and its effects



Other Behavioral Control Programs

- Stimulus control therapy
- Sleep restriction therapy
- Cognitive behavioral therapy
- Biofeedback—EEG and EMG
- Light therapy

Why Are These a Good Idea?

Personal Efficacy

&

Control



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