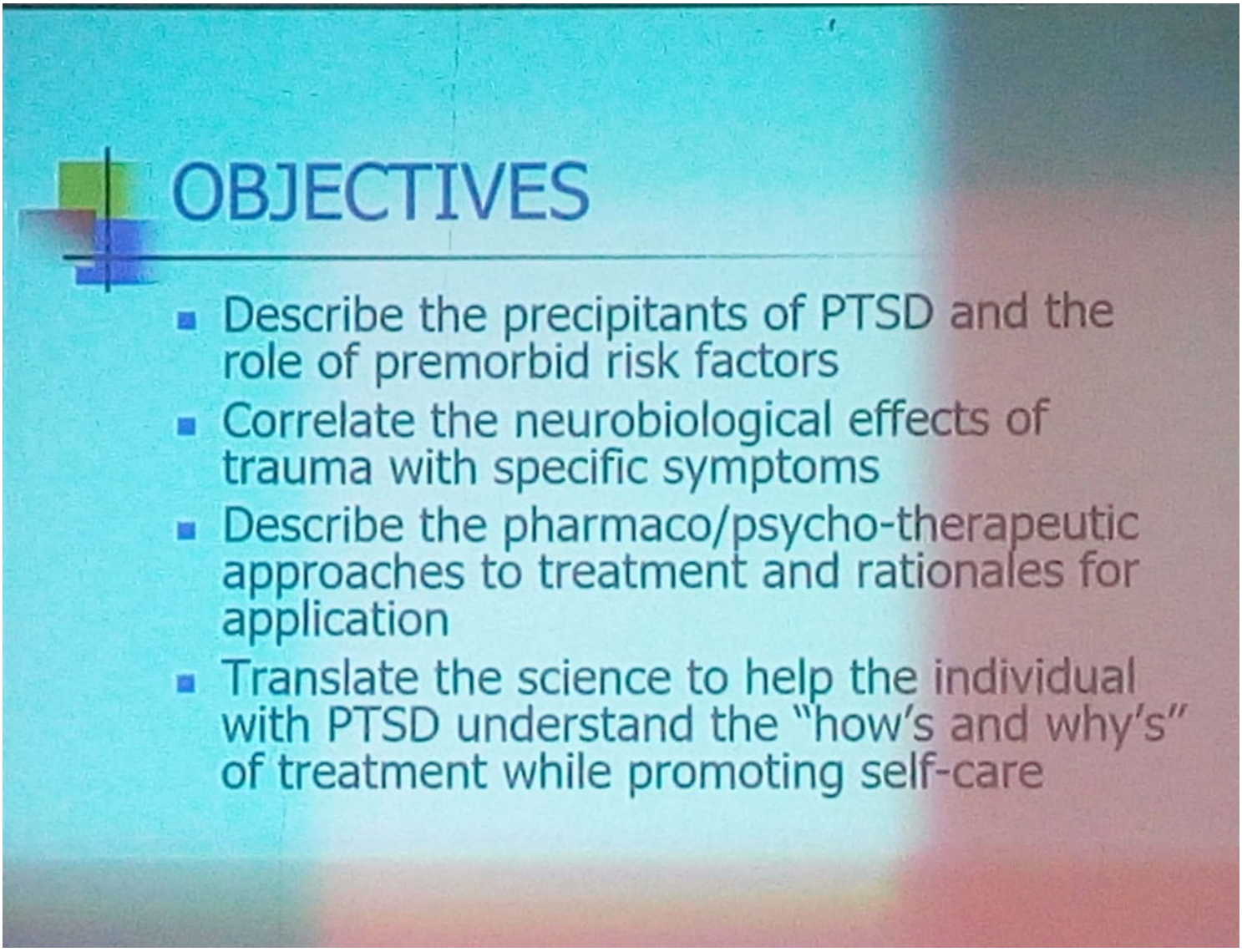
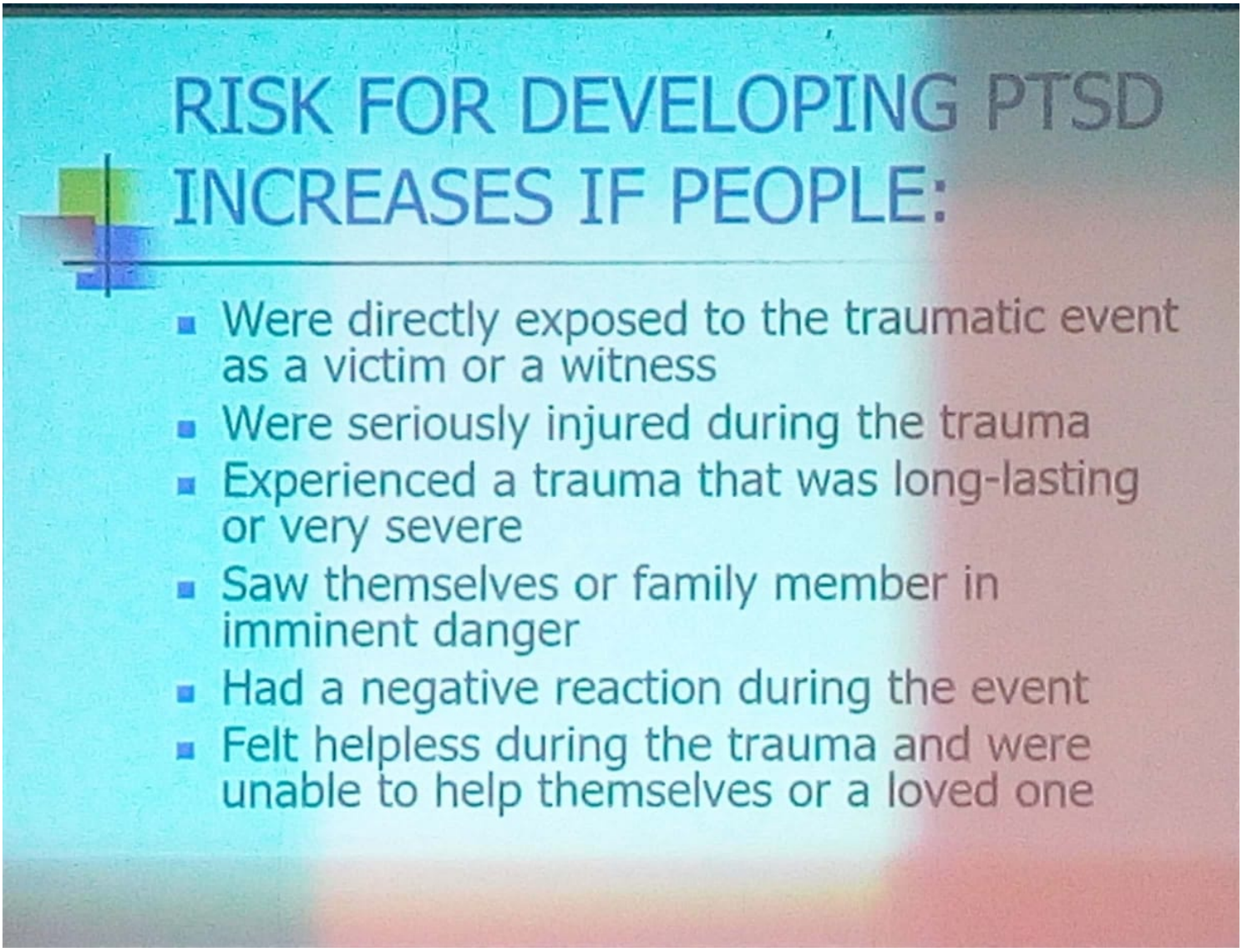
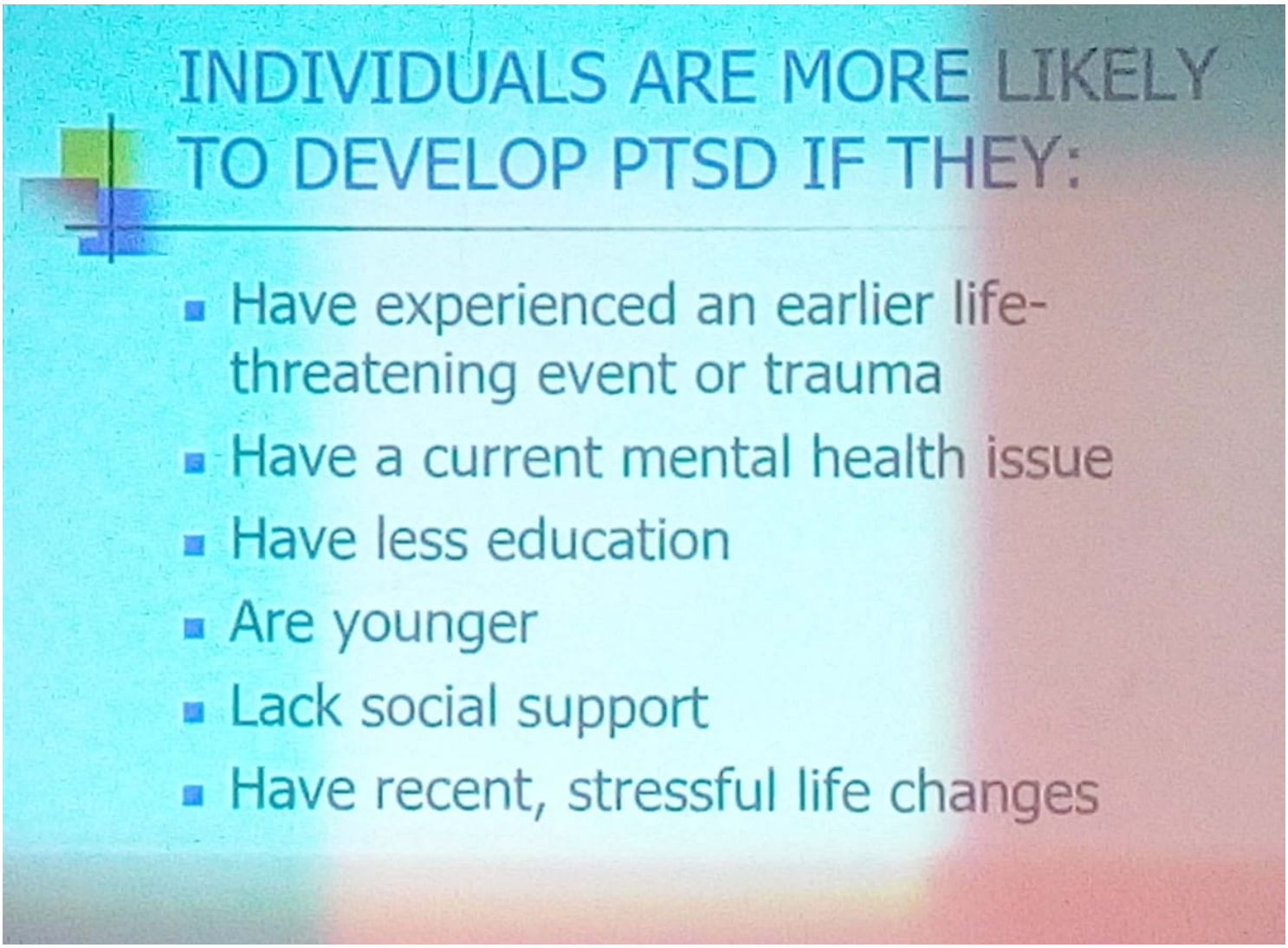
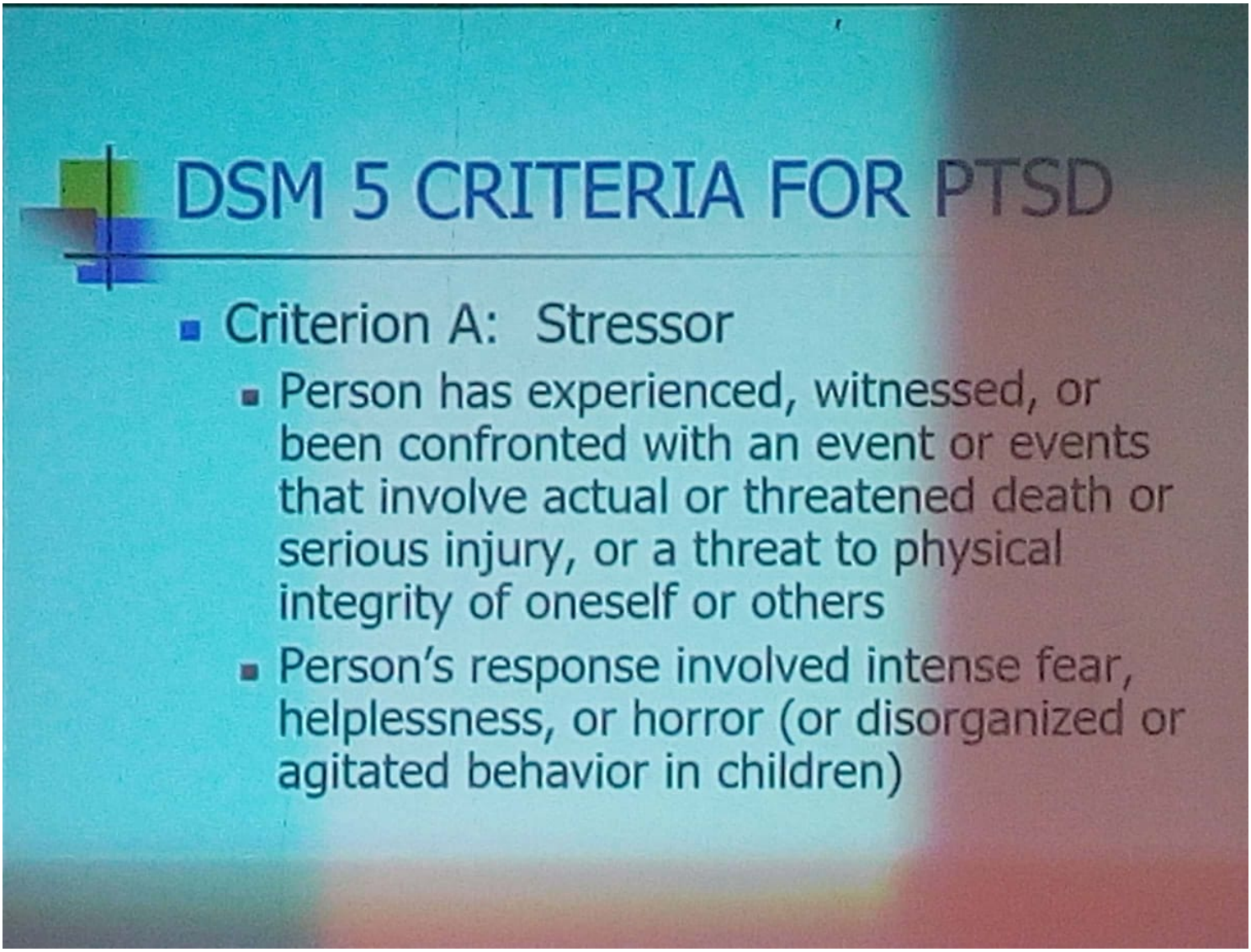


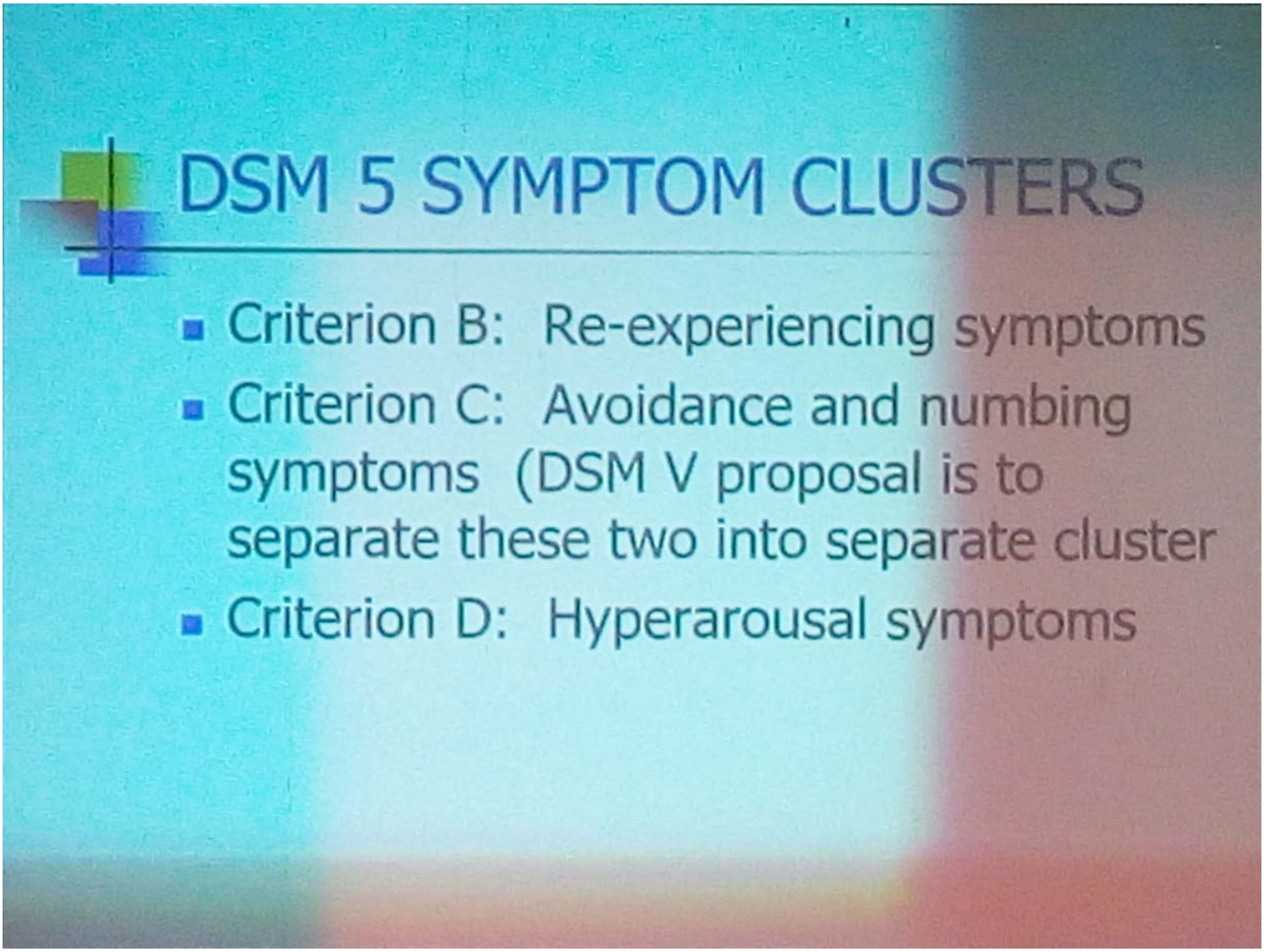
# PREVALENCE OF PTSD

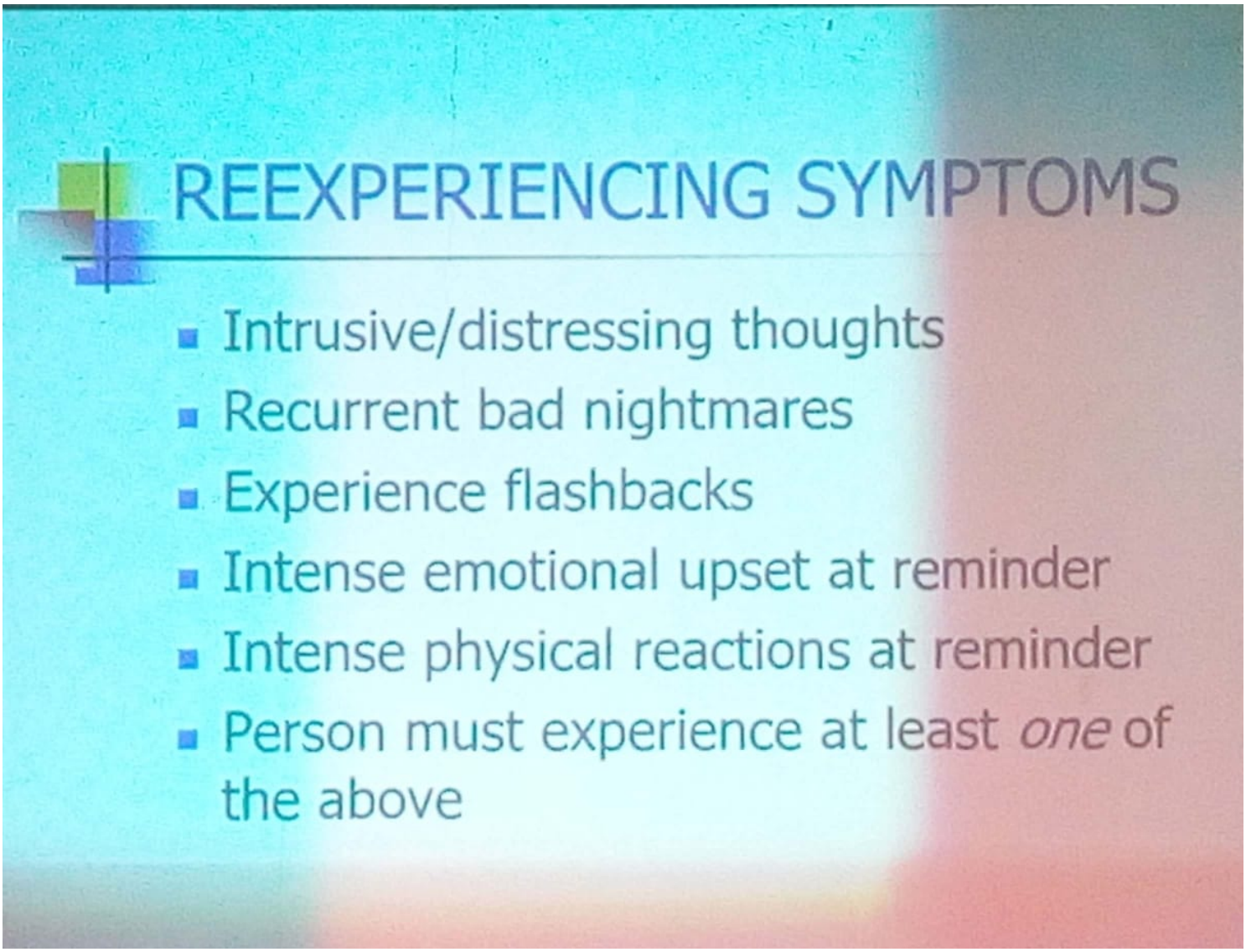
- 60% of women and 50% of men will experience a traumatic event, in Nairobi, by the time one reaches 18 years, 99 will have been exposed to a traumatic event
- 9.7% of women and 3.6% of men will develop PTSD (5-15% will have developed PTSD)
- 30% of these will develop a chronic form- these will include comorbid mental disorders

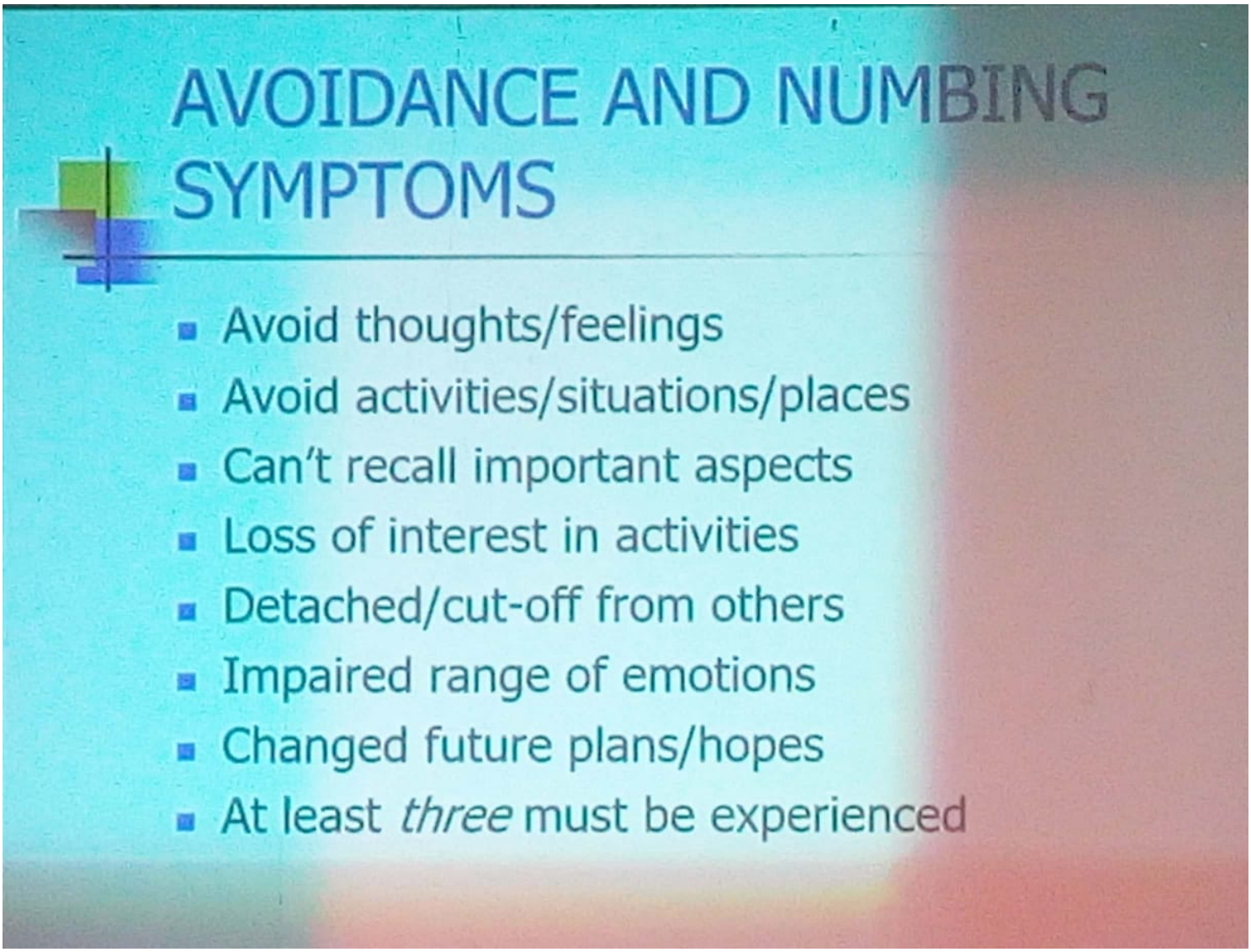


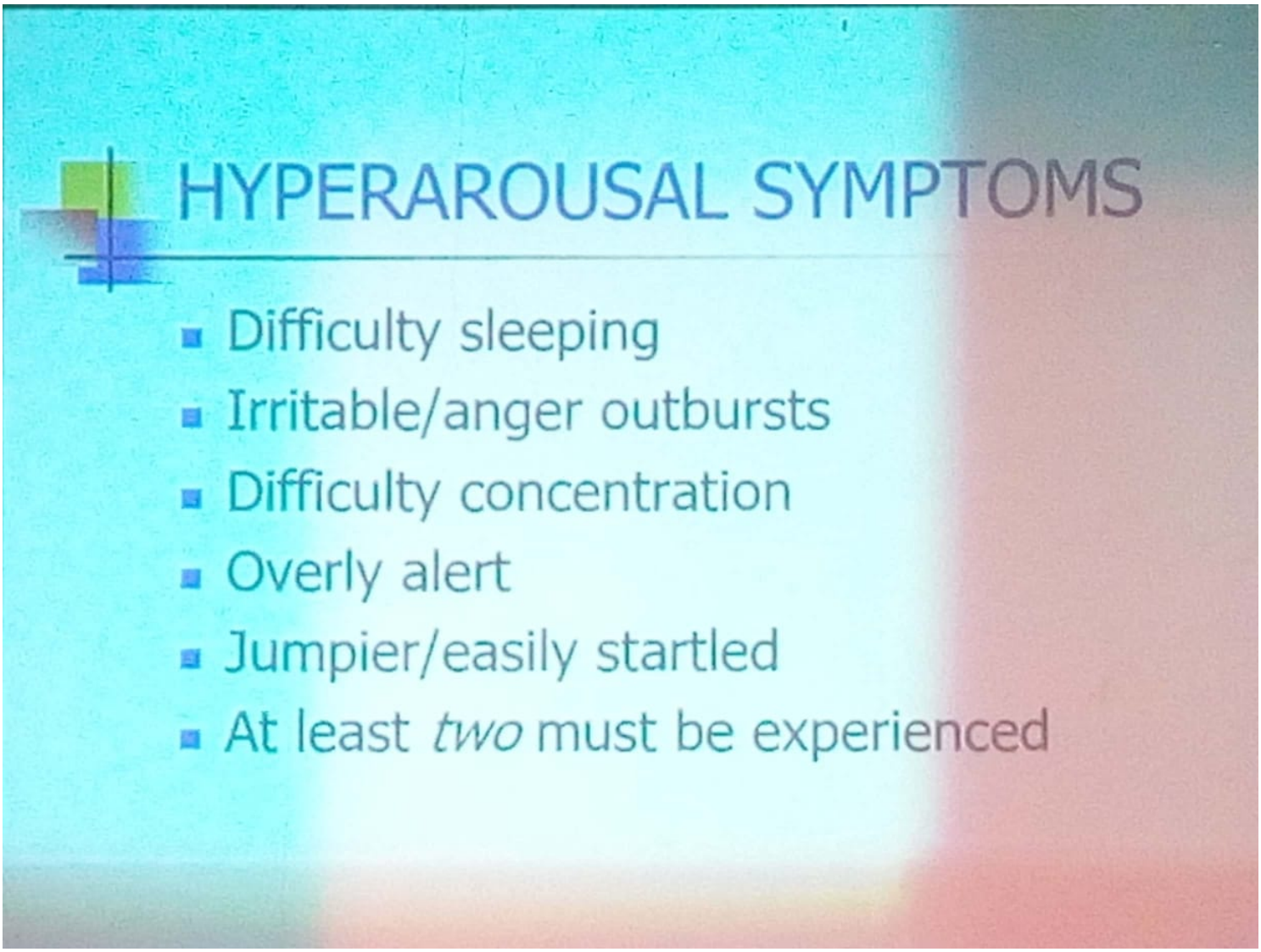






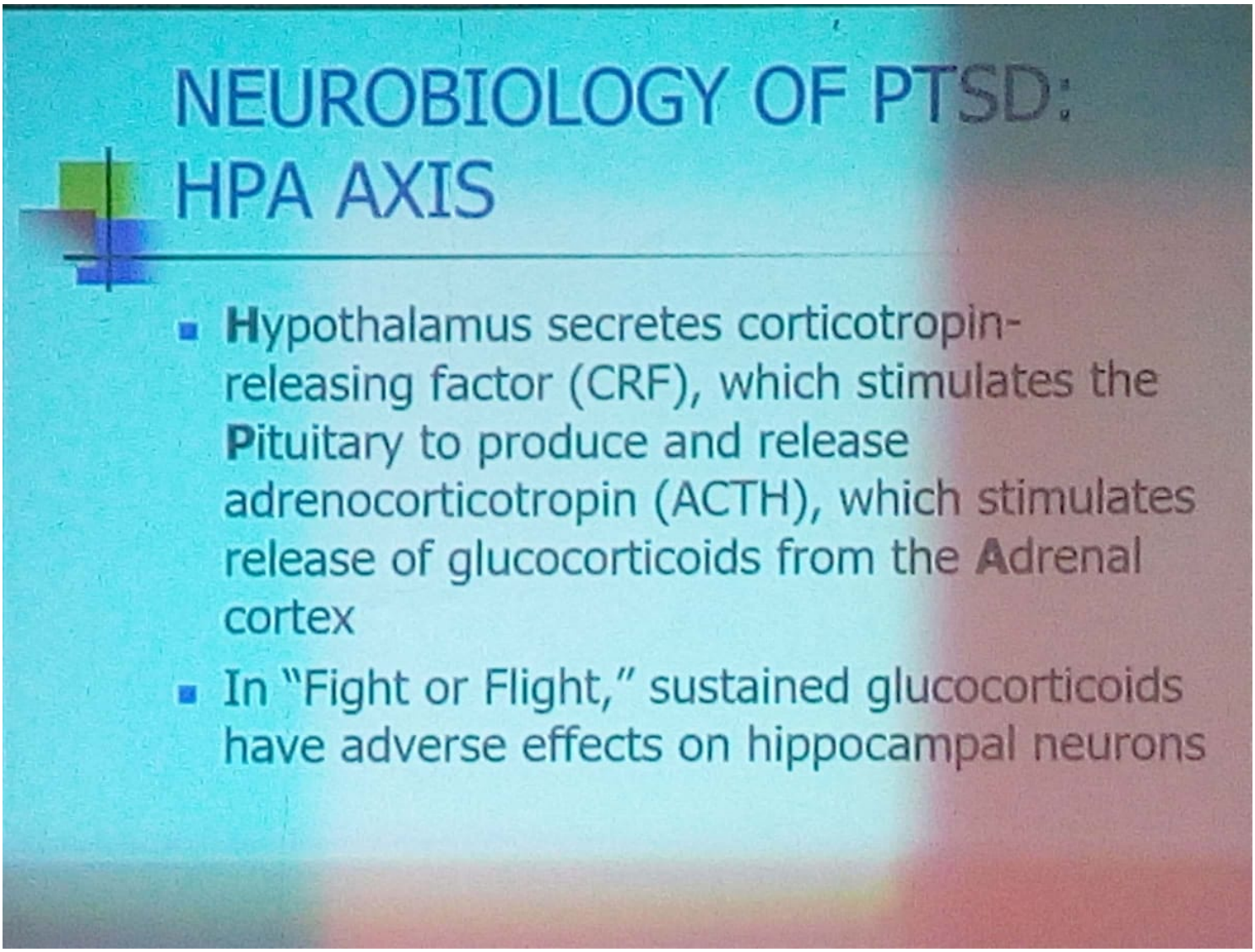


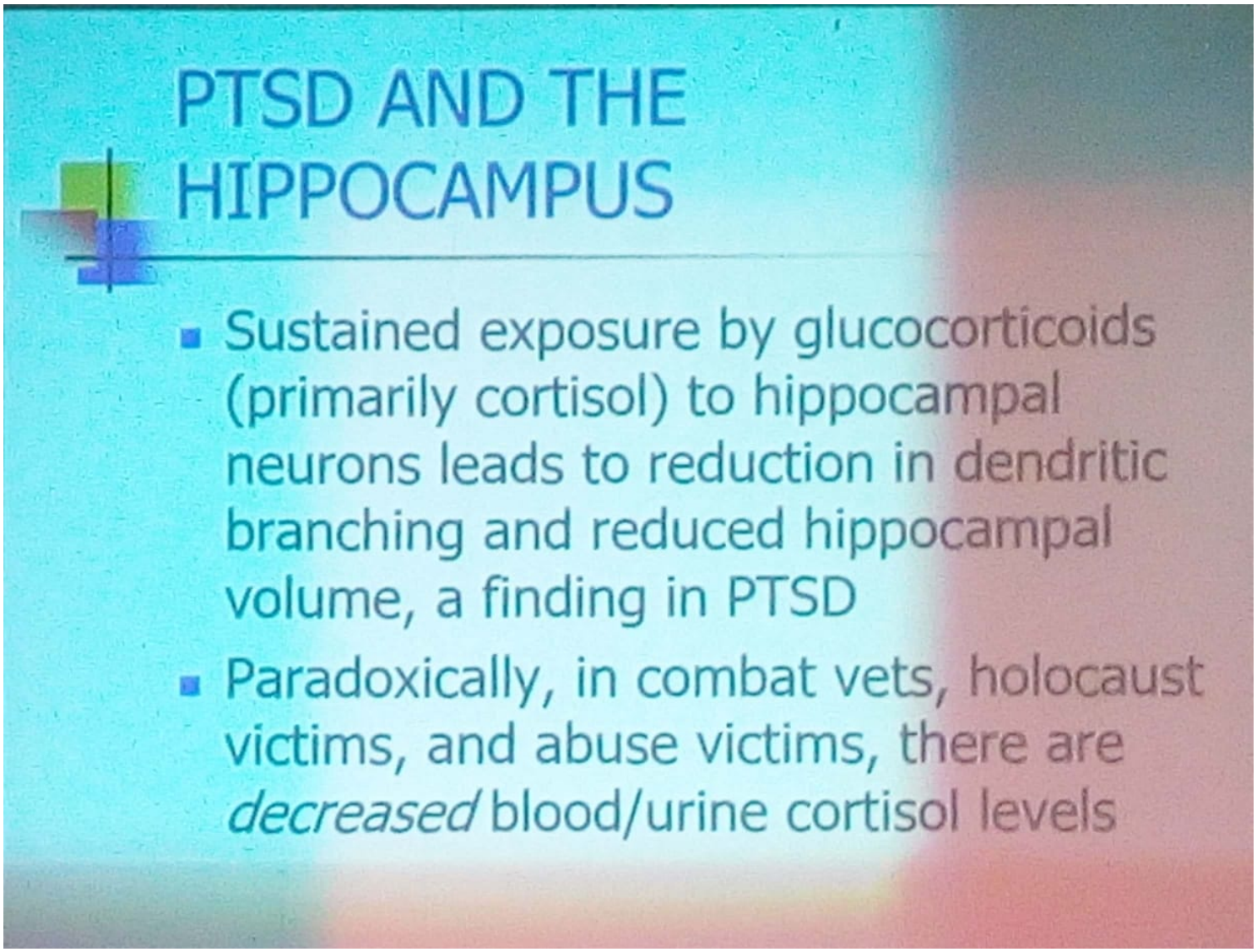


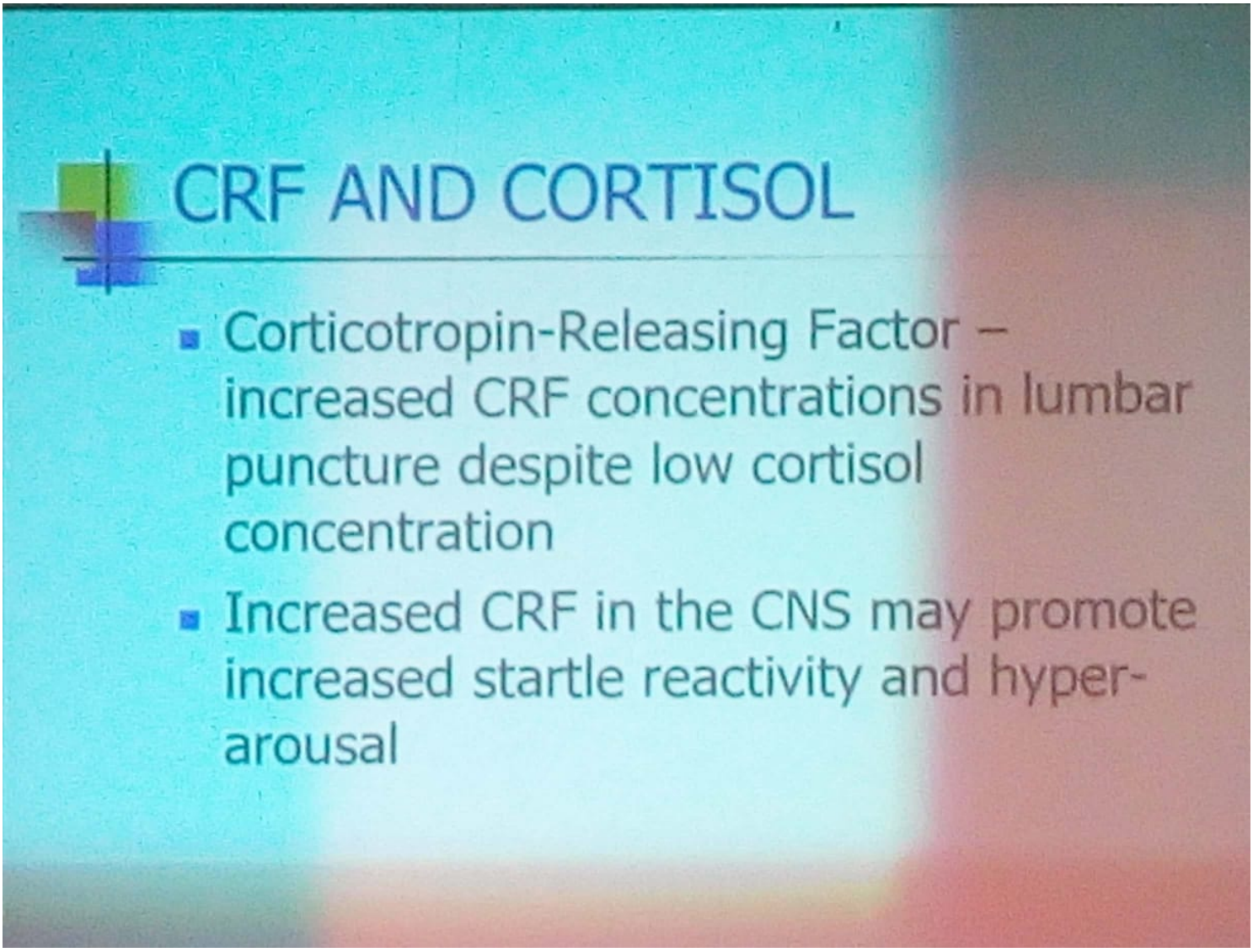


# DURATION AND FUNCTIONAL SIGNIFICANCE

- Criterion E: Duration of symptoms in B, C, and D is more than one month
- Criterion F: The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning

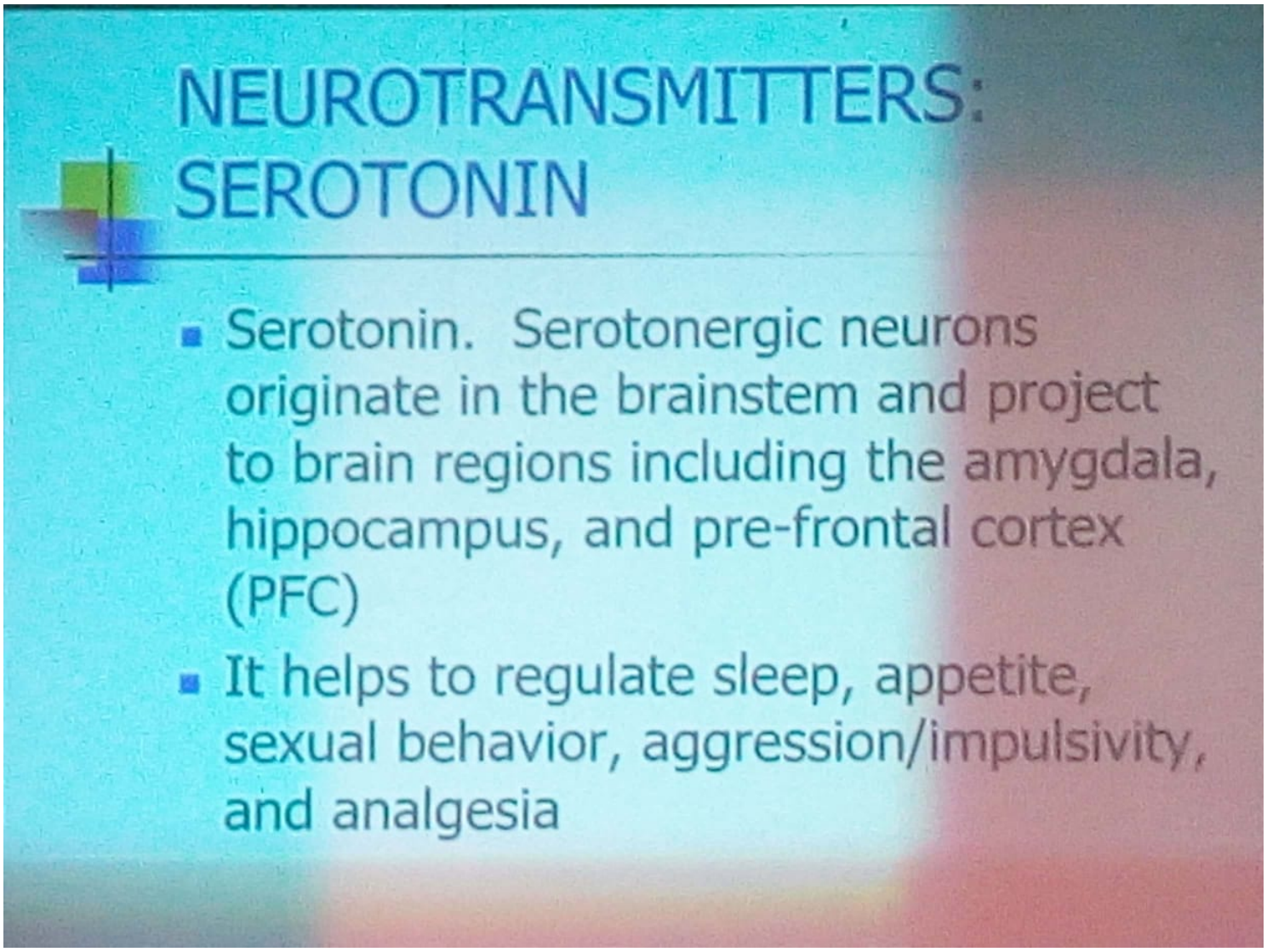






# NEUROTRANSMITTERS: THE CATECHOLAMINES

- Norephinephrine and epinephrine are released from the adrenal medulla during exposure to a stressor
- Increased urinary excretion of NE is found in PTSD patients, who also exhibit increased heart rate, BP, and NE levels when challenged with traumatic reminders



# NEUROTRANSMITTERS: GABA/BNZ SYSTEM

- GABA is the primary inhibitory transmitter in the CNS
- PET scans reveal decreased BNZ receptor binding in the cortex, hippocampus, and thalamus of persons with PTSD
- Treatment with BNZs after exposure to psychological trauma, however, doesn't prevent PTSD

# NEUROTRANSMITTERS: GLUTAMATE/NMDA SYSTEM

- Glutamate is the primary excitatory transmitter in the CNS and exposure to stress increases glutamate release
- Glutamate binds to several receptors, one of which is NMDA(N-Methyl-D-aspartate **receptor)**
- The glutamate/NMDA receptor system is implicated in learning, memory, and enhanced neuronal communication
- Overexposure to glutamate is associated with excitotoxicity and may cause loss of neurons in the hippocampus and prefrontal cortex

# CHANGES IN STRUCTURAL AND FUNCTIONAL NEUROANATOMY

- Decreased volume in the **HIPPOCAMPUS.** The hippocampus controls stress responses, declarative memory, and contextual aspects of fear conditioning
- Functional imaging studies show hypersensitivity of the **AMYGDALA** in PTSD. The amygdala is involved with the acquisition of fear responses
- The **PREFRONTAL CORTEX** exerts inhibitory control over stress responses including fear acquisition

# CONNECTING FINDINGS WITH SYMPTOMS: STRUCTURE

- Decreased hippocampal volume can lead to memory impairments and impair the ability to distinguish between safe and unsafe contexts
- Changes in the amygdala leads to exaggerated responses and promote the activation of stress responses
- PFC impairments may cause deficits in suppressing fear responses and interfere with extinction

# CONNECTING FINDINGS WITH SYMPTOMS: FUNCTION

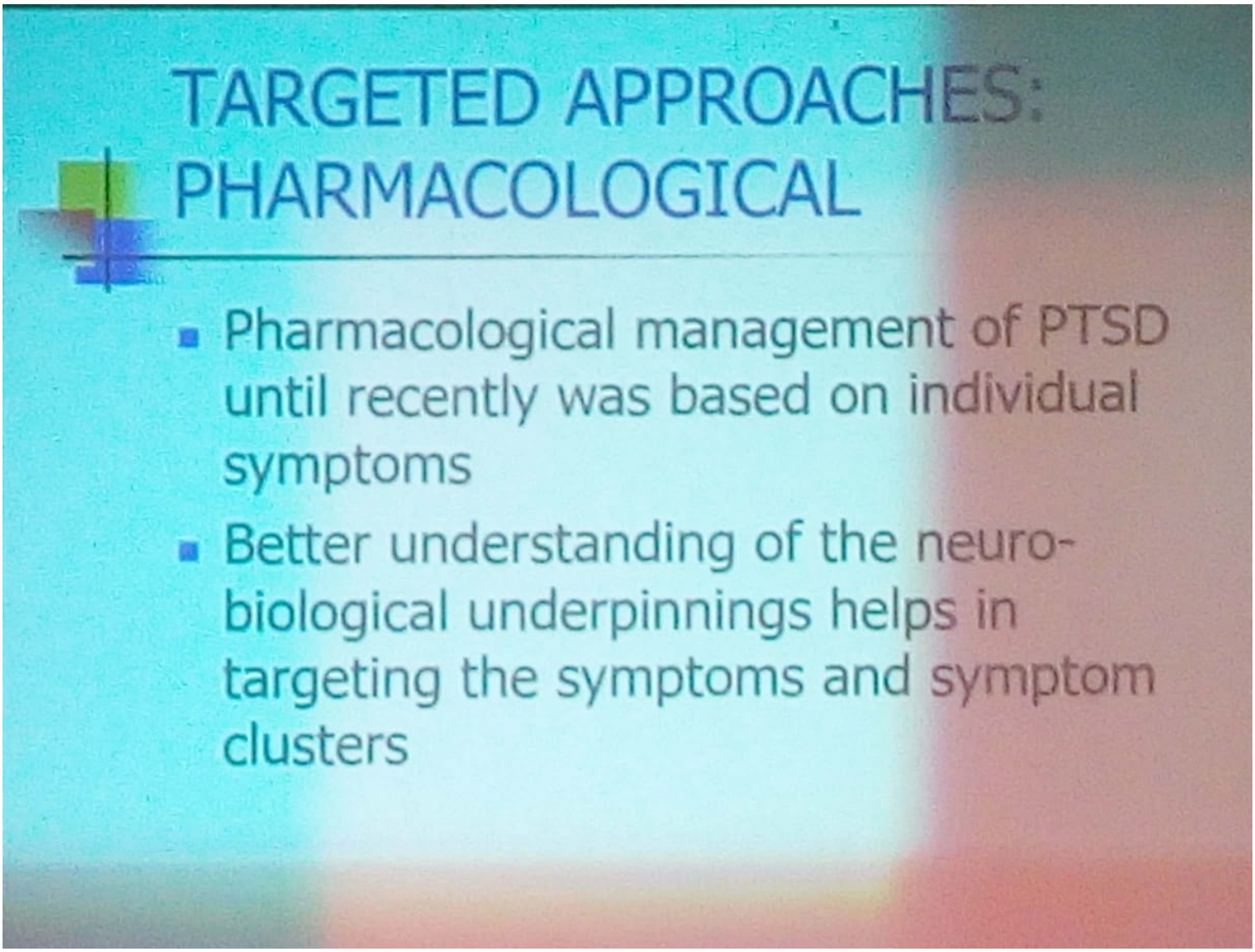
- Norepinephrine enhances the encoding of *fearful memories*
- Glucocorticoids block the retrieval of emotional memories
- Together these actions could cause encoding of traumatic memories and lack of inhibition of memory retrieval which might cause intrusive memories

# CONNECTIONS: FUNCTION

- Lack of regulatory acitivity of GABA could increase stress responsiveness
- Lack of serotonin could lead to difficulties with impulsivity, aggression, and sleep/appetite disturbances. Serotonin projections exist in (pre-frontal Cortex (PFC) and hippocampus, and decreased volume in those areas could result in fewer serotonergic neurons

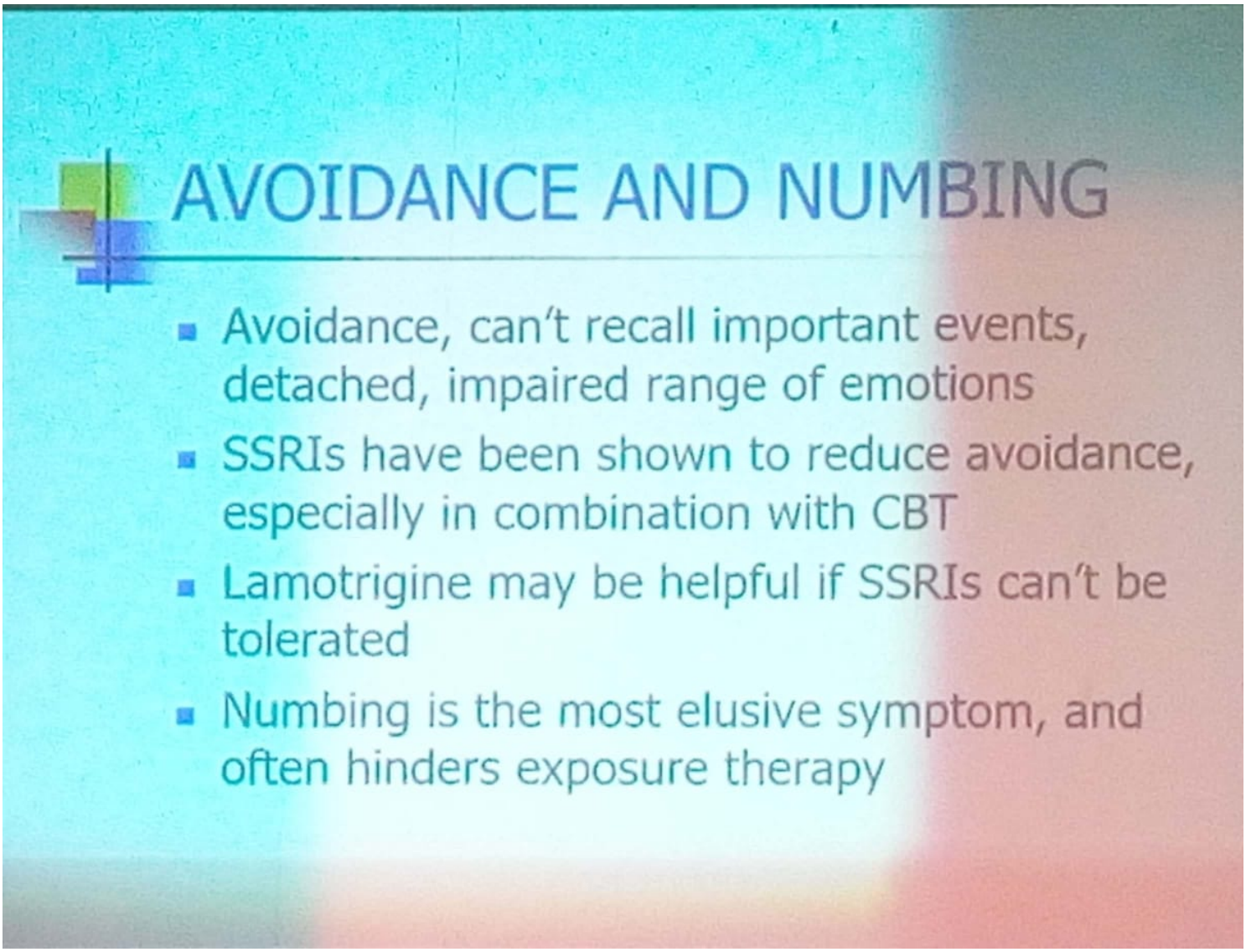
# TARGETED AND NOVEL APPROACHES: THERAPY

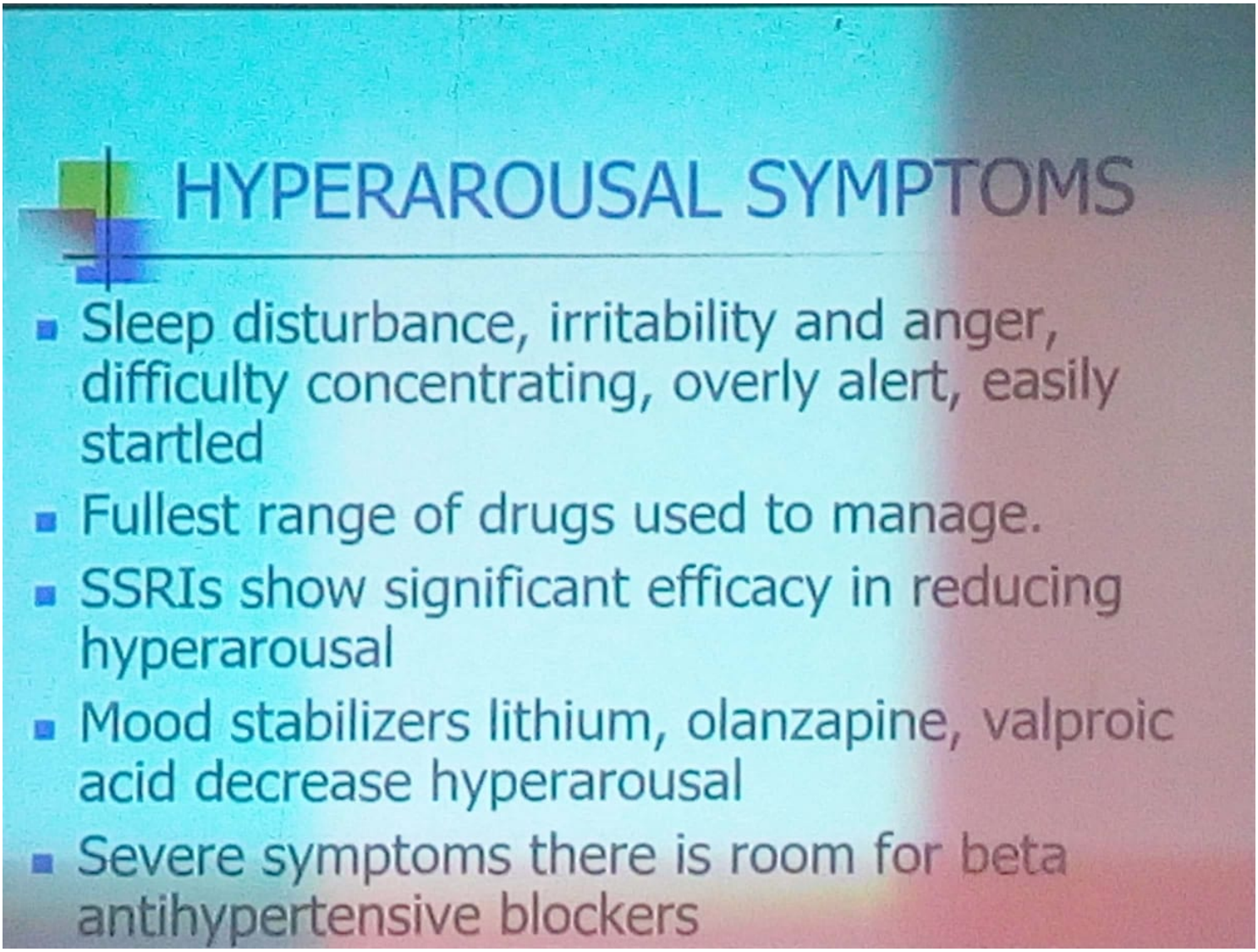
- The gold-standard is **COGNITIVE-BEHAVIORAL THERAPY**
- Individual approaches help the patient confront altered traumatic memories while modifying negative belief systems
- Cognitive Processing Therapy (CPT) and Prolonged Exposure Therapy (PE) are types of CBT



# TARGETED PHARMACY: REEXPERIENCING SYMTPOMS

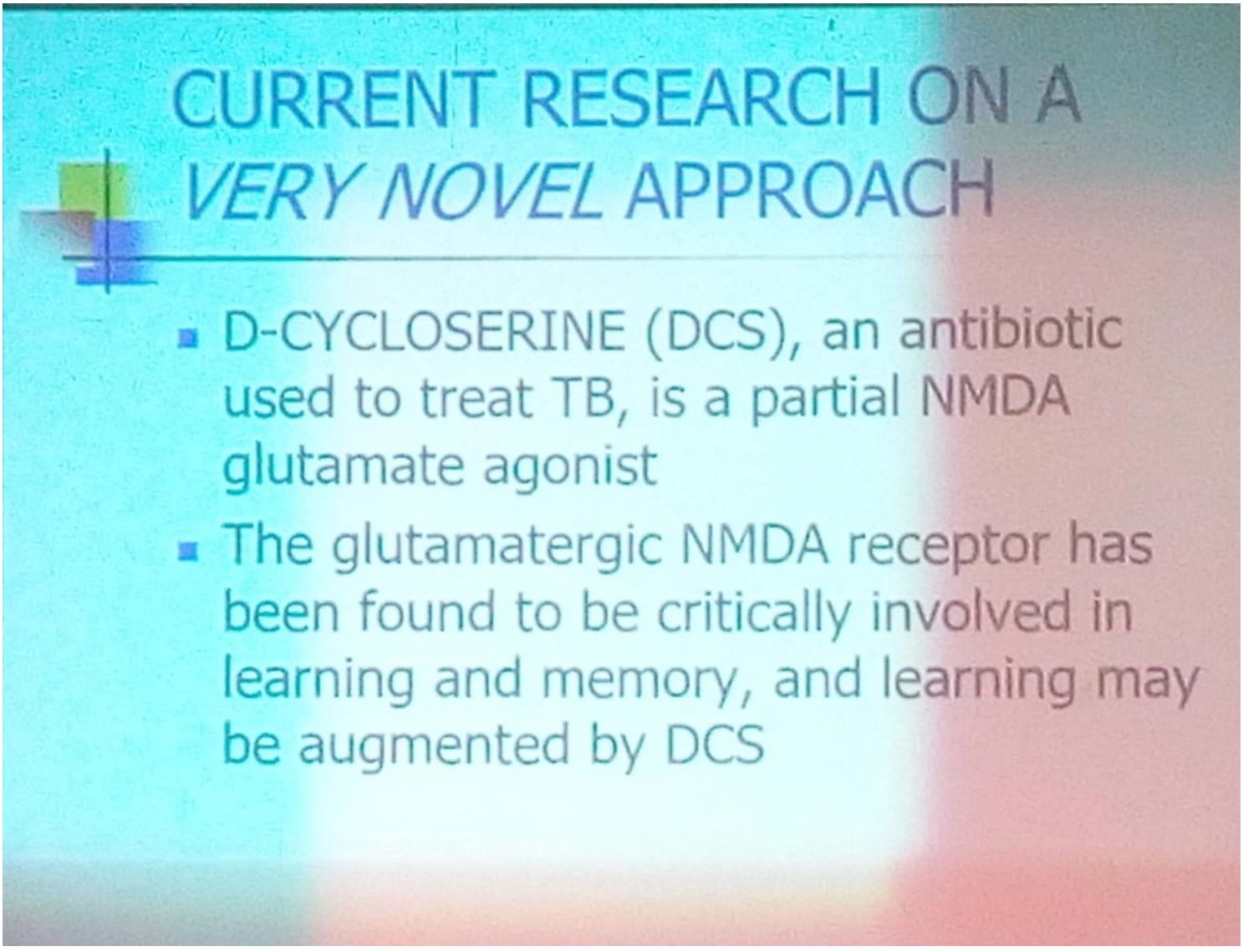
- SSRIs are considered the first line of defense and can help with co-morbid panic or major depression. *SSRIs have been shown to increase volume of hippocampus*
- Atypical antipsychotics risperidone, quetiapine, olanzapine decrease intrusive thoughts and flashbacks





# NOVEL PHARMACOLOGY

- Prazosin, an alpha-1 antagonist, is an adjunct for treatment in PTSD.
- **Prazosin** is an $\alpha_1$-blocker that acts as an inverse agonist at alpha-1 adrenergic receptors.
- It is speculated that it blocks the brain's response to norepinephrine
- Has been shown to ameliorate nightmares



# CURRENT RESEARCH

- DCS has been shown to facilitate the extinction of learned fear in and reduce reinstatement of fear in rats
- Human studies have shown efficacy in facilitating fear extinction in social anxiety and other phobias
- DCS is ineffective by itself. It must be administered *during* exposure therapy