

Stress and Mental Flexibility in Autistic Spectrum Disorders

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William S. Stone, Ph.D., ABPP-CN

Harvard Medical School Department of Psychiatry
at Beth Israel Deaconess Medical Center
and Massachusetts Mental Health Center

The Whole Talk

Autism and DSM-5

Importance of Cognition

Cognition in ASD

Nonverbal Reasoning

Executive Function – Mental Flexibility

Stress and ASD

Intervention – Reduce Stress

Autism and DSM-5

Autism Spectrum Disorders (ASD):

Early infantile autism

Childhood autism

Kanner's autism

High functioning autism

Atypical autism

Childhood disintegrative disorder

Pervasive developmental disorder not otherwise specified

Asperger's disorder

Autism and DSM-5: Criteria

Criterion A: Persistent deficits in social communication and social interactions across multiple contexts

Criterion B: Restricted, repetitive patterns of behavior, interests or activities

Criterion C: Symptoms must be present in the early developmental period (even if not manifest until later, or masked through learning)

Criterion D: Symptoms cause clinically significant impairment in social, occupational or other important areas of current functioning

Criterion E: Disturbances are not better explained by intellectual disability or global developmental delay (but may be co-morbid)

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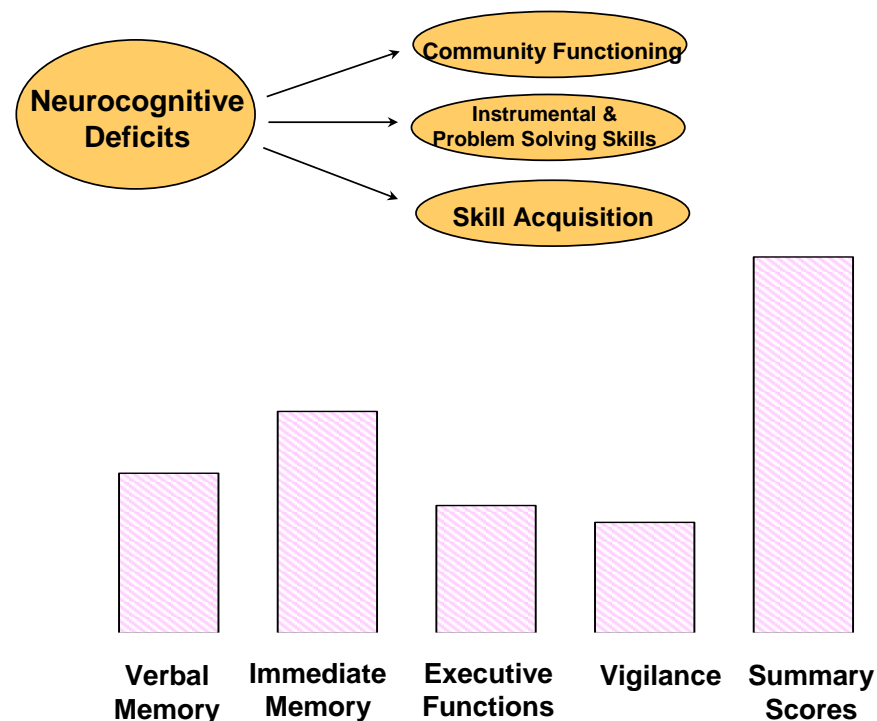
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Cognitive Impairments are Strong Contributors to Functional Outcome in Psychiatric Disorders

Effects Sizes (Cohen's r):
Neurocognitive Deficits and Functional Outcome



Green et al. 2000

Cognition and ASD: General Considerations

- Overall cognitive abilities (e.g. I.Q) vary considerably in different ASDs
- In general, better cognitive abilities (e.g. memory, attention) are associated with better overall cognitive abilities, and vice versa
- Co-morbidity an important modifier (e.g. ADHD)
- Social cognition different from standard cognition

Cognition and ASD: Nonverbal Reasoning

- Essential for top-down, big-picture reasoning
- Essential for synthesizing novel information to understand **context**
- Vulnerable to decline in a variety of normal (e.g. aging) and psychiatric (e.g. depression, anxiety, ASD) conditions

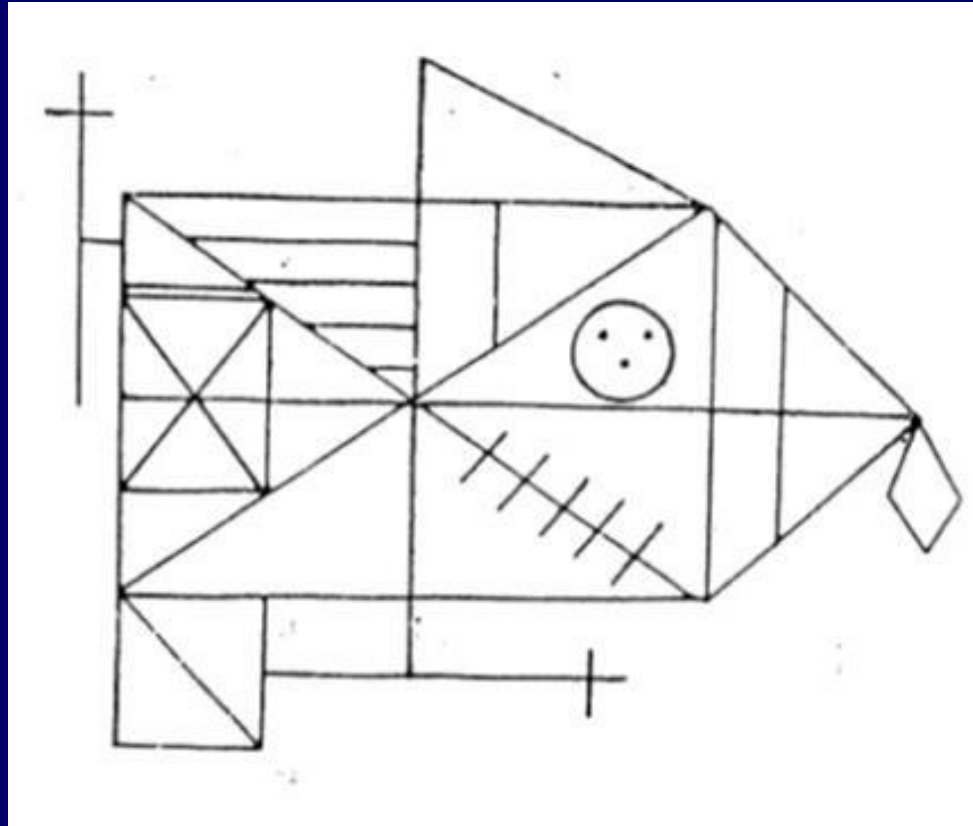
Cognition and ASD: Nonverbal Reasoning

- Tests of nonverbal reasoning often involve the organization, synthesis and integration of information
- Deficits may be described by ‘global’ versus ‘local’ processing theories (e.g. Happe, 1999; Happe and Frith 2006)
- They may also be described by “weak central coherence” theories, that posit a weak drive to combine details into meaningful wholes, or an avoidance of wholes, or a focus on particular details or parts of objects, which could be viewed as a drive for ‘sameness’ (Happe, 1996, 1999, Happe and Frith, 2006)

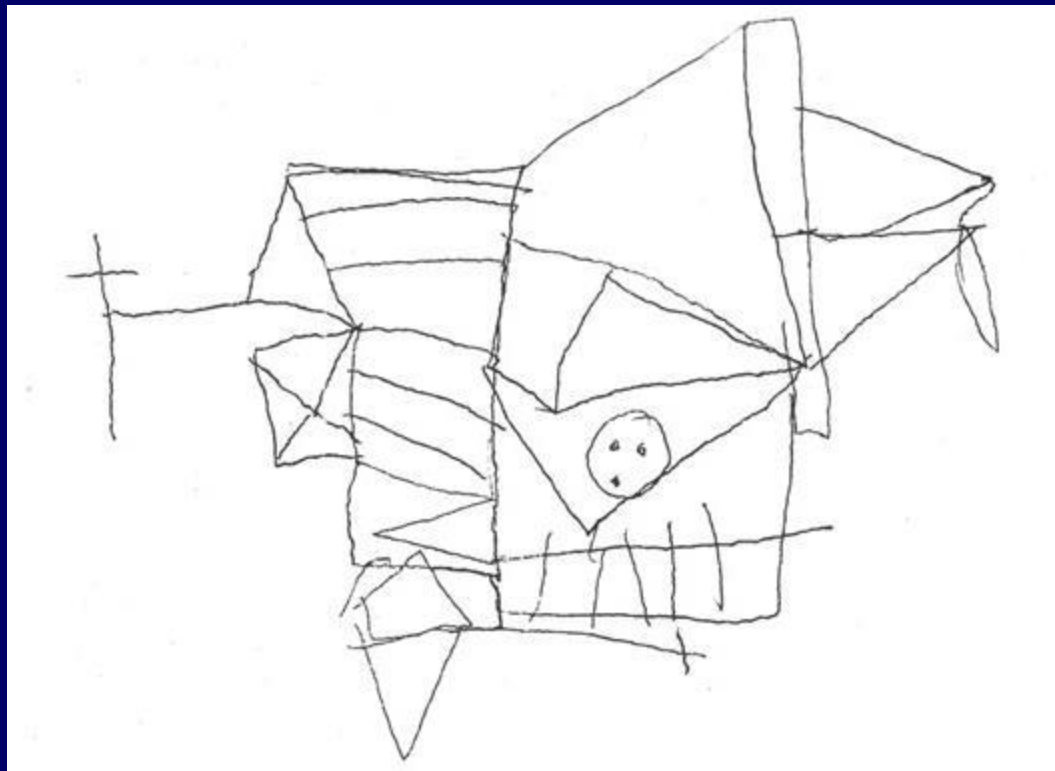
Cognition and ASD: Nonverbal Reasoning

- ‘Salience’ is a related idea that focuses on the reciprocal relationship between what we attend to and what we view as relevant. In several conditions, such as ASD schizophrenia, odd behaviors stem from idiosyncratic meanings attached to particular stimuli and combinations of stimuli
- In ASD, individuals show particular problems in salience to social stimuli, especially when distractors are present, or rapid responses are required, or flexible responses are required

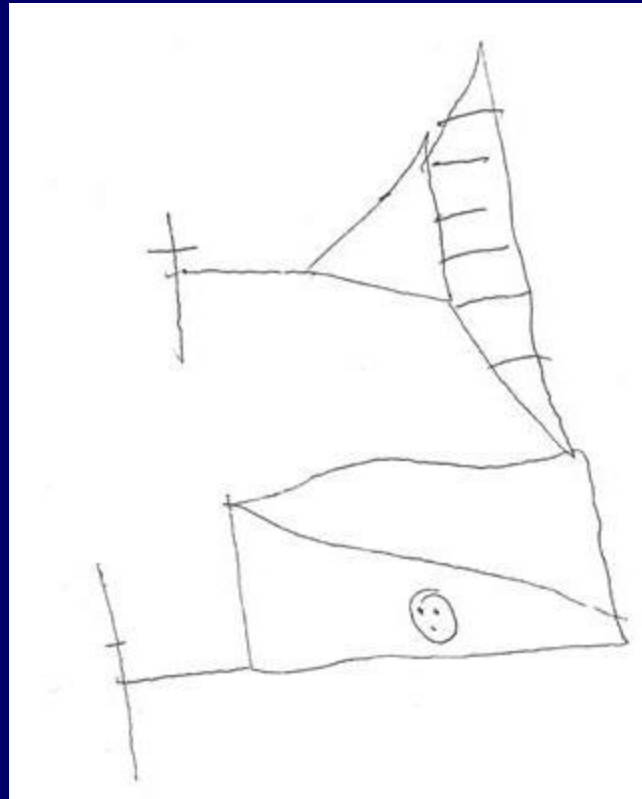
Cognition and ASD: (Abstract Figure)



Cognition and ASD: (Copy of Figure)



Cognition and ASD: (Immediate Recall of Figure)



Cognition and ASD: Mental Flexibility

Executive functions: A family of mental abilities related to problem solving to attain goals (Geurts et al, 2009; Pennington and Ozonoff, 1996). Includes abilities to:

- Inhibit or delay responses

- Persist in the presence of interference

- Make strategic plans for the future (includes organizing, encoding and retrieving information)

Cognition and ASD: Mental Flexibility

- Make mental representations of tasks at hand and recruit other supporting cognitive and neural components of those tasks
- Make strategic plans for the future (includes organizing, encoding and retrieving information)
- Learn rules to process information quickly, efficiently and *flexibly*

Cognition and ASD: Mental Flexibility

-Flexibility fundamentally refers to the ability to adapt to changing or variable circumstances to integrate information in ways that supports problem solving and goal attainment.

The absence of these qualities includes repetitive, unchanging behaviors and mental abilities, and the inflexible application of behaviors to changing circumstances.

Name the color of the word...

Blue

Did you have a

Yellow

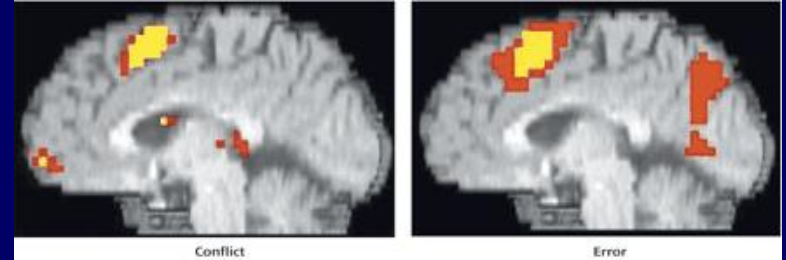
STROOPs! Effect?

Red

Green

Blue

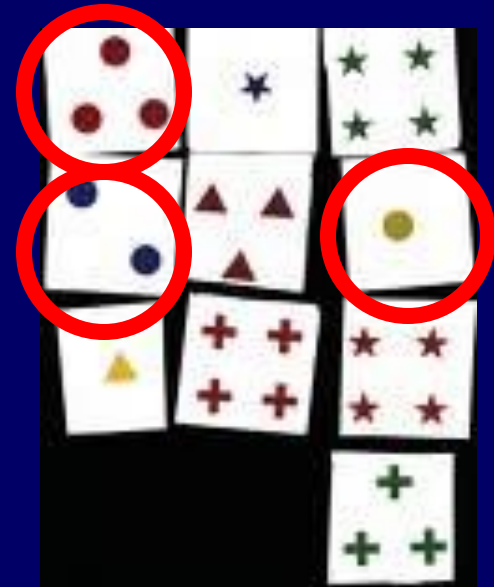
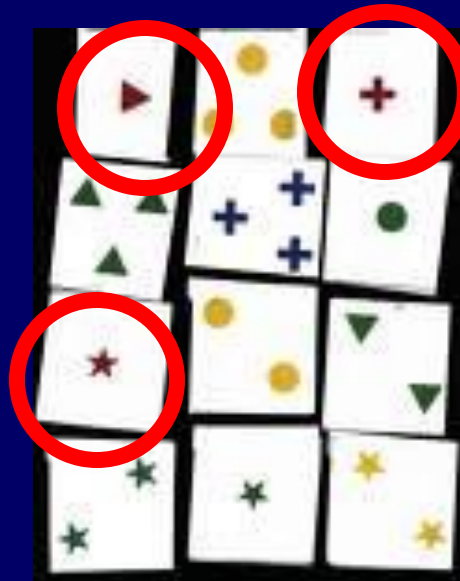
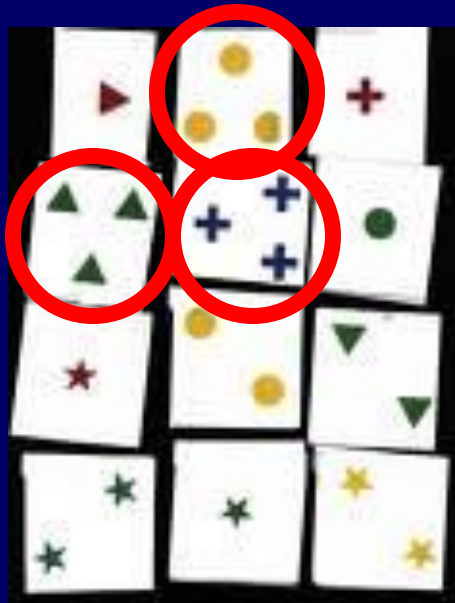
Green



Healthy persons activate
Anterior cingulate when they
Detect errors

Selective ATTENTION

Wisconsin card sort



Color

Shape

Comparison Subjects (N=28)



Normally activates

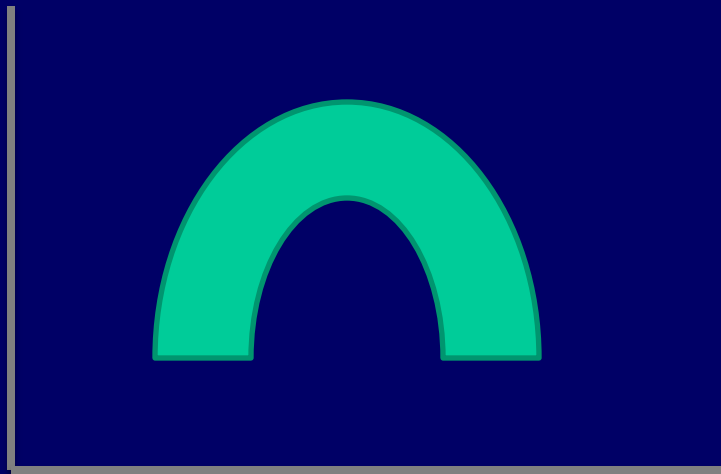
Reasoning and conceptual flexibility

Stress

- Hypothalamic – Pituitary – Adrenal Cortex(HPA) system (and associated hormones of arousal) is one of the major systems moderating stress responses.
- Release of cortisol (crosses blood brain barrier
- Release of adrenalin
- Inverted-U dose-response curve
- Good and bad effects

Stress

Performance



Arousal

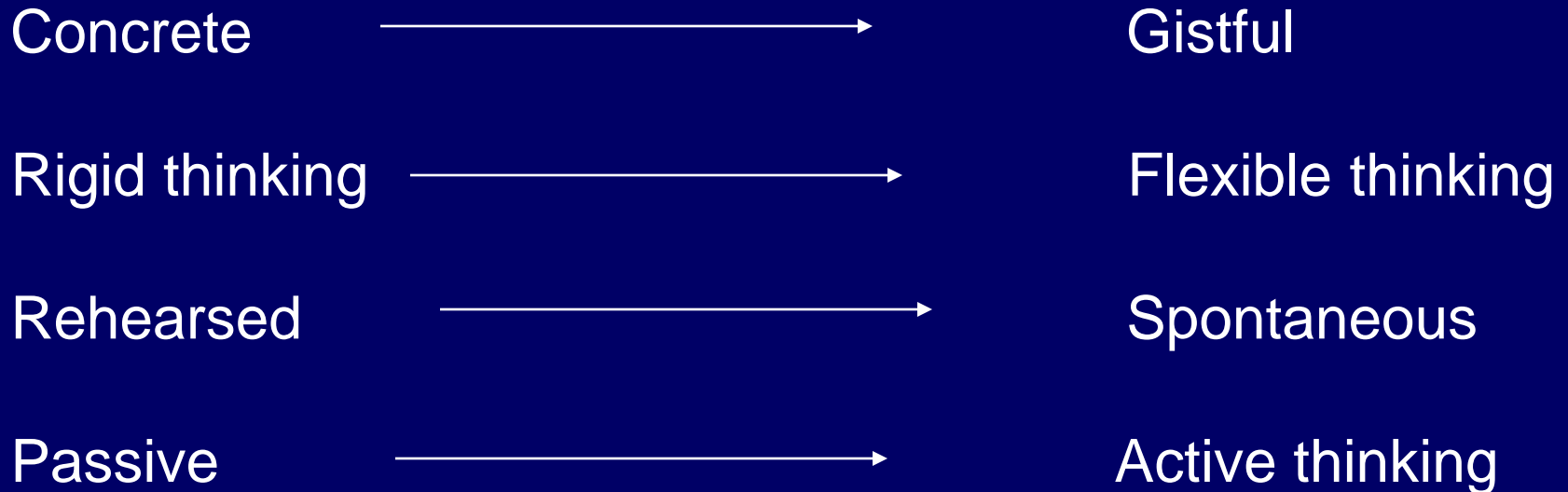
Stress

- Typically developing individuals
- Hypercortisolimia in Cushing's disease
- ASD: Extensive evidence for elevated cortisol or other measures of stress, in relation to high levels of inflexible, restricted behaviors

Stress

-Opportunity to improve cognition and social function by reducing stress

Cognitive Enhancement Therapy moves individuals' thinking from...



Components of CET

- Neurocognitive remediation
 - Attention, memory, and problem-solving modules (1 – 1.5 hours/week; 60 hours total)
 - Done in pairs; computer exercises; coaching by clinician
- Social-Cognitive Group Therapy
 - Training in perspective-taking, gistfulness, non-verbal communication, emotion perception, etc (1.5 hours/week; about 45 sessions)
 - Acting wisely in social situations; Appraising the social context; Taking another person's perspective; Reading non-verbal cues; Example exercise: Sending a condensed message
 - Small groups (6-8 patients); homework; peer feedback; psychoed lecture

Conclusions

- ASDs are strongly associated with repetitive, restricted, inflexible behavior and thinking
- Stress is an important moderating factor in standard and social cognition that frequently exacerbates these functions
- Stress reduction – and cognitive improvement – may be more attainable than we sometimes think in ASD

Thank You