

Cognitive processing style in children and adolescents with Anorexia Nervosa and its implications for clinical practice

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Map of talk

- What is neurocognitive processing?
- Why is it important in AN?

- Neurocognitive processing in adults with AN.
- Neurocognitive processing in children and adolescents with AN.

- Latest study of neurocognitive processing in young people with AN.
- What does this mean for AN treatment?

- Cognitive Remediation therapy: Theory and practice and adaptations for younger populations.
- Is inefficient cognitive processing a familial trait in AN?

- Further CRT adaptations and future directions.

Current status of AN treatment

- ❑ No first line recommended treatment.
- ❑ NICE Guidelines (2004):

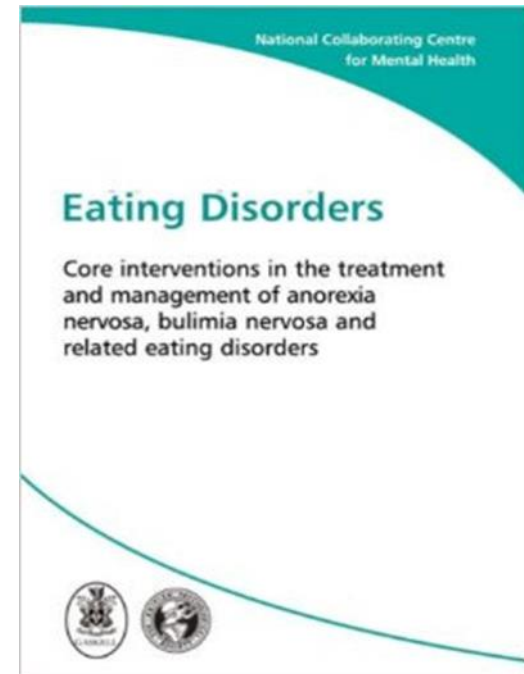
For Adults Grade 'C' evidence for:

- Cognitive Behavioural Therapy (CBT)
- Cognitive Analytic Therapy (CAT)
- Interpersonal Therapy (IPT)

- ❑ Meta-analysis: No superior treatment for adult AN
(Watson & Bulik, 2013, Hay, 2014)

- ❑ **For children and adolescents:** Family Based Treatments (FBT)

- Significant number of non-responders (Agras et al., 2004).



Importance of Carer involvement

Involvement of carers in treatment:

- Reductions in carer distress (Goddard et al., 2011)
- Reductions in interpersonal factors that may maintain eating disorder behaviour (Goddard et al., 2012).
- May lead to improved treatment outcomes (Treasure & Schmidt, 2006).

Lack of treatment options has led to a shift in focus

Underlying traits that may make engaging in treatment difficult

Neuropsychology of AN

- ❑ Consistent evidence of specific processing style In adults with AN
- ❑ **-Inefficient set shifting**
- ❑ **-Weak central coherence**

Neuropsychological Weaknesses in Anorexia Nervosa: Set-Shifting, Central Coherence, and Decision Making in Currently Ill and Recovered Women

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Nicole Sanders, MD^{1,2,8}
Paul A.M. Smeets, PhD^{3,8}
Floor van Meer, MSc^{1,8}
Roger A.H. Adan, PhD^{1,2,8}
Hans W. Hoek, MD, PhD^{1,4,5,6,8}
Annemarie A. van Elburg,
MD, PhD^{1,7,8}

ABSTRACT

Objective: The purpose of this study is to examine set-shifting, central coherence, and decision making in women currently ill with anorexia nervosa (AN), women recovered from AN, and healthy control women. We aim to test whether these neuropsychological weaknesses persist after recovery, and explore relations between the impairments

Discussion: The present findings suggest that impaired set-shifting and decision making are stable traits in women with AN. Because individual differences within these groups were large, a rigid thinking style is only present in a (sub)population of ill and recovered women. Decision-making performance is not related to a rigid thinking style, but further research in this area is warranted.

OPEN ACCESS Freely available online



Poor Cognitive Flexibility in Eating Disorders: Examining the Evidence using the Wisconsin Card Sorting Task

Kate Tchanturia^{1*}, Helen Davies¹, Marion Roberts¹, Amy Harrison¹, Michiko Nakazato¹, Ulrike Schmidt¹, Janet Treasure¹, Robin Morris²

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DOI: 10.1017/S1355617706060528

BRIEF COMMUNICATION

ORIGINAL INVESTIGATION

Set shifting deficit in anorexia

Measuring state trait properties of detail processing and global integration ability in eating disorders

Neuropsychology of AN

Also evidence of this profile:

- ❑ -Once weight has been restored (Tchanturia et al., 2012; Linder et al., 2013)
- ❑ -Unaffected family members (Holliday et al., 2005; Roberts et al., 2012)

Does this profile exist in children and adolescents
with AN?

Set shifting in children and adolescents with AN

EMPIRICAL ARTICLE

Set Shifting in Children and Adolescents with Anorexia Nervosa: An Exploratory Systematic Review and Meta-analysis

Katie Lang, MSc¹
Daniel Stahl, PhD²
Jonathan Espie, ClinPsyD³
Janet Treasure, MD, PhD, FRCP,
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Kate Tchanturia, PhD,
ClinPsyD^{1*}

ABSTRACT

Objective: Set shifting inefficiencies in adults with anorexia nervosa (AN) are established, however the neurocognitive profile of children and adolescents with AN is less clear. This study aimed to provide a review of the literature.

Method: Electronic databases were used to search for manuscripts.

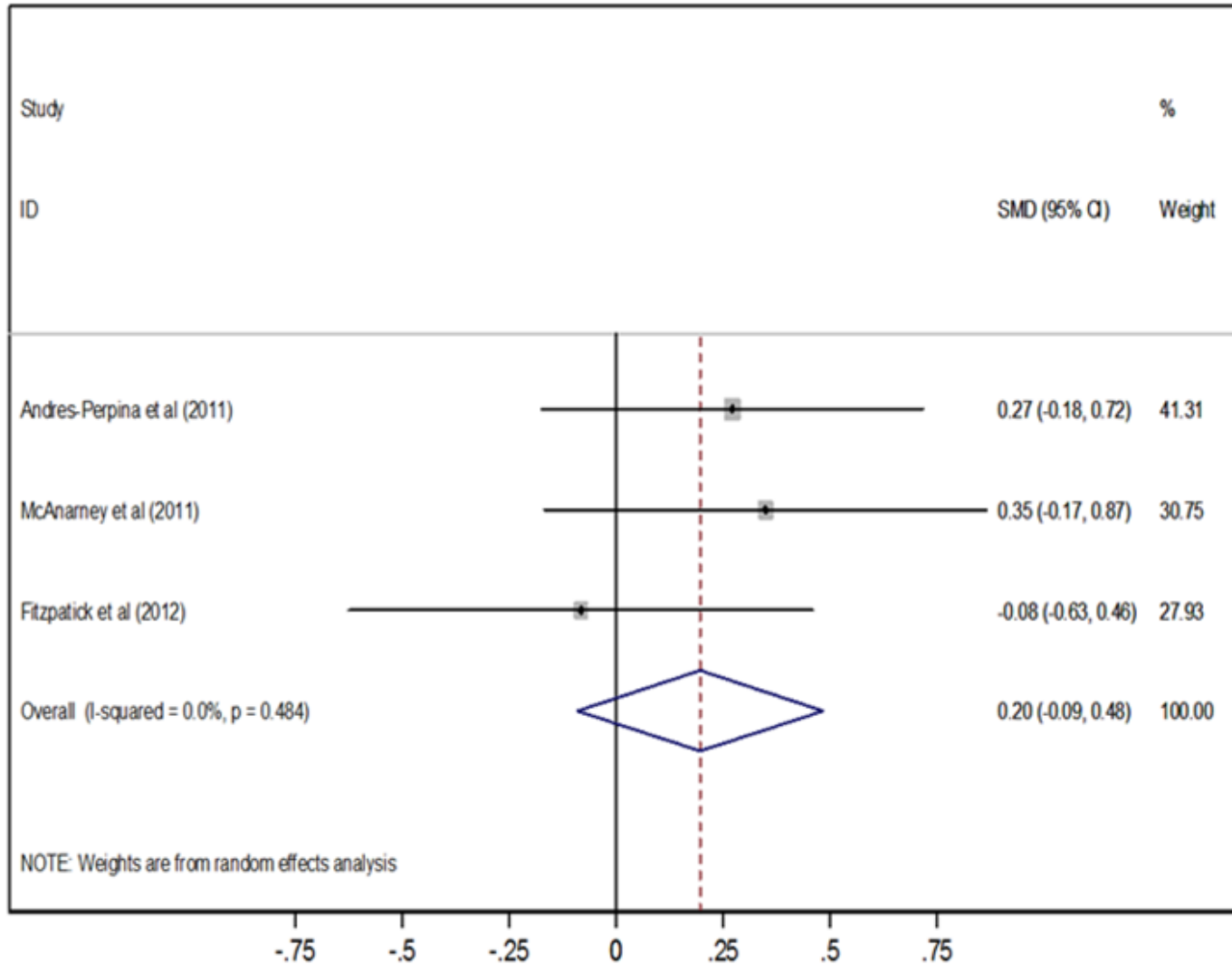
Results: Meta-analysis was performed on seven studies using two neuropsychological tests (Trail Making Task, TMT; Wisconsin Card Sorting Task, WCST). The mean difference in outcome between AN

pooled effect size of $d = 0.196$ (95% C.I. $-0.091-0.483$, $z = 1.34$, $p = .18$). Studies which did not allow for a calculation of effect size typically showed a nonsignificant, worse performance by the AN groups.

Discussion: The inefficiencies in set shifting that are apparent in the adult AN literature do not appear to be as pronounced in children. This may suggest that set shifting difficulties in adult AN are the result of starvation or indicative of longer duration of illness. Larger studies are needed to confirm these impres-

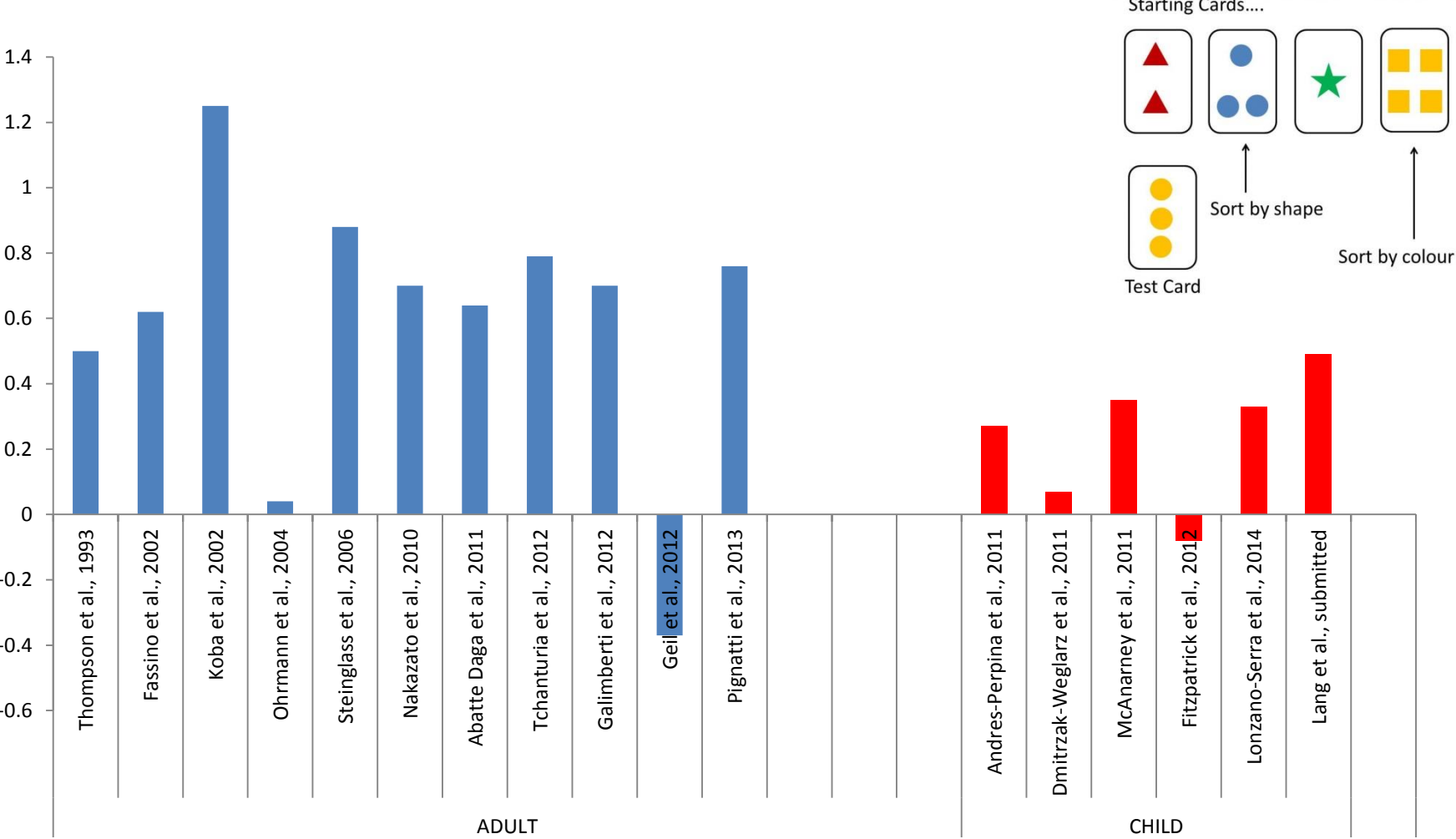
Results: Wisconsin Card Sorting Test (WCST)

Average N= \sim 28



$d=0.196$
[95%C.I. > -0.091 to 0.483,
 $z=1.34$, $p=0.18$].

Effect sizes from studies using the Wisconsin Card Sorting task (WCST) with adults and children and adolescents with AN



Central Coherence in children and adolescents with AN



Journal of Child & Adolescent
Behavior

Lang et al., J Child Adolesc Behav 2014, 2:3
<http://dx.doi.org/10.4172/jcalb.1000140>

Research Article

Open Access

A Systematic Review of Central Coherence in Young People with Anorexia Nervosa

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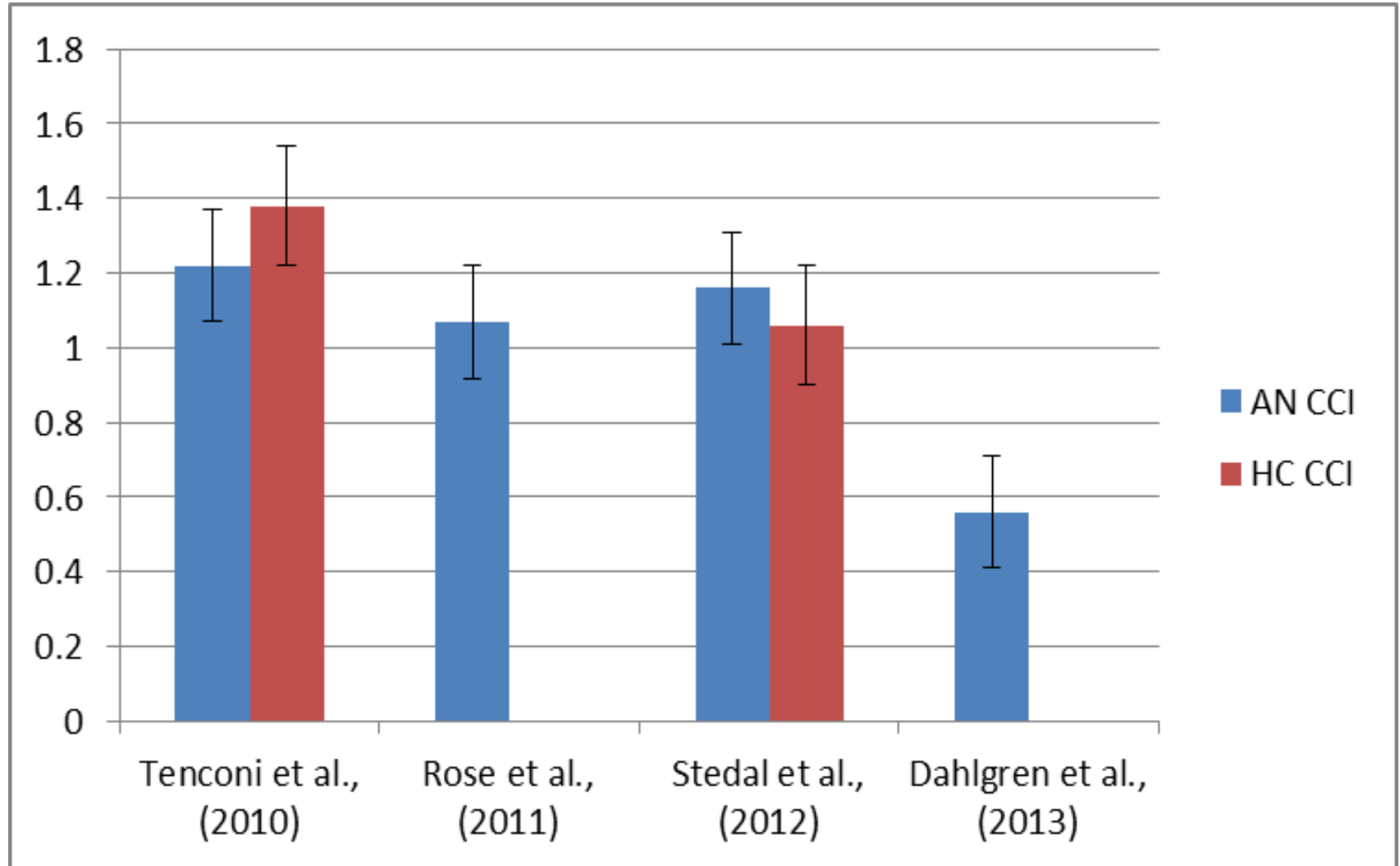
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Means Central coherence



Summary: Child and adolescent literature

- ❑ Existing literature is small
- ❑ Large variability in test used
- ❑ Data hard to interpret

- ❑ Generally:
 - ❑ Appears to be a *non-significant worse* performance by AN groups

- ❑ Could this be due to small sample sizes and methodological differences between studies?

RESEARCH ARTICLE

Do Children and Adolescents with Anorexia Nervosa Display an Inefficient Cognitive Processing Style?

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Kate Tchanturia^{1,4*}

1 King's College London, Psychological Medicine, Institute of Psychiatry, Psychology & Neuroscience, London, United Kingdom, 2 Biostatistics department, Institute of Psychiatry Psychology & Neuroscience London, United Kingdom, 3 Child and Adolescent Eating Disorder Service, South London and Maudsley NHS Trust, London, United Kingdom, 4 Ilia State University, Department of Psychology, Tbilisi, Georgia

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Study methods- Participants

❑ **N=41 children and adolescents with Anorexia Nervosa**

Aged 11-18 (mean: 15.07)

Percentage ideal body weight (%IBW) below 90%
(mean=80.68)

❑ **N=43 Healthy control children and adolescents**

Aged 11-18 (mean: 15.11)

%IBW above 90 (mean=101.1)

No history of ED or other psychiatric conditions,

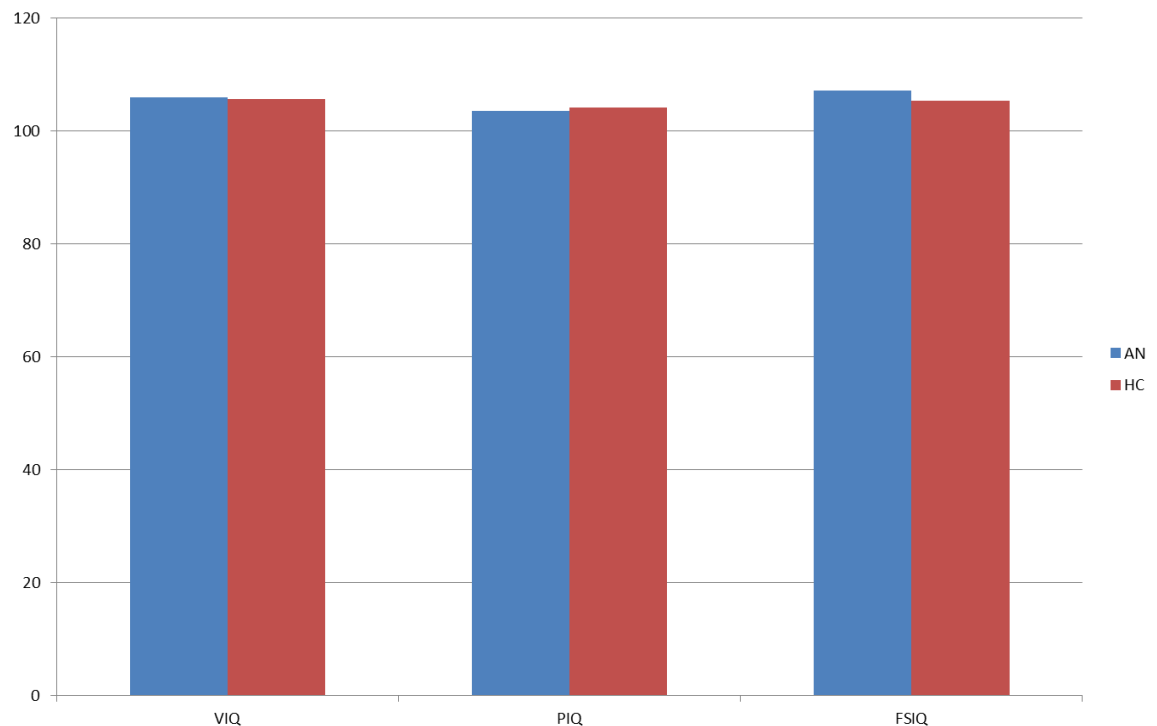
No family history of ED

Study methods- Measures

- **Intelligence: WASI (Wechsler, 1981)**

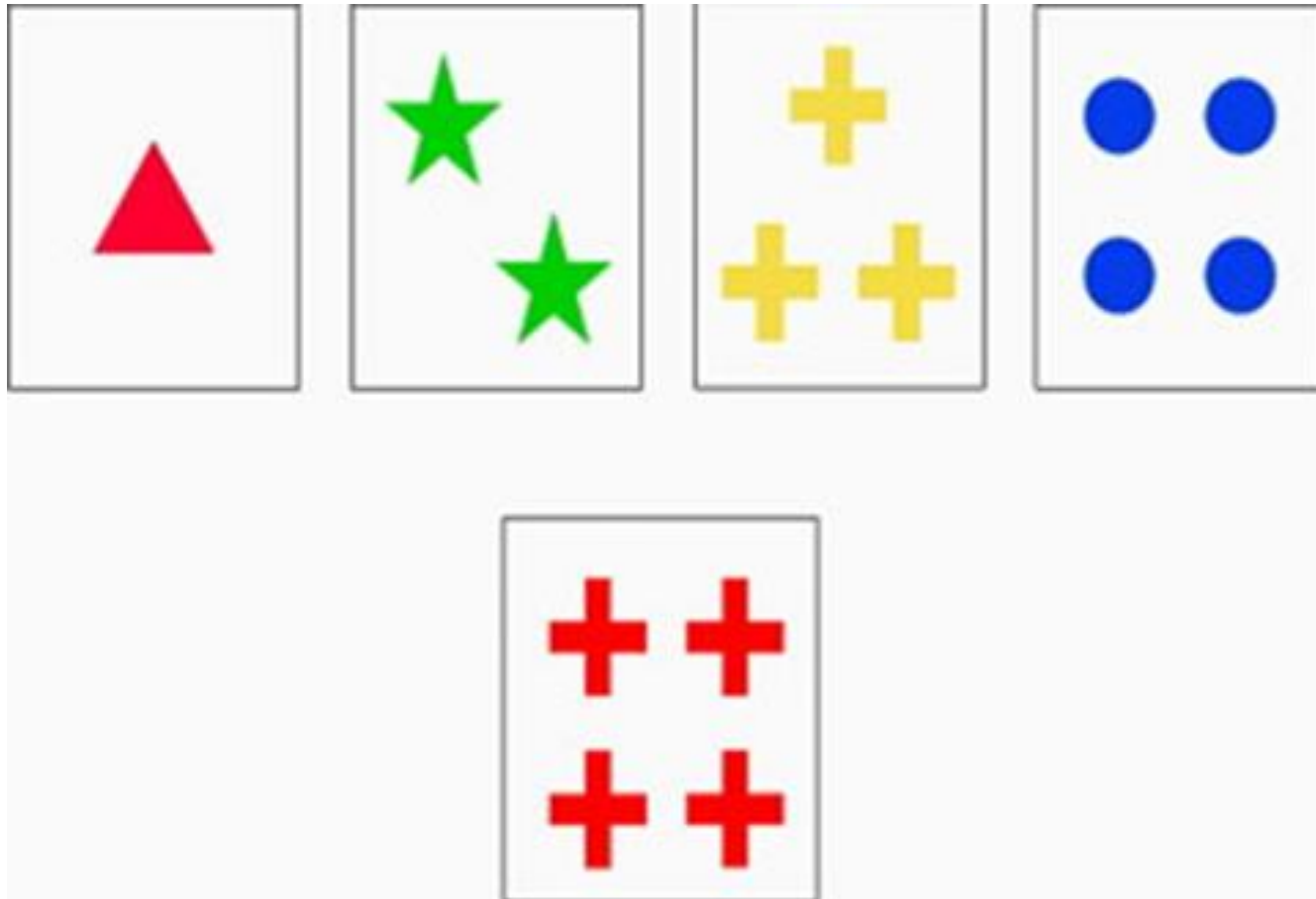
Contains four subscales:

- Block design
- Matrix reasoning
- Vocabulary
- Similarities

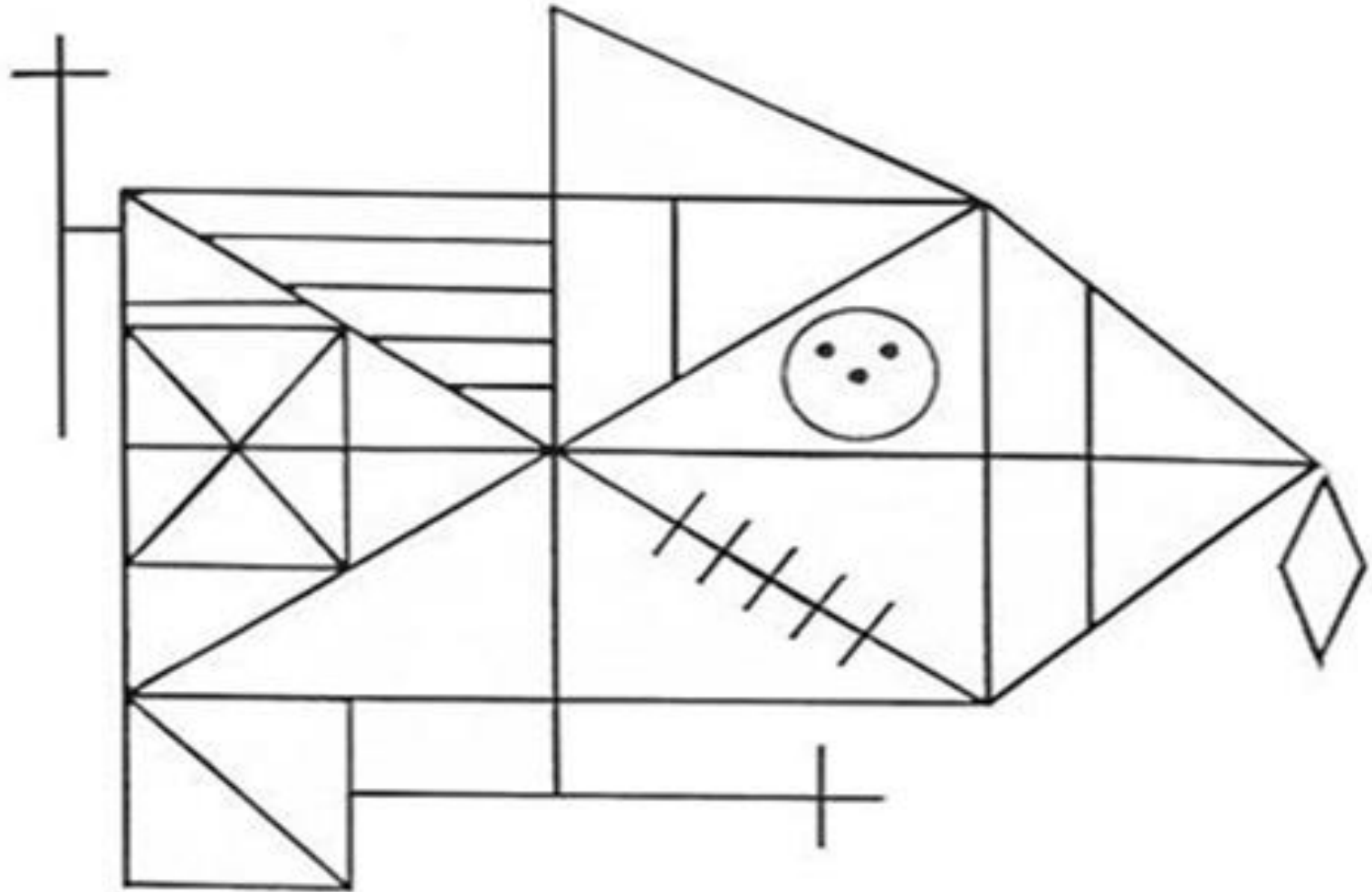


Estimates: Full scale IQ, Performance IQ and Verbal IQ

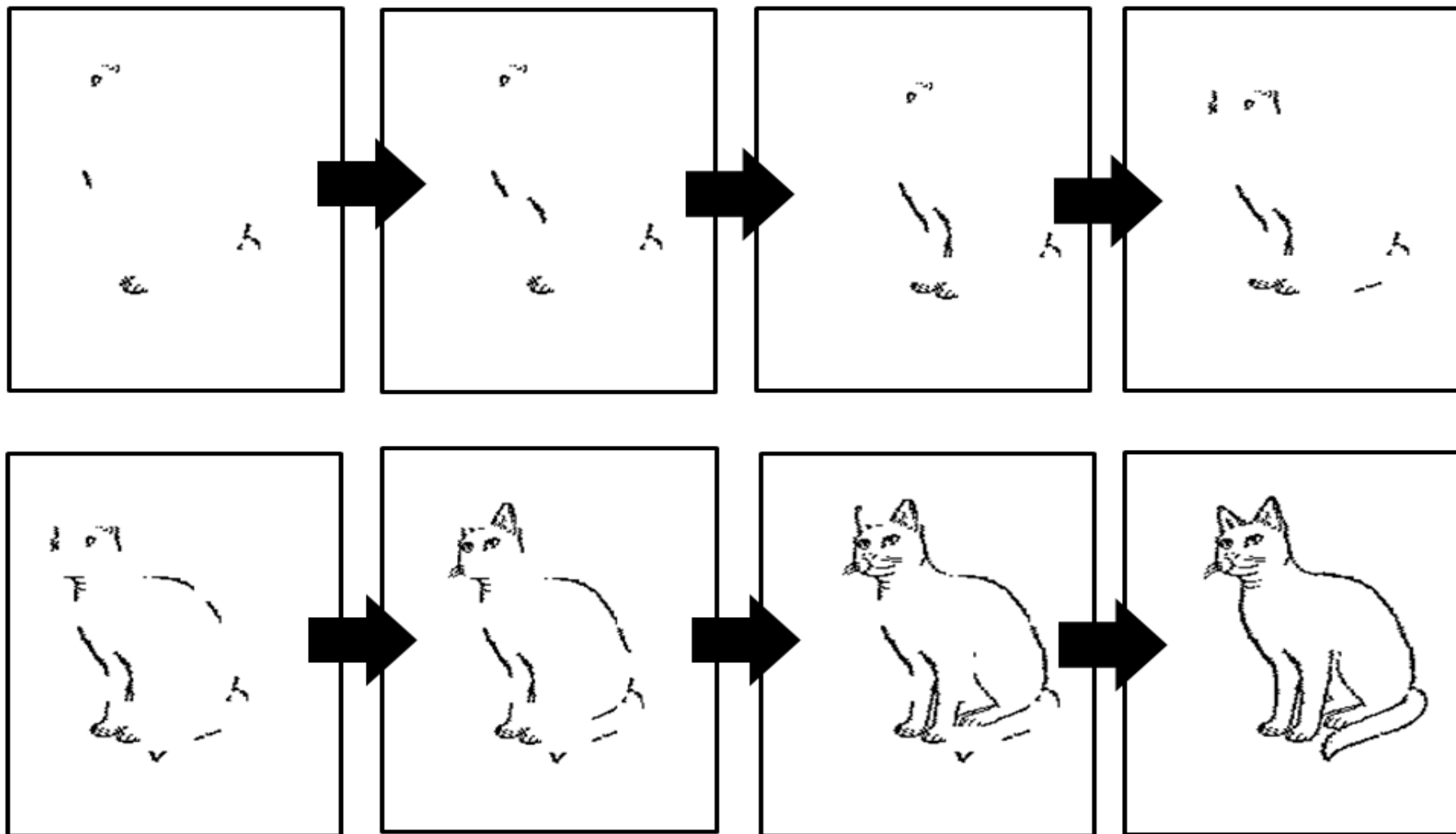
Wisconsin Card Sorting Test (WCST)



Rey Osterrieth Complex Figures Test (ROCFT)



Fragmented Pictures task (FPT)



Neuropsychological outcomes

	AN (N=41)	HC (N=43)	Test statistic <i>P</i>	Effect size (Cohen's <i>d</i>)
Perseverative errors (transformed)	2.3 (0.5)	2.1 (0.3)	.007	0.49
FPT	4.6 (0.7)	4.3 (0.6)	.089	0.38
Order Index	1.5 (0.7)	1.8 (0.6)	.104	0.36
Style Index	1.2 (0.5)	1.4 (0.4)	.006	0.62
CCI	1.0 (0.4)	1.3 (0.4)	.012	0.57

Conclusions

- ❑ Children and adolescents with AN share the same inefficiencies as adults.
- ❑ Early onset AN in this sample, effects of starvation on neuropsychological processing should be less pronounced.
- ❑ Findings suggest that they may be an underlying trait.

What do these findings mean for AN treatment?

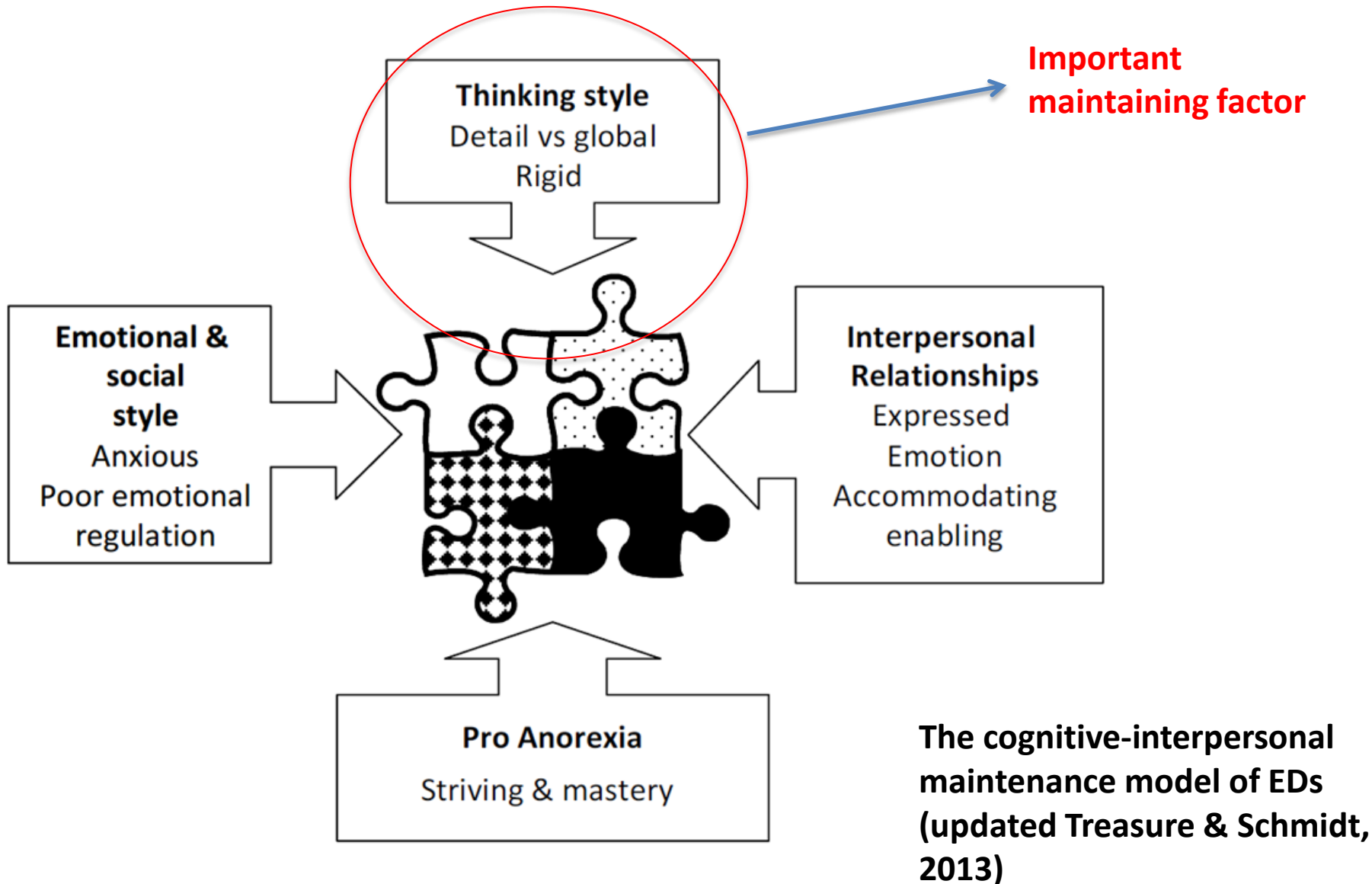
- Similar cognitive profile as adults with AN may make engagement in psychological treatments difficult.
- May reduce efficaciousness and negatively impact on prognosis.
- Provides support for the use of remedial treatments with younger AN populations.

What is Cognitive Remediation Therapy (CRT)?

- ❑ Cognitive Remediation Therapy tackles underlying maintaining factors in AN.
- ❑ Directly targets thinking styles
 - Cognitive inflexibility
 - Excessive focus on details
- ❑ Without focussing on eating disorder related symptoms.



Cognitive interpersonal model



Active ingredients

- ❑ Cognitive tasks.
- ❑ Encourages reflection/ develop meta-cognition.
- ❑ Motivational style of delivery.
- ❑ Engage the patient in treatment.

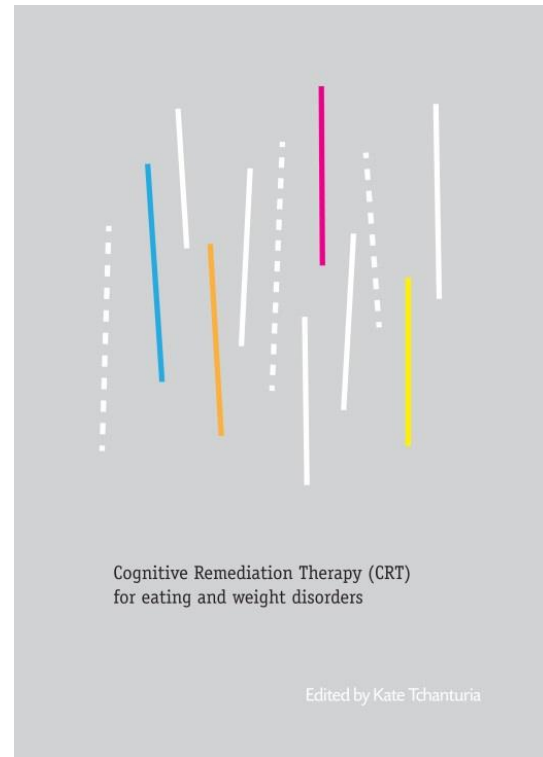
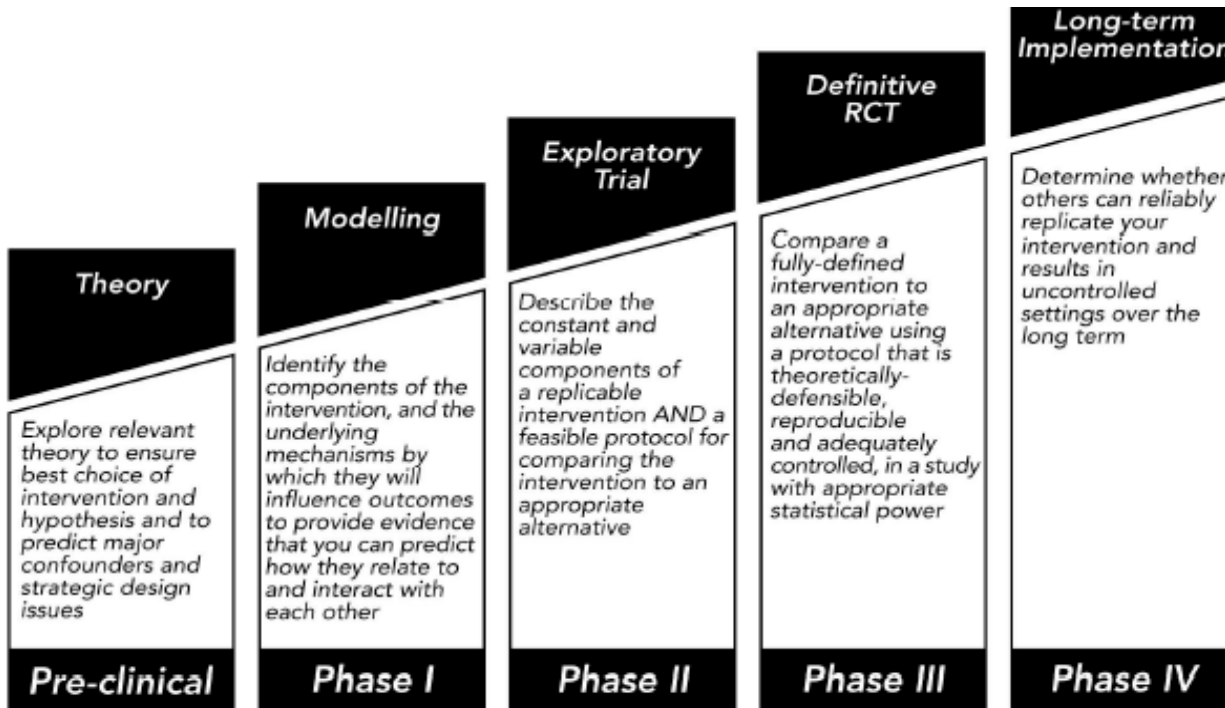


Growing evidence-base

- ❑ Randomised Controlled Trials with adults: Improvements to cognitive processing (for systematic review see Tchanturia et al., 2014).
- ❑ Preliminary evidence for use with children & adolescents (Wood et al., 2011; Pretorius et al., 2012; Dahlgren et al., 2013).
- ❑ Group formats (Genders & Tchanturia, 2010).
- ❑ High acceptability from patients and clinicians (Whitney et al., 2008).

Research evidence for CRT in ED

MRC Framework for the Development of Complex Interventions



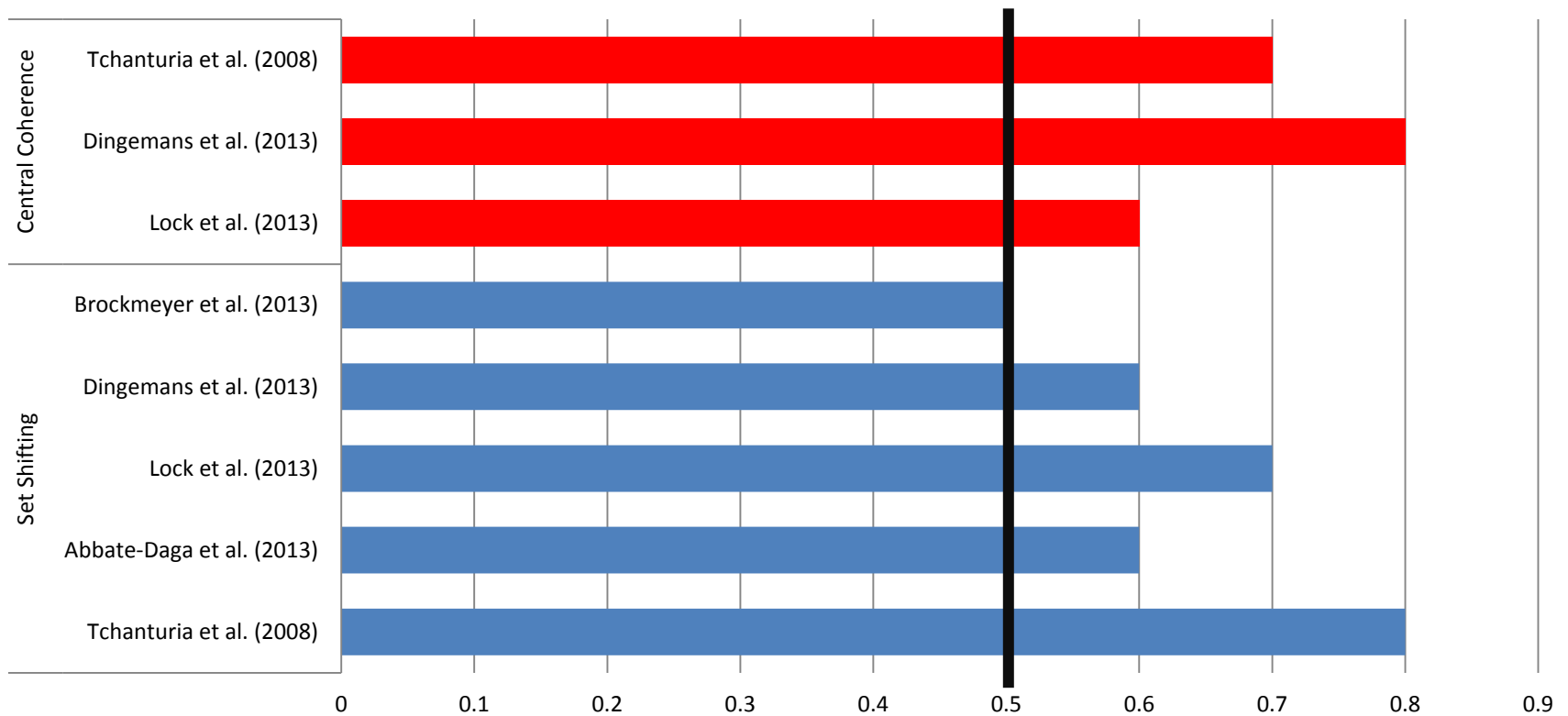
Continuum of increasing evidence

Routledge 2015 London
www.katetchanturia.com

CRT improves cognitive task performance

(Tchanturia et al 2014 for review EERD)

Effect sizes of the CRT treatment studies including cognitive assessments



Switching tasks: Cognitive flexibility

green red yellow blue black green pink red yellow purple

blue blue yellow green red yellow green blue red red red

blue yellow black black green pink pink red yellow yellow

black red blue blue blue green green green yellow yellow

blue yellow blue yellow blue green blue green blue yellow

black yellow blue green yellow blue green yellow red red

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green purple purple yellow green black blue green yellow red

blue black green blue red blue red blue yellow pink black



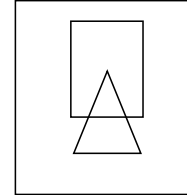
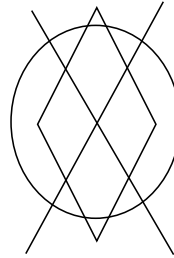
Bigger picture thinking task

What is going on in this picture....?



How can we adapt CRT for younger AN
populations?

Bigger Picture Thinking



- Geometric Figures
- Sending “how to” texts
- London Landmarks
- Piccadilly Circus tasks
- Board Games:
 - Qwirkle
 - Blokus



Multi-tasking

- Rub tummy, pat head
- Play a game on tablet whilst doing memory game
- Make a play dough object whilst following instructions
- Play a card game whilst having a conversation
- Question Game
- Do a puzzle whilst listening to list of objects- remember them!



Homework Tasks

- Notice when you use or could use a skill in the week and bring examples to the group
- Brainstorm in the session how different people like to spend their time. Everyone chooses something from the list they have not tried before
- List of things to try differently – behavioural experiments
- Pros and Cons of Flexible Thinking Sheet

What is the cognitive style of AN
families like?

Cognitive style in AN families

- ❑ Evidence of inefficient cognitive processing in:
 - Currently ill
 - Recovered
 - Children & Adolescents
- ❑ Unaffected family members (Holliday et al 2005; Roberts 2013, 2013; Kanakam et al, 2013)

AIM

Investigate cognitive processing in unaffected mothers of children & adolescents with AN

Citation: Is inefficient processing in Anorexia Nervosa a familial trait? A neuropsychological pilot study of mother of offspring with a diagnosis of anorexia nervosa. *World journal of biological psychiatry, In Press.*

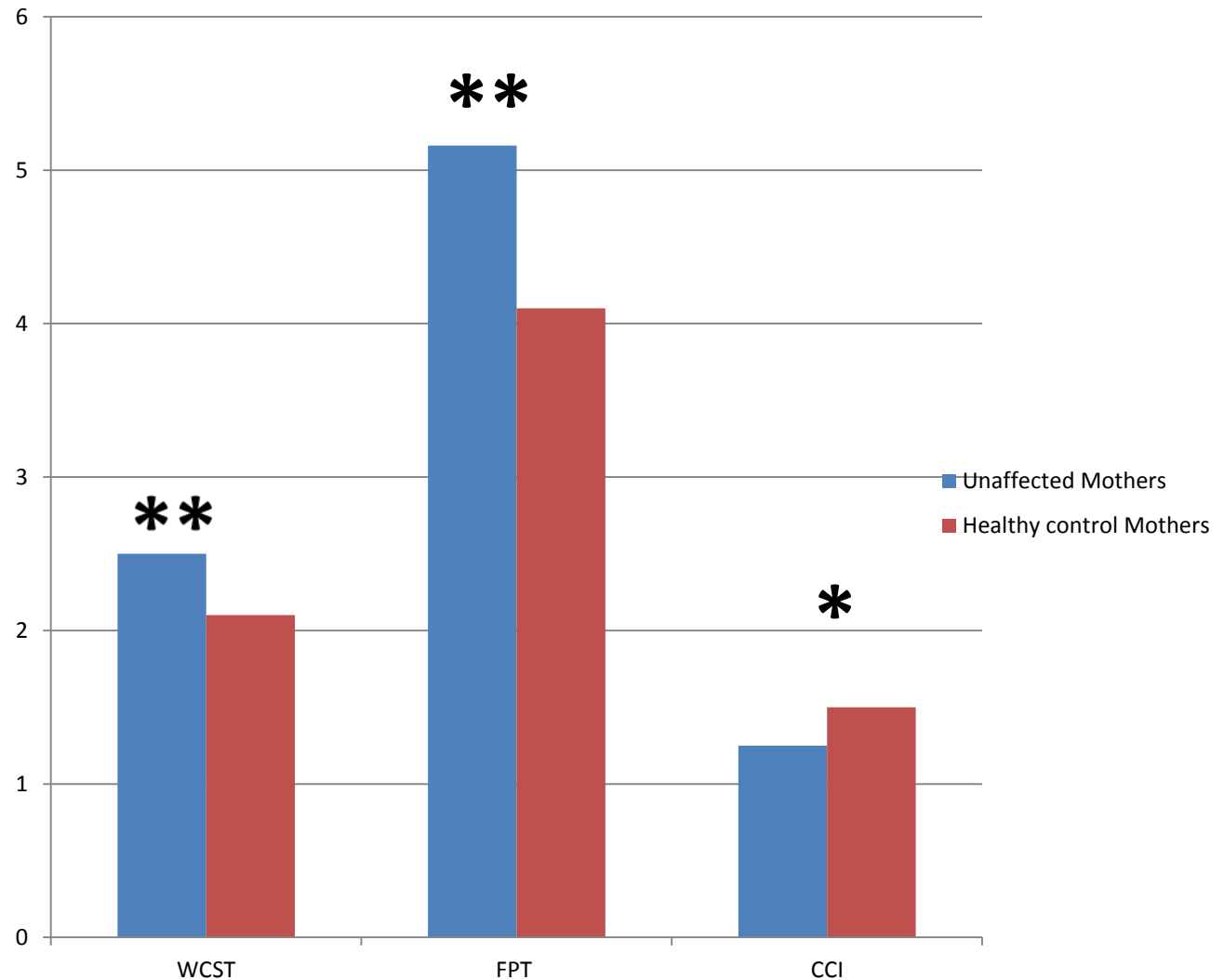
Neuropsychological outcomes

Participants

- 21 unaffected mothers with AN offspring
- 20 Healthy control mothers with HC offspring

Procedure

- WCST
- FPT
- ROCFT
- Self report measures



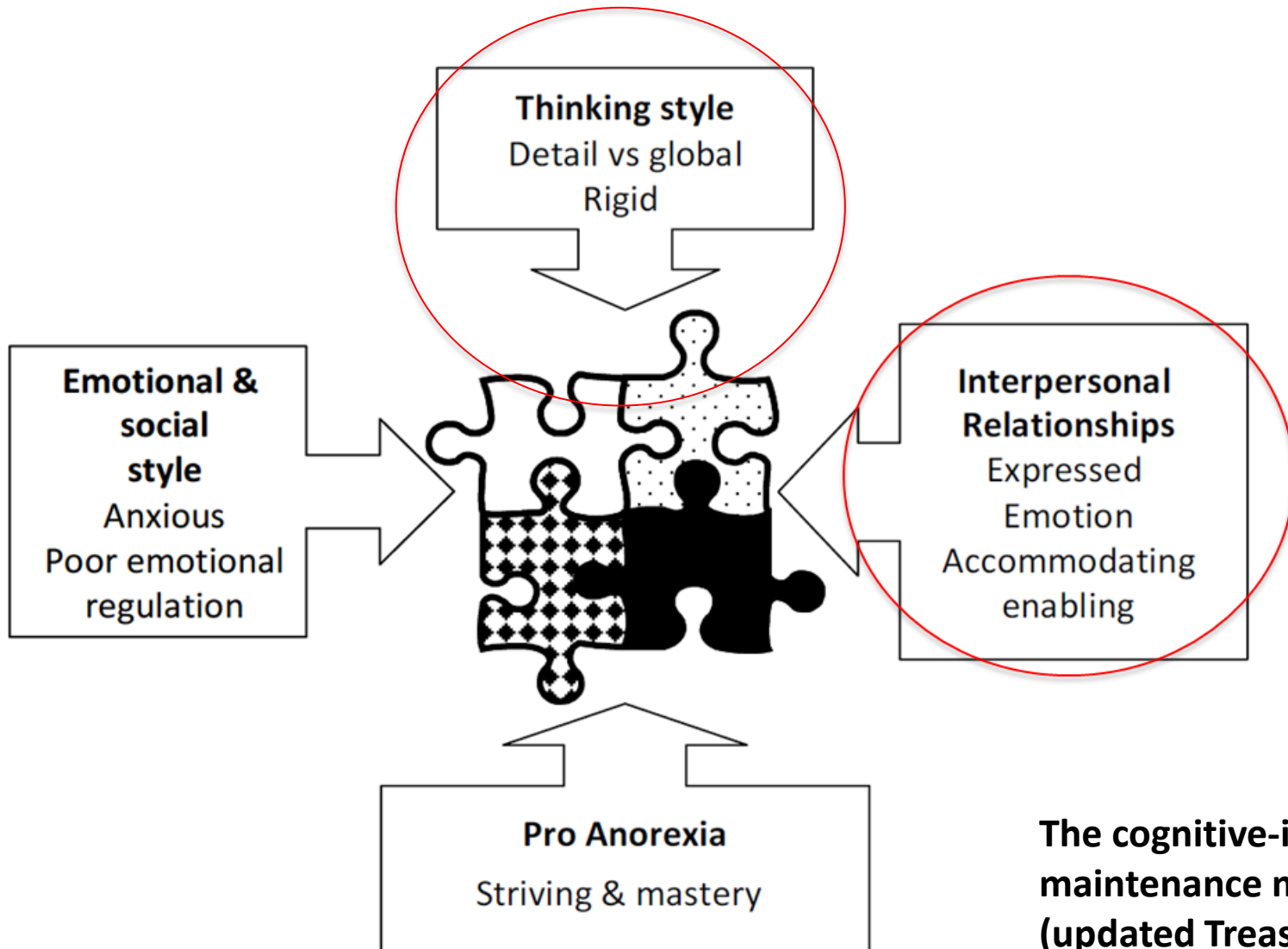
**P=<.01; *P=<.05

Conclusions

- ❑ Inefficient processing is a familial trait within AN.
- ❑ Unhelpful cognitive styles within unaffected mothers could also maintain eating disorder pathology.
- ❑ Clinical implications: Involving family members in CRT could be beneficial.

Future directions and adaptations

Cognitive interpersonal model



The cognitive-interpersonal maintenance model of EDs (updated Treasure & Schmidt, 2013)

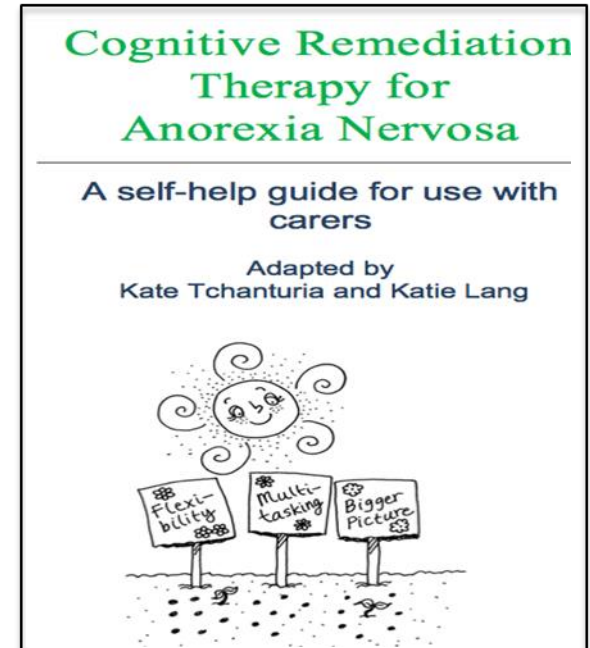
Future directions

Given the:

- Benefits of family involvement in treatment
- Benefits of CRT

Next step:

- Development of self-help module of CRT in family context
- Decrease care-giver stress
- Increase accessibility
- Reduce cost



Can CRT be modified to be delivered in a self-help CRT format in a family context?



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journal homepage: www.elsevier.com/locate/psychres



Acceptability and feasibility of self-help Cognitive Remediation Therapy For Anorexia Nervosa delivered in collaboration with carers: A qualitative preliminary evaluation study

Katie Lang^a, Janet Treasure^{a,b}, Kate Tchanturia^{a,b,c,*}

Participants

- ❑ Six participants with DSM-IV diagnosis of AN or EDNOS-AN.
- ❑ Recruited via advertisements on B-eat charity website, eating disorder support groups.
- ❑ Six mothers (one history of AN).

	Age	BMI
AN (N=6)	19.5 (6.9)	17.10 (1.70)
	Range: 14-32	
Mothers (N=6)	53.8 (2.46)	23.95 (2.46)
	Range: 45-64	

Procedure

1. Training session

- -Adapted manual
- -Neuropsychological & questionnaire measures

2. Intervention

- -Six weeks
- -CRT diary

3. Follow-up

- -Qualitative interview
- -Neuropsychological & questionnaire measures

Results: Qualitative

Themes & Sub-themes

- **Acceptability of self-help**
 - +Convenient
 - Difficult reflecting without therapist
- **Acceptability of family involvement**
 - +Spend 'fun' time outside of ED
 - +Lead to more difficult conversations
 - Child not always responsive to parent
- **Raised awareness of profile**
- **Future directions**

"More spontaneous, which was helpful"

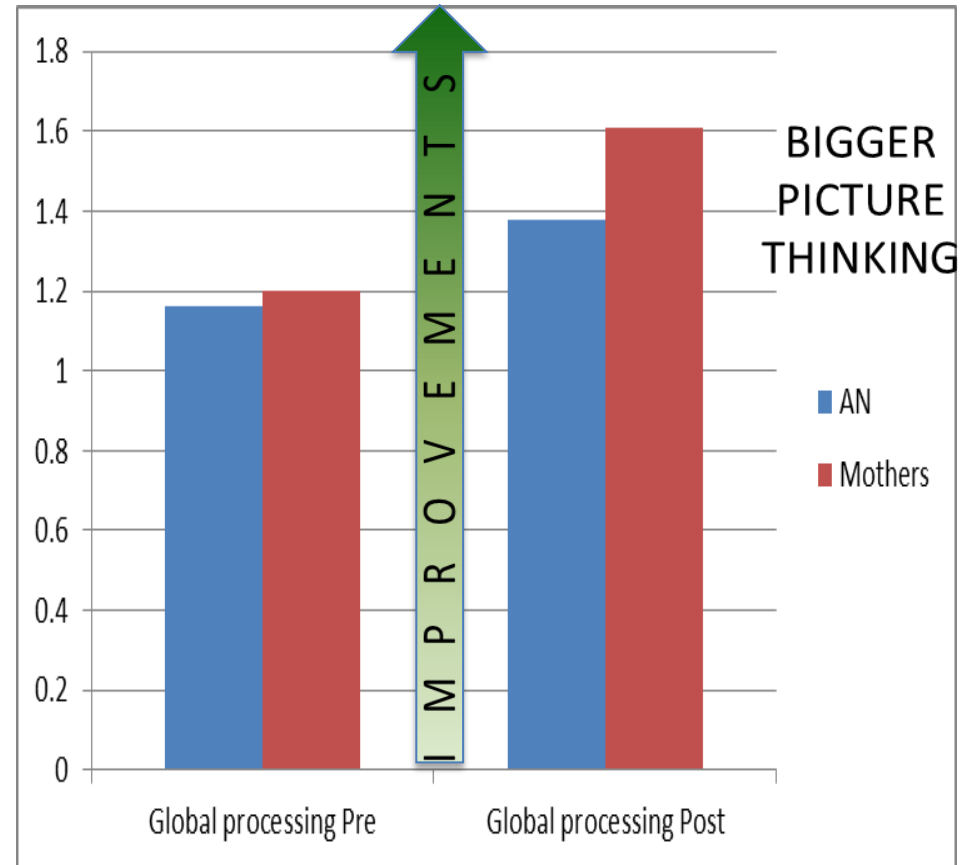
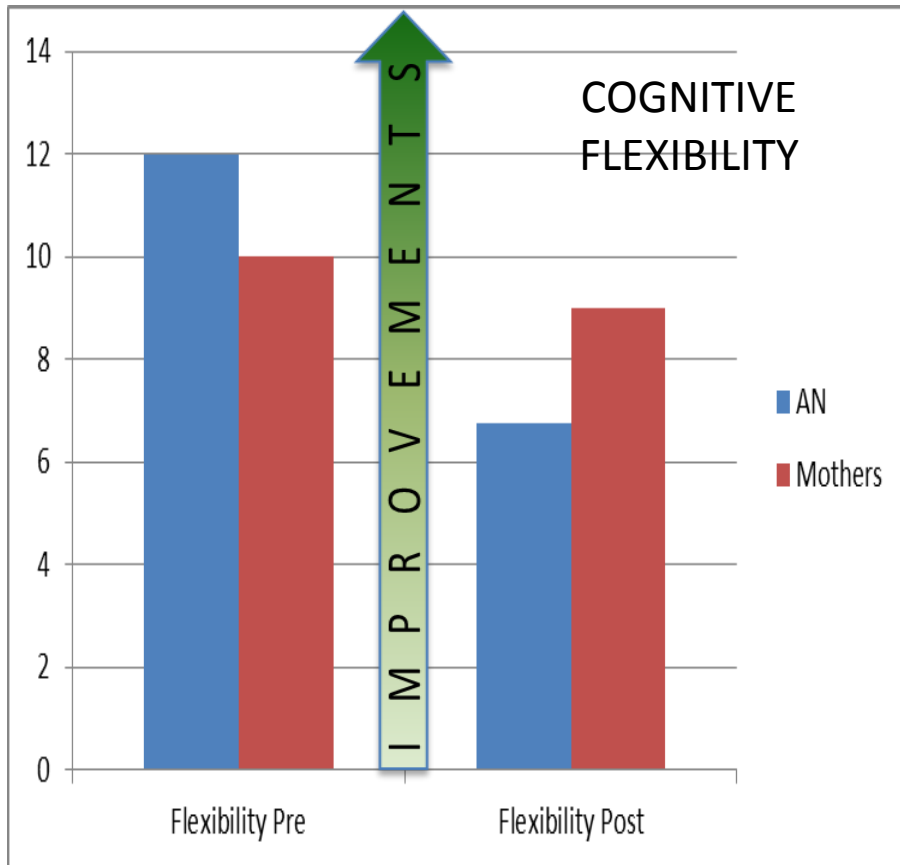
"A therapist may have challenged my daughter more"

"It was the first time my dad had become involved in my treatment"

"Helped to make small changes that made a big difference"

"it would be great as an app"

Results: Neuropsychology



Reductions across all self-report measures

Conclusions

- ❑ Add to literature supporting CRT as a treatment for AN
- ❑ Self-help is an acceptable form of treatment
- ❑ Involving carers was mostly positive
- ❑ **Clinical implications:**
 - Benefits to carers
 - Increase accessibility to treatment
 - Cost effective

Future directions: Emotion skills training

- Evidence of poor emotion processing in adults with AN
 - Theory of mind
 - Alexithymia
 - Emotion recognition
 - Emotion expression
- Preliminary evidence of similar difficulties in children and adolescents (Rhind et al., 2014; Lang et al., 2015; Zonneville-Bender et al., 2013).



Development of Cognitive Remediation & Emotion Skills Training (CREST): Focus groups AN-Emotion

- We had four groups:
2 x Patients, 1 x Carers, Clinicians
- Aim to identify overlapping and most common themes relating to emotions

(Kyriacou, Easter, Tchanturia – Journal of Health Psychology, 2010)

- *Focus groups + tailoring OP module + experimental research = CREST*

Focus Groups

- Patients, Carers, Clinicians
- Difficulties with

Tolerance – Understanding - Expression

I think it's also an issue of identifying emotions.... Other people, if you ask them how do they feel they just don't know, and I'm like that quite a lot.

..if someone has a really good day, and they're happy and smiling, then the next couple of days they're miserable and guilt-ridden

[if I show my feelings] I'm scared I'll be exposed to being exploited and seen as vulnerable

Revised CREST:

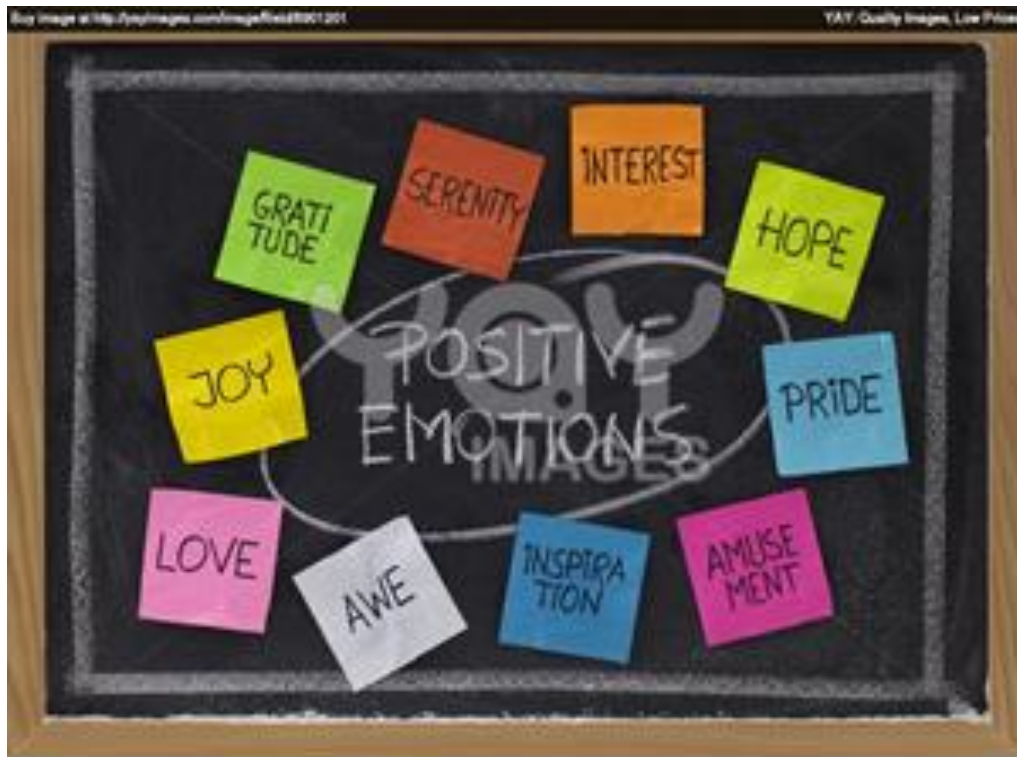
- more focus on psych education
- materials from Positive psychology
- more homework
- more specific exercises

Future developments...

Do we need further adaptations for children and adolescents?

Important to consider developmental trajectories

Development of social cognition





Thank you

Questions?

Acknowledgments



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Supervisors: Dr Kate Tchanturia, Professor Janet Treasure

Collaborators: Samantha Lloyd, The Child and Adolescent ED team SLaM, The Vincent Square Eating Disorder Team, Emma Larsson, Liza Mavromara.

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