

PEACE pathway progress and Future

*Professor Kate Tchanturia
Consultant Clinical Psychologist/ Principal Investigator of
PEACE Pathway*

King's College London

Kate.Tchanturia@kcl.ac.uk



PEACE 

Pathway for Eating disorders and Autism
developed from Clinical Experience

PEACE is peaceful and creative collaboration/coproduction of autism friendly eating disorder treatment pathway:

PEACE

Pathway for Eating disorders and Autism developed from Clinical Experience

Health care professionals



Patients, families autism experts



January 2019 first meeting



South London and Maudsley 
NHS Foundation Trust



More detailed information about PEACE:

- Book is published: March 2021
- Peer-reviewed publications (up to 30)
- Social media
- Our website peacepathway.org



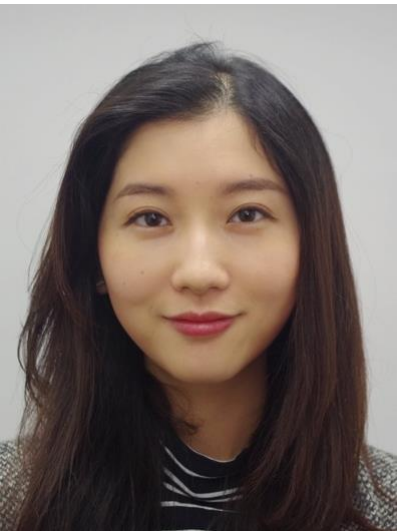
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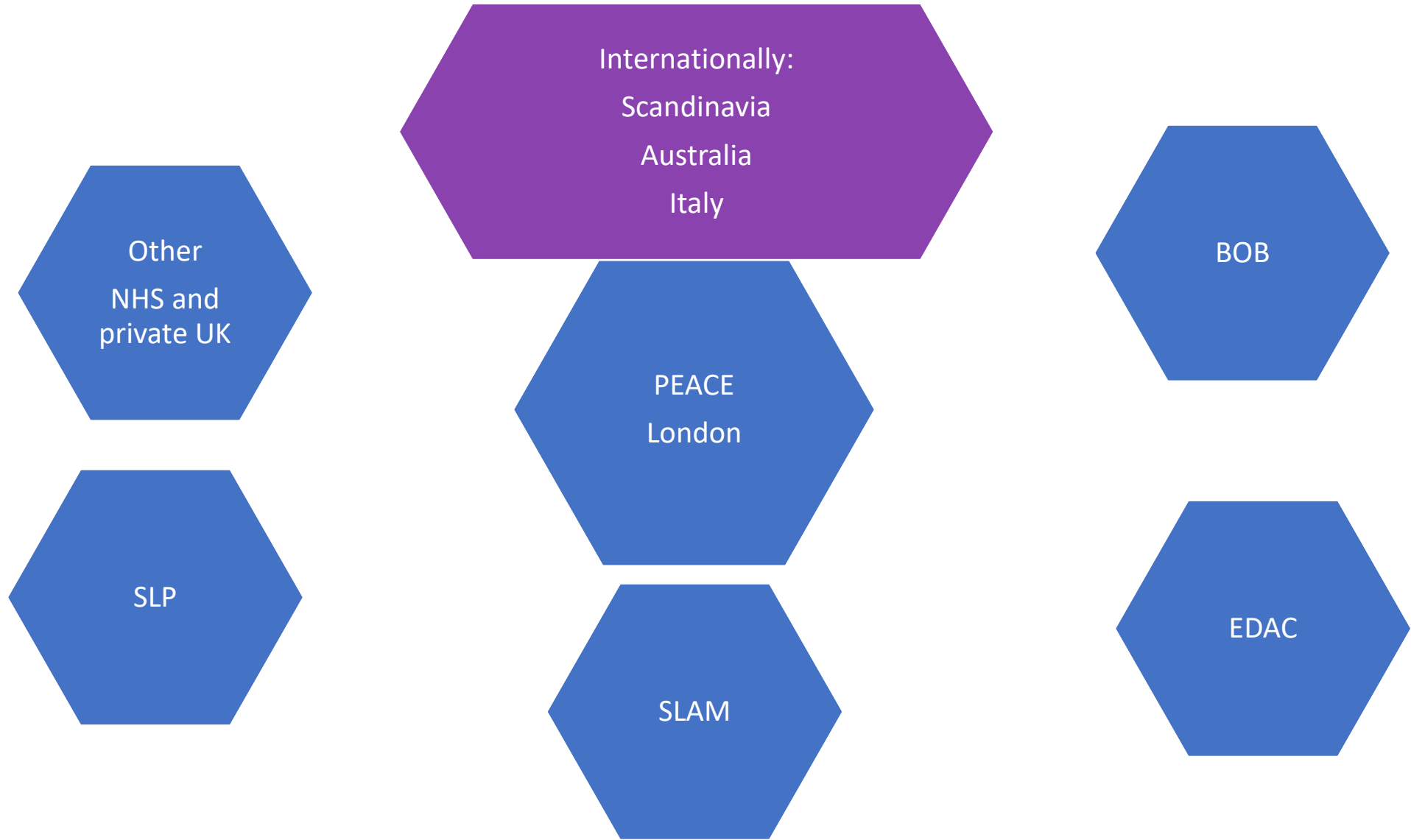
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How do we know PEACE was helpful?



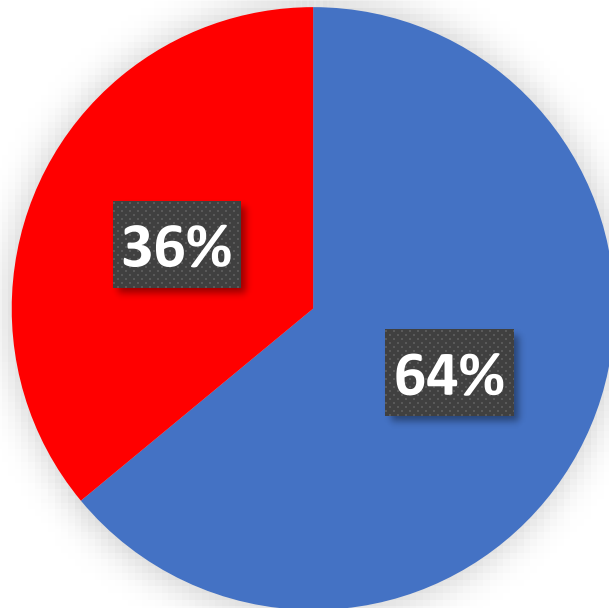
Scaling up PEACE



Clinical reality

Audit data from Maudsley

Clinical Audit Data in our own clinical service



Original Article



Characteristics of autism spectrum disorder in anorexia nervosa: A naturalistic study in an inpatient treatment programme

Kate Tchanturia^{1,2,3}, James Adamson², Jenni Leppanen¹ and Heather Westwood¹

Abstract

Previous research has demonstrated links between anorexia nervosa and autism spectrum disorder however, few studies have examined the possible impact of symptoms of autism spectrum disorder on clinical outcomes in anorexia nervosa. The aim of this study was to examine the association between symptoms of autism spectrum disorder and eating disorders, and other psychopathology during the course of inpatient treatment in individuals with anorexia nervosa. Participants with anorexia nervosa (n=171) completed questionnaires exploring eating disorder psychopathology, symptoms of depression and anxiety, and everyday functioning at both admission and discharge. Characteristics associated with autism spectrum disorder were assessed using the Autism Spectrum Quotient, short version. Autism spectrum disorder symptoms were significantly positively correlated with eating disorder psychopathology, work and social functioning, and symptoms of depression and anxiety, but not with body mass index. Autism Spectrum Quotient, short version scores remained relatively stable from admission to discharge but there was a small, significant reduction

Autism
1–8
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sagepub.co.uk/journalsPermissions.nav
DOI: 10.1177/1362361317722431
journals.sagepub.com/home/aut
SAGE

Approximately third of our patients with AN have autism or possible Autism

% Autism/ possible Autism



Huke V et al 2013 systematic review- 22% community based sample 24%
Swedish and UK studies (N=7)



Female autism phenotype

- Autism in females looks different – harder to identify
(Van Wijngaarden-Cremers, 2014)
Less repetitive and stereotyping behaviour
- Camouflaging
(Bargiela, Steward, & Mandy, 2016)
Especially high-functioning females
- Why is this an important question?
Lack of diagnoses /
wrong diagnoses may impact people



Anorexia Nervosa and Autism

Curr Psychiatry Rep (2017) 19: 41
DOI 10.1007/s11920-017-0791-9



EATING DISORDERS (S WONDERLICH AND JM LAVENDER, SECTION EDITORS)

Autism Spectrum Disorder in Anorexia Nervosa: An Updated Literature Review

Heather Westwood¹ · Kate Tchanturia^{1,2,3}

- Over-representation of Autism in AN
- Poorer treatment outcomes, higher illness severity, longer illness duration
- Need for treatment adaptations

Psychiatry Research 326 (2023) 115272



Contents lists available at ScienceDirect

Psychiatry Research

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



Analysis of symptom clusters amongst adults with anorexia nervosa: Key severity indicators

Zhuo Li^{a,1}, Jenni Leppanen^{c,1}, Jessica Webb^b, Philippa Croft^b, Sarah Byford^c,
Kate Tchanturia^{a,b,d,*}

^a King's College London, London, Department of Psychological Medicine, Institute of Psychiatry, Psychology, and Neuroscience, UK

^b National Eating Disorders Service, South London and Maudsley NHS Foundation Trust, London, UK

^c King's Health Economics, Health Service and Population Research Department, Institute of Psychiatry, Psychology & Neuroscience, King's College London, London, UK

^d Psychological Set Research and Correction Center, Tbilisi State Medical University, Tbilisi, Georgia

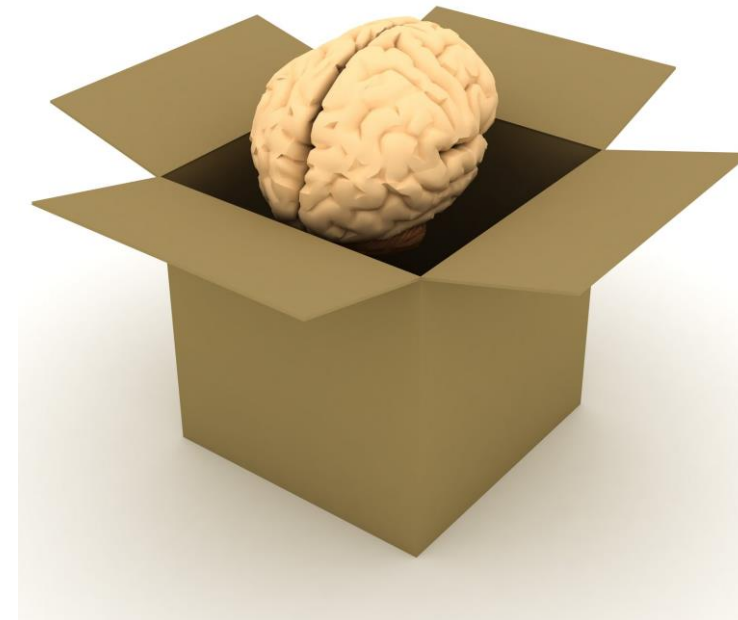
* Department of Neuroimaging, Institute of Psychiatry, Psychology, and Neuroscience, King's College London, UK

Research based evidence, clinical audit data, clinical observations

Thinking inside the box

SYMPTOM Management!

Thinking outside the box?



Before development of PEACE we did needs assessment!

Patients (AN/Autism) ✓



Carers ✓

Qualitative
interviews



Clinicians ✓

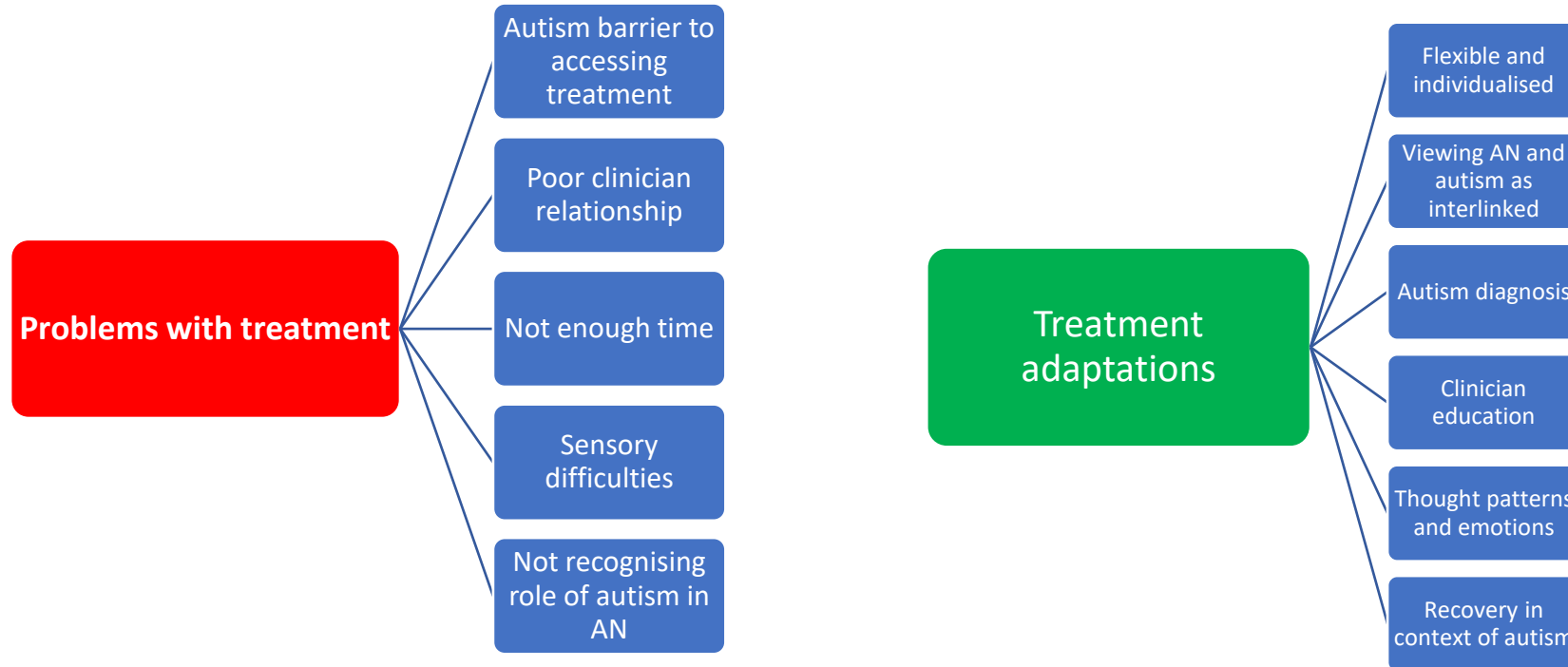
RESEARCH ARTICLE

Open Access

Clinicians' views on working with anorexia nervosa and autism spectrum disorder comorbidity: a qualitative study

Emma Kinnaird¹, Caroline Norton² and Kate Tchanturia^{1,2,3,4*}

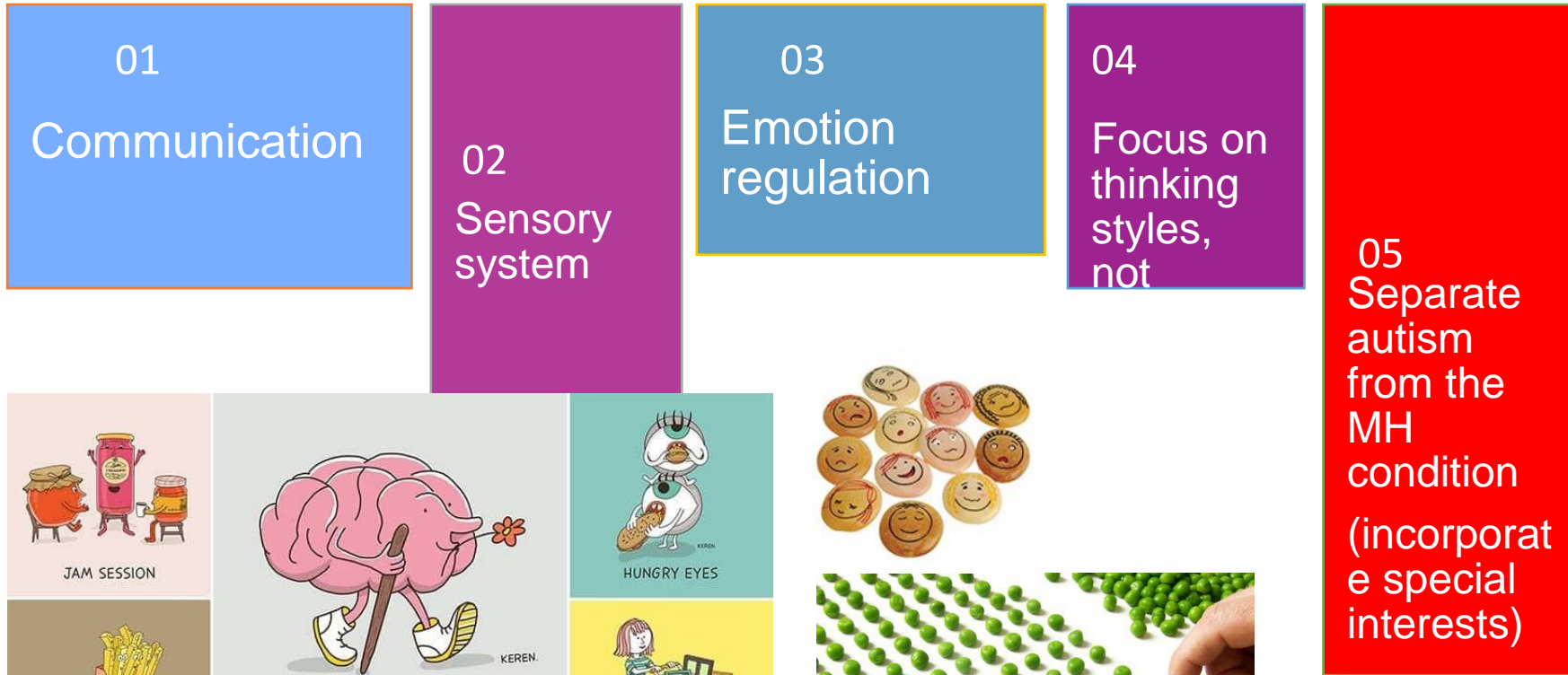
What do patients with co-occurring anorexia and autism want from the treatment?



Main Adaptations/Adjustments



“The combination of autism and starvation is like autism on steroids”



Recourse developments
Implementation

Sensory
Nutritional
Communication

What all stakeholders would like to improve

Table 1: Overlap with Patients, Staff & Carers

Patients	Staff	Carers
AN & ASD Interlinked	AN & ASD Interlinked	AN & ASD Interlinked
Sensory Difficulties	Sensory Difficulties	Sensory Difficulties
Not enough time / clinician rapport	Takes longer to build rapport	Takes longer to build rapport
Flexible and individualised treatment	Adaptions and specific modifications	Flexible and individualised approach
Difficulty getting diagnosis	No clear pathways for assessment	Difficulty getting diagnosis
Clinician education	Clinician education	Clinician education

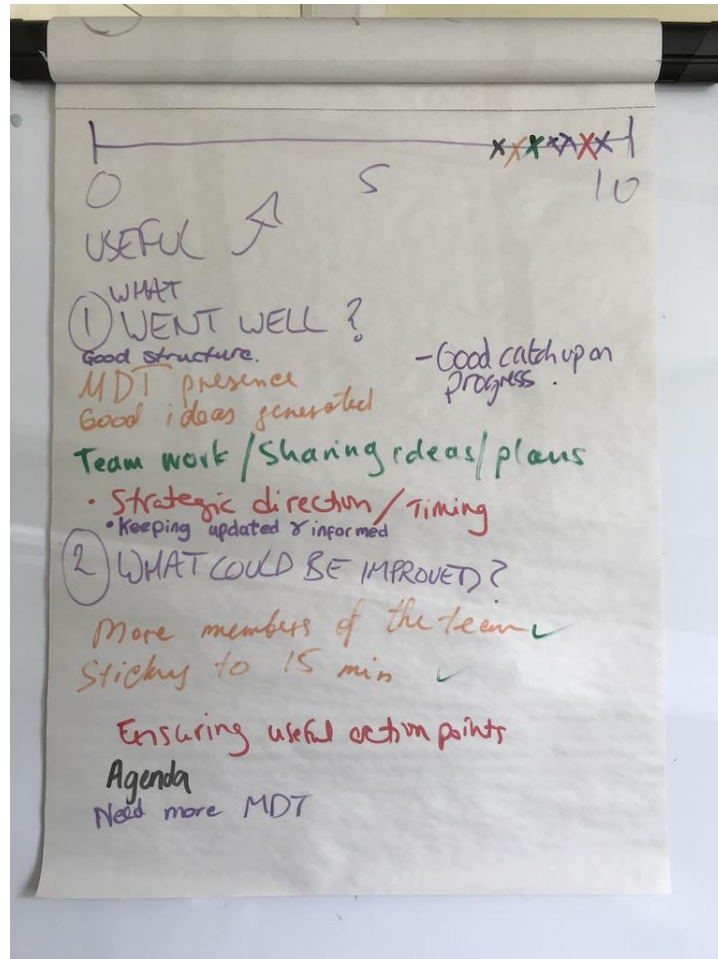
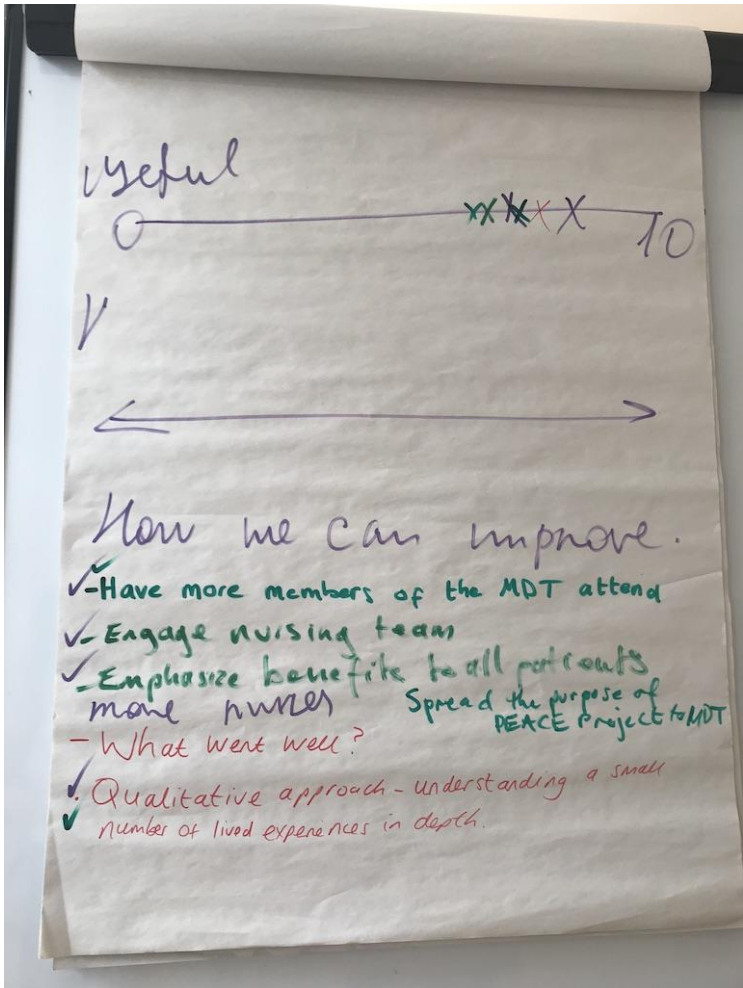
V

PEACE pathway implementation in the clinical work



- PEACE- gained momentum and it has really helped at bringing the MDT together”
- “I am now thinking about things I might not have thought about”
- “Extended huddles are very important”
- “Looking back at previous patients, I wish I had known then what I knew now”
- “I have now included questions around it in my standardised assessment”

Huddles short and frequent meetings the best way to implement changes in team culture!



Are Huddles the Missing PEACE of the Puzzle in Implementing Clinical Innovation for the Eating Disorder and Autism Comorbidity?

Katherine Amanda Smith¹ and Kate Tchanturia^{1,2,3*}

¹ Department of Psychological Medicine, King's College London, Institute of Psychiatry, Psychology and Neuroscience, London, United Kingdom, ² South London and Maudsley National Health Service (NHS) Foundation Trust, National Eating Disorder Service, London, United Kingdom, ³ Department of Psychology, Ilia State University, Tbilisi, Georgia

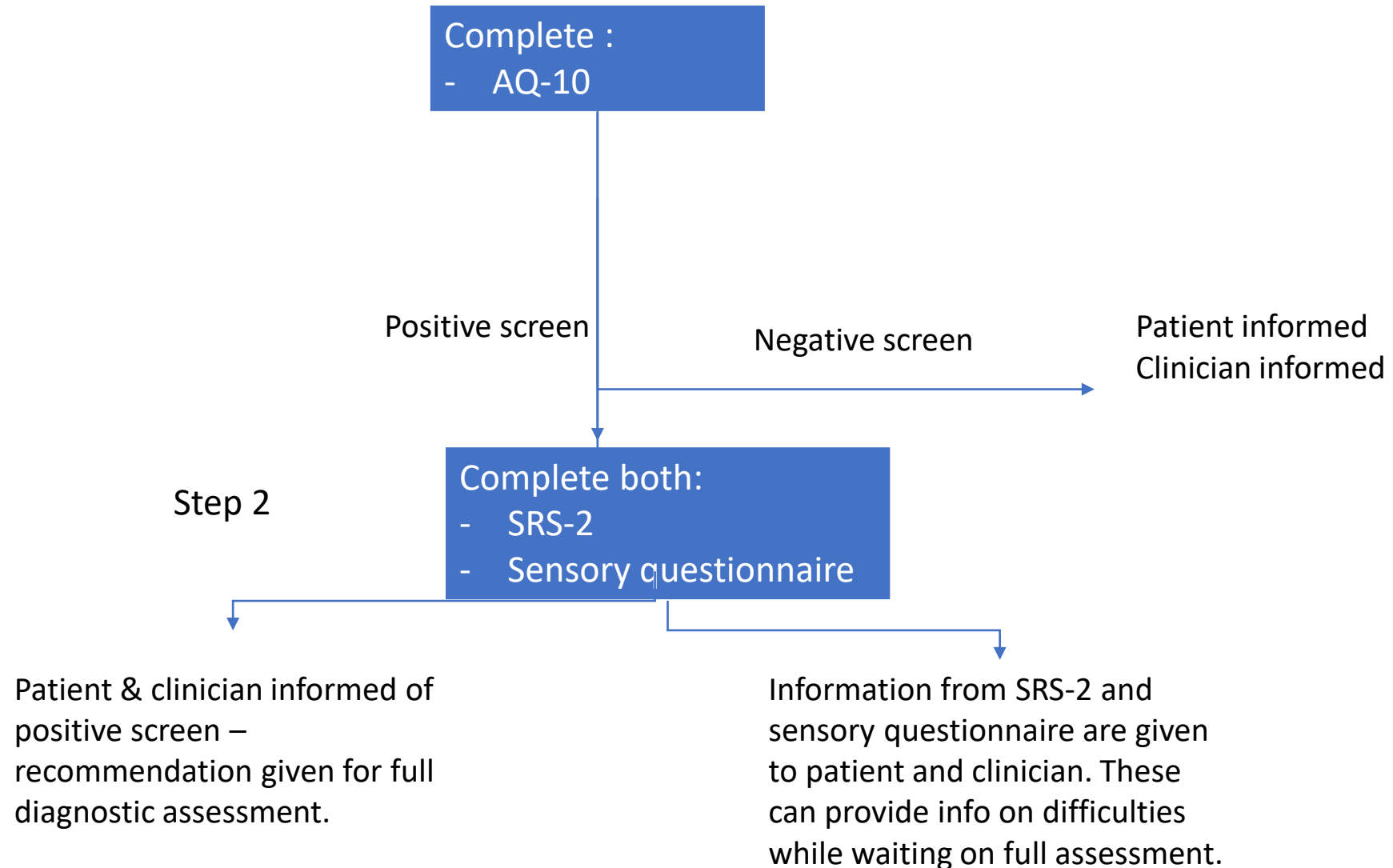
Assessment?

Does it matter formal diagnosis?

Do we have recourse?

Is there pragmatic solution?

How it is possible to manage autism assessment/audit within specialist services?



The ED service audit: AQ10

- Within the first two weeks of admission, patients are asked to fill in an audit pack. They are then asked to complete the same measures on discharge so we can compare scores.
- Feedback from these comparisons (pre/post treatment) demonstrate how well individuals responded to their treatment here
- Several different psychological measures including...
- The AQ-10: 10 questions, scores of 6+ indicate high autistic traits

A quick referral guide for adults with suspected autism who do not have a learning disability.

Please tick one option per question only:

		Definitely Agree	Slightly Agree	Slightly Disagree	Definitely Disagree
--	--	------------------	----------------	-------------------	---------------------

1	I often notice small sounds when others do not				
2	I usually concentrate more on the whole picture, rather than the small details				
3	I find it easy to do more than one thing at once				
4	If there is an interruption, I can switch back to what I was doing very quickly				
5	I find it easy to 'read between the lines' when someone is talking to me				
6	I know how to tell if someone listening to me is getting bored				
7	When I'm reading a story I find it difficult to work out the characters' intentions				
8	I like to collect information about categories of things (e.g. types of car, types of bird, types of train, types of plant etc)				
9	I find it easy to work out what someone is thinking or feeling just by looking at their face				
10	I find it difficult to work out people's intentions				

SCORING: Only 1 point can be scored for each question. Score 1 point for Definitely or Slightly Agree on each of items 1, 7, 8, and 10. Score 1 point for Definitely or Slightly Disagree on each of items 2, 3, 4, 5, 6, and 9. If the individual scores **more than 6 out of 10**, consider referring them for a specialist diagnostic assessment.

This test is recommended in 'Autism: recognition, referral, diagnosis and management of adults on the autism spectrum' (NICE clinical guideline CG142). www.nice.org.uk/CG142

Key reference: Allison C, Auyeung B, and Baron-Cohen S, (2012) *Journal of the American Academy of Child and Adolescent Psychiatry* 51(2):202-12.

Social Responsiveness Scale, 2nd edition (SRS-2; Constantino, 2012)

- 65-item screening questionnaire assessing symptoms associated with autism.
- The SRS-2 identifies social difficulties associated with autism and quantifies its severity.
- Although the SRS should **not** be used in isolation for autism screening or diagnosis, the subscale scores may be useful for designing and evaluating eating disorder treatment.
- Recommended by NICE guidelines

	1 = NOT TRUE	2 = SOMETIMES TRUE	3 = OFTEN TRUE	4 = ALMOST ALWAYS TRUE
1. I am much more uncomfortable in social situations than when I am by myself.	1	2	3	4
2. My facial expressions send the wrong message to others about how I actually feel.	1	2	3	4
3. I feel self-confident when interacting with others.	1	2	3	4
4. When under stress, I engage in rigid or inflexible patterns of behavior that seem odd to people.	1	2	3	4
5. I do not recognize when others are trying to take advantage of me.	1	2	3	4
6. I would rather be alone than with others.	1	2	3	4
7. I am usually aware of how others are feeling.	1	2	3	4
8. I behave in ways that seem strange or bizarre to others.	1	2	3	4
9. I am overly dependent on others for help with meeting my everyday needs.	1	2	3	4
10. I take things too literally, and because of that, I misinterpret the intended meaning of parts of a conversation.	1	2	3	4
11. I have good self-confidence.	1	2	3	4
12. I am able to communicate my feelings to others.	1	2	3	4
13. I am awkward in turn-taking interactions with others (for example, I have a hard time keeping up with the give-and-take of a conversation).	1	2	3	4
14. I am not well coordinated.	1	2	3	4
15. When people change their tone or facial expression, I usually pick up on that and understand what it means.	1	2	3	4
16. I avoid eye contact or am told that I have unusual eye contact.	1	2	3	4
17. I recognize when something is unfair.	1	2	3	4
18. I have difficulty making friends, even when trying my best.	1	2	3	4
19. I get frustrated trying to get ideas across in conversations.	1	2	3	4
20. I have sensory interests that others find unusual (for example, smelling or looking at things in a special way).	1	2	3	4
21. I am able to imitate others' actions and expressions when it is socially appropriate to do so.	1	2	3	4
22. I interact appropriately with other adults.	1	2	3	4

What all stakeholders would like to improve:

Table 1: Overlap with Patients, Staff & Carers

Patients	Staff	Carers
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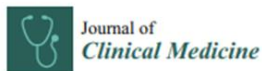
Sensory Screening

Based on stakeholder interviews suggesting identifying sensory differences could benefit both autistic patients and their clinicians in adapting treatment.

We have found that patients with high autistic traits rate themselves as more hypersensitive.

Patient Feedback:

"It can be very helpful to discover what a particular person likes or dislikes and will help to create an environment comfortable for people who suffer from eating disorders especially during meals."



Article

Pragmatic Sensory Screening in Anorexia Nervosa and Associations with Autistic Traits

Emma Kinnaird ¹, Yasemin Dandil ^{1,2}, Zhuo Li ¹, Katherine Smith ¹, Caroline Pimblett ², Rafiu Agbalaya ², Catherine Stewart ³ and Kate Tchanturia ^{1,2,4,*}

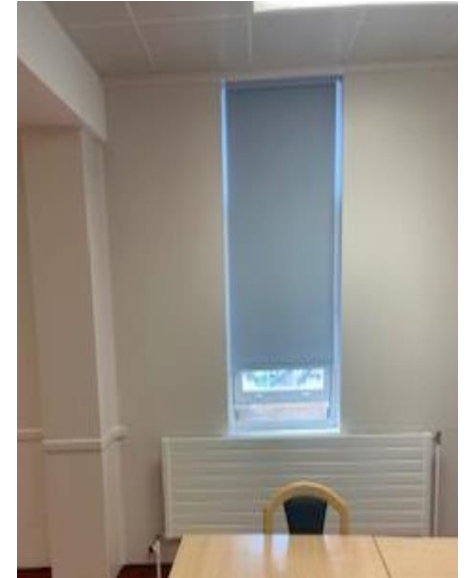


Environmental Adaptations

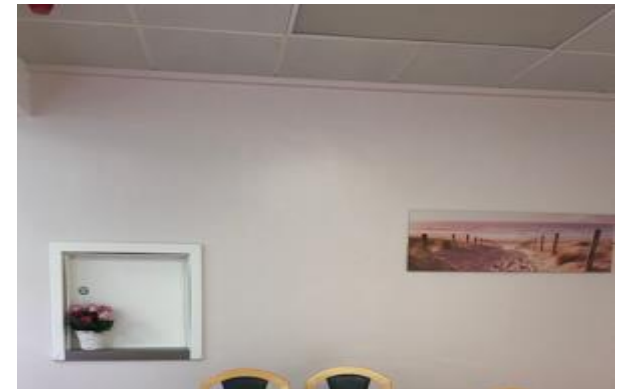
Little things can make a big difference



"Go easy on the walls"
- Patient Feedback



"I really like the changes the PEACE team made to the dining room as it **looks and feels so much more like a calmer environment**"
- Patient MW



Example from the dietician working on PEACE pathway

She told me of some of her sensitivities around food:

Texture "the biggest" - cannot tolerate soft, mushy and "blobby" foods, such as porridge, mash, particularly any soft foods with a mix of textures, such as quiche. She has "flash backs" about being asked to eat quiche.

Smell - she recoils from the smell of food, both hot and cold foods

Taste - prefers less highly flavoured foods but thinks this less important than the above
Brands - she prefers branded food (ketchup etc), her sisters think she should be more concerned about the costs



Sensory workshops can be developed more:

Self-soothing strategies we add more to learn to live sensorially!

Collaboration with human robotics and King's College Engineering department



Article

Introducing a Smart Toy in Eating Disorder Treatment: A Pilot Study

Dimitri Chubinidze ^{1,2}, Zhuo Li ¹, Petr Slovak ³, Julian Baudinet ^{1,4}, Emmanuelle Dufour ² and Kate Tchanturia ^{1,2,5,*}

¹ Department of Psychological Medicine, Institute of Psychiatry, Psychology and Neuroscience (IoPPN), King's College London, London SE5 8AF, UK; dimitri.chubinidze@kcl.ac.uk (D.C.); zhuo.li@kcl.ac.uk (Z.L.); julian.baudinet@kcl.ac.uk (J.B.)

² National Eating Disorders Service, South London and Maudsley NHS Foundation Trust, London SE5 8AZ, UK; emmanuelle.dufour@slam.nhs.uk

³ Department of Informatics, King's College London, London WC2B 4BG, UK; petr.slovak@kcl.ac.uk

⁴ Maudsley Centre for Child and Adolescent Eating Disorders (MCCAED), Maudsley Hospital, London SE5 8AZ, UK

⁵ Department of Psychology, Ilia State University, Tbilisi 0162, Georgia

* Correspondence: kate.tchanturia@kcl.ac.uk; Tel.: +44-077-0804-6640

Take Home Message

Understanding, recognising and adapting around sensory differences is beneficial for both autistic people with EDs, and EDs only

We find sensory passports helpful!

Communication difficulties

Adaptations

Communication passport

- Prefer written information?
- Visual aids?

Adapt communication

- Use direct language.
- Leave time for the person to answer
- Offer options or choices where possible
- Use visual support
- Break things down



My Communication Passport

HELLO
MY NAME IS

How I would like you to communicate with me:

What support do I need communicating in group settings:

Sensory needs: (e.g. my sensitivity to light, sound, touch, texture, taste, or smell and how you can support me):

My special interests and strengths are:

Other things you should know about me:

My dislikes and things that I struggle with, and how you can support me:

Main message that I would like you to know:

You can support me by:

KINGS London The Health Foundation NHS South London and Maudsley Hospital Backling District Mental Health Trust

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Some of the resources we have developed for autistic patients

Communication Passport

My Communication Passport

HELLO MY NAME IS

How I would like you to communicate with me:

Sensory needs:

My special interests and strengths are:

Other things you should know about me:

My dislikes and things that I struggle with and how you can support me:

Adult message that I would like you to know:

You can support me by:

Sensory Wellbeing

Sensory Wellbeing

There are important to me

My sensory needs in relation to vision are:

I can enhance my sensory wellbeing in relation to vision by:

My sensory needs in relation to hearing are:

I can enhance my sensory wellbeing in relation to hearing by:

My sensory needs in relation to smell are:

I can enhance my sensory wellbeing in relation to smell by:

My sensory needs in relation to taste are:

I can enhance my sensory wellbeing in relation to taste by:

My sensory needs in relation to touch are:

I can enhance my sensory wellbeing in relation to touch by:

My sensory needs in relation to texture are:

I can enhance my sensory wellbeing in relation to texture by:

Collaborative Formulation



Wellbeing During COVID-19

Wellbeing During COVID-19

Questions you can help me think about during COVID-19

How can you best be touch with friends and family of the moment (e.g. WhatsApp, Facebook)?

Write down your answer to the question:

What is your current environment like at home (or your school)?

Write down your answer to the question:

How can you think of something you can do to improve your environment?

Write down your answer to the question:

What makes you feel lonely?

Write down your answer to the question:

What can someone else do to help?

Write down your answer to the question:

What have you enjoyed doing lately?

Write down your answer to the question:

Wellness Recovery Action Plan

My Wellness Recovery Action Plan (WRAP)

These are important to me

When I am well:

What am I like when I can well? When I am well I...:

This is what I need to do for myself everyday to keep myself well:

These are the things I know I need to do to sustain my wellbeing. You can also support me by:

Triggers:

Triggers are things that happen to us that are likely to set off a chain reaction of uncomfortable or unhappy behaviours, thoughts or feelings?

What can I do to avoid or limit my exposure to things that trigger me?

What can I do to cope with my triggers when they occur? You can also support me by:

Early Warning Signs:

Early warning signs are the subtle signs of changes in our thoughts, feelings or behavior, which indicates that I may early warning signs are:

These are the actions I can take when I recognize the early warning signs:

You can support me when I show early warning signs by:

Reducing Signs of a Potential Crisis:

Think about the things that can help to reduce your symptoms. These things might also help keep you from taking things that have got worse for you?

What will help me to reduce my signs & symptoms when they have progressed to this point?

This is who will support me during my recovery and staying well:

You can support me by:

Wellbeing Communication Passport

My Wellbeing Communication Passport

PEACE Pathway for Eating Disorders and Autism Developmental Clinical Experiences

HELLO MY NAME IS

You need to know this about me:

These are important to me:

My preferences (likes and dislikes):

People who care for my wellbeing this communication passport has important information about me. Please make sure you read the before you help me.

This communication passport needs to stay with me but please take a copy for my file.

Positive Behaviour Support Plan

My Positive Behaviour Support (PBS) plan

A PBS Plan is an individualised care plan to identify and understand behaviours that may be challenging and then identify strategies to avoid and deal with the difficult situation.

My difficult situation:

(For example, an event or situation that increases me to be at my limit and find it harder to cope, such as loud noise or a loud experience)

My challenging behaviour usually has a function and it is to:

(For example, I am frustrated and overwhelmed that I cannot do something and it is too complicated for me, I might raise my voice as a way to be removed from the situation)

Behaviours I might display:

Early warning signs: (For example, eye poking, not speaking or moaning)

If early warning signs are not noticed I might: (For example, my voice will get louder)

What can I do to avoid this difficult situation:

(For example, early communication and requests, have time out, certain environments avoided, interaction plans)

What you can do to support me - Positive support strategies:

When I am showing early warning signs (For example, ask me what is wrong or distract me by...)

If the situation has escalated (For example, talk in a calm voice, give me space but keep me safe)

Afterwards: (For example, encourage me to only my needs)

My Sensory, Cognitive & Social World



Keeping your routine During Covid-19

Keeping Your Routine During COVID-19

It can be difficult to adjust when you are asked to stay at home and your whole routine varies. It might make it harder for you to go through your day and complete everyday tasks that you did not struggle with before. This is completely understandable, many of us are struggling with this right now.

Sleep

- Try and keep the time you wake up and the time you go to sleep the same each day, with an optimal time for energy levels being 7-8 hours, depending on the individual.
- If you are struggling to fall asleep at night, you might want to have a look at your sleeping habits. These are the habits we have around bedtime which may impact our sleep. Some tips on how you might want to improve your sleeping habits:
 - Avoid stimulants before bed, like working or using computer devices
 - Try a warm, decaffeinated drink before bed such as chamomile tea
 - Read a book before bed or do an activity that calms you and takes your mind like writing a journal
 - Try and only go to bed when you are feeling sleepy
 - If you are working from home during this time, try not to work in your bedroom if possible so that you do not associate your bed with work

Self-Care

- Creating a new 'at home' (metable can be helpful (template on page 2))
- Looking after your health
 - Set alarms/reminders on your phone for things that might not be part of other members of your household's routine such as medication and snacks
 - If you have specific food preferences, then limited items available at the supermarkets may be very challenging and anxiety provoking. Get what you can and try to remember that this will pass.
 - Schedule in some gentle exercise for 20 minutes a day such as a walk or gentle yoga/stretching
 - Practice mindfulness, if you find this difficult apps like Headspace can be helpful.
- Schedule in doing things you enjoy
 - Make it something arts, a quiz, a book, a TV show, a puzzle, listening to your favourite band, a warm bath or petting your rabbit
 - Take the time to list three things each day that you are grateful for and incorporate this into your 'at home' routine

Stay Connected!

- It is natural to feel lonely during this time when it's hard to see people. Here are some creative ideas for staying connected:
 - Video call friends and family
 - Play online games with people you know
 - Write letters or thank you cards to healthcare workers or others
 - Start a book club or join an online one

Lapse and Relapse Prevention Plan

My Lapse and Relapse Prevention Plan

These are important to me

When we put a new plan into action, we may sometimes have setbacks, and that's okay. A lapse is a brief return to previous unhelpful thoughts or behaviours. A relapse is a more prolonged setback to previous unhelpful thoughts or behaviours. The crucial thing is that we try to learn from each lapse or relapse, so we are in a stronger position next time.

Prevention

Identify your high-risk situations that may lead to a setback!

Other times I am likely to be vulnerable and will need to take more care:

What can I do to prevent a setback?

In case of a setback...

Understandably, I had a setback because:

What I learnt from the setback and what I would do differently is:

Coping skills, I can use (for example, engaging in activities I enjoy or speaking to a loved one):

Identify your emergency contacts

In an emergency I would call:

Who would I like to call me:

Make a list of people who can give you support in times of need:

Establish your action plan in case of an emergency:



Prof Kate Tchanturia
Consultant Clinical Psychologist
Principal Investigator



Katherine Smith
Former Project Manager



Yasemin Dandil
Former Project Manager



Dr Emma Kinnaird
PhD Student / PEACE
Researcher



Zhuo Jo Li
PhD Student / PEACE
Researcher



Nike Oyeleye
Assistant Psychologist
(Inpatient)



Anna Carr
Assistant Psychologist
(Step-up)

We have a great multidisciplinary team
making team work-dream work



Dr Claire Baillie
Senior Counselling
Psychologist



Dr Amy Harrison
Clinical Psychologist and
Specialist Family Worker



Caroline Pimblett
Dietician



Kate Williams
PEACE Dietetic Advisor



Isis McLachlan
Occupational Therapist



Jake Copp-Thomas
Occupational Therapist



Cindy Toloza
Assistant Psychologist
(Day Care)



Brandon Southcott
Staff Nurse

Thank you



Kate.Tchanturia@kcl.ac.uk

www.peacepathway.org



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References

(Selected references. For more see www.peacepathway.com):

- Tchanturia, K., Adamson, J., Leppanen, J., & Westwood, H. (2019). Characteristics of autism spectrum disorder in anorexia nervosa: A naturalistic study in an inpatient treatment programme. *Autism : the international journal of research and practice*, 23(1), 123–130. <https://doi.org/10.1177/1362361317722431>
- Saure, E., Laasonen, M., Lepistö-Paisley, T., Mikkola, K., Ålgars, M., & Raevuori, A. (2020). Characteristics of autism spectrum disorders are associated with longer duration of anorexia nervosa: A systematic review and meta-analysis. *The International journal of eating disorders*, 53(7), 1056–1079. <https://doi.org/10.1002/eat.23259>
- Westwood, H., Mandy, W., & Tchanturia, K. (2017). Clinical evaluation of autistic symptoms in women with anorexia nervosa. *Molecular Autism*, 8, 1-9.
- Kerr-Gaffney, J, Harrison, A, Tchanturia, K. The social responsiveness scale is an efficient screening tool for autism spectrum disorder traits in adults with anorexia nervosa. *Eur Eat Disorders Rev.* 2020; 28: 433-444. <https://doi.org/10.1002/erv.2736>
- Li, Z., Hutchings-Hay, C., Byford, S., & Tchanturia, K. (2022). How to support adults with anorexia nervosa and autism: Qualitative study of clinical pathway case series. *Frontiers in psychiatry*, 13, 1016287. <https://doi.org/10.3389/fpsyt.2022.1016287>
- NAS good practice guide: <https://s2.chorus-mk.thirdlight.com/file/24/asDKIN9as.klK7easFDsalAzTC/NAS-Good-Practice-Guide-A4.pdf>