

Pain in autism: sensation, feeling and behaviours, what might differ?

Dr David Moore

Liverpool John Moores University

Somatosensory and Affective Neuroscience Research Group

What is autism?

DIAGNOSTIC AND STATISTICAL
MANUAL OF
MENTAL DISORDERS

FIFTH EDITION

DSM-5

AMERICAN PSYCHIATRIC ASSOCIATION



Social co
interac



Rest
pat



Sensory disturbances

What is pain?

- ‘An unpleasant sensory and emotional experience associated with actual or potential tissue damage, **or described in terms of such damage.**’

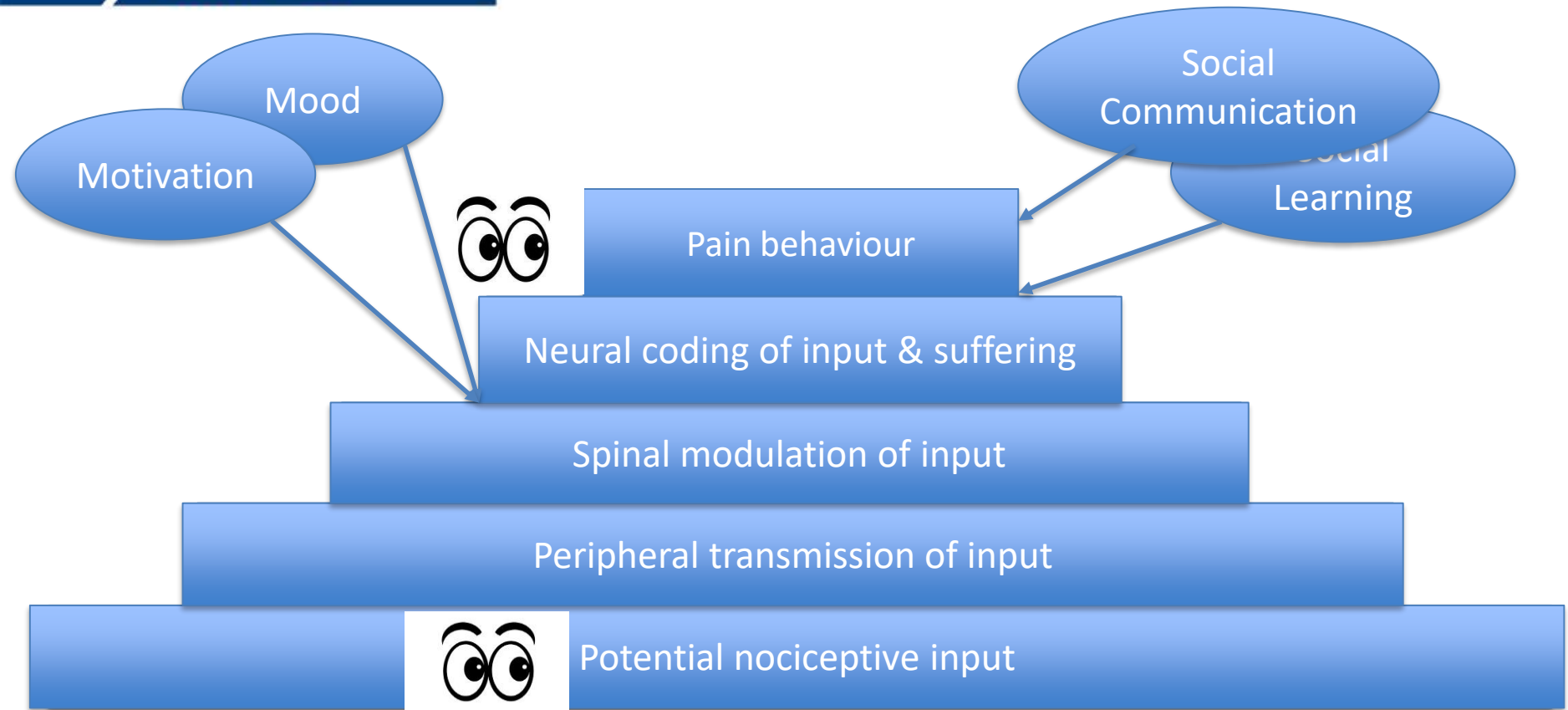
Updated definition

- Pain is a distressing experience associated with actual or potential tissue damage with sensory, emotional, cognitive, and social components

Why do we have pain?

- Pain is functional
 - It promotes behavioural analgesia
 - Which protects us from sustained tissue damage
 - Promotes healing
 - Teaches us about dangers in the world
- Without pain
 - Increased tissue damage
 - Reduced environmental learning

Where can we see pain?



*Based on Loeser (1980)

Why study pain in ASD



Pain in ASD

- What is the evidence here?



Review Article

Acute pain experience in individuals with autism spectrum disorders: A review

David J Moore

Autism

1–13

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Categories of study

Case Study

Self/other report

Observation

Experimental

Case studies

- Kanner (1943) and Asperger (1944) altered sensory processing
- Mahler (1952) cigarette lighter
- Rothenberg (1960) 'The rebirth of Jonny'
- Wing (1976, 1996) 'Sally' played in snow without clothes
- Gillberg and Coleman (2000) Child placed hand on stove
- Bursch et al. (2004) insensitivity might be for some pain and not others

Self/other report

- Approximately 25% of children show signs of unresponsiveness to pain (Kolvin, 1971)
- Self report of pain suggests reduced pain experience (Minschew & Hobson 2008).
 - Bandstra et al. (2012) failed to support this.
- Also found in report of parents (Militeri et al. 2000; Klintwall et al. 2011)

Objective observation

- Observations of medical procedures suggest a range of responses:
 - Greater FACS activity (Nader et al. 2004)
 - Elevated heart rate and plasma β -endorphin levels (Tordjman et al. 2009)
 - Slower recovery (Rattaz et al. 2013)

Induced pain models

Lower thermal threshold (Cascio et al. 2008)

– Though see Duerdan et al, (2015)

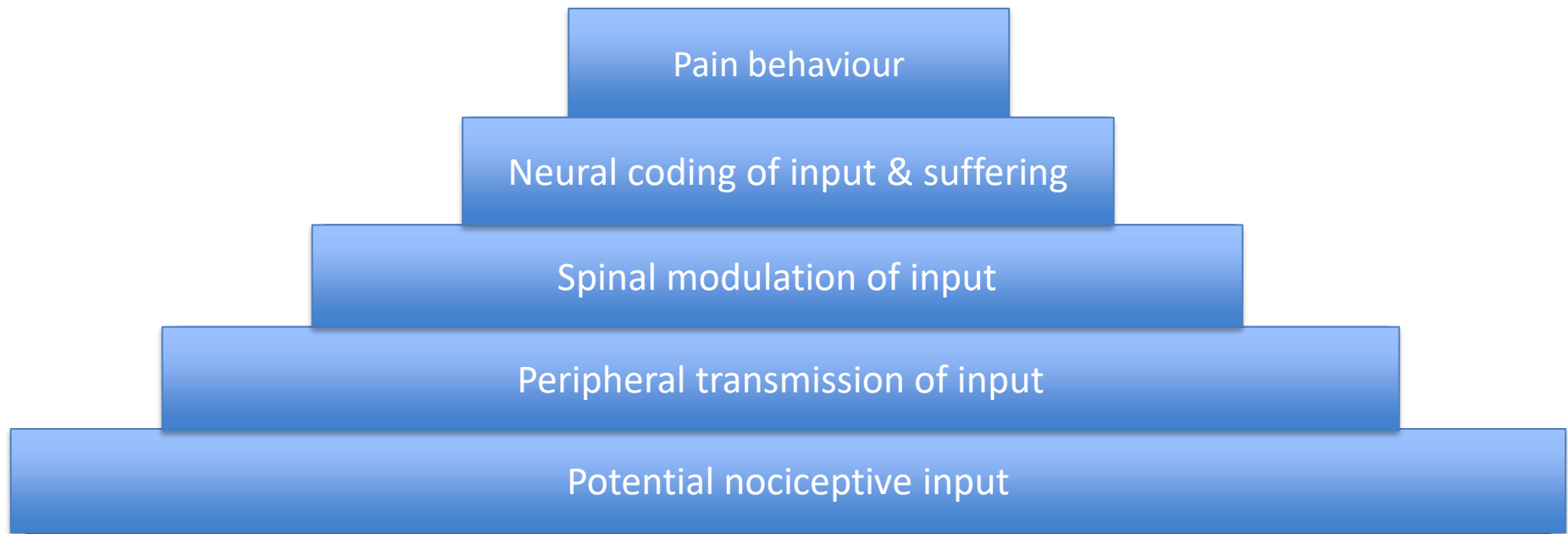


Greater pressure sensitivity (Fan et al. 2013)

No differences in electrical thresholds Bird et al. (2010).



Where can we see pain?



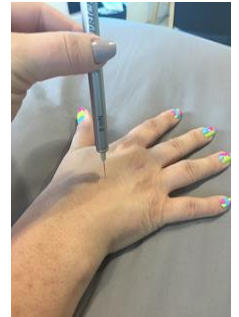
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Rationale for research

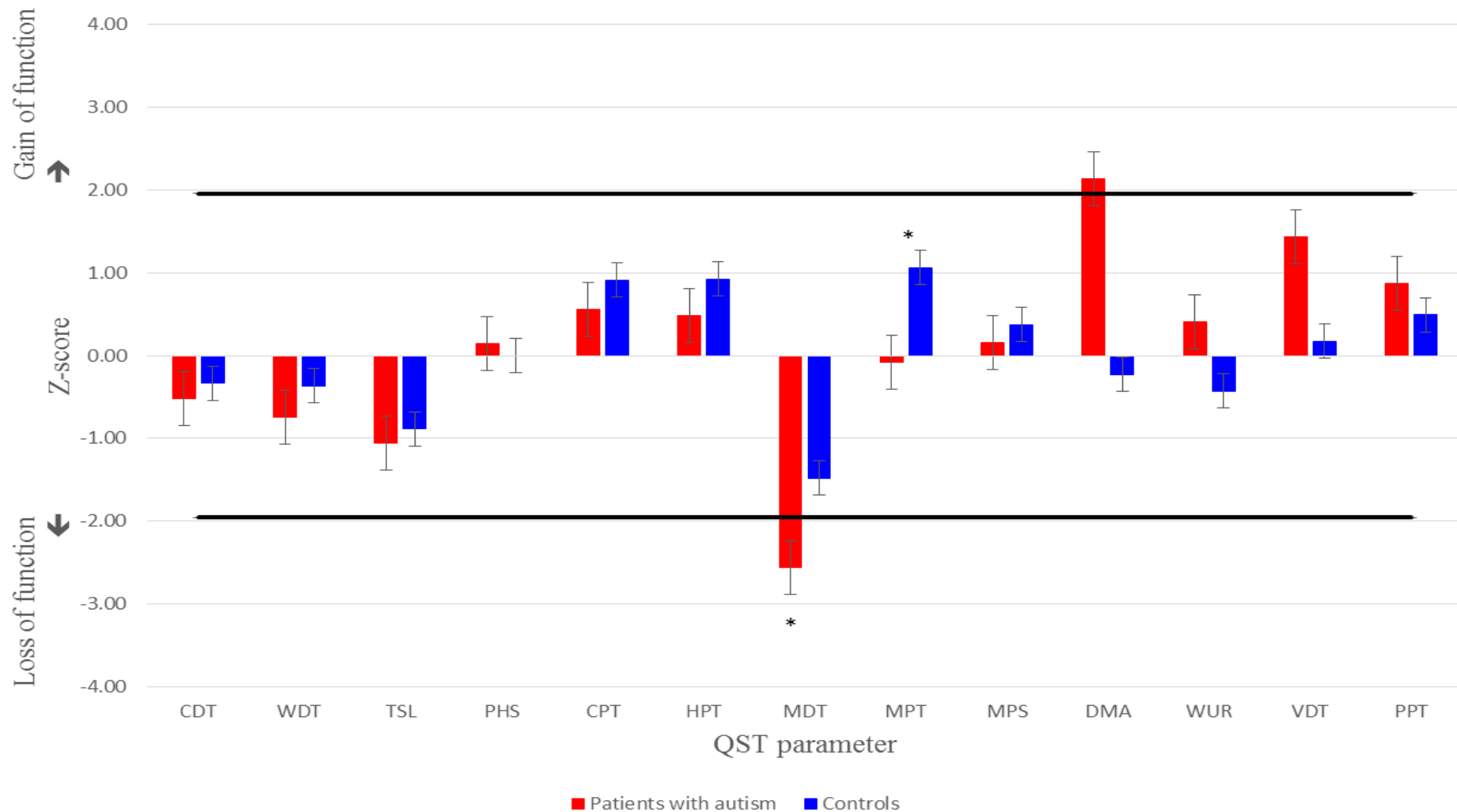
- Builds on the limited evidence of differences in pain sensitivity on psychophysically sound tests.
- The systematic use of a battery tests which differently activate fibers will help to characterize sensory alterations in ASD
- The use of tests which include published norms facilitates the examination of individual somatosensory profiles

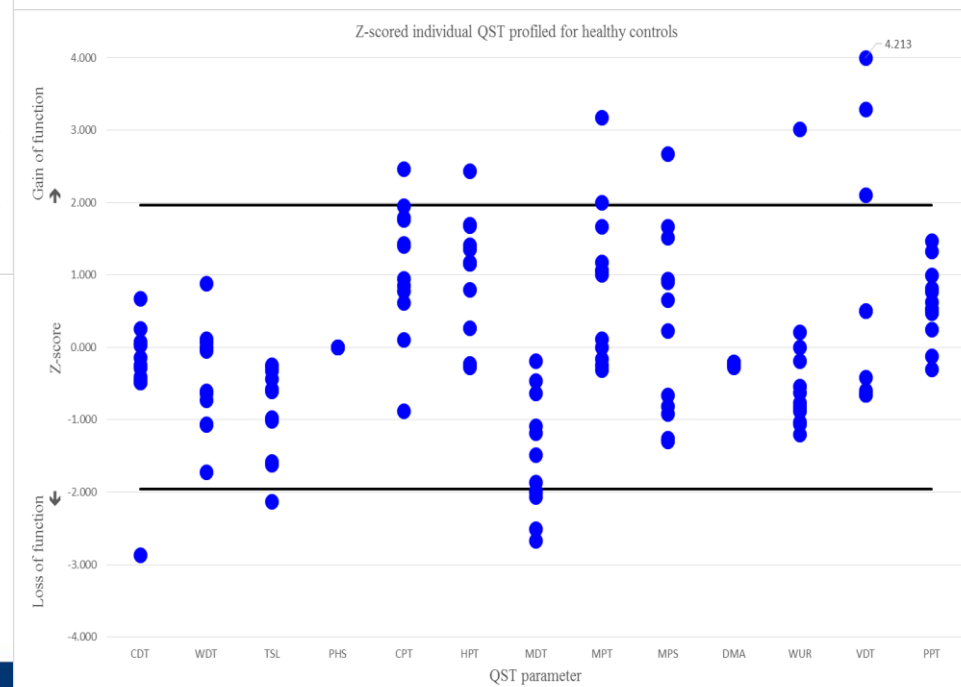
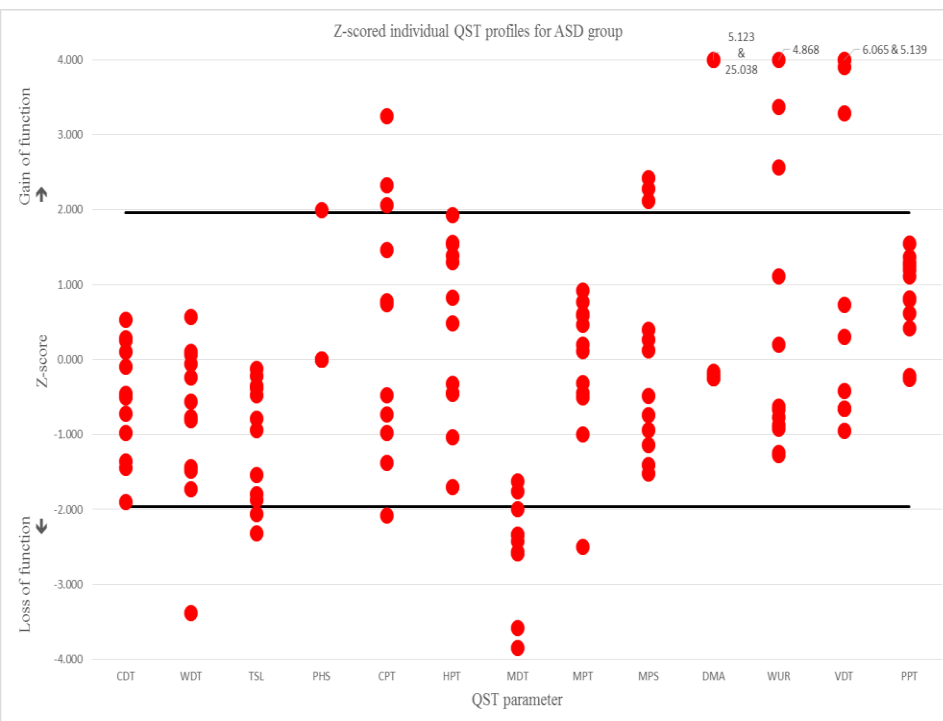
Methods

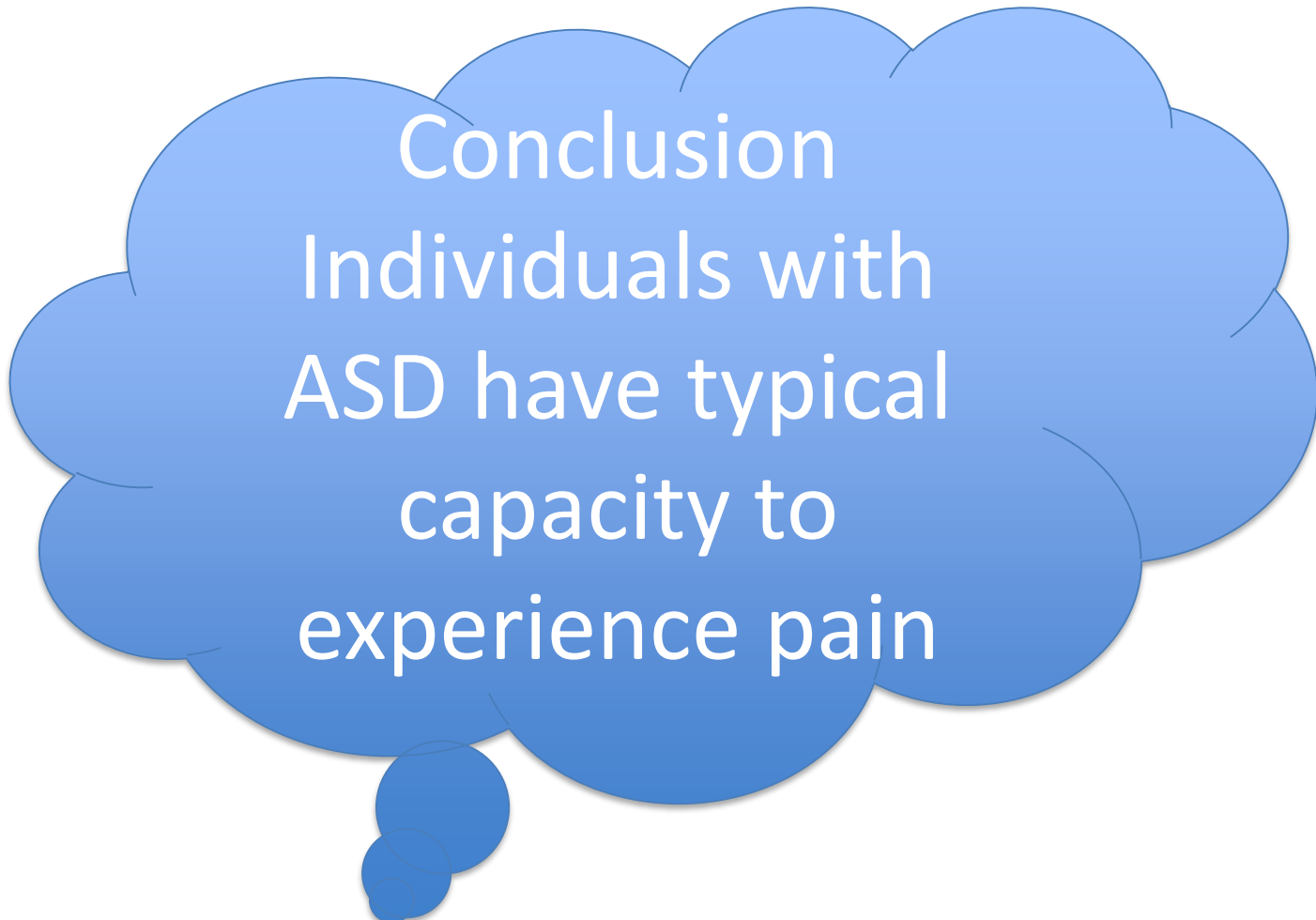
- Thermal detection and pain
- Mechanical Detection
- Mechanical Pain
- Vibration
- Pressure Pain



Group Z-scores for QST parameters

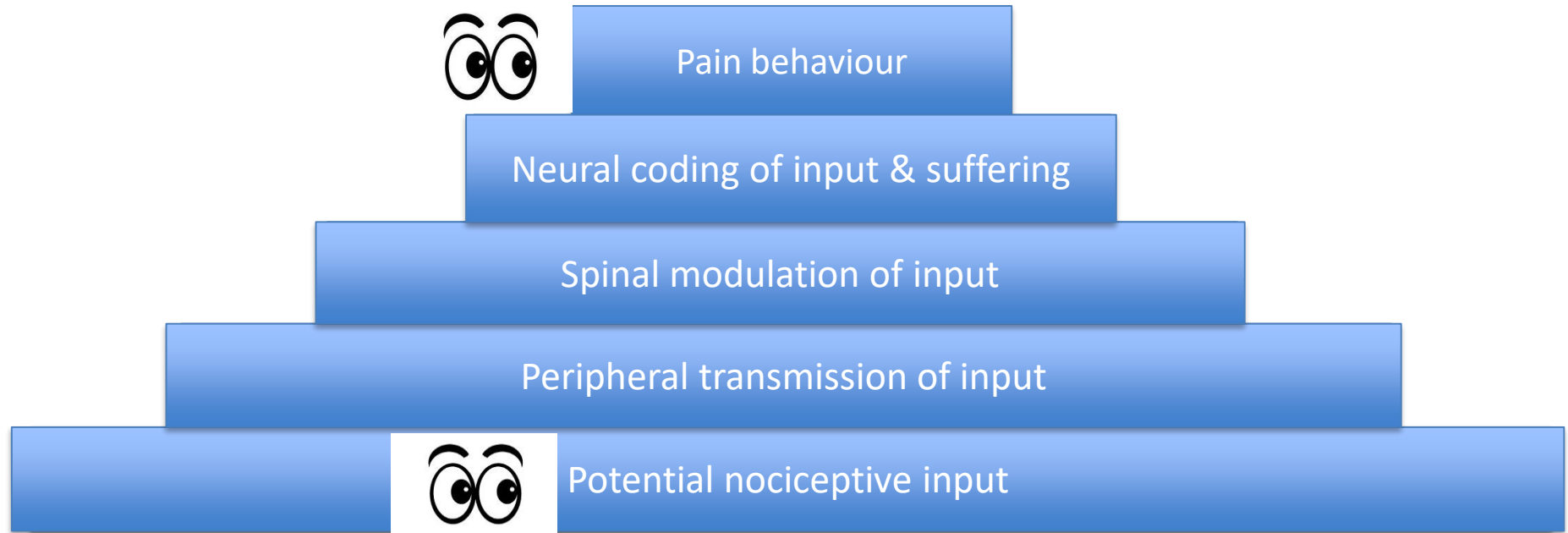






Conclusion
Individuals with
ASD have typical
capacity to
experience pain

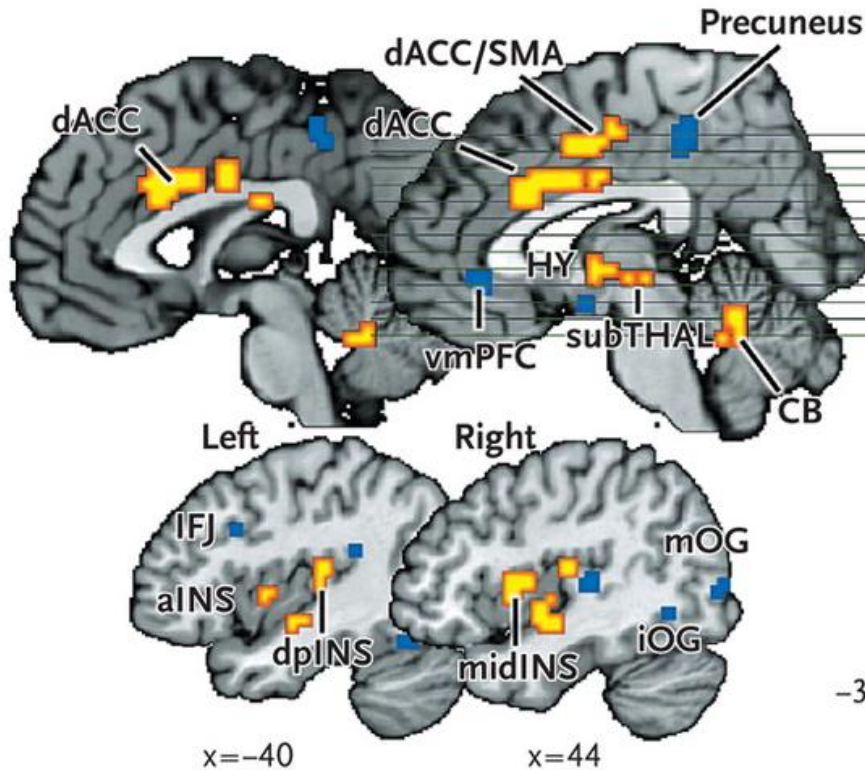
Where can we see pain?



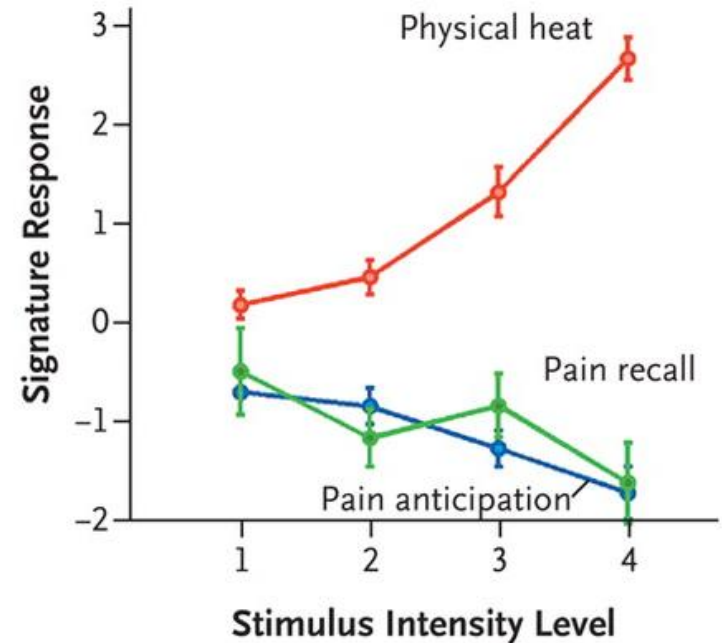
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Pain processing: fMRI Neural Pain Signature

A Pain-Predictive Signature Pattern



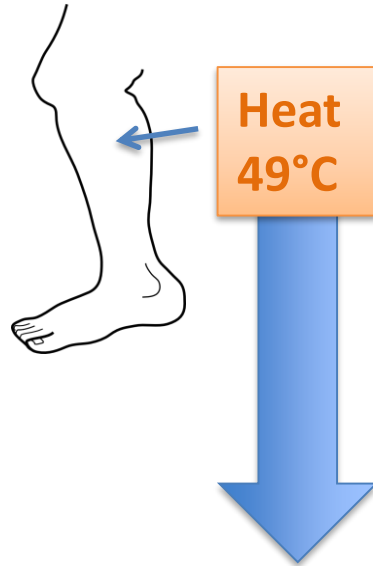
C Pain vs. Other Affective Events



(Wager NEJM 2013)

Neural Responses to Heat Pain in ASD

Experimental Paradigm



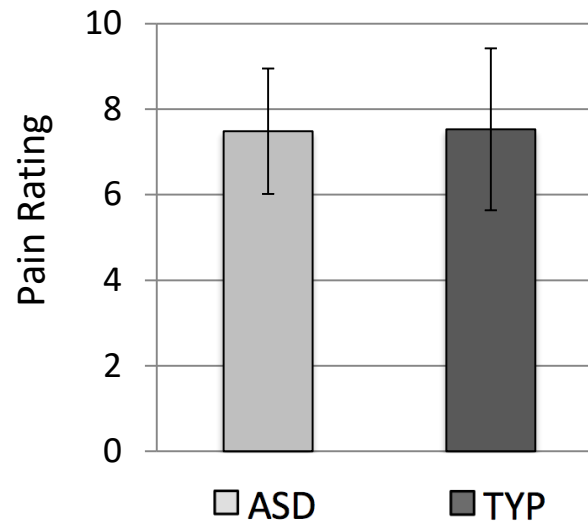
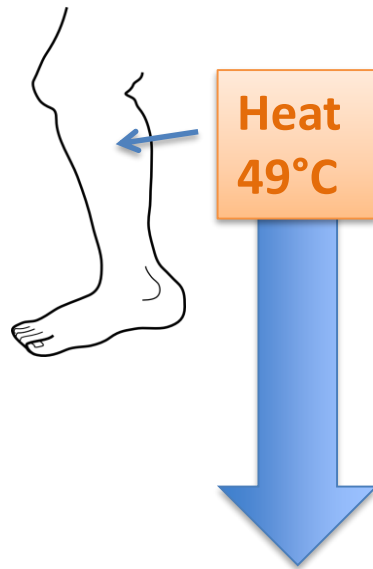
Subjects : 15 high-functioning adults with
ASD: 16 neurotypical adults
*Matched on the basis of age, gender, race,
and IQ

3s 15s 39s
49° C Rest

Numerical
Pain
Rating

Neural Responses to Heat Pain in ASD

Experimental Paradigm

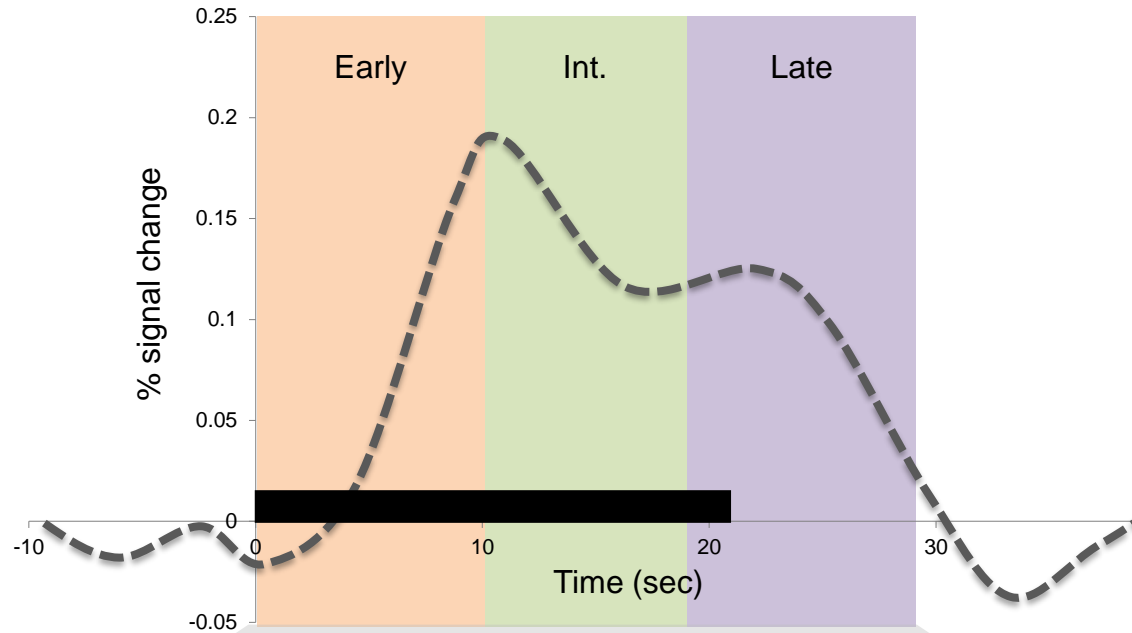
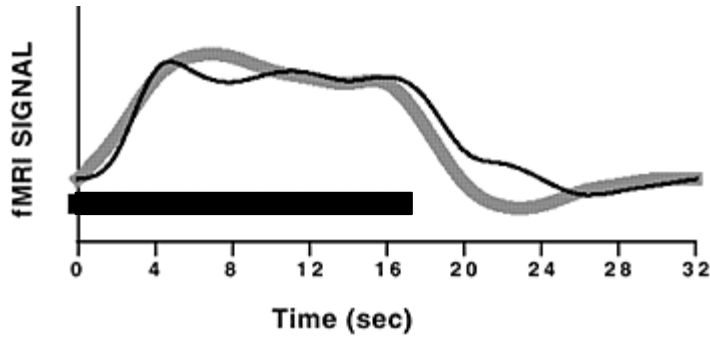


No differences
in Pain Ratings

3s 15s 39s
49° C Rest

Numerical
Pain
Rating

Expected hemodynamic response during pain



Early

Int.

Late

Acute
Pain/
Intensity

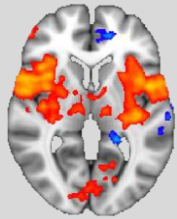
Sustained
Pain

Affective
Cognitive
Appraisal

Evidence for Aberrant Pain Response in ASD

↔ Pain Thresholds

↔ Pain Ratings



Neural Pain Signature

Early

Acute
Pain/
Intensity

Int.

Sustained
Pain

Late

Affective/
Cognitive
Appraisal

Evidence for NPS suppression in ASD

Early
Pain
Intensity

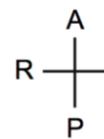
No
differences

Int.

Sustained
Pain

Late

Affective
Cognitive
Appraisal

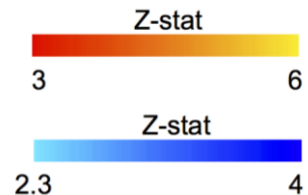
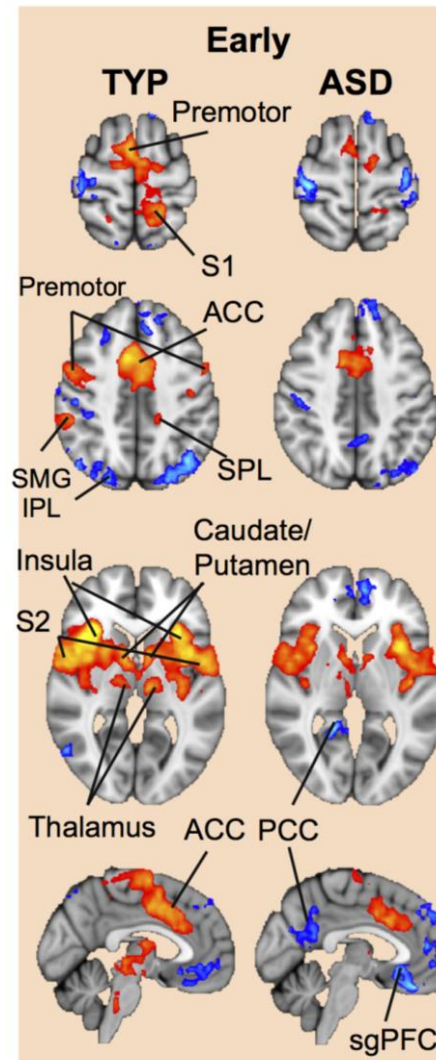


Z= 62

Z= 43

Z= 4

X= -3



Evidence for NPS suppression in ASD

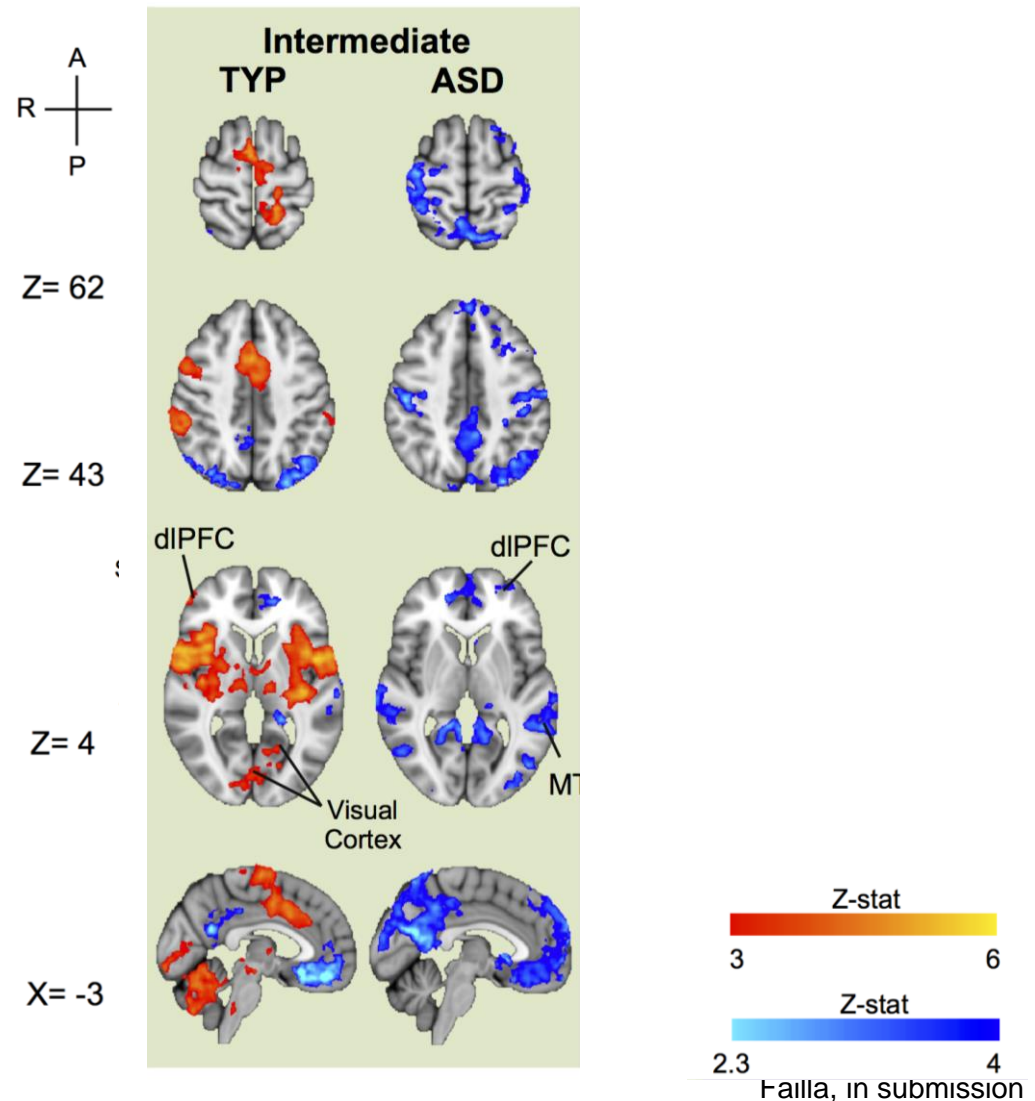
Early
Pain
Intensity

Int.
Sustained
Pain

Significant
Suppression

Late

Affective
Cognitive
Appraisal



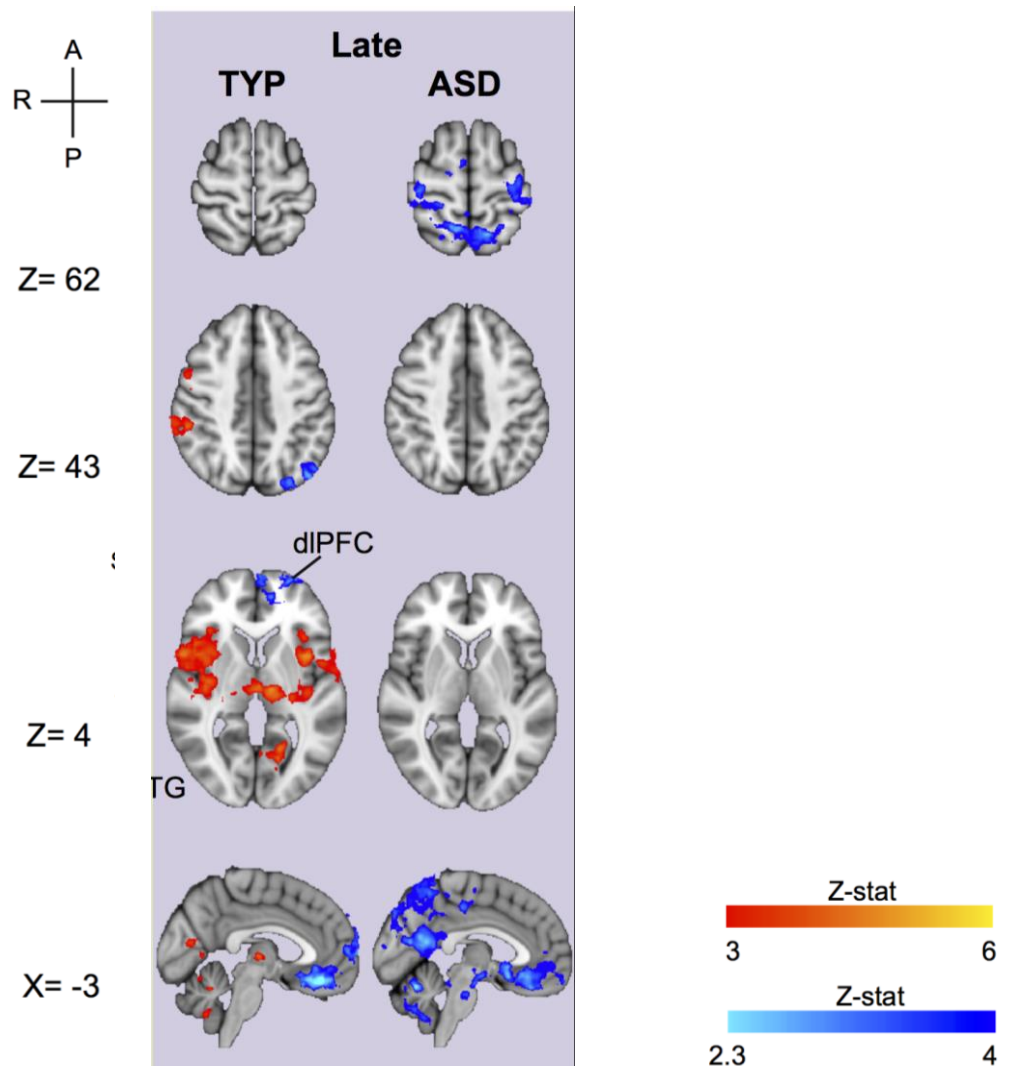
Evidence for NPS suppression in ASD

Early
Pain
Intensity

Int.
Sustained
Pain

Late
Affective
Cognitive
Appraisal

Significant
Suppression

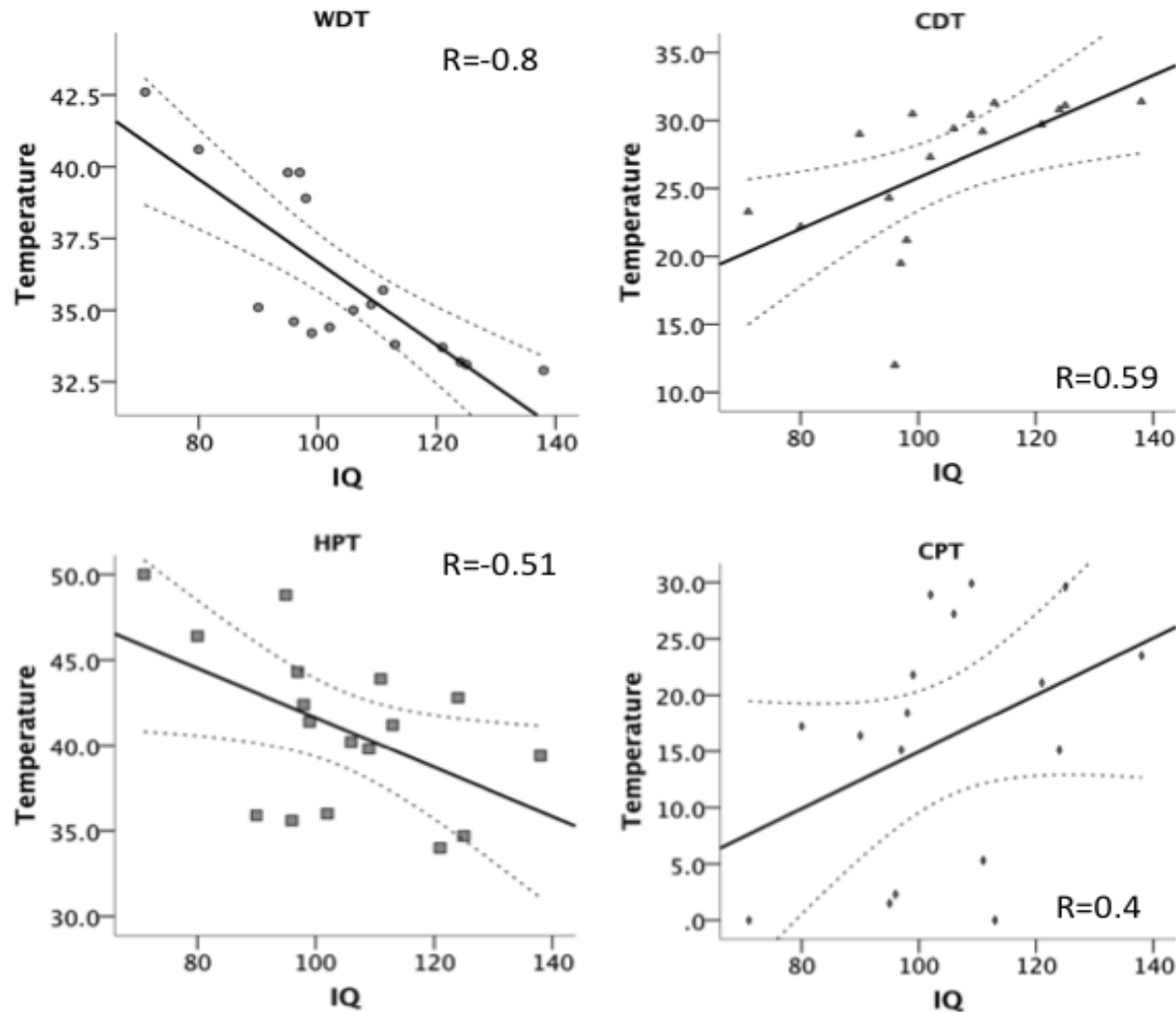


Conclusion

Individuals with ASD
have typical initial
neural response.
Changes may be
cognitive or emotional

Individual differences in pain

Individual differences: Thermal sensitivity is associated with cognitive ability



Mood

- 45 adults with ASD with mild ID
- Facial reactions to pain recorded during vaccination and dental treatment
- Depression and anxiety recorded
 - Both were significant predictors of pain behaviours

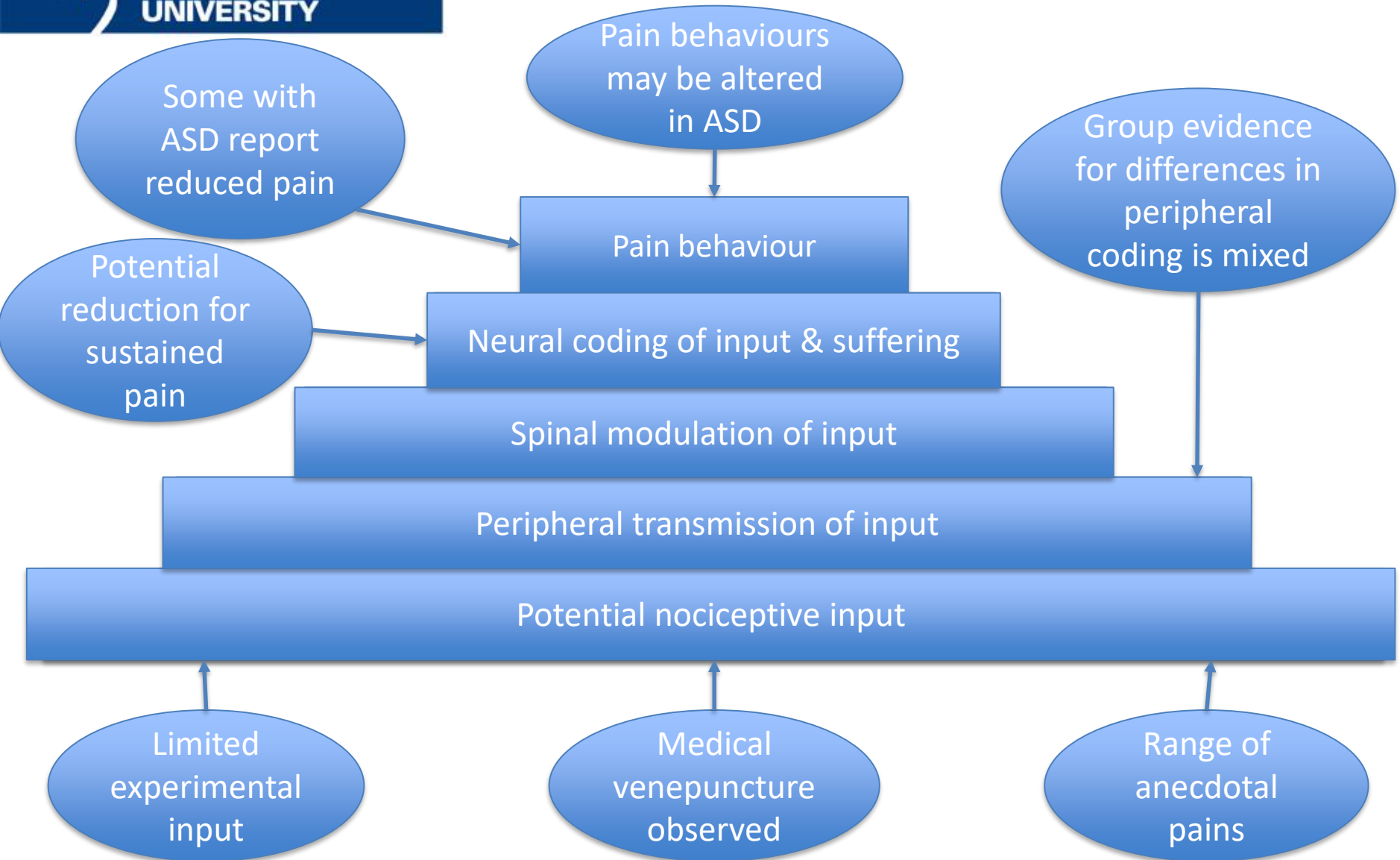
Putting a voice to pain in ASD

- Interviews conducted following surgery
 - 38 children with ASD
- Children reported withdrawing in pain
- Parents as a critical gatekeeper
 - Parent presence can also mediate pain
- Distraction matters
- Language use matters
 - Hurt is preferred, then pain, cry, sad, scream, sore & owie

Conclusion

Similar pathways in ASD may mediate pain response. General functioning may also matter.

What do we know?



What do we not know?

- A lot!
- If differences are there at what level do they appear
 - Peripheral
 - Central
 - Expression/behaviour

How do we examine this better?

- How big is pain in ASD?
- We need to treat individuals with ASD as individuals
- Look at pain in context
- How do people with autism communicate pain?
 - What is the function of pain behaviours
- Understand the development of pain in ASD
- Pain management in autism

Somatosensory & Affective Neuroscience Research Group

- Prof Francis McGlone
- Dr David Moore
- Dr Susannah Walker
- Dr Sarah Vaughan
- Connor Haggerty
- Sharon Smith
- Adarsh Makdani
- Dr Andrew Marshall
- Dr Ralph Pawling
- Dr Paula Trotter
- <http://somaffect.org/>

Collaborators

- Carissa Cascio
- Michelle Failla
- Jim Bodfish
- Elaine Wainwright
- Geoff Bird