



# Mental health and behaviour

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Declarations: advisor to the pharmaceutical industry

# The IPWSO mental health network

## Outline of talk

1. Definitions of mental health and the terminology used to describe mental ill-health in people with PWS.
1. Causative mechanisms for mental ill-health – biological vulnerability and environmental demands.
1. Best practice in the assessment of mental ill-health and its prevention and treatment and the promotion of mental wellbeing.

# WHO definition of Mental Health

Galdeseri et al 2015 Towards a Definition of Mental Health. World Psychiatry DOI:10.1002/wps.20231

Good mental health is **more than** 'the absence of mental disorder'. It includes....

- A dynamic internal state or equilibrium
- The ability to maintain harmony in line with universal values
- The ability to recognise, express and modulate emotions
- The ability to cope with adverse events and function socially



# Mental Health

## Maintaining equilibrium in a changing environment

Good mental health requires the development of the necessary cognitive, social and functional skills and the ability to regulated emotional and affective states

- Feelings and behaviours a manifestations of homeostasis (Damasio: The Strange Order of Things)
- The brain is the decision maker of the body and is dependent upon internal and external sensory input to maintain and update a model of the world (Friston: Predictive Coding Mode, Free Energy Principle)

# Neuropsychiatric (behavioural phenotype) of PWS

- Numerous studies from different countries:
  - Emergence of hyperphagia in early childhood (100%)
  - Repetitive and ritualistic behaviours (50 to 60%)
  - Emotional (temper) outbursts, episodic dyscontrol (60 to 80%)
  - Skin picking (40 to 60%)
  - Non-psychotic mood disorders (15 to 20%)
  - Psychotic illness (predominately in those with mUPD – 60%)
- Mean Full Scale IQ 60 with different verbal/performance profiles in del vs mUPD
- Impairments in executive and social functioning and in educational attainments

(see Whittington 2003 for summary in Prader-Willi Syndrome Edited by C. Hoybye Nova Science Publishers)



# Atypical development in people with PWS

- Impaired development of the ability to regulate:
  - Food intake in line with energy expenditure
  - Response to threat in an efficient and appropriate manner
  - Mood in response to life events
  - Temperature in response to environmental change
- Impaired development of those cognitive skills that allow an accurate and efficient model of the external world to be developed and up-dated over time

# Temper outbursts in PWS

Rice et al 2018 AJMG

- Survey of 101 families
- Behaviour worse in adolescence
- Characteristic onset and course
- Triggered by:
  - Goal blockage
  - Social injustice (perceived and real)
  - Difficulty dealing with change
- Interventions
  - Give space and distract only effective intervention
  - Risperidone, sertraline, fluoxetine regularly used but of limited value

# Temper outbursts in children with PWS

Woodcock et al 2011

- Single case design investigating the relationship between cognitive demand and outbursts
  - Increased temper outbursts when cognitive challenge required switching of attention
  - In experimental and naturalistic settings increased temper outbursts related to unexpected change
- Specific directional relationship between a particular cognitive deficit and behaviour via an environmental interaction

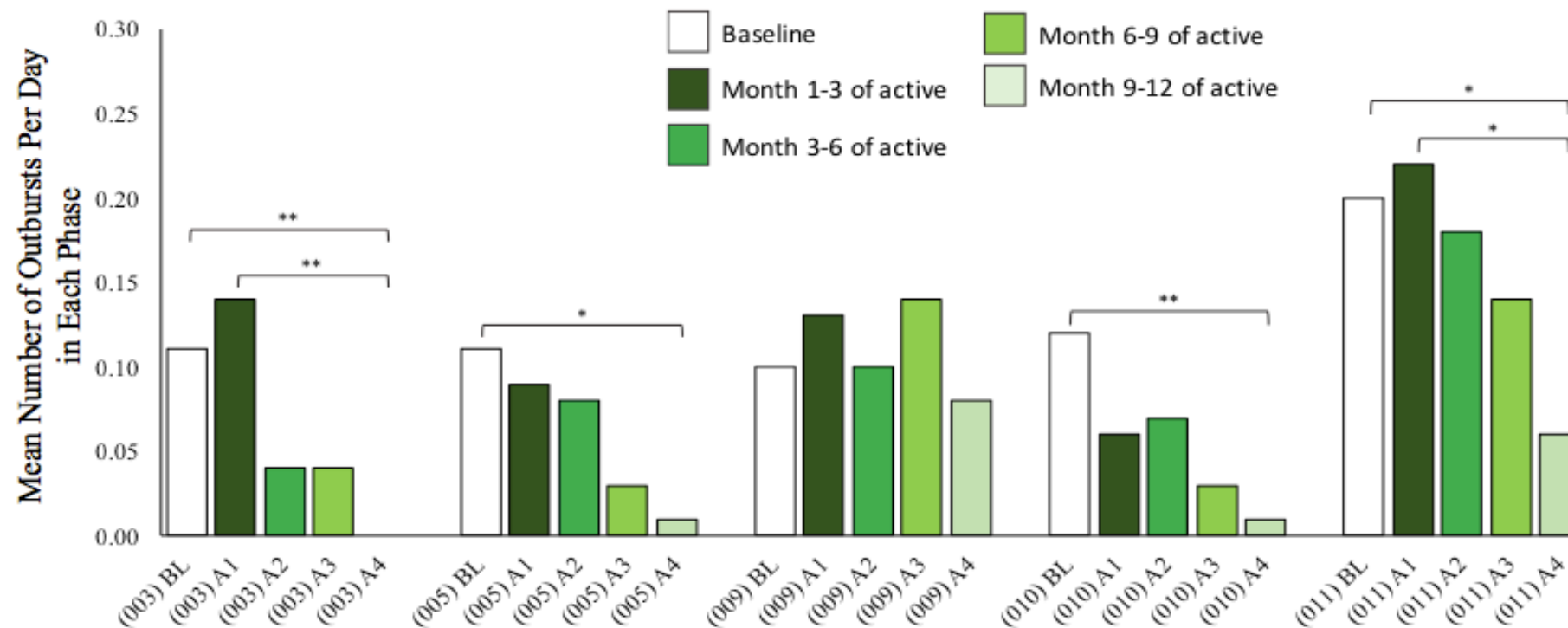




# Transcutaneous Vagus Nerve Stimulation (t-VNS)

Nemos device

## Mean Number of Temper Outbursts per Day



Manning et al, 2019 <https://doi.org/10.1371/journal.pone.0223750>

# Understanding the repetitive and ritualistic behaviours and temper outbursts in PWS

- Temper outbursts and ritualistic and repetitive behaviours - common mechanism in developmental delay and in impaired attention switching
- Repetitive questioning related to 'anxiety' due to uncertainty and change
- Emotional dysregulation consequent upon impaired ANS functioning (observations from VNS)
- Environmental circumstances and response to outbursts – maintain behaviours (acquire a function)
- Interventions
  - Functional analysis and behavioural/environmental interventions
  - Improving attention switching through training
  - Treatment of co-morbid psychopathology
  - Interventions aimed at altering sympathetic/parasympathetic balance (e.g. VNS, psychological techniques)

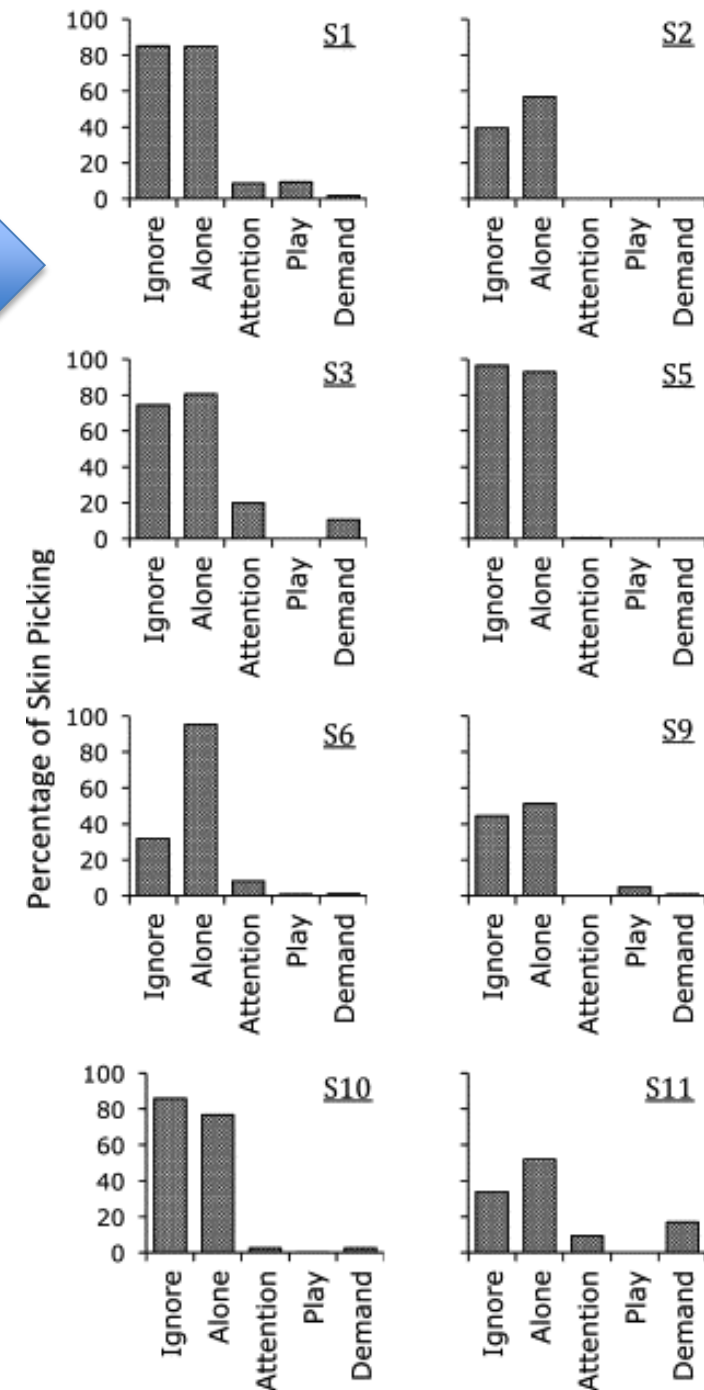
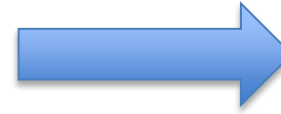
Bull, L. E., Woodcock, K. A., Holland, A. & Oliver, C. (2010). Toward an early intervention strategy to reduce temper outburst behaviour in Prader-Willi syndrome. *Journal of Applied Research in Intellectual Disability*, 23, 431. DOI: 10.1111/j.1468-3148.2010.00582.x

# SKIN PICKING IN PEOPLE WITH PWS

Functional analysis of eight people with PWS. High levels of skin picking were observed in the *alone* and *ignore* conditions for eight of the twelve participants

Hall et al (2014) Experimental functional analysis of severe skin-picking behavior in Prader–Willi syndrome. Res Dev Dis 35: 2284-2292

Hall et al 2015 Human Brain Mapping 36; 4135-4143 fMRI study using self-injury trauma scale – areas of the brain (R insula and L pre-central gyrus) mediating interoceptive behaviours (itch and pain) activated.



# Skin picking.....

Best understood as an interaction between a biological vulnerability, physical and psychological factors and environmental circumstances

- Functional analysis - behavioural interventions
- Treatment of co-morbidity (e.g. mood disorder)
- Environmental changes
- Topical treatments to skin
- Medication to modify glutaminergic pathways in the brain??

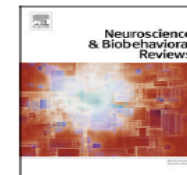
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Developing an understanding of skin picking in people with Prader-Willi syndrome: A structured literature review and re-analysis of existing data

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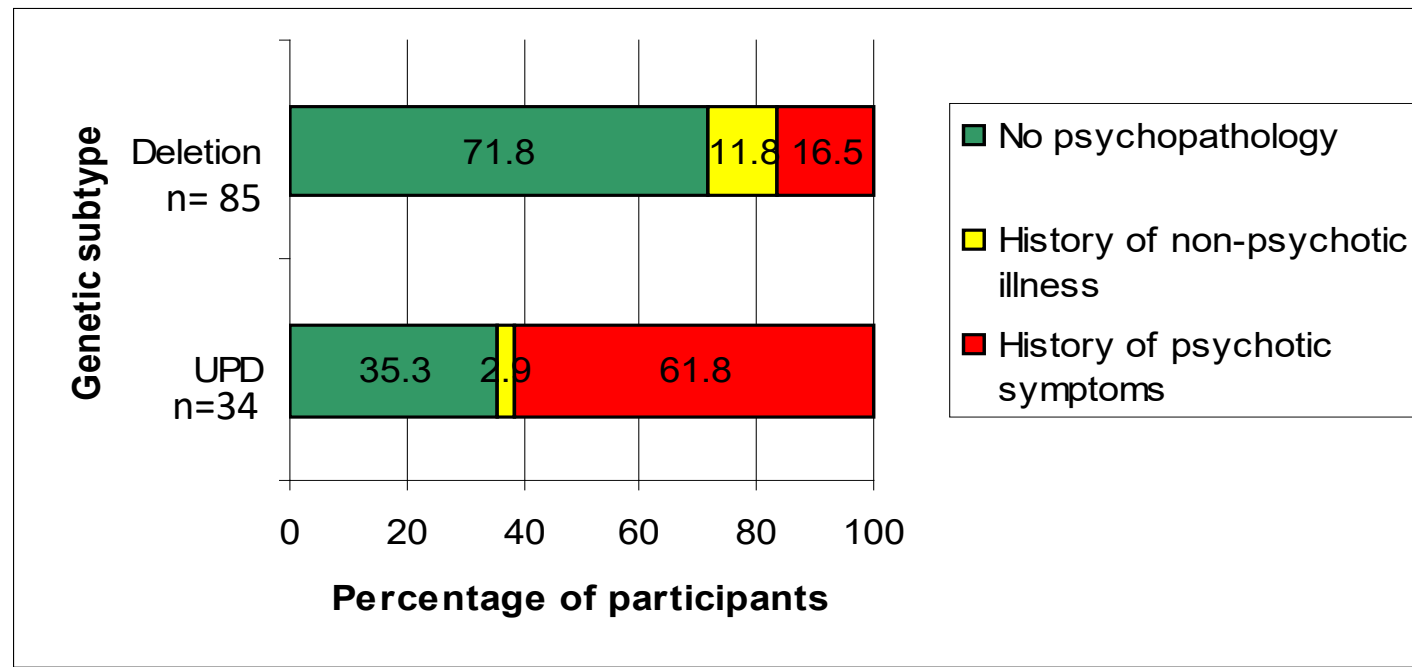


# Abnormal mental state in 18 year old with PWS due to mUPD

- Sudden (over hours) deterioration in his mental state at his group home
  - Confusion (bewildered)
  - Anxious++
  - Unable to talk coherently – referring to ‘blackmail’
- Seen in A/E – Diagnosis confusional state given IV antibiotics
  - Using unrelated words “black, sky, fish”
  - Staring at his hands – grabbing things – hitting staff – saying strange things
  - Staff ‘not using their real names and lying to him’
  - Crawling on hands and knees chasing a butterfly that was not there
- Discharged after some improvement, relapsed within hours – liaison psychiatrist diagnosed atypical psychotic illness started on aripiprazole
- Mental state improved over 4 days – two months later remains well on medication.

# Prevalence of psychotic and non-psychotic mental illness

- Psychotic symptoms more common in people with mUPD than deletion
- Psychopathology without psychotic symptoms more common in people with deletion than mUPD

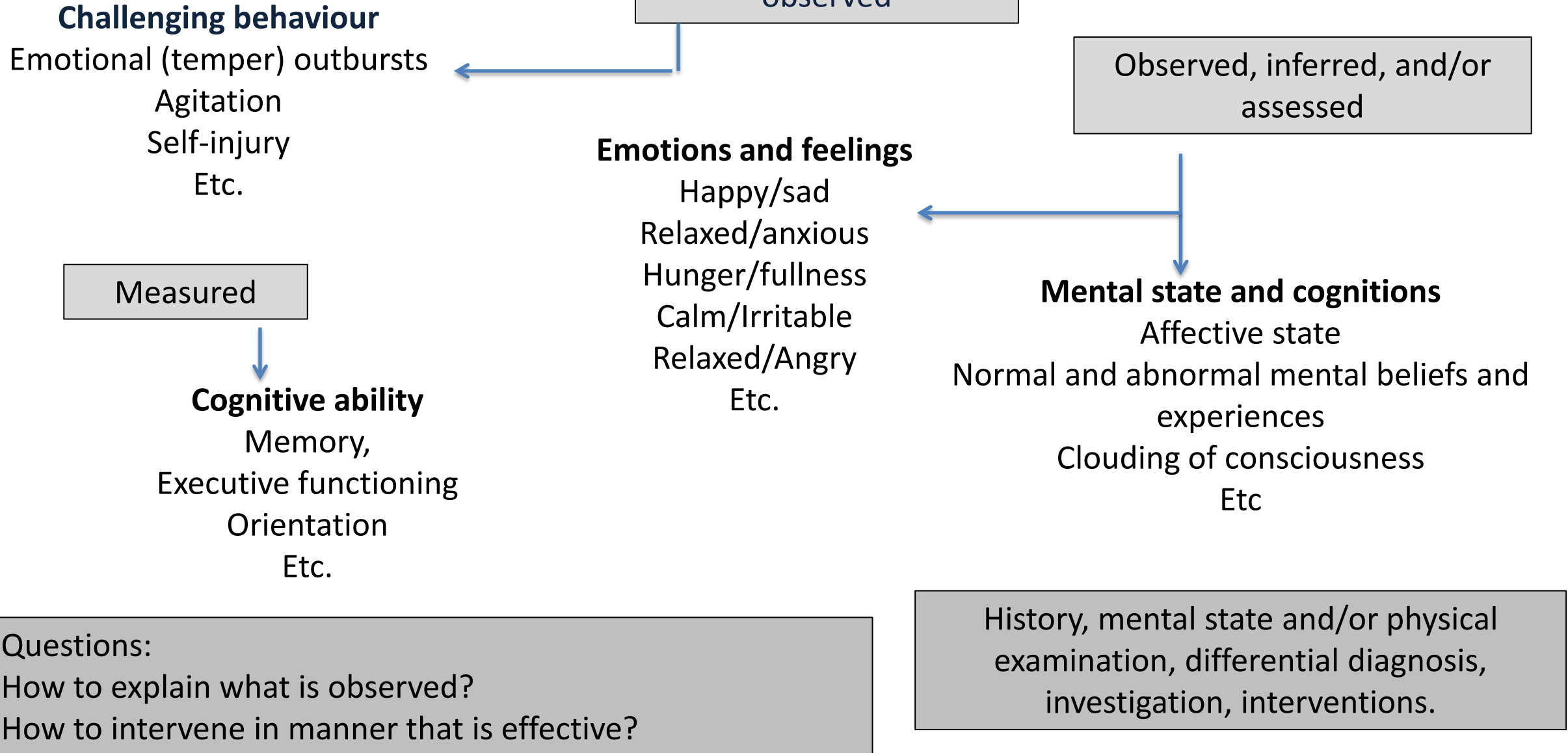


Soni et al, 2007, 2008

# Mental illness in people with PWS

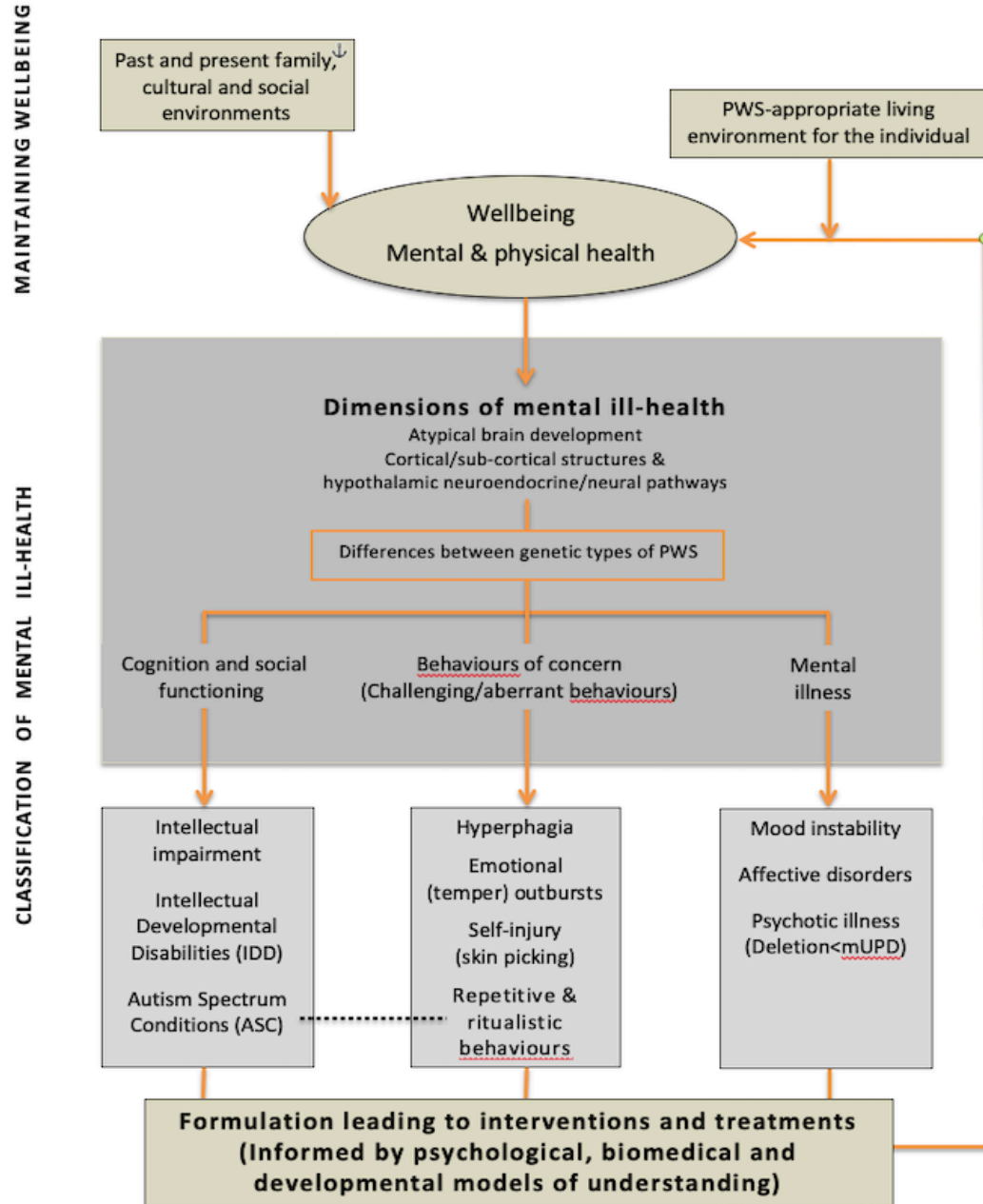
- Presents with a deterioration in behaviour and/or the onset of new bizarre behaviours
- Onset usually acute but can also be gradual
- Associated with abnormal mood state and the development of abnormal mental experiences (confusion, hallucinations, delusions)
- Interventions
  - Medication based on diagnosis
  - Reduce demands
  - Consistent informed support
  - Prevent harm

# FORMULATION





## Conceptual framework for mental health and wellbeing of people with PWS



## APPROACHES TO FORMULATION & INTERVENTION

### Applied Behavioural Analysis (learning theory)

- Predispose
- Precipitate
- Maintain

### Bio-medical

- Co-morbidities (physical, psychiatric)
- Biological vulnerabilities

### Developmental

- Delayed development
- Behavioural phenotype of PWS
- Social cognition
- Intellectual and cognitive functioning

### Systemic

- Quality and nature of support
- PWS informed
- Safe

## Environmental and psychological interventions

Early intervention  
Environmental change  
Psychological interventions

## Environments

Behaviours reinforced and maintained

Functional analysis

Present environment

Predictability

Food security

Past experiences

Opportunities to learn

## Mental health and wellbeing

Psychotic illness

Impact of maternally expressed genes

Impaired cognition

Understanding  
Response to change

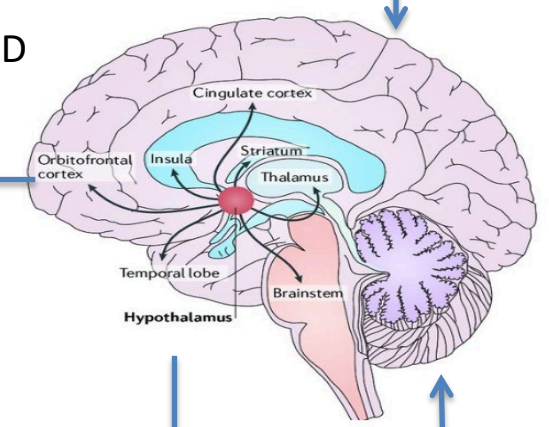
Impaired regulation

Mood, food intake etc  
'Homeostasis'

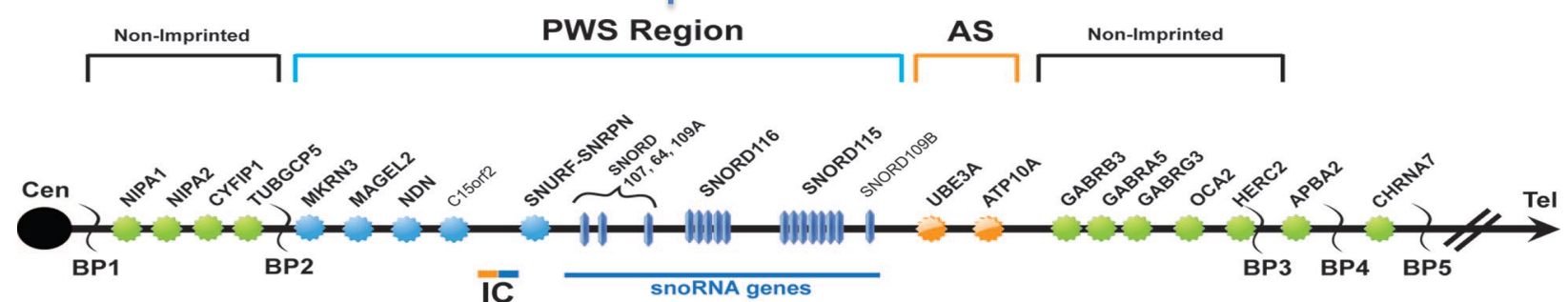
## 'Biological' interventions

Medications

VNS



Atypical brain development and function



COMMENTS  
&  
QUESTIONS?