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# THE RESEARCH LANDSCAPE OF TUBEROUS SCLEROSIS COMPLEX-ASSOCIATED NEUROPSYCHIATRIC DISORDERS (TAND): A COMPREHENSIVE SCOPING REVIEW

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UNIVERSITY OF BIRMINGHAM

VUB VRIJE UNIVERSITEIT BRUSSEL

**Dr Stacey Bissell & Dr Stephanie Vanclooster**

**on behalf of the TANDem project consortium**

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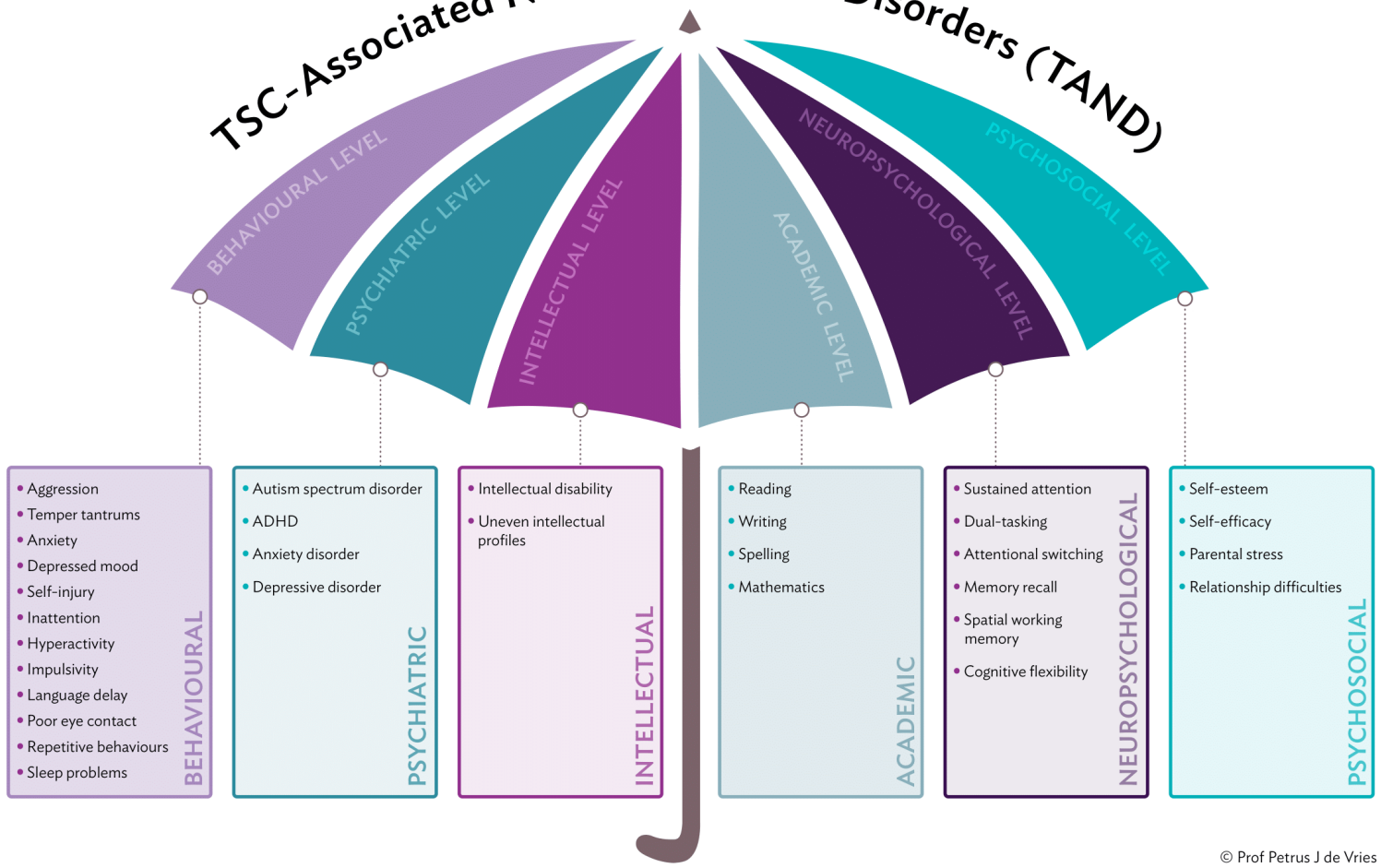
# TAND




Tuberous Sclerosis Complex Associated Neuropsychiatric Disorders or TAND

Six TAND levels: behavioural, psychiatric, intellectual, scholastic, neuropsychological and psychosocial manifestations (de Vries et al., 2015) – assessment via the TAND Checklist

Seven TAND clusters: naturally occurring groupings of manifestations (Leclezio et al., 2018, 2020)

TAND affects 90% of individuals with TSC - yet significant identification and treatment gap worldwide

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# TAND CLUSTERS AND THEIR ITEMS

| TAND CLUSTERS | TAND ITEMS |
|---|---|
| 1. Scholastic | Reading, writing, spelling, mathematics |
| 2. Neuropsychological | Memory, disorientation, attention deficits, visuo-spatial deficits, dual-task deficits, executive function deficits |
| 3. Dysregulated behaviour | Aggressive outbursts, temper tantrums, self-injury |
| 4. Overactive/impulsive | Overactivity, impulsivity, restlessness |
| 5. Eat/sleep | Eating difficulties, sleep difficulties |
| 6. Mood/anxiety | Anxiety, depressed mood, extreme shyness, mood swings |
| 7. Autism spectrum disorder-like | Inflexibility, unusual language, delayed language, repetitive behaviours, poor eye contact, peer difficulties |

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## BACKGROUND AND AIMS

Increased interest and output in TAND research, but lack of comprehensive synthesis of these scientific findings:

- broad and complex construct of TAND
- varied topics, methods and approaches in studies on TAND

**AIMS:**

1) To describe the research landscape of TAND
2) To find knowledge gaps in TAND research that could inform priority-setting and recommendations for TAND research

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# METHODOLOGY

**Scoping review framework - 5 stages (Arksey & O'Malley, 2005)**

1) Outlining research questions: 'big picture questions'
2) Study identification: systematic searches of 12 electronic databases in Feb-March 2020 using search strings consisting of TSC term variations and TAND level items
3) Study selection: screening of titles, abstracts and full texts of returned searches for relevance according to inclusion and exclusion criteria
4) Data charting: data on TAND levels, clusters and items, including sample characteristics, research design and study methodology
5) Data analysis and interpretation: review of data in light of research questions

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1) Outlining research questions: 'big picture questions'

# SCOPING REVIEW RESEARCH QUESTIONS

1. How much TAND research has been done across the years?
2. Where has TAND research been done in the world?
3. Which TSC age groups have been investigated?
4. What is the overall quality of existing TAND research?
5. Which TAND levels have been investigated?
6. Which research methods and research measures have been used to investigate TAND?
7. How much quantitative and qualitative TAND research has been conducted?
8. How many intervention studies have been conducted?
9. Have remote technologies been utilised to study TAND?
10. Which TAND clusters have been studied?

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1) Outlining research questions: 'big picture questions'

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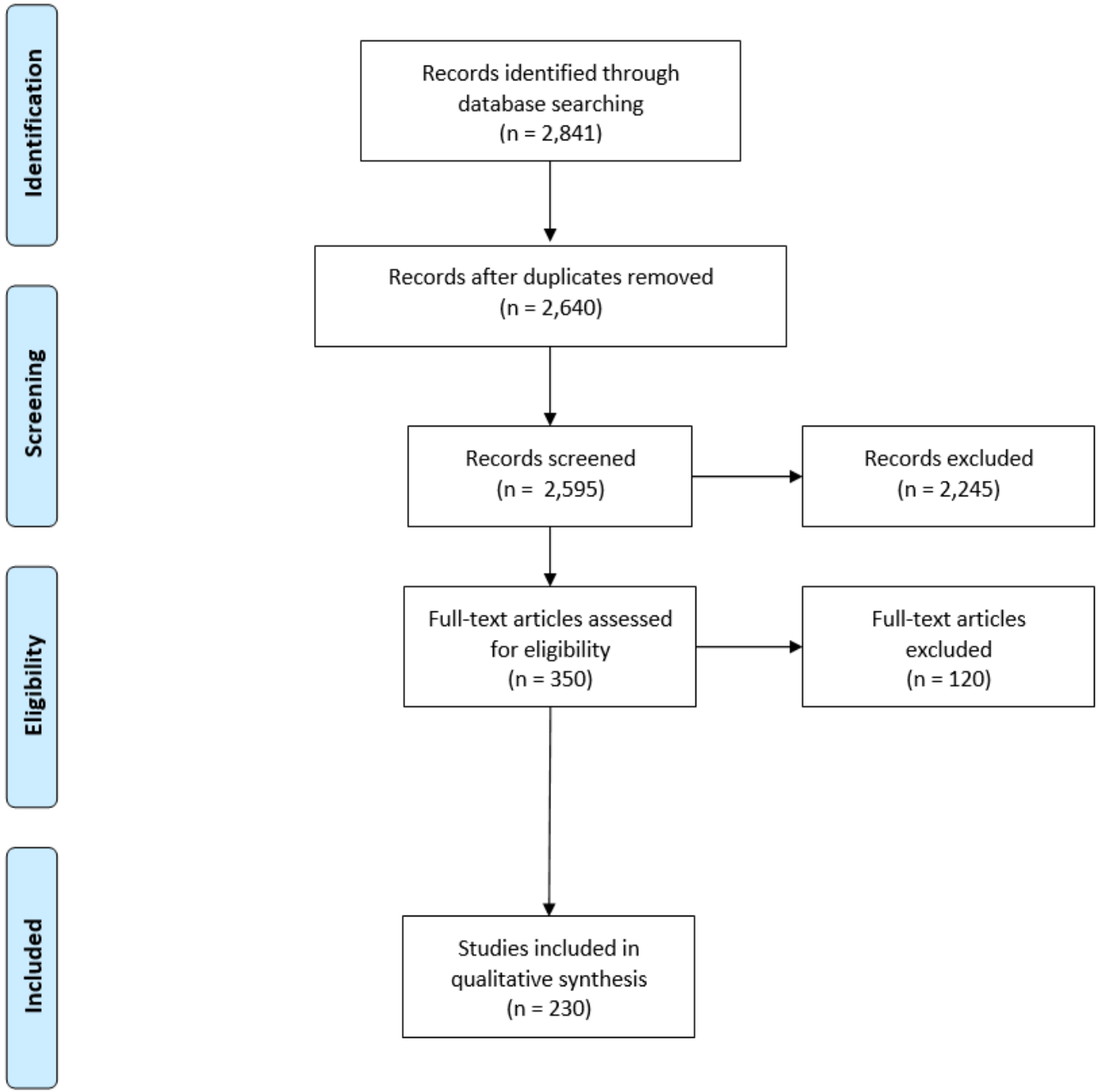

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4) Data charting: data on TAND levels, clusters and items, including sample characteristics, research design and study methodology

| | Animal Studies (n = 30) | Case Studies (n = 47) | Cohort Studies (n = 153) |
|---|---|---|---|
| **Study design** | | | |
| Quantitative | 30 (100%) | 12 (26%) | 147 (96%) |
| Qualitative | N/A | 45 (96%) | 13 (9%) |
| *descriptive* | | 42 (89%) | |
| *typical* | | 3 (6%) | |
| Control group (e.g. typically developing) | N/A | N/A | 23 (15%) |
| Contrast group (e.g. genetic syndrome) | N/A | N/A | 15 (10%) |
| Multiple control and contrast groups | N/A | N/A | 5 (3%) |
| **Methodology** | | | |
| Medical record review | N/A | 41 (87%) | 67 (44%) |
| Standardised questionnaires | N/A | 3 (6%) | 52 (34%) |
| Interviews (standardised/clinical/research) | N/A | 0 (0%) | 38 (25%) |
| Clinical report | N/A | 1 (2%) | 0 (0%) |
| Neuroimaging | 23 (77%) | 42 (89%) | 74 (48%) |
| Direct neuropsychological assessment | N/A | 12 (26%) | 33 (22%) |
| IQ assessment | N/A | 17 (36%) | 80 (52%) |
| Direct behavioural assessment | 28 (93%) | 27 (57%) | 9 (6%) |
| Physiological examination | 14 (47%) | 39 (83%) | 35 (23%) |
| Diagnostic assessment | N/A | 15 (32%) | 51 (33%) |
| TAND Checklist | N/A | 1 (2%) | 6 (4%) |

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THE TAND CHECKLIST
Lifetime version (TAND-L)

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