

**Accepted Manuscript**

Tarren-Sweeney, M. (2021). Mental health symptom profiles of adolescents in foster care. *Journal of Child & Adolescent Trauma*. DOI: 10.1007/s40653-021-00417-2

**Abstract**

Purpose: The article describes an investigation of the nature, patterns and complexity of carer-reported mental health symptoms for a population sample ( $N=230$ ) of adolescents (age 12-17) placed in long-term foster and kinship care following chronic and severe maltreatment.

Methods: Two cluster analyses of Child Behaviour Checklist DSM-oriented (CBCL-DSM) and Assessment Checklist for Adolescents sub-scale scores of clinical cases were performed. The first yielded 8 profiles of attachment- and trauma-related symptoms as measured across eight ACA scales ( $N=113$  cases). The second yielded 11 profiles of a broader range of symptoms, as measured across five CBCL-DSM and five ACA sub-scales ( $N=141$  cases).

Results:

The symptom profiles derived from both cluster analyses are differentiated more by symptom severity and complexity, than by symptom specificity – suggesting that trauma- and attachment-related symptomatology does not conform to a taxonomy of discrete disorders. Five of the 11 CBCL-DSM/ACA profiles describe severe and complex symptomatology that does not correspond to discrete DSM-5 or ICD-11 diagnoses.

Conclusions: Accurate measurement and formulation of clinical phenomena is an essential component of evidence-based psychological and psychiatric practice. Clinicians who carry out mental health assessments of children and adolescents in care should be aware of the limits of the diagnostic classification systems for formulating complex attachment- and trauma-related symptomatology.

**Keywords:** Assessment Checklist for Adolescents; attachment; Child Behavior Checklist; classification of mental disorder; complex disorders; developmental psychopathology; mental health symptom profiles; out-of-home care.

### **Introduction**

Children and adolescents placed into long-term statutory out-of-home care (OOHC) are a sub-set of maltreated children who have generally experienced severe and chronic maltreatment from an early age. The most critical developmental consequence of early exposure to severe social adversity is poor mental health (Charlotte, Viding, Fearon, Glaser, & McCrory, 2017). Population surveys and cohort studies have consistently found that children and adolescents in OOHC have high mean levels and rates of mental health difficulties (Goemans, van Geel, van Beem, & Vedder, 2016; Oswald, Heil, & Goldbeck, 2010). Though rates vary a little by survey and location, up to half of such children have clinical-level mental health difficulties, and another 20% to 25% have difficulties approaching clinical significance (Oswald et al., 2010). This is largely accounted for by their exposure to chronic and severe maltreatment prior to entering OOHC. A range of psychological and neuro-biological processes in early childhood that are critical to human social functioning are impaired by early and prolonged exposure to traumatic abuse, and by the absence of nurturing, sensitive care (Charlotte et al., 2017). The strongest independent predictor of mental health difficulties among children and adolescents in care is ‘age at entry into care’ – with entry at younger age being protective (Burge, 2007; Hukkanen, Sourander, Bergroth, & Piha, 1999; Tarren-Sweeney, 2008). This is consistent with cumulative trauma exposure models and neuroscience (Charlotte et al., 2017), as well as attachment theory (Bowlby, 1988; O'Connor, Bredenkamp, Rutter, & the English and Romanian Adoptees Study Team, 1999).

Less is known however, about the nature, patterns and complexity of mental health difficulties experienced by children and adolescents in OOHC. Maltreated children, including those placed into statutory care, manifest combinations of attachment- and trauma-related mental health difficulties that, due to their complexity and lack of symptom specificity, are not adequately conceptualised within the Diagnostic and Statistical Manual of Mental Disorders (DSM) (American Psychiatric Association, 2013) and International Classification of Diseases (ICD) (World Health Organization, 2020) classification systems (DeJong, 2010; van der Kolk, Roth, Pelcovitz, Sunday, & Spinazzola, 2005). Furthermore, cumulative exposure to childhood maltreatment accounts for increasing symptom complexity in both childhood and adulthood (Cloitre et al., 2009). Clinicians struggle to formulate complex attachment- and trauma-related symptomatology when it is identified among these populations. A review of multiple clinical assessments carried out with 50 such children revealed considerable diagnostic disagreement and uncertainty, as well as a tendency to frame complex psychopathology as a series of discrete, comorbid disorders (Tarren-Sweeney, 2007). The accuracy and utility of clinical assessments of these children are thus compromised by clinicians' inability to formulate symptom complexity, such as resorting to co-morbid diagnosis (D'Andrea, Ford, Stolbach, Spinazzola, & van der Kolk, 2012; Minnis, 2013) – with incorrect formulation compromising the delivery of safe and effective treatments (Spinazzola, Blaustein, & van der Kolk, 2005; van Der Kolk, 2016). For example, a recent analysis of US Medicaid prescribing patterns for disadvantaged youth, including those in foster care (O'Brien & Rapp, 2021), raises the possibility that inaccurate formulation of complex symptoms may account for incorrect prescribing of psychotropic medication.

To advance our understanding of complex attachment- and trauma-related symptomatology, it is useful to investigate the extent to which it might be conceptualised within a typology of complex disorders (van der Kolk et al., 2005). One empirical method for

investigating symptom typology and complexity is to isolate *symptom profiles* through cluster analysis. Symptom profiles provide a means for examining the construct validity of existing taxonomies, and for proposing alternative taxonomies. Using cluster analysis, Achenbach (Achenbach, 1993) identified characteristic symptom profiles from scores on the Child Behaviour Checklist (CBCL), and its teacher (Teacher Report Form – TRF) and adolescent self-report (Youth Self Report – YSR) variants for a sample of clinic-referred adolescents, with a view to proposing an empirically-based taxonomy of common child and adolescent mental disorders. Seven profile types were identified for the CBCL, consisting of: four cross-informant, cross-gender types (labelled *Withdrawn*, *Somatic*, *Social*, and *Delinquent-Aggressive*); two CBCL-specific, cross-gender types (*Delinquent*, *Social-Attention*); and one CBCL-specific type that was only found among boys (*Withdrawn-Anxious/Depressed-Aggressive*). Five of the seven profile types describe relatively non-complex, discrete symptomatology. However, the *Social* and *Withdrawn-Anxious/Depressed-Aggressive* profile types have elevated scores on most syndrome scales, pointing to complex symptomatology that does not conform to standard diagnostic formulation.

Findings from a small number of studies suggest there is not one homogenous set of symptom profile types, but rather, various special populations and clinical groupings may manifest distinctly different profiles. Cluster analyses of behavioural difficulties reported for children with Autism Spectrum Disorder (ASD) identified profiles largely delineated by children's cognitive and social functioning (Bitsika, Sharpley, & Orapeleng, 2008; Prior et al., 1998). A number of researchers have also proposed specific CBCL profile types for various clinical constructs and/or special populations, including a CBCL dysregulation profile, characterized by clinical range scores on the anxious/depressed, attention problems, and aggressive behaviour scales.

Two studies have attempted to isolate symptom clusters among children and young people in OOHC. A hierarchical cluster analysis of CBCL syndrome scores for a population sample of 91 Dutch children and adolescents in foster care yielded a four-cluster solution, where the derived profile types were delineated more by overall profile elevation, than symptom type (Strijker, Zandberg, & Van der Meulen, 2002). In the second study, cluster analyses of CBCL and Assessment Checklist for Children (ACC) scores for a population sample of Australian pre-adolescent children in foster and kinship care (N=347) also yielded mental health profiles characterized more by symptom complexity than specificity (Tarren-Sweeney, 2013b). Whereas 35% of the Australian sample had clinical difficulties that could plausibly be construed as discrete mental disorders or comorbidity, another 20% displayed complex attachment- and trauma-related symptomatology that is not adequately conceptualized within DSM or ICD classifications. These findings for pre-adolescent children raise the possibility that a sizeable proportion of adolescents in care also manifest complex symptomatology that is not adequately described using standard diagnostic formulations. The present article reports various analyses of adolescent mental health data obtained in a prospective epidemiological study of the mental health and developmental risk exposure of children and young people in long-term foster and kinship care, in New South Wales (NSW), Australia. The analyses aimed to address the following research questions:

1. *To what extent do the patterns and complexity of mental health symptoms experienced by adolescents in out-of-home care resemble that experienced by adolescents in the general population?*
2. *How adequate are diagnostic classification systems (ICD-11, DSM-V) for conceptualizing the mental health symptomatology of adolescents in out-of-home care?*

## Method

The present analyses were carried out on adolescent mental health scores obtained in the follow-up and adolescent survey stages of the Australian study and largely replicate the aforementioned analyses of pre-adolescent mental health scores (Tarren-Sweeney, 2013b). The study included a baseline cross-sectional survey of 4-11 year-olds conducted between November 1999 and January 2003 ( $N=347$ ); a follow-up survey of those participants conducted in 2009 (by which time they were adolescents); and a cross-sectional survey of additional adolescents carried out in 2011. The second and third of these surveys employed the same study design with a view to yielding a combined ( $N=230$ ) cross-sectional dataset obtained for a representative sample of adolescents residing in family-based OOHC (foster and kinship) in NSW. Data were collected from a mail-out caregiver questionnaire, and from the state child welfare and OOHC database. The caregiver questionnaire measured participants' mental health, development, education and present status (e.g. type and makeup of present placement, recent life events). The statutory agency which held legal guardianship of the young people provided approval for the study, while participation in the adolescent survey also required informed consent by both the young person and their carer. Aside from providing informed consent, young people were not directly involved in the study.

### Mental Health Measures

Adolescent mental health was measured by two carer-report checklists, the CBCL (2001 profile) and the Assessment Checklist for Adolescents (ACA). The reliability of foster parent reports of children's difficulties remains somewhat uncertain, although there is evidence that in respect of children in long-term care, foster parents are at least as reliable as parents (Jacobson, Pullmann, Parker, & Kerns, 2019; Tarren-Sweeney, Hazell, & Carr, 2004). However, the

evidence is less encouraging with regard to foster carers' identification of adolescent difficulties in relatively new placements (Simmel, Lee, Kim, & Miles, 2014).

The CBCL measures child and adolescent problem behaviour across eight empirically-derived clinical sub-scales; two higher-order, broadband scales approximating spectrums of depressive / anxious symptoms (internalizing) and disruptive behavioural symptoms (externalizing); and a total problems score that provides a measure of global psychopathology (Achenbach, 1991; Achenbach & Rescorla, 2001). In addition to continuously distributed scores, the CBCL defines scores as being within 'normal', 'borderline clinical' and 'clinical' ranges. The 2001 profile CBCL also includes DSM-oriented scales that were derived through expert ratings of items' conforming to DSM-IV-TR diagnostic criteria (Achenbach & Rescorla, 2001).

The ACA is a 105-item carer-report mental health rating scale, measuring behaviours, emotional states, traits, and manners of relating to others, as manifested by adolescents residing in various types of OOHC, as well as those adopted from care (Tarren-Sweeney, 2013a). The ACA was developed to measure a range of attachment- and trauma-related problems not adequately covered by standard survey instruments, including the CBCL, with most items being derived from the pre-adolescent ACC measure (Tarren-Sweeney, 2007). In addition to a total clinical score, the ACA has seven clinical scales that measure various attachment- and trauma-related symptomatology, derived through factor analysis of 73 core clinical items (a robust 7-factor model accounted for 51% of score variance). Four of the factors replicate ACC clinical scales (*non-reciprocal interpersonal behaviour; sexual behaviour problems; food maintenance behaviour; and suicide discourse*), and three are unique to the ACA (*social instability / behavioural dysregulation; emotional dysregulation / distorted social cognition; and dissociation / trauma symptoms*). The ACA also contains two low self-esteem scales (*low confidence; negative self-image*) that were constructed

separately to the clinical scales. For each ACA scale, two cut-points were selected to identify young people with ‘possible’ and ‘probable’ clinical-level problems. Scores above the higher cut-points constitute *clinical* ranges that are highly predictive of psychiatric impairment (highly specific), while scores above the lower cut-point ranging up to and including the high cut-point constitute *elevated* ranges that retain high sensitivity for detecting psychiatric impairment. Initial data indicate that the ACA has good content, construct and criterion-related validity, as well as high internal reliability (Tarren-Sweeney, 2013a).

## **Sample Recruitment**

### ***Follow-up Participants***

Of 347 baseline survey participants, 231 remained in court-ordered foster or kinship care at follow-up. Of these, 66 were residing in placements that did not have a verifiable contact address, and whose carers could not be located by telephone. There were thus 165 young people that were eligible for inclusion in the follow-up survey, and could be reliably located. Of these, questionnaires were returned for 85 young people, representing a 51.5% response rate. However, these participants represented only 37% of baseline participants who remained in care.

### ***Additional Adolescent Survey Participants***

The sampling frame for recruiting additional adolescent survey participants was: young people aged 12 to 17 years residing in non-temporary court-ordered foster and kinship care in New South Wales, Australia; case supervision was provided by the statutory child welfare agency (i.e. not supervised by private agencies); were not part of the baseline survey sample; and whose placement address could be verified. Survey questionnaires were sent to the caregivers of 290 eligible participants residing at verified residential addresses with telephone contact, of which 145 were completed and returned (50% response rate). Additional adolescent participants

did not differ to eligible non-participants in terms of age or gender distributions, geographical location, time in care, or age at entry into care.

### **Sample Characteristics**

The adolescent survey sample ( $N=230$ ) consisted of 85 follow-up participants, and 145 newly recruited participants. It included slightly more boys (54%,  $N=125$ ) than girls (46%,  $N=105$ ). Participants had a mean age of 15.3 years, ranging from 10.7 to 18.6 years. Ethnicity was not reliably recorded in the state database at the time data were collected, and hence it is not reported. Numbers of young people residing in foster and kinship care were 196 (85%) and 34 (15%) respectively. Aggregate sample mean CBCL and ACA scores have been reported previously (Tarren-Sweeney, 2018). Fifty-two percent of girls and 46% of boys had at least one CBCL syndrome or broadband scale score in the clinical range. Equivalent proportions of young people with any score in the borderline plus clinical ranges were 63% (girls) and 59% (boys).

### **Statistical Analyses**

Statistical analyses were performed with STATA – version 16 (StataCorp, 2019). With the exception of the cluster analyses, all statistical analyses reported in the present article were carried out on the aggregate sample data ( $N=230$ ). The purpose of conducting the cluster analyses was to identify and delineate between characteristic clinical profiles. The cluster analyses were therefore restricted to sub-samples of adolescents with clinical-level difficulties. Two cluster analyses were performed. The first sought to identify characteristic profiles of attachment- and trauma-related symptoms as measured across eight ACA scales, excluding the *Low Confidence* scale. The Low Confidence was excluded because it measures low self-esteem that is not specifically symptomatic of mental ill-health. Cases were defined for the ACA cluster analysis as participants with a clinical range score on one or more ACA scales, including the ACA total clinical score. This method yielded 113 ACA cases.

The second cluster analysis sought to identify characteristic symptomatology across a broader range of symptoms, as measured by the CBCL DSM-oriented and ACA scales. The second cluster analysis identified symptom clusters across ten scales, namely: five CBCL DSM-oriented scales (Affective problems, Anxiety problems, Attention-deficit / hyperactivity problems, Oppositional defiant problems, and Conduct problems); and five ACA scales (Nonreciprocal interpersonal behaviour; social instability / behavioural dysregulation; emotional dysregulation / distorted social cognition; dissociation / trauma symptoms; and negative self-image). While CBCL syndrome scales have stronger empirical validity than the DSM-oriented scales, the latter were selected so that the identified clusters might be better referenced to standard classifications of child and adolescent mental disorders. Importantly, there is evidence that the DSM-oriented scales effectively delineate between young people with identified discrete DSM-IV-TR disorders (Nakamura, Ebesutani, Bernstein, & Chorpita, 2009). The DSM-oriented Somatic Problems scale was excluded because few adolescents in the present study were reported with clinical-level somatic problems. The remaining ACA scales were excluded because of the need to contain the number of variables included in the analyses (the excluded ACA scales measure less common difficulties). Cases were defined for the CBCL-DSM/ACA cluster analysis as participants with a clinical range score on any CBCL broadband or DSM-oriented scale, or on any ACA scale. This yielded 141 CBCL-DSM/ACA cases.

The first consideration in selecting a method to identify psychopathology clusters is the extent to which variation in adolescents' symptomatology can be subsumed within a hierarchical structure. Evidence of a hierarchical structure is found in common comorbidity patterns, and the existence of higher-order CBCL internalizing and externalizing factors. However, these examples translate as just two levels within a nested structure. At increasingly higher levels, a hierarchical analysis is likely to combine clusters that are not clinically coherent or meaningful.

Therefore, a non-hierarchical method is preferable for final identification of adolescent psychopathology clusters in both sets of analyses. The main drawback for a non-hierarchical method is that it provides no ready indication of the optimal number of clusters or likely relationships between clusters. Various researchers have thus recommended a two-stage cluster analysis method, whereby an exploratory cluster analysis is performed using a hierarchical method, followed by a confirmatory cluster analysis performed using a non-hierarchical method (Henry, Tolan, & Gorman-Smith, 2005; Steele & Aylward, 2007). Exploratory hierarchical cluster analyses were performed using the Ward's linkage method with Euclidean squared distance measure. Non-hierarchical cluster analysis was performed using the K-Means agglomerative method with Euclidean distance measure, and randomly generated starting centres. Hierarchical analyses were performed on scores that were rescaled using a range-bound transformation, namely  $Z = X / [Max(X) - Min(X)]$ , whereas raw scores were used for the non-hierarchical analyses. It was decided that cluster sizes of five or less identified among the present sample would be too small to have face validity, or to generate hypothesised symptom profiles.

## Results

### Inter-scale Correlations for the Aggregate Sample

There were high inter-scale correlations of the two CBCL externalizing sub-scale (*aggressive* and *rule-breaking*) raw scale scores ( $r = .75$  for boys and  $.73$  for girls) and between the *social problems*, *attention problems* and *thought problems* sub-scales (Boys  $r = .70$  to  $.76$ ; Girls  $r = .66$  to  $.74$ ). Among boys, *attention problems* also correlated highly with the *aggressive* and *rule-breaking* scores ( $r = .75$  and  $.64$ ), while a moderate correlation was present for girls ( $r = .60$  and  $.53$ ). However, the three internalizing syndrome scores, *withdrawn-depressed*, *anxious-depressed* and *somatic complaints* were only moderately correlated (Boys  $r = .52$  to  $.59$ ; Girls  $r = .34$  to  $.59$ ). Inter-scale correlations of ACA clinical scale scores for boys and girls are

reported in Table 1, while correlations of ACA clinical scale scores with CBCL syndrome, broadband and DSM-oriented raw scale scores are reported in Table 2.

[Insert Tables 1 and 2 about here]

### **Higher-order Factor Analysis of CBCL Syndrome Scores**

The higher-order factor structure of CBCL scores for the present sample was investigated through maximum likelihood factor analysis (with varimax rotations) of syndrome raw scale scores. This method retained a maximum of four factors. The 4-factor model was rejected because none of the scales loaded strongly ( $> 0.40$ ) on the fourth factor. The 3-factor model was the most clinically meaningful and statistically sound solution. Factor loadings for the 3-factor model are listed in Table 3, with loadings above 0.45 underlined. The three factors are labelled *Social-Attention-Thought problems (SAT)*, *Externalizing*, and *Internalizing*, with the Aggressive behaviour scale loading on to both the SAT and Externalizing factors, and the Anxious-Depressed scale loading on to both the Internalizing and SAT factors. The 2-factor model consisted of “Externalizing + SAT” (five syndromes) and “Internalizing” (three syndromes) factors.

[Insert Table 3 about here]

### **Combinations of Clinically Significant CBCL Syndrome Scores**

The proportions of young people with various combinations of clinically significant CBCL syndrome scores were calculated, with a view to identifying variations in the type and complexity of their symptomatology. Forty-three percent had at least one CBCL syndrome scale score in the clinical range. Table 4 lists the proportions of these 98 *clinical cases* having clinical-range scores on one through to a maximum of eight syndrome scales; as well as the proportions having clinical-range scores that are confined within each of three broadband symptom domains (internalizing, externalizing, and social-attention-thought problems); and the proportions having clinical-level scores that fall across two, as well as all three domains. Forty-

nine percent of cases had clinical-level scores confined to a single domain (i.e. either pure internalizing, pure SAT or pure externalizing), 33% had clinical-level scores within two domains, and 18% had clinical-level scores within all three domains.

[Insert Table 4 about here]

### **ACA Symptom Profile Types**

For the Ward's cluster analysis of ACA scores, stopping rules provided inconclusive guidance on the optimal number of clusters. Dendograms of the hierarchical cluster structures indicated that 8- to 10-cluster solutions yielded the greatest number of distinct symptom clusters containing six or more clinical cases. K-Means agglomerative cluster analyses were then carried out, specifying eight, nine and ten clusters. The 9- and 10-cluster solutions included clusters with very small case numbers. The 8-cluster solution was more acceptable because cluster sizes ranged from eight to 21 cases. Symptom profiles for these eight clusters, depicting variation in profile shape and overall elevation of scores, are presented in Figure 1. The symptom profiles place cluster mean scores for each of the ACA scales within the four ranges used on the ACA score profile sheets: sub-clinical scores are delineated between *normative range* and *elevated range* scores; while clinical-level scores are delineated between *clinically indicated range* (less severe) and *marked clinical range* (more severe) scores. Given that the mean food maintenance scores for all eight clusters were within the normative range, they are excluded from the symptom profiles.

[Insert figure 1 about here]

### **Symptom Profile Types: CBCL-DSM/ACA Scales**

For the Ward's cluster analysis of the CBCL-DSM and ACA scores, stopping rules provided inconclusive guidance on the optimal number of clusters. Dendograms of the hierarchical cluster structures indicated 9- to 11-cluster solutions yielded the largest number of

distinct symptom profiles containing six or more children. K-Means agglomerative cluster analyses were then carried out, specifying nine, ten and 11 clusters respectively. The 11-cluster solution was adopted, with cluster sizes ranging from eight to 23 cases. Symptom profile types for this combination of CBCL-DSM and ACA scales, depicting variation in profile shape and overall elevation of scores, are presented in Figure 2. For the CBCL-DSM scales, the four symptom severity ranges were defined by CBCL T-score ranges, namely *normative* (T-scores < 63, representing scores that are clearly normative); *elevated* (T-scores = 63-69, representing sub-clinical scores that are less clearly normative, with the upper end encompassing the CBCL borderline clinical range); *clinically indicated* (T-scores = 70-73, the moderate end of the clinical range); and *marked clinical* (T-scores > 73, the severe end of the clinical range).

[Insert figure 2 about here]

### **Discussion**

The present article describes an investigation into the nature, patterns and complexity of carer-reported mental health symptoms for a population sample of adolescents in long-term foster and kinship care. The study findings provide new insight into the nature, patterns and complexity of the mental health symptomatology of adolescents residing in foster and kinship care. Participants had almost universal exposure to severe and chronic maltreatment prior to their entry into care. Higher order factor analysis of CBCL syndrome scores suggests that the combination of Social, Attention and Thought (SAT) problems scores is a valid higher order symptom grouping for this population, in addition to the Externalizing and Internalizing constructs. A cluster analysis of clinical case scores on seven ACA scales identified eight symptom profiles that are delineated more by elevation than shape – that is, they are mostly differentiated by symptom severity and complexity rather than symptom specificity. A second cluster analysis of clinical case scores on five CBCL DSM-oriented and five ACA scales

identified 11 symptom profiles that are also differentiated more by symptom severity and complexity, rather than symptom specificity. Three of the 11 profiles (#9 to #11), manifested by 15% of the overall sample, describe severe and complex symptomatology that does not align with discrete DSM or ICD diagnoses. The present findings largely mirror previously-reported analyses of pre-adolescent mental health symptoms obtained in an earlier stage of the study (Tarren-Sweeney, 2013b).

### **Evidence that Social-Attention-Thought Problems (SAT) is a Valid Higher-order Construct**

Whereas adolescents in the general population manifest discrete differentiation between externalizing and internalizing problems on the CBCL, with no evidence of a third SAT higher-order construct (Achenbach, 1991; Achenbach & Rescorla, 2001), the present higher order factor analysis provides clear evidence of a 3-factor grouping for adolescents in OOHC. The strongest rotated factor (accounting for 42% of the 3-factor model) encompassed five of the eight CBCL syndrome scales, namely the three SAT scales, the anxious-depressed scale (that also loaded on the Internalizing factor), and the aggressive behaviour scale (that also loaded on the Externalizing factor). This provides further evidence that adolescent cases in OOHC with prior history of severe and chronic maltreatment manifest more complex psychopathology than do adolescent cases in the general population.

### **What do the Symptom Profile Types Represent?**

#### ***ACA Profiles***

Profiles #1 and #2 are both characterised by elevated, sub-clinical scores on three ACA clinical domains, and normative-level scores on four domains. Profile #4 is the only one of the eight profiles showing relatively discrete clinical symptomatology – namely clinical-level ‘non-reciprocal interpersonal relatedness difficulties’ and ‘social instability / behavioural dysregulation’ scores. Otherwise, the ACA profile types are delineated more by elevation than shape – that is,

they are mostly differentiated by symptom severity and complexity rather than symptom specificity.

### ***CBCL-DSM/ACA Profiles***

The first two CBCL-DSM/ACA profiles describe elevated difficulties that fall short of clinical threshold. Profiles #3 to #8 describe moderate to severe, though relatively non-complex clinical-level difficulties. Profiles #7 and #8 are characterized by clinical-level attachment- and trauma-related difficulties as measured by the ACA scales, with relatively low general mental health difficulties as measured by the CBCL. This suggests that a relatively large proportion of young people in care (11% of the present sample) have clinical-level psychopathology that is likely to be missed by general mental health measures such as the CBCL and the Strengths and Difficulties Questionnaire (SDQ). The remaining three profiles (#9 to #11) describe more severe and complex symptomatology that does not align well with discrete DSM or ICD diagnoses – essentially replicating what was found for pre-adolescent children in care (Tarren-Sweeney, 2013b). They describe variations of complex and severe symptomatology manifested by 15% of the overall sample – except that each profile includes clinical-level *conduct problems* and *social instability / behavioural dysregulation* scores. In common with the pre-adolescent symptom profiles, these severe and complex adolescent profiles do not align well with existing diagnostic constructs that have more discrete symptomatology. Two diagnoses that encompass broad attachment- and trauma-related symptomatology are DSM-V Borderline Personality Disorder (BPD) and ICD-11 Complex Post-traumatic Stress Disorder (C-PTSD). The companion article in this special issue reports on the alignment between the presently-reported CBCL-DSM/ACA profiles, and participants' nominal diagnosis of Borderline Personality Disorder (BPD) and Complex Post-traumatic Stress Disorder (C-PTSD) [insert companion article citation].

Looking more closely across the 11 profiles, we can see that none of them include clinical range CBCL *affective problems* or *anxiety problems*. This is unsurprising given that previous surveys have consistently found that children and adolescents in care are reported with lower internalizing difficulties relative to other difficulties on general measures such as the CBCL and SDQ (Goemans, van Geel, & Vedder, 2015; Tarren-Sweeney & Goemans, 2019). However, it is notable that Profiles #7 and #11 are characterized by clinical-level ACA *dissociation / trauma symptoms* alongside sub-clinical CBCL *anxiety problems*. The ACA scale measures trauma-related anxiety and dissociative symptoms, while the CBCL scale measures general anxiety symptoms. The present results suggest that a sizeable proportion of adolescents in care experience relatively high trauma-related internalizing difficulties that are not captured by general mental health measures such as the CBCL and SDQ, including dissociative symptoms, hypervigilance and acute perceptions of threat, and re-experiencing traumatic events. This finding therefore challenges the notion that children and young people in care have less internalizing problems relative to their other mental health difficulties. While four profiles (#6, #9, #10, #11) included clinical-level *conduct problems*, none of these four included clinical-level *oppositional defiant problems*. Instead, each of the four profiles identifies patterns of conduct problems co-occurring with social instability and behavioural and emotional dysregulation. These results suggests a need for further research into the nature of conduct disturbance manifested by this population as well as by other youth exposed to chronic and severe maltreatment in early and middle childhood.

### **Implications for practice and future research**

Accurate assessment and formulation of complex symptomology among this vulnerable population is critical for treatment planning. Until further progress is achieved, it is important that clinicians understand the particular limitations of standard classifications for children and adolescents in care who have complex symptomatology, and modify their clinical reasoning and formulations to account for this. Further research and scholarship is necessary to demystify the nature and patterns of complex attachment- and trauma-related mental health difficulties experienced among severely maltreated children and adolescents. Furthermore, the evidence base for treating complex presentations is opaque – standard mental health treatments have largely been evaluated with children and young people who have simple or discrete psychopathology. Establishing a robust evidence base for treating complexity requires accurate conceptualisation and classification of these symptoms, and/or developing trans-diagnostic treatments that target underlying clinical mechanisms (e.g. executive function deficits, regulatory mechanisms, social cognitions), rather than specific disorders.

### **Study Limitations**

The present study was hampered by a number of methodological and conceptual limitations. Firstly, adolescent mental health difficulties were measured solely using carer-report instruments. Further research on this topic should ideally include adolescent clinical interviews and self-report measures, as well as caregiver-report measures. However, it is important to retain caregiver measures in any future study, given evidence that young people in OOHC systematically under-report their mental health difficulties in population studies (Tarren-Sweeney, 2019). A more definitive study of adolescent symptomatology should utilize multiple informants, including adolescent self-report. Secondly, carer-report rating scales measure the number and frequency of adolescents' mental health symptoms, but not symptom intensity or

extremity, or functional impairment. High checklist scores thus only provide proxy estimates of severity. Future studies that are looking to gain a better understanding of complex presentations would benefit from more detailed symptom measurement. Finally, the ACA was developed for the present study because of the lack of suitable survey measures of attachment and trauma symptoms. While initial estimates of the ACA's validity and reliability are promising, it should be noted that the present findings are derived from a new and relatively untested measure.

### **Conclusions**

Among the present aggregate sample of adolescents in care, roughly 39% were reported with normative difficulties; another 16% had elevated, sub-clinical checklist scores; 30% had relatively non-complex, clinically significant psychopathology that can be conceptualized as discrete mental disorders or comorbidity within standard diagnostic classifications; and the remaining 15% had complex psychopathology that is not adequately conceptualized within DSM or ICD classification systems, with the possible exceptions of BPD and C-PTSD (see the companion article in the present special issue). These findings therefore suggest that a fairly large proportion of adolescents residing in OOHC who require clinical services have symptoms that elude coherent diagnostic formulation – at least using standard classifications. Furthermore, the equivalent rate is likely to be larger among adolescents residing in residential care.

There are some distinct differences between the derived symptom profiles that merit further research, and that may further our understanding of complex attachment- and trauma-related disorders. However, as with the pre-adolescent profiles, the adolescent profiles do not provide a basis for a new taxonomy. The CBCL-DSM/ACA clusters are differentiated more by profile elevation than profile shape or pattern, suggesting an absence of typology. Furthermore, whilst the symptom profiles are statistically differentiated, manual inspection of individual profiles suggests there is some variability in the symptomatology of cases within clusters, further

emphasising the absence of typology. Accurate formulation of clinical phenomena is an essential component of evidence-based psychological practice. Until further progress is achieved, it is important that clinicians understand the particular limitations of standard classifications for children and adolescents in care who have complex symptomatology, and modify their clinical reasoning and formulations to account for this.

### **Compliance with ethical standards**

The study was approved by the Human Ethics Committees of the University of Newcastle, Australia (H-2008-0256), and the University of Canterbury, New Zealand (HEC-2008/93). All procedures performed were in accordance with the ethical standards of the institutional research committees and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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**Table 1.** Correlation matrices of ACA clinical scale scores for girls (above diagonal, n=105), and boys (below diagonal, n=125) <sup>a</sup>

Total Clinical	.68	.92	.84	.58	.61	.50	.18 <i>ns</i>	
Non-reciprocal	.69		.49	.54	.28	.30	.17 <i>ns</i> .08 <i>ns</i>	
Social instability / behavioural dysregulation	.86	.52		.72	.38	.55	.49 .13 <i>ns</i>	
Emotional dysregulation / distorted social cognition	.83	.41	.60		.42	.33	.17 <i>ns</i> .17 <i>ns</i>	
Dissociation / trauma symptoms	.71	.40	.45	.60		.34	.47 .00 <i>ns</i>	
Food maintenance	.69	.48	.46	.50	.55		.44 .00 <i>ns</i>	
Sexual behaviour	.56	.28	.45	.36	.42	.30		
Suicide discourse	.50	.09 <i>ns</i>	.27	.58	.41	.29	.48	
	Total Clinical	Non-reciprocal	Social instability / behavioural dysregulation	Emotional dysregulation / distorted social cognition	Dissociation / trauma symptoms	Food maintenance	Sexual behaviour	Suicide discourse

<sup>a</sup> All *p* values < .05, except where indicated by *ns* (not significant)

## Adolescent symptom profiles

**Table 2.** Correlation matrix (Pearson's  $r$ ) of ACA and CBCL scale scores (age 11-18,  $n = 230$ )

ACA SCALES															CBCL SCALES		
	Syndrome scales							DSM-oriented scales				Broadband					
	Anxious / depressed	Withdrawn / depressed	Somatic complaints	Social problems	Thought problems	Attention problems	Rule-breaking	Aggressive	Affective problems	Anxiety problems	Somatic problems	ADH problems	Oppositional-defiant	Conduct problems	Internalizing	Externalizing	Total problems
I. Non-reciprocal	.42	.72	.25	.48	.52	.47	.49	.56	.51	.44	.18	.47	.49	.53	.57	.57	.62
II. Social instability / behavioural dysregulation	.55	.43	.30	.71	.60	.62	.75	.77	.44	.49	.22	.70	.64	.78	.54	.82	.80
III. Emotional dysregulation / distorted social cognition	.70	.50	.49	.62	.63	.47	.55	.73	.60	.62	.40	.50	.63	.63	.70	.70	.75
IV. Dissociation / trauma symptoms	.55	.46	.41	.49	.64	.51	.37	.45	.50	.56	.23	.45	.33	.40	.58	.44	.60
V. Food maintenance	.34	.36	.36	.46	.49	.34	.49	.49	.36	.32	.25	.38	.36	.52	.42	.53	.55
VI. Sexual behaviour	.27	.22	.13	.40	.47	.36	.49	.36	.32	.20	.00	.36	.22	.43	.26	.44	.46
VII. Suicide discourse	.38	.17	.28	.30	.43	.19	.25	.30	.46	.24	.20	.21	.25	.25	.34	.30	.36
Total clinical score	.70	.62	.45	.75	.76	.65	.73	.82	.65	.64	.32	.68	.67	.78	.74	.84	.89
<i>Internal consistency (Cronbach's alpha)</i>	.83	.75	.71	.84	.78	.89	.87	.92	.78	.78	.73	.87	.87	.91			

## Adolescent symptom profiles

**Table 3.** Higher-order factor analysis (maximum likelihood) of CBCL syndrome scale scores:  
Factor loadings on 3-factor model (N = 230)

	<b>Factor 1:</b> “Social-Attention- Thought (SAT)”	<b>Factor 2:</b> “Externalizing”	<b>Factor 3:</b> “Internalizing”
% variance accounted for by rotated factor	42%	32%	26%
<b>Syndrome scales</b>			
Anxious-depressed	<b><u>0.46</u></b>	0.20	<b><u>0.68</u></b>
Withdrawn-depressed	0.39	0.32	<b><u>0.47</u></b>
Somatic complaints	0.17	0.17	<b><u>0.63</u></b>
Social problems	<b><u>0.77</u></b>	0.35	0.29
Thought problems	<b><u>0.64</u></b>	0.32	0.40
Attention problems	<b><u>0.73</u></b>	0.40	0.17
Rule-breaking	0.26	<b><u>0.96</u></b>	0.13
Aggressive behaviour	<b><u>0.58</u></b>	<b><u>0.58</u></b>	0.30

## Adolescent symptom profiles

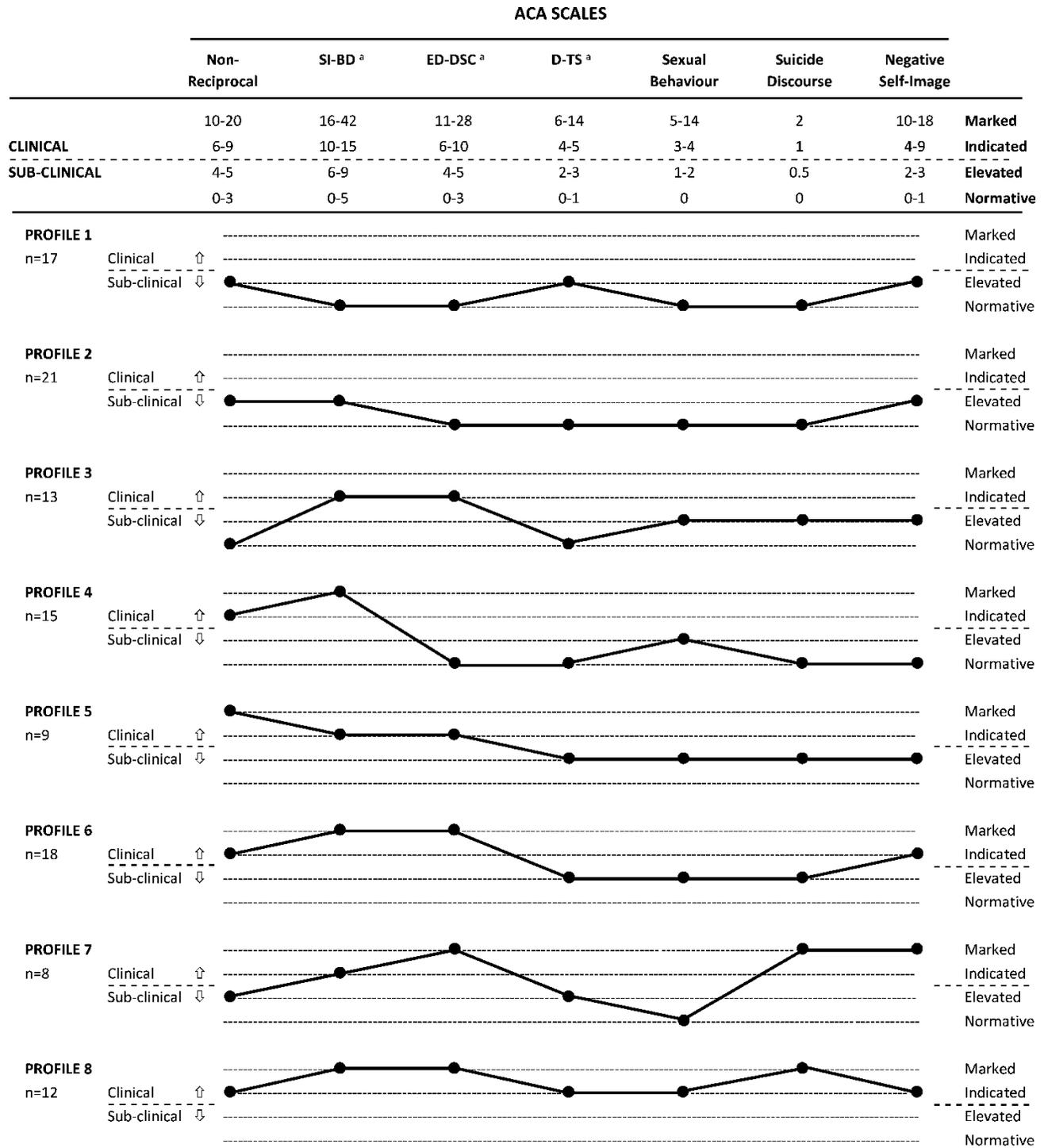
**Table 4.** Distributions of number and type of clinical range CBCL syndrome scores among clinical cases <sup>a</sup> (N=98)

	N	Percent
<b># syndrome scores in clinical range</b>		
<i>1</i>	36	36.7%
<i>2</i>	23	23.5%
<i>3</i>	9	9.2%
<i>4</i>	11	11.2%
<i>5</i>	10	10.2%
<i>6</i>	7	7.1%
<i>7</i>	0	0%
<i>8</i>	2	2.0%
<b>Location of clinical-range syndrome scores within symptom domains <sup>b</sup></b>		
<i>Internalizing only</i>	12	12.2%
<i>SAT only</i>	18	18.4%
<i>Externalizing only</i>	18	18.4%
<i>Internalizing + SAT</i>	7	7.1%
<i>Internalizing + Externalizing</i>	4	4.1%
<i>SAT + Externalizing</i>	21	21.4%
<i>Internalizing + SAT + Externalizing</i>	18	18.4%

<sup>a</sup> Clinical cases defined as children having at least one CBCL syndrome score in the clinical range (98/230)

<sup>b</sup> Location of clinical range syndrome scores within broadband symptom domains: Internalizing encompasses *withdrawn-depressed, anxious-depressed* and *somatic complaints* syndromes; SAT encompasses *social problems, thought problems* and *attention problems* syndromes; and Externalizing encompasses *rule-breaking* and *aggressive behaviour* syndrome

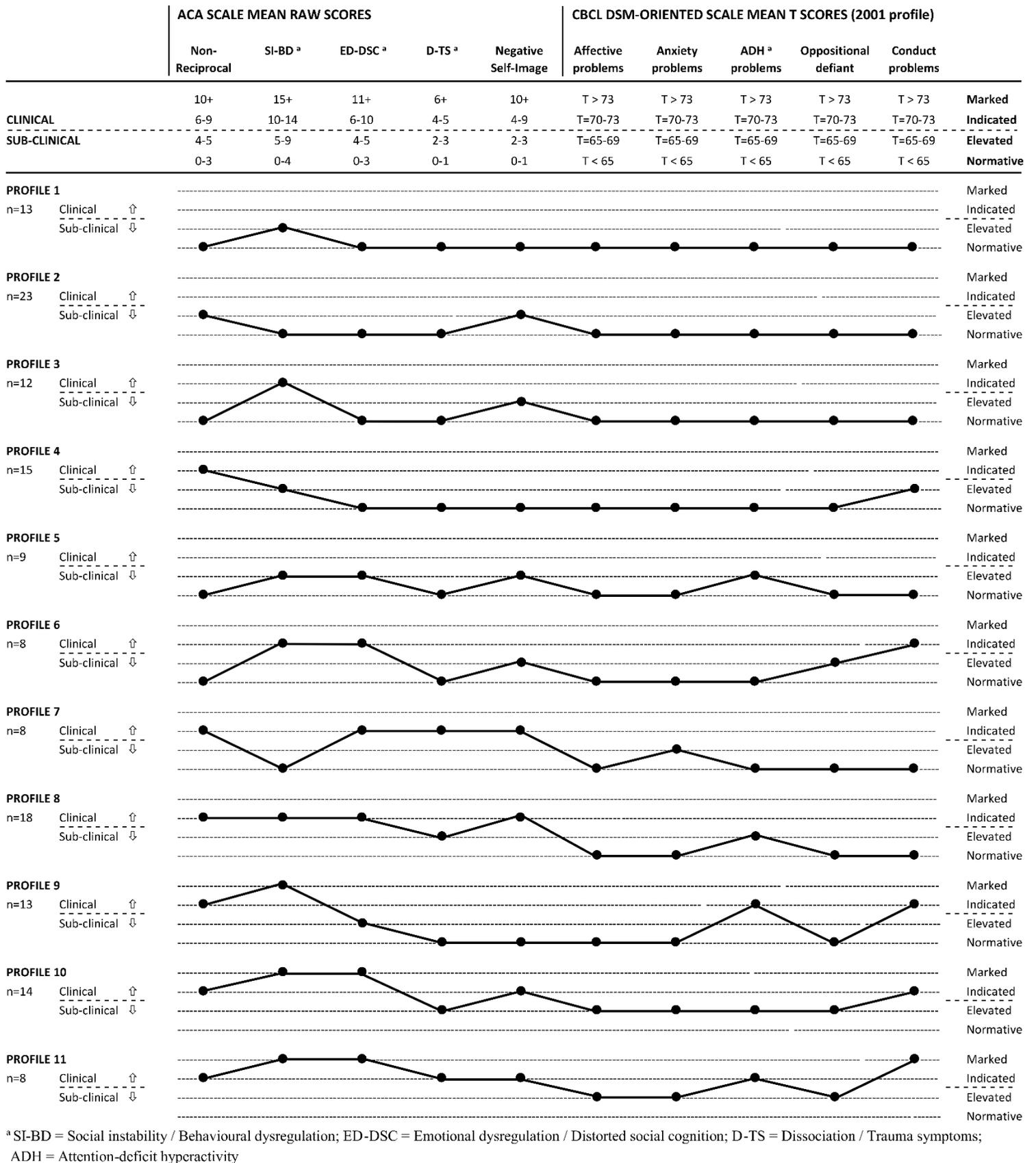
# Adolescent symptom profiles



<sup>a</sup>SI-BD = Social instability / Behavioural dysregulation; ED-DSC = Emotional dysregulation / Distorted social cognition; D-TS = Dissociation / Trauma symptoms

**Figure 1.** Symptom profile types:  
Mean ACA scale scores for 8 groups identified through K-means cluster analysis (n=113)

# Adolescent symptom profiles



**Figure 2.** Symptom profile types:

Mean DSM-oriented and ACA scale scores for 11 clusters identified through K-means cluster analysis (n=141)