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OF TURKU

CHILDHOOD ADVERSETIES AND MENTAL ILL HEALTH

Studies on associations between reported
childhood adverse and trauma experiences
and adult perceived attitudes of others,
mental disorders and suicidality

Raimo K. R. Salokangas



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ABSTRACT

Several studies have indicated that childhood adversities and trauma (CAT) are not uncommon and that they are often associated with physical illnesses, mental problems and disturbed behaviour in adulthood. We have no standardised Finnish instrument for assessment of CAT, and our knowledge of the association between CAT and mental wellbeing is still sporadic. In particular, knowledge of specific associations of CAT with mental problems and gender differences is sparse.

The aims of this study programme were to evaluate the feasibility of a new Finnish CAT instrument and the associations of CAT experiences with adult individuals' perceived attitudes of other people, and the associations of CAT with suicidality and psychiatric disorders.

The study samples comprise 692 adult individuals from the general population, 250 patients attending primary care, 160 patients attending psychiatric outpatient care, and 245 patients with clinical high risk (CHR) of psychosis. The three first samples were recruited from South-West Finland. The CHR sample was available from the European Prediction of Psychosis Study (EPOS). In each sample, CAT was assessed with the Trauma and Distress Scale (TADS) which was translated into Finnish.

TADS and its five sub-scale domains indicated good psychometric properties in terms of internal consistency, content, inter-method reliability and concurrent validity for adults from a Finnish community sample. TADS appeared to be a useful instrument for the assessment of retrospectively reported childhood adversity and trauma in the general population and clinical samples.

In the general population, nearly three fourths (72.3%) of individuals reported at least one and nearly a half (48.1%) two or more CAT experiences. In primary care, the corresponding figures were 76.9% and 57.7%, and in psychiatric outpatient care, 94.4% and 80.6%.

Childhood adverse and trauma experiences in general and emotional neglect specifically associated with negative perceived attitude of others in adulthood. The effects of CAT experiences on adult perceived negative attitude of others seem to be stronger in males than in females.

All CAT domains associated significantly with reported alcohol problems. In females, sexual abuse and physical abuse had a direct effect on alcohol problems, while in males the corresponding effects were mainly mediated via depressive mood.

Emotional abuse and neglect and physical abuse associated most strongly with current mood and anxiety disorders. However, there were considerable inter-correlations within the CAT domains, as well as comorbidity between clinical diagnoses. When these inter-correlations were taken into account, physical abuse and emotional neglect had the strongest specific association with adult psychiatric disorders and might transmit main effects of other CAT domains onto mental disorders.

In a random clinical sample, most psychiatric disorders and CAT domains associated with suicide risk. However, when the effect of co-morbidity and overlap of CAT domains was controlled, major depression, social phobia, alcohol, drug dependency and emotional abuse seemed to increase the risk of suicide. This risk profile varied between the genders. In clinical high risk to psychosis patients, all CAT domains except physical neglect predicted suicidal ideations. The effect of CAT on suicidal ideation was mediated via clinical depression and concurrent depression symptoms.

Gender proved to be a central moderating factor in effects of CAT experiences on mental wellbeing. Therefore, in addition to controlling for the effect of gender in the analyses, it is also important to carry out analyses for females and males separately.

Emotional neglect and physical abuse proved to be associated specifically with adult psychiatric disorders and, emotional neglect also with perceived negative attitude of other people.

These both CAT domains touche on child's and adolescent's basic needs of safety and love, and may consequently damage their psychic integrity and self-esteem, predisposing him/her to a distrusting attitude towards other people and making him/her vulnerable to adult mental problems and disorders.

The majority of childhood adverse and trauma experiences are family-centred. Parents' mental health and their mutual interaction, i.e. family function, form a central basis for the children's undisturbed development. Therefore, early family-centred therapeutic and educational interventions directed to improving parents' and children's mental health, and to supporting parents in their parenthood can protect children from adverse and traumatic experiences. Societal measures to help families facing economic and other difficulties can contribute to the same goal. At the level of the whole society, it is a question of valuation of family life. Societal actions should be taken to support a stable and harmonious family life, and to really value children and their wellbeing. Moreover, the public media have an important role to play in these actions.

KEY WORDS: childhood adversities and trauma, assessment instrument, perceived attitude of others, mental disorders, alcohol problems, suicidal thoughts, general population, primary care, psychiatric care, risk of psychosis

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TIIVISTELMÄ

Lukuisat tutkimukset ovat osoittaneet, että lapsuuden kaltoinkohtelu ja traumat (KT) eivät ole harvinaisia ja että ne usein yhdistyvät aikuisiän fyysisiin sairauksiin, mielenterveyden ongelmiin ja häiriintyneeseen käyttäytymiseen. Meillä ei ole vielä standardoitua suomenkielistä mittaria lapsuuden KT:n arviointiin ja tietomme KT:n ja psyykkisen hyvinvoinnin välisistä yhteyksistä on edelleen satunnaista. Varsinkin tietomme KT:n ja psyykkisten ongelmien välisistä spesifisistä yhteyksistä ja sukupuolieroista ovat niukkoja.

Tässä tutkimuskokonaisuudessa pyrittiin arvioimaan uuden suomenkielisen lapsuuden KT-instrumentin käyttökelpoisuutta, KT:n yhteyksiä koettuun, muiden taholta tulevaan asennoitumiseen sekä KT:n yhteyksiä itsetuhoisuuteen ja psykiatriisiin häiriöihin.

Tutkimusaineistot käsittävät 692 yleisväestön aikuista, 250 terveyskeskukseen ja 160 psykiatriseen avohoitoon tullutta sekä 245 psykoosiriskissä olevaa potilasta. Kolme ensiksi mainittua otosta kerättiin Lounais-Suomesta. Psykoosiriskiaineisto tuli European Prediction of Psychosis study:stä (EPOS). Kaikissa aineistoissa lapsuuden kaltoinkohtelu ja traumat arvioitiin Trauma and Distress Scale:lla (TADS), joka oli käännetty englannista suomeksi.

TADS:n ja sen viiden komponentin psykometriset ominaisuudet: sisäinen konsistenssi, sisältö, menetelmällinen reliabiliteetti, samanaikaisvaliditeetti, osoitautuivat hyviksi suomalaisessa väestöotoksessa. TADS osoittautui käyttökelpoiseksi instrumentiksi, kun takautuvasti raportoituja lapsuuden kaltoinkohtelua ja traumoja arvioidaan yleisväestössä ja kliinisissä aineistoissa.

Yleisväestöstä lähes kolme neljäsosaa (72.3%) raportoi vähintään yhden ja lähes puolet (48.1) kaksi tai useamman lapsuuden KT-kokemuksen. Terveyskeskuksen potilailla vastaava osuudet olivat 76.7% ja 57.7% ja psykiatrisilla avohoitopotilailla 94.4% ja 80.6%.

Lapsuuden kaltoinkohtelu ja traumakokemukset yleisesti ja emotionaalinen laiminlyönti spesifisesti yhdistyivät aikuisiässä koettuun, toisten ihmisten negatiiviseen asenteeseen. KT-kokemusten vaikutukset aikuisiässä koettuun, toisten ihmisten negatiiviseen asenteeseen näyttivät olevan miehillä voimakkaampia kuin naisilla.

Kaikki KT:n komponentit yhdistyivät merkitsevästi raportoituihin alkoholiongelmiin. Naisilla seksuaalinen hyväksikäyttö ja fyysinen kaltoinkohtelu yhdistyivät suoraan alkoholiongelmien esiintymiseen; miehillä vastaavat yhteydet välittyivät pääasiassa masentuneen mielialan kautta.

Emotionaalinen kaltoinkohtelu ja laiminlyönti sekä fyysinen kaltoinkohtelu yhdistyivät vahvimmin ajankohtaisiin mieliala- ja ahdistuneisuushäiriöihin. KT:n komponentit kuitenkin korreloivat huomattavasti keskenään, samoin kliinisten diagnoosien kesken ilmeni samanaikaisesiintymistä. Kun nämä samanaikaiskorrelaatiot otettiin huomioon, fyysinen kaltoinkohtelu ja emotionaalinen laiminlyönti yhdistyivät spesifisesti aikuisiän psykiatriisiin häiriöihin ja saattoivat siten välittää KT:n muiden komponenttien pääasialliset vaikutukset mielenterveyden häiriöihin.

Satunnaisessa kliinisessä aineistossa useimmat psykiatriset häiriöt ja lapsuuden KT:n komponentit yhdistyivät itsemurhariskiin. Kuitenkin kun oheissairaudet ja KT:n komponenttien päällekkäisyys oli kontrolloitu, masennustila, sosiaalinen fobia, alkoholi- ja huumeriippuvuus sekä emotionaalinen kaltoinkohtelu näyttivät lisänneen itsemurhariskiä. Tämä riskiprofiili vaihteli sukupuolten välillä. Psykoosiriskipotilailla kaikki KT:n komponentit paitsi fyysinen laiminlyönti ennustivat seuranta-aikaisia itsetuhoisia ajatuksia. KT:n vaikutus itsetuhoisiin ajatuksiin välittyi perusvaiheen kliinisen masennushäiriön ja samanaikaisen masentuneisuuden kautta.

Sukupuoli osoittautui keskeiseksi muovaavaksi tekijäksi, kun tarkasteltiin lapsuuden KT:n vaikutusta psyykkiseen hyvinvointiin. Niinpä sen lisäksi, että sukupuolen vaikutus analyyseissä kontrolloidaan, on tärkeää myöskin suorittaa analyysejä naisilla ja miehille erikseen.

Emotionaalinen laiminlyönti ja fyysinen kaltoinkohtelu osoittautuivat yhdistyvän spesifisti psykiatriisiin häiriöihin ja emotionaalinen laiminlyönti myös negatiiviseksi koettuun toisten ihmisten asenteeseen. Nämä molemmat KT:n muodot koskettavat lapsen ja nuoren perustavaa laatua olevia turvallisuuden ja rakastettuna olemisen tarpeita ja voivat siten vahingoittaa hänen psyykkistä eheyttään ja itsetuntoaan altistaen hänet aikuisiässä epäluottamuksen sävyttämälle asenteelle toisia ihmisiä kohtaan sekä mielenterveyden ongelmille ja häiriöille.

Enemmistö lapsuuden kaltoinkohtelusta ja traumakokemuksista liittyy perheisiin. Vanhempien mielenterveys ja heidän keskinäinen vuorovaikutuksensa, ts. perhefunktio, muodostaa keskeisen pohjan lasten häiriöttömälle kehitykselle. Tämän vuoksi varhaiset vanhempien ja lasten mielenterveyttä tukevat perhekeskeiset terapeuttiset ja neuvontatoimenpiteet sekä vanhempien tukeminen heidän vanhemmuuden tehtävässään voivat suojata lapsia ja nuoria kaltoinkohtelulta ja traumakokemuksilta. Sosiaalipoliittiset toimenpiteet, jotka suunnataan perheisiin niiden kohdatessa taloudellisia ja muita vaikeuksia, voivat vaikuttaa samaan tavoitteeseen. Koko yhteiskunnan taholla kyse on perhe-elämän arvostamisesta. Yhteiskunnan tuleekin ryhtyä toimenpiteisiin stabiilin ja tasapainoisen perhe-elämän tukemiseksi sekä suhtautua todella arvostavasti lapsiin ja heidän hyvinvointiinsa. Myös julkisella medialla on tärkeä rooli näissä toimenpiteissä.

AVAINSANAT: lapsuuden kaltoinkohtelu ja traumat, arviointimittari, kokemus toisten taholta tulevasta asennoitumisesta, mielenterveyden häiriöt, alkoholi-ongelmat, itsetuhoajatukset, väestö, perusterveydenhuolto, psykiatrinen erikoissairaanhoito, psykoosiriski.

Acknowledgements

Why did I select childhood adverse and traumatic experiences as the subject of this my second thesis? My first thesis *The Psychosocial Development of Schizophrenic Patients* (1977) was proposed and supervised by my teacher Professor Yrjö O. Alanen, MD, PhD. Professor Alanen's own thesis *The Mothers of Schizophrenic Patients* (1952) had dealt with communicative and emotional disturbances in mothers with schizophrenic children. In his teaching, the problems in families where children, who later suffered from schizophrenia, grew up were thoroughly and emphatically described. Thus, it is possible to see the series of studies of this thesis as an extension of the same study area; now focused on individuals' painful childhood experiences. Therefore, I would like to express my deepest gratitude to Professor Alanen for his teaching of a humane attitude to psychiatric patients, as well as his enthusiastic stimulus and support throughout my scientific career.

Concerning this thesis, I would like first to thank Professor Jukka Häynä, PhD who kindly agreed to act as my supervisor during preparation of this thesis work and accepted it for publication in the series of the Department of Psychology. Professor Häyhä has helped me greatly in both practical and theoretical issues concerning my thesis. My successor as Professor of Psychiatry, Jarmo Hietala, MD, PhD I would like to thank for our longstanding and fruitful collaboration in clinical and scientific psychiatry, as well as for the numerous stimulating discussions on science and everyday life. I am grateful to Professors Kirsi Honkalampi, PhD and Raija-Leena Punamäki, PhD, MBA for agreeing to review this thesis. Their careful work and constructive comments have helped me to improve this work.

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In Turku, July 2020
Raimo K. R. Salokangas

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List of Original Publications

This dissertation is based on the following original publications, which are referred to in the text by their Roman numerals:

- I Salokangas, R. K. R., Schultze-Lutter, F., Patterson, P., Graf von Reventlow, H., Heinimaa, M., From, T., Luutonen, S., Hankala, J., Kotimäki, M., & Tuominen, L. (2016). Psychometric properties of the Trauma and Distress Scale, TADS, in an Adult Community Sample in Finland. *European Journal of Psychotraumatology*, 7: 30062. doi.org/10.3402/ejpt.v7.30062.
- II Salokangas, R. K. R., From, T., Luutonen, S., & Hietala, J. (2018). Adverse childhood experiences leads to perceived negative attitude of others and the effect of adverse childhood experiences on depression in adulthood is mediated via negative attitude of others. *European Psychiatry*, 54, 27–34. doi: 10.1016/j.eurpsy.2018.06.011.
- III Salokangas, R. K. R., From, T., Luutonen, S., Salokangas, H. R. W., & Hietala, J. (2018). Effect of childhood adversities on alcohol problems is mainly mediated by depression. *The American Journal of Addictions*, 27, 391–399. doi: 10.1111/ajad.12734.
- IV Salokangas, R. K. R., Schultze-Lutter, F., Schmidt, S. J., Pesonen, H., Luutonen, S., Patterson, P., Graf von Reventlow, H., Heinimaa, M., From, T., & Hietala, J. (2020). Childhood physical abuse and emotional neglect are specifically associated with adult mental disorders. *Journal of Mental Health*, 29(4), 376–284. doi:10.1080/09638237.2018.1521940.
- V Salokangas, R. K. R., Luutonen, S., Heinimaa, M., From, T., & Hietala, J. (2019). A study on the association of psychiatric diagnoses and childhood adversities with suicide risk. *Nordisk Journal of Psychiatry*, 73(2), 125–131. doi: 10.1080/08039488.2018.1493748.
- VI Salokangas, R. K. R., Patterson, P., Hietala, J., Heinimaa, M., From, T., Ilonen, T., Graf von Reventlow, H., Schultze-Lutter, F., Juckel, G., Linszen, D., Dingemans, P., Birchwood, M., Klosterkötter, J., Ruhrmann, S., & the EPOS group. (2019). Childhood adversity predicts persistence of suicidal thoughts differently in females and males at clinical high risk patients of psychosis. Results of the EPOS project. *Early Intervention in Psychiatry*, 13(4), 935–942. doi: 10.1111/eip.12714.

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Abbreviations

ACTH	Adrenocorticotrophic hormone
ANYDEP	Any depressive disorders
ANYMAN	Any manic disorder
ANYPSY	Any psychotic disorder
ANYANX	Any anxiety disorder
ANYSUB	Any substance disorder
AoO	Attitude of others
APs	Alcohol problems
BDI	Beck Depression Inventory
CAT	Childhood adversities and trauma (ACE in the original Study II is replaced by CAT)
CNS	Central nervous system
CHR	Clinical high risk
EPOS	European Prediction of Psychosis Study
EmoAb	Emotional abuse
EmoNeg	Emotional neglect
SexAb	Sexual abuse
PhyAb	Physical abuse
PhyNeg	Physical neglect
HPA	Hypothalamic-Pituitary-Adrenal
LKT	Lapsuuden kaltoinkohtelu ja trauma
PrimC	Primary care
PsychC	Psychiatric care
SIPS	Structured Interview for Prodromal Syndromes
SCID-1	Structured Clinical Interview for DSM-IV
SUI	Suicidal ideation
TADS	Trauma and Distress Scale

1 Introduction

It is generally accepted that childhood is an extremely important period for an individual's biological, cognitive, emotional and social development. Compared with other mammals, human newborns are helpless and need protection and care for a long time. Self-evidently, the quality of care is decisive for the infant's undisturbed physical growth, as well as for the development of emotional balance and social skills. However, childhood growing circumstances are not always adequate. Several studies have indicated that childhood adversities and trauma (CAT) are not uncommon, but are world-wide problems (e.g. Stoltenborgh, van IJzendoorn, Euser, & Bakermans-Kranenburg, 2011; Stoltenborgh, Bakermans-Kranenburg, van IJzendoorn, & Alink, 2013a; Stoltenborgh, Bakermans-Kranenburg, & van IJzendoorn, 2013b; Chiu et al., 2013), and that they are often associated with physical illnesses, mental problems and disturbed behaviour in adulthood (Green et al., 2010; McLaughlin et al., 2010; Iffland et al., 2013; Schüssler-Fiorenza et al., 2014; Ferguson & Dacey, 1997; Pine & Cohen, 2002; Briere, Hodges, & Godbout, 2010; Varese et al., 2012). For example, in the United States and Germany, more than a half of a population sample reported childhood adversities (Green et al., 2010; Iffland et al., 2013).

1.1 Theories related to the effects of CAT experiences

The effects of the CAT experiences on the individual's well-being can be understood through various theories. The psychoanalytic theory emphasises the significance of intrapsychic drives and conflicts. Freud (1926) proposed that a traumatic event, characterized by the experience of helplessness, precipitates intense anxiety that mobilizes the ego to avoid future encounters with potentially re-traumatizing stimuli. Traumatic experience can make the individual hypersensitive to potential cues of impending trauma and this hypersensitivity evokes a dysphoric and highly mobilizing state of anxiety (Yates, 2004). In line with the psychoanalytic theory, Janet (1889; ref. Yates, 2004) argued that that intense affective stimulation related to a traumatic event may, because of psychological defences, such as dissociation, prevent its integration with cognition. Dissociation interferes with the formation of

a personal narrative because it necessitates a “narrowing of consciousness” such that traumatic events cannot be associated and integrated with other experiences (Yates, 2004).

The object relation and attachment theories focus on the role of internalised representations of self, others, and self–other relationships in human development. Winnicott (1971) suggested that in an inadequate parental “holding” environment, the child may fail to develop a coherent and genuine sense of self. The caregiver’s failure to provide adequate nurturance and protection leads to premature maturation of the “false” self, which protects the “true” self by preventing its spontaneous and creative expression. The “false” self is a defence trying to anticipate others’ demands and complying with them in order to protect the true “self” from a world that is felt to be unsafe. The attachment theory (Bowlby, 1973) proposes that in the context of the attachment relationship, the child internalises a sense of the caregiving other as reliable or unreliable, as protective or threatening, and a complementary perception of the self as deserving or undeserving of care, as effective or inept at eliciting adequate nurturance, support, and protection. These internalized representations form the basis of the working models of the self, of others, and of the self-with-others that guide future behaviour and shape subsequent experiences in the interpersonal milieu. Negative representational models of attachment figures, built during childhood and adolescence, tend to persist relatively unchanged into and throughout adult life, and can manifest in neurotic symptoms and personality disorders (Bowlby, 1977). Ainsworth et al. (1978) identified three distinct patterns or styles of attachment: secure, anxious-resistant or ambivalent, and avoidant. The securely attached child will develop positive expectations of both the self and others with respect to eliciting nurturance and obtaining comfort. In contrast, the insecurely attached child will likely develop negative relational expectations. Parental emotional rejection as a part of the acceptance-rejection syndrome may specifically lead to psychological maladjustment, including a negative worldview (Rohner, 2004).

The developmental psychopathology approach provides a framework within which psychoanalytic, object relation, attachment and psychosomatic theories can be integrated, and adaptation across time and contexts is articulated within the organizational theory of development (Cicchetti & Cohen, 1995; Sroufe & Rutter, 1984; Sroufe, 2005). The quality of individual adaptation represents the shared influence of both contemporaneous experience and previous development (Sroufe & Fleeson, 1986). Because the relations among successive adaptations are probabilistic rather than deterministic, the organizational model also accommodates individual differences in patterns of adaptation over time; a single developmental starting point may yield divergent outcomes (i.e., multifinality), and different patterns of early adaptation may converge on a single developmental endpoint. However, since

behaviour is always a function of the entire life history, change, even when substantial, does not mean that early experience and early adaptation are erased. There is a tendency for individuals to return to trajectories of development following perturbations (Bowlby, 1973; Sourfe, 2005)

Adopting the organizational theory of development, Sroufe, Egeland, & Carlson (1999) identified five core levels of competence (motivational, attitudinal, instrumental, emotional and relational) that contribute to the successful negotiation of developmental issues. Traumatic experiences, particularly in the caregiver's environment, may lead to negative other-representations (negative expectations of others), negative self-representations (unfavourable self-representations), ineffective integration (ineffective skills in negotiating developmental issues), and may affect dysregulation (inability to regulate emotions, arousal and impulse) and vague self-other boundaries (incapacity to engage in reciprocal and emphatic relationships). In the context of traumatizing childhood experience, particularly maltreatment, the individuals may not develop adaptive self and other expectations, effective tools for the perception, interpretation, and integration of experience, competent arousal modulation strategies, and/or the capacity to engage in fulfilling and meaningful relationships with social partners. Experiments on the recognition of emotions in faces have shown that traumatised children's experience with the world differ from that of non-traumatised individuals (Pollak et al., 2000; Scrimin et al., 2009), indicating that during their psychosocial development they interpret other people's emotions differently.

Childhood adverse and traumatic experiences, in particular repetitive ones, may also have biological effects. Teicher (2000) has proposed that abusive experiences may induce a cascade of stress-mediated effects on hormones (e.g. glucocorticoids and vasopressin-oxytocin) and noradrenergic neurotransmitters. In addition, exposure to early stress programs the individual to display enhanced stress responsiveness, which may affect important developmental processes, including neurogenesis, synaptic overproduction and pruning, and myelination during their sensitive periods (Teicher et al. 2002). These effects would likely target specific stress-susceptible brain regions including the hippocampus, amygdala, neocortex, cerebellum and white matter tracts (Teicher et al., 2002). Apart from possibly causing damaging long-term effects, early stress can also increase CNS resistance and resilience to and be favourable for adaptation to adult stress situations (Teicher, 2000; Teicher & Samson 2016).

The hypothalamic-pituitary-adrenal (HPA) axis is one of the core stress systems, responsive to many stressors including early-life stressors like CAT (Macrì et al., 2011; Koss & Gunnar, 2018). Exposure to mild or moderate stressors may enhance HPA regulation and promote a lifelong resilience to stress, while early-life exposure to extreme or prolonged stressors can induce a hyper- or hypo-reactive HPA axis and

may contribute to lifelong vulnerability to stress (Flinn et al., 2011; Hinkelmann et al., 2013; De Bellis & Zisk, 2014). CAT may sensitise neuroendocrine, autonomic and behavioural responsiveness to stress as well as to HPA axis dysregulation. This sensitization extends to adult life, and when a new emotional stressor or traumatic reminder is experienced, the HPA axis response will be enhanced with higher adrenocorticotrophic hormone (ACTH) and higher cortisol levels (De Bellis & Zisk, 2014).

Genetic predisposition may have double effects on CAT. Genetic factors may affect childhood victimisation, as well as modify effects of childhood adversities (Pezzoli et al., 2019). On the other hand, the epigenetic hypothesis suggests that stress-induced neuronal and synaptic changes may be the result of alterations in genetic functions, possibly through DNA methylation. The epigenetic hypothesis has received support in animal studies (e.g. Weaver et al., 2004; Roth et al., 2009). The molecular DNA changes caused by environmental stress can be permanent and transmittable to following generations (Richards, 2006; Franklin et al., 2010; Gröger et al., 2016).

Gender may play an important role in both CAT experiences and adult mental problems. Adverse early experiences (e.g. girls are at greater risk for sexual abuse than boys), the central nervous system (CNS) development (e.g. hemisphere laterality) and hormonal milieu may differ between females and males. There are also gender differences in prevalence of mental disorders (e.g. depression) and suicidal behaviour (Teicher et al., 2006; Teicher & Samson, 2016, Miller et al., 2013). Therefore, there are grounds to analyse possible effects of CAT experiences in females and males separately (Miller et al., 2013).

1.2 General aims

Prevalence of CAT depends on the population studied and the CAT assessment instruments used. In Finland, we have had no Finnish standardised instrument for the assessment of CAT experiences. Consequently, we have no knowledge of the prevalence of adverse and trauma experiences in the Finnish general population or in help-seeking populations. The CAT experiences associate with mental and behavioural problems cumulatively, i.e. the individuals with mental disorders usually report experiences of several CAT domains. Less is known about which of the CAT domains have a specific effect on disorders of interest. In addition to CAT associating with mental problems, it may also have an effect on attitudinal thinking. These questions were considered in the present study program comprising a validation of the Finnish version of the Trauma and Distress Scale (TADS) and studies on the associations of CAT and mental ill-being and disorders. In the analyses, special attention has paid to gender differences and similarities.

2 Review of the Literature

2.1 Assessment of CAT

Several interview and self-report instruments for the assessment of CAT have been developed (e.g. Bernstein et al., 1994 and 1997; Bremner, Vermetten, & Mazure, 2000; Bremner, Bolus, & Mayer, 2007; Briere & Runtz, 1990; Gallagher et al., 1989; Felitti et al., 1998, Roy & Perry, 2004; Thabrew, de Sylva, & Romans, 2012). However, reliable reporting of the psychometric properties of retrospective childhood trauma measures is frequently lacking (Burgermeister, 2007; Thabrew, de Sylva, & Romans 2012).

A clinician-administered assessment (the Childhood Trauma Interview, Bernstein et al., 1994) resulted in the development of a self-report inventory, the Childhood Trauma Questionnaire (Bernstein et al., 1997) that includes childhood emotional, physical, and sexual abuse, as well as emotional and physical neglect, as the core domains. Another self-report questionnaire, the Early Trauma Inventory–Self Report, assesses physical, emotional, and sexual abuse, as well as general traumas (Bremner, Bolus, & Mayer, 2007). Emotional and physical abuse, emotional and physical neglect, and sexual abuse are generally regarded in the literature as five core childhood adversity domains (Burgermeister, 2007; Thabrew, de Sylva, & Romans, 2012). Psychometric properties of the Childhood Trauma Questionnaire (Bernstein et al., 1997) and the Early Trauma Inventory– Self Report (Bremner, Bolus, & Mayer, 2007) have been established. A broader definition of adversity can include peer emotional abuse; peer bullying; witnessing violence against a parent or sibling; bereavement and other loss; parental mental illness; stigma and discrimination and other traumatic events such as natural disasters (Kessler, Davis, & Kendler, 1997; Varese et al., 2012; Teicher & Parigger, 2015).

Within the European Prediction of Psychosis Study (EPOS; Klosterkötter et al., 2005), Patterson et al. (2002) developed a new self-report instrument, the Trauma And Distress Scale (TADS) to enable the assessment of a range of adverse childhood experiences in patients at clinical high risk of psychosis. Items for the TADS were initially selected from a comparison of several scales for the assessment of traumatic, adverse and distressing childhood events or experiences including the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994) and the Child Abuse and

Trauma Scale (CATS; Sanders & Becker-Lausen, 1995). Additional items were gathered from a review of common childhood adversity-related issues reported by clinical staff treating individuals in youth and adult mental health services in EPOS project centres. The aim was to come to agreement on a checklist of items describing core domains of childhood adversity, and for the scale to be feasible in both self-report and interview formats for working with high-risk clinical samples and additional comparative populations. To ensure adequate content validity and psychometric consistency (Streiner, 1993; Michel et al., 2014), frequency ratings employing a 5-point Likert-scale focused on the five core domains: emotional neglect (EmoNeg) and abuse (EmoAb), physical neglect by parents/caregivers (PhyNeg), physical abuse (PhyAb) and sexual abuse (SexAb) by non-specified offenders.

Because there was no Finnish instrument for assessment of CAT, TADS was translated into Finnish and has since then been used in several studies (e.g., Joukamaa et al., 2008; Tikka et al., 2012; Luutonen et al., 2013; Aaltonen et al., 2017). In the present study program, we aimed to examine the psychometric properties of TADS and its feasibility in assessing CAT in general, as well as in clinical populations.

2.2 Childhood attachment and perceived attitude of others

According to Bowlby's (1973) attachment theory, the styles with which we interpret other people's attitudes towards us, have their roots in our childhood. In interaction with the attachment figures (most often with parents), children develop representational models that allow them to predict and interpret the behaviour of attachment figures and view themselves in relation to others. Negative representational models of attachment figures, built during childhood and adolescence, tend to persist relatively unchanged into and throughout adult life, and can manifest in neurotic symptoms and personality disorders (Bowlby, 1977). On the other hand, some people with neurotic or personality problems can produce their own severe life events in response to early negative experiences (Harris 2001). According to Rohner (2004), parental emotional rejection as a part of the acceptance-rejection syndrome may specifically lead to psychological maladjustment including a negative worldview.

Childhood adverse and trauma experiences can distort the development of the representational models, specifically the worthiness of the self and expectations of others' reactions to the self, resulting in insecure or vulnerable attachment styles, such as low self-esteem, poor support and childhood adversity, emotional disorders, depression in particular, and disruption in psychosocial functioning in adulthood

(Alexander, 1993; Bifulco et al., 2002; Harris & Bifulco, 1991; McLaughlin et al., 2011; Pirkola et al., 2005). Negative parenting practices, such as high level of criticism, verbal humiliation and lack of emotional warmth, may lead to dysfunctional attitudes and attribution styles with vulnerability for depression (Abramso, Metalsky, & Alloy, 1989; Beck, 2008; Brown, Harris, & Hepworth, 1995; Harris, 2001; Ensink et al., 2019). It is thus possible that insecure attachment styles with dysfunctional attitudes, such as perceived negative attitude of others (AoO), may act as mediators between CAT and depression in adulthood.

It has also been found that family environments with CAT experiences are associated with poor mental health, in particular depression (Lindert et al., 2014; Mandelli, Petrelli, & Serretti, 2015; Pirkola et al., 2005; Repetti, Taylor & Seeman 2002; Weich et al., 2009), and that depression may change the way individuals perceive their environment, including other people and their attitude towards themselves (Bora, Bartholomeusz, & Pantelis 2016; Wang et al., 2008). Thus, it is possible that depression act as a mediator between individuals' CAT and the way they perceive the attitude of others (AoO). Depression – more prevalent in females than in males – may moderate the association between CAT and AoO differently in females and males. Therefore, it has been suggested that, for example, the association between depression and suicidal behaviour should be analysed separately by gender (Miller et al., 2013).

Bowlby's attachment theory is widely utilised in clinical work but is not tested in population samples. Therefore, we aimed to explore the associations between CAT and individuals' perceived AoO and depressive symptoms (DEPS). Our hypothesis was that CAT and its domains associate with negative AoO, and that these associations are independent of depression.

2.3 CAT and alcohol problems

Heavy use of alcohol is a huge public health problem. Compared to men, women drink less, are less likely to have drinking problems and to develop alcohol-related disorders. However, women's excessive drinking brings about more medical problems than that of men (Erol & Karpyak 2015). Moreover, in many countries, episodic heavy drinking seems to be increasing, especially among young females (Keyes, Li, & Hasin, 2011). In the literature, numerous gender-related biological, personality trait and psychosocial factors have been shown to contribute to alcohol problems (APs) (Nolen-Hoeksema & Hilt, 2006).

Among many psychosocial factors, childhood maltreatment has been related to alcohol dependence and other alcohol disorders (Goldstein, Flett, & Wekerle, 2010; Fenton et al., 2013; Elliot et al., 2014; Dragan & Hardt, 2016). Supposedly, clinical alcohol dependence is preceded by excessive use of alcohol and subjectively

perceived APs. However, the results of studies regarding any association between childhood adverse experiences and APs have been contradictory. In many studies (Kestilä et al., 2008; Brady & Back, 2012), family adversities, early life stress and childhood trauma were associated with reported heavy drinking and drinking problems. A meta-analysis suggested that there is a causal relationship between non-sexual child maltreatment and alcohol problems, and that the effect of physical abuse is stronger in males, while the effect of neglect dominates in females (Norman et al., 2012). On the other hand, in a population study, there was no consistent association between childhood adversities and excessive alcohol consumption or binge drinking (Patten et al., 2016).

Emotional (EmoAb) and physical abuse (PhyAb), emotional (EmoNeg) and physical neglect (PhyNeg), and sexual abuse (SexAb) are generally regarded as the core CAT domains (Thabrew, de Sylva, & Romans 2012). However, few studies on alcohol dependence (Fenton et al., 2013; Elliott et al., 2014; Schwandt et al., 2013) and only one population study of APs (Shin, Hassamal, & Groves, 2015) have considered all five CAT domains, and even fewer (Fenton et al., 2013; Strine et al., 2012) gender differences. In previous studies, effects of various adverse childhood experiences on substance abuse have been found to be mediated by psychiatric disorders, particularly by depression (Kessler, Davis, & Kendler, 1997; Sihvola et al., 2008; Douglas et al., 2010). It is generally found that depression is more prevalent in females than in males (Piccinelli & Wilkinson, 2000). It is, thus, possible that the effect of CAT domains on APs is mediated via depressive symptoms, and that this mediating pathway is stronger in females than in males.

2.4 CAT and psychiatric disorders

Recent systematic reviews and meta-analyses have demonstrated that each CAT core domain, i.e., EmoAb, PhyAb, SexAb, EmoNeg and PhyNeg (Burgermeister, 2007; Thabrew, de Sylva, & Romans, 2012), is individually associated with adult mental axis-I disorders, in particular with psychotic, affective, anxiety and substance use disorders (e.g., Varese et al., 2012; Bonoldi et al., 2013; Lindert et al., 2014; Mandelli, Petrelli, & Serretti, 2015; Aas et al., 2016). A large community study concluded that little specificity exists for a particular CAT, i.e., SexAb and PhyAb, as well as combined EmoNeg and PhyNeg, to associate with particular disorders, but they have an additive risk-enhancing effect (Green et al., 2010). Commonly, main effects of single CAT domains, as well as their simple additive effects on selected disorders or diagnostic categories, are studied, despite the fact that more often than not, there is considerable comorbidity of mental disorders (Hartley, Barrowclough, & Haddock, 2013; Lai et al., 2015; van Loo & Romeijn, 2015; van Loo et al., 2013),

as well as a broad co-occurrence of CAT domains (Salokangas et al., 2016a; Schilling et al., 2016).

Studies concerning the impact of CAT on comorbidity have generally focused on specific disorders (e.g., Levitan et al., 2003; Spinhoven et al., 2010; Enoch, 2011; Bonoldi et al., 2013; Mandelli, Petrelli, & Serretti, 2015; Fernandes & Osório, 2015; Aas et al., 2016), and they have consistently found that the presence of any CAT increases the odds for the respective comorbid disorder. Similarly, studies comparing the impact of different CAT domains on mental disorders generally considered them independent of each other (Bonoldi et al., 2013; Mandelli, Petrelli, & Serretti, 2015; Aas et al., 2016; Fernandes & Osório, 2015; Enoch, 2011; Turner et al., 2017). They commonly found that the occurrence of several CAT domains (or higher global scores of CAT assessment) increases the odds for an adult mental disorder (Bonoldi et al., 2013; Fernandes & Osório, 2015; Turner et al., 2017). In clinical samples, comorbidity of various psychiatric disorders and different types of CAT domains is common but rarely taken into account concurrently in the same studies.

However, studies on specific associations of certain CAT domains with different clinical disorders that simultaneously disentangle both kinds of interrelations are still lacking, although detailed knowledge of specific associations would be crucial for clinicians in focussing their interventions when they meet a patient with multiple CAT domains and mental disorders.

2.5 CAT and suicidality

Suicidal ideation refers to any thoughts related to suicide. Young females are twice as likely to report suicidal ideation (SUI) and suicide attempts than males, while males are three to four times more likely to complete suicide than females (Bebbington et al., 2009; Miller et al., 2013). SUI correlates strongly with suicide attempts (Victor & Klonsky, 2014) and suicide attempts with completed suicides (Nrugham, Herrestad, & Mehlum, 2010). Thus, in addition to suicide attempts, severe SUI can be regarded as a proxy for the risk of completed suicide.

Mood and anxiety disorders and alcohol and drug dependence are associated with suicidal ideations and behaviour (Kessler, Borges, & Walters, 1999; Thibodeau et al., 2013; Isometsä, 2014). Depression, more prevalent in females than in males, is associated with SUI, suicide attempts and completed suicides (Beautrais et al., 1996; Hawton et al., 2005; Isometsä, 2014; Kessler, Borges, & Walters, 1999), and the association between depression and SUI may be moderated by gender (Miller et al., 2013).

CAT is associated with adult depression (Chapman et al., 2004; Isometsä, 2014; Tunnard et al., 2014), as well as with SUI and suicidal behaviour (Afifi et al., 2009; Evans, Hawton, & Rodham, 2004; Bruwer et al., 2014), suggesting the possibility

that the effect of CAT on SUI and suicidal behaviour is mediated via depressed mood. Other factors, e.g. gender, social support, and physical health, have often been associated with suicidal behaviour (Goodwin & Marusic, 2011; Almeida et al., 2012; Isometsä, 2014). Patients who are clinically at high risk of psychosis (CHR) often report a high number of CAT experiences (Addington et al., 2013; Kraan et al., 2017), alongside depressive disorders and symptoms (Fusar-Poli et al., 2014; Granö et al., 2013; Salokangas et al., 2012a), and commonly present with suicidal ideation and behaviour (Taylor, Hutton, & Wood, 2015). In cross-sectional studies of CHR patients, affective disorders have been associated with SUI and suicidal behaviour (Fusar-Poli et al., 2014), while trauma history has been associated with SUI and suicidal behaviour (Grivel et al., 2017). CHR patients are particularly prone to suicidality, if CAT experiences lead to the development of depressiveness (Schmidt et al., 2017).

3 Aims of the Present Study

The aims of this study program were to investigate the assessment of CAT, as well as associations of CAT with adult individuals' mental health, when also taking gender differences into account.

In the general population sample, the specific study aims were

1. to study the psychometric properties of a new (Finnish) instrument (the Trauma And Distress Scale; TADS) developed for the assessment of CAT,
2. to study effects of CAT on how adult individuals perceive other people's attitude towards them (to test Bowlby's attachment theory) and
3. to study associations of CAT with alcohol problems (APs), and the role of depression as a mediator between CAT domains and APs.

In the samples of individuals attending primary and psychiatric care, the study aims were

4. to study associations of CAT with psychiatric morbidity, taking into account overlap of CAT and comorbidity and
5. to study associations of CAT and psychiatric disorders with the risk of suicide when also taking into account the co-occurrence of CAT domains and psychiatric diagnoses.

In the sample of individuals at risk of psychosis, the aim was

6. to study how the CAT domains affect the persistence of SUIs and the role of depression as a mediator between CAT and SUIs.

4 Study Subjects and Methods

The ethical committee of the University of Turku and the Turku University Central Hospital have approved all three study protocols.

4.1 General population studies (Studies I, II, III)

4.1.1 Population sample

A random, age-stratified sample of 2,080 citizens aged 18 years or more was drawn from the general population of the Varsinais-Suomi Health District of South-West Finland. The general sampling rate was 1/100, and because of their low proportion in the population, 2/100 for people over 70 years. An extensive questionnaire battery was mailed in spring 2008 and re-mailed to non-responders in summer 2008. In the first round 545 (26.2%) and in the second round 147 (7.1%) subjects responded, thus one-third ($n=692$, 33.3%) of the sample returned the completed questionnaire. Response rates for females (41.5%) were higher than that for males (25.3%; Fisher exact: $p<.001$). Mean age of responders (42.0 ± 16.95 years) was slightly higher than that of non-responders (39.5 ± 16.37 years; $p=.001$).

In addition, a random sample of 100 responders was contacted for a reassessment of the Trauma and Distress Scale (TADS; Patterson et al., 2002) via a semi-structured telephone interview. The interviewers, three medical students, were blind to the questionnaire responses from the earlier completed TADS. The time period between the return of the completed questionnaire and the interview ranged from 2 to 4 weeks.

4.1.2 Assessment instruments

The questionnaire battery included items on the participants' socio-demographic background, prior help-seeking for mental health problems ("Have you ever received treatment for mental problems?"; Yes/No), a question on the use of alcohol (1=not at all, 2=very rarely, 3=monthly, 4=weekly, 5=daily), and three questions (yes/no) concerning problems related to alcohol use: (1) "I think that I use alcohol too much,"

(2) “My close relatives think that I use alcohol too much,” (3) “I have visited a doctor because of my alcohol use”. The sum of these three questions (range 0–3) was used as an indicator for alcohol problems (APs).

The questionnaire also included the depression screening instrument DEPS (Salokangas, Poutanen, & Stengaård, 1995) consisting of 10 questions rated on a Likert scale as: 0=“not at all,” 1=“to some extent,” 2=“rather much,” and 3=“very much”; their sum indicates the number of depressive symptoms during the past month. In a sample of patients attending primary care (Salokangas, Poutanen, & Stengaård, 1995) with the cut-off of >8, the DEPS revealed a sensitivity of 74% and a specificity of 85% for clinical depression. The DEPS, originally developed for the use of general practitioners, is a short screening test for detecting depression; it is widely used in Finnish health care services.

The questionnaire also included a visual analog with the “attitude” question: “What kind of attitude do other people take towards you?”. The ends of the visual analog were: 0=very negative and 10=very positive. This question was used as an indicator of perceived attitude of others (AoO).

Finally, the questionnaire battery included the Trauma and Distress Scale (TADS), originally developed in English (Patterson et al., 2002) for detecting childhood trauma and distress experiences in patients at risk for psychosis (Klosterkötter et al., 2005). TADS was translated into Finnish. It comprises 43 items (Table 1) on childhood trauma and adversity rated for their frequency on a Likert scale: 0=“never,” 1=“rarely,” 2=“sometimes,” 3=“often,” and 4=“almost always”. To control for possible response bias, questions were phrased both positively (high ratings indicative of adversity) and negatively (low ratings indicative of adversity). Thus, ratings of negatively phrased items (r) require reversion before the calculation of the total and five domain scores. Five TADS domain scores can be calculated by summing up their five respective items (Table 1): 1) EmoNeg (5r, 8r, 13r, 21r, 40r), 2) EmoAb (10, 12, 14, 26, 32), 3) PhyNeg (1r, 2, 4, 6, 31r), 4) PhyAb (9, 16, 17, 20, 24), and 5) SexAb (22, 25, 30, 33, 41). The TADS total trauma score is the sum of all five domain scores. The proportion of missing data on individual items of TADS was generally lower than 1% except for the PhyAb items 17 (2.6%) and 20 (1.0%), the EmoNeg item 21 (1.2%), 29 (1.9%; feeling singled-out) and 38 (1.0%; loss event).

4.2 Studies on primary and psychiatric care (Studies IV and V)

4.2.1 Patient samples

Recruitment of study patients was carried out in two stages in 2003/2004 and 2005 (Figure 1). In the first stage, consecutive adult patients presenting at Primary Health

Care Centres (PrimC) or Community Mental Health Centres (PsychC) were recruited in three catchment areas in South-Western Finland during two months in the spring of 2003 and 2004. During the first two-month recruitment phase, 2703 PrimC and 420 PsychC patients were invited to participate in the study and, following written informed consent, asked to complete a short questionnaire before seeing a doctor (Figure 1). Of these, 1357 (50.2%) PrimC and 283 (67.4%) PsychC patients completed a questionnaire which included a depressive symptom screening and DEPS (sum score range 1–10; Salokangas et al., 1995).

Two hundred and two (79.5%) of the 254 PrimC patients who scored ≥ 8 in DEPS and, randomly selected, 142 (12.9%) of 1103 who scored < 8 , as well as 221 (78.1%) of 283 PsychC patients underwent an additional telephone interview. In recruiting the PrimC sample, the DEPS score ≥ 8 was used to find more PrimC patients with a psychiatric disorder.

In the second-stage recruitment phase in 2005, all telephone interviewed 344 PrimC and 221 PsychC patients were re-contacted by a letter informing them about the study and mailed another questionnaire for the assessment of CAT. The questionnaire was fully completed and returned by 250 (73.9%) PrimC and 160 (72.4%) PsychC patients (Figure 1). They form the sample of Studies IV and V. Compared with the refusers/other non-participants ($n=2448$) of the initially invited PrimC patients ($n=2703$), participating PrimC patients ($n=255$) were more often female (64.1% vs. 72.2%; $\chi^2_{(1)}=6.525$, $p=.011$) but of similar age (mean age: 49.9 vs. 49.3 years; $U=303562.5$, $p=.517$). No corresponding differences were detected in PsychC patients (females 64.2% vs. 71.3%; age 45.0 vs. 45.0 years).

4.2.2 Assessment instruments

The baseline questionnaire included questions on the socio-demographic background and former treatment for mental problems (yes/no), and the DEPS screening test (Salokangas et al., 1995) for the assessment of depressive symptoms. In the second-stage questionnaire, CAT experiences were assessed by TADS (Patterson et al., 2002; Salokangas et al., 2016a).

In the first-step telephone interview, 15 current axis-I disorders according to DSM-IV were assessed with the Mini International Neuropsychiatric Interview (MINI 5.0.0; Lecrubier et al., 1997) that does not include somatoform disorders. The MINI has good validity in telephone settings (Sheehan, Lecrubier, & Sheehan, 1998). As it does not allow the assessment of lifetime diagnoses for all disorders, and because of the focus on co-morbidities, i.e. the concurrent rather than the sequential occurrence of disorders, only current disorders were considered in Study IV. In Study V, the MINI lifetime diagnoses for major depression, manic, hypomanic, and psychotic disorder and panic disorder were used in the sensitivity analyses of suicidality.

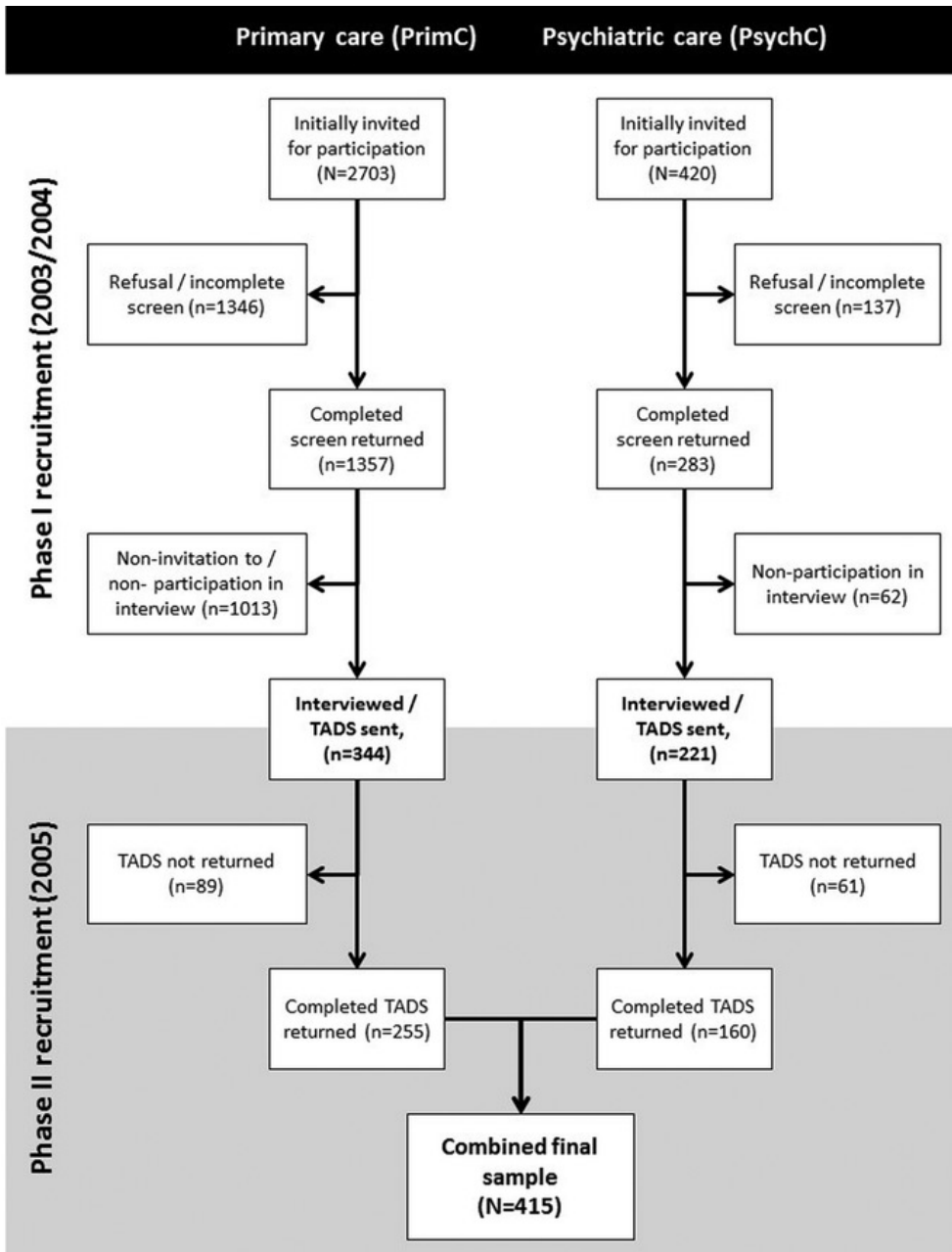


Figure 1. Flowchart of recruitment during the first and second phase of the study.

The MINI (Lecrubier et al., 1997) short version also includes the Suicidal Scale with six items; each of them can be weighted according to its estimated contribution to risk level (Roaldset, Linaker, & Bjørkly, 2012): ‘In the past month did you: C1 Think

that you would be better off dead or wish you were dead?’ (1 point), ‘C2 Want to harm yourself or to hurt or to injure yourself?’ (2 points), ‘C3 Think about suicide?’ (6 points), ‘C4 Have a suicide plan?’ (10 points), ‘C5 Attempt suicide?’ (10 points), and ‘C6 Did you ever make a suicide attempt?’ (4 points). In Study V, the sum of these weighted items (range 0–33) was used as the criterion for suicide risk.

4.3 Risk of psychosis study (Study VI)

4.3.1 Patient sample

The sample is derived from the “European Prediction of Psychosis Study” (EPOS). EPOS is a naturalistic, prospective follow-up study of 245 clinical high-risk of psychosis (CHR) patients who were recruited between August 2002 and April 2006 in six centres: Cologne and Berlin, Germany; Turku, Finland; Amsterdam, the Netherlands; and Birmingham and Manchester, the UK (Klosterkötter et al., 2005; Ruhrmann et al., 2010). CHR criteria comprised the basic symptom criterion “cognitive disturbances, COGDIS” (Klosterkötter et al., 2005; Schultze-Lutter & Klosterkötter, 2002) and/or ultra-high risk (UHR) criteria assessed by the Structured Interview for Prodromal Syndromes, version 3.0 (SIPS) (McGlashan et al., 2001): attenuated psychotic symptoms, brief limited psychotic symptoms, and genetic risk and reduction of function.

The assessments were carried out at baseline, and at 9-month and 18-month follow-ups, or until a conversion to psychosis was detected. Therefore, data were available at baseline for 245, at 9 months for 187, and at 18 months for 156 patients. There were no systematic statistical differences in socio-demographic or clinical characteristics between the patients included in versus excluded from the 9- or 18-month follow-ups (Ruhrmann et al., 2010).

4.3.2 Assessment instruments

The baseline examination included socio-demographic information and extensive clinical assessments (Klosterkötter et al., 2005; Ruhrmann et al., 2010), including SIPS, TADS (Patterson et al., 2002; Salokangas et al., 2016a), the Beck Depression Inventory (BDI; Beck, 1978), and the Structured Clinical Interview for DSM-IV (SCID-I; WHO, 1993). SIPS and BDI were assessed also at 9-month and 18-month follow-ups. At baseline, BDI was available from 238, at 9 months from 181, and at 18 months from 156 subjects.

BDI (Beck, 1978) was developed to identify depressive symptoms and demonstrates good internal consistency, as well as discriminant and construct validity in assessing depression in CHR subjects (DeVylder et al., 2014). One of the

BDI items, “Thoughts of killing self,” was employed as an indicator for suicidal ideation (SUI0 at baseline, SUI9 at 9-month and SUI18 at 18-month follow-up points). The remaining BDI item scores (without “thoughts of killing self”) were summed up to form an indicator of depression status at baseline and at both follow-up time points. From the SCID-I assessment (WHO, 1993), the presence of any baseline unipolar depressive disorder was used as a mediating factor in the multivariate analyses.

4.4 Statistical analyses

4.4.1 Psychometric properties of TADS (Study I)

Data were analysed using the Statistical Programme for the Social Sciences (SPSS) v22.0. To calculate the inter-method reliability between self-report and interview, intra-class coefficients (ICC) were calculated for the raw score of each TADS item. In addition, each TADS item was dichotomised [0 = 0 (“never”) to 1 (“rarely”), and 1 = 2 (“sometimes”) to 4 (“almost always”)], reversed for negatively phrased items. The agreement for the presence of adverse childhood experiences between the questionnaire and interview was calculated by the overall concordance rate (CR) and additionally by Cohen’s kappa (κ). ICC values of less than 0.40 indicate poor, 0.40–0.59 fair, 0.60–0.74 good, and 0.75–1.0 excellent agreement (Cicchetti, 1994). For the appraisal of κ , the prevalence index (PI) was calculated when information was contradictory (Burn & Weir, 2011). The PI reports values between –1 and 1, and is 0 when both responses are equally probable. With $PI \rightarrow |1|$, the likelihood of an underestimation of κ increases, and more attention should be paid to CR.

With regard to the five core domains, both raw (range 0–20) and dichotomized (range 0–5) scores of their respective items were summed up as a measure of severity of trauma and adversity in each domain, and ICCs were calculated for both scores. The domain severity scores were also dichotomised (0 = 0; 1 = 1–5) as an indicator of persons (“cases”) who rated ≥ 2 (“sometimes”) in ≥ 1 items of the respective domain and, thus, were deemed to have suffered from some childhood adversity. To calculate the inter-method reliability of this binary score, CR, κ and PI were calculated.

To examine the internal consistency of domains, Cronbach’s alphas (α) were calculated for the sum scores of both original raw items and dichotomised items of the domain. Current depression (DEPS > 8) and help-seeking for mental problems were used as proxy measures of adverse experiences. Each of these two proxies was cross-tabulated with TADS domain “cases”, and diagnostic accuracy measures [sensitivity, specificity, positive and negative predictive values, positive and negative likelihood ratios (LRs)] were then calculated.

4.4.2 Perceived attitude of others (Study II)

First, the means of perceived attitude of others (AoO) and DEPS scores were broken down as a function of the background characteristics, and adverse childhood experience (ACE) scores by gender, after which differences were tested by t-test. CAT domain and DEPS scores were correlated (Spearman's rho) with AoO. Because the dependent variables, DEPS and AoO, were skewed, their logarithmic transformations were used in the multivariate path analyses. In the multivariate analyses, a PROCESS macro in SPSS (model template 4) by Hayes (2013) was used. In cross-sectional samples, this macro tests the direct and indirect effects of an independent variable (X) on a dependent variable (Y), while modelling a process in which X affects a mediator (M), which in turn affects Y. The models tested the effect of X (ACE) on a) Y (AoO) with the mediator (DEPS) and b) on Y (DEPS) with the mediator (AoO) in the total sample, and in females and males separately. Five thousand bootstrap samples and 95% confidence intervals were used for all analyses. In these analyses, the effects of gender, age and previous mental care were controlled. The same analyses were also carried out in a subsample of participants without previous mental care. The data were analysed using SPSS software (22.0 for Windows). P-values below .05 (two-tailed) were considered statistically significant.

4.4.3 Alcohol problems (Study III)

First, the means (SD) of alcohol problems (Aps) were calculated, broken down as a function of the background variables for the whole sample and for females and males separately. DEPS and CAT domain severity scores were correlated (Pearson correlation coefficient) with Aps; CAT domain scores were also correlated with DEPS scores.

In multivariate analyses, a PROCESS macro in SPSS (model template 6) by Hayes (2013) was used. The model tests the effect of X (CAT) on Y (APs) with the mediator (DEPS) in the total sample, and in females and males separately. In each model, the total effect of X on Y, the specific indirect effect and the direct effect are reported. Five thousand bootstrap samples and 95% confidence intervals were used for all analyses. In these multivariate analyses, the effects of background characteristics (gender in the whole sample only, age, marital status [dichotomized: 1 = married/cohabiting, 2 = single, divorced/separated, or widowed] and education, use of alcohol and received mental treatment) were controlled and their effects reported. Finally, path analyses were performed in which also the effects of other CAT domains were controlled. The data were analysed using SPSS software (22.0 for Windows). P-values below .05 (two-tailed) were considered statistically significant.

4.4.4 Childhood adverse and trauma experiences and clinical disorders (Study IV)

As the number of many individual diagnoses were low, in the analyses only diagnostic categories (any depressive disorder [ANYDEP), any manic disorder [ANYMAN), any psychotic disorder [ANYPSY), any anxiety disorder [ANYANX) and any substance dependency [ANYSUB]; see Table 2) were used. To explore the associations between diagnostic categories and CAT domains, as well as with age and gender, bivariate correlations were first calculated.

A stepwise path analytical approach was used to test for specific effects of five CAT domains on axis-I categories, while controlling for co-morbidities and co-occurrence of CAT domains, as well as gender and age effects. As there is currently no evidence to support disregard of certain predictor–outcome paths, no specific paths between mediators could be hypothesized. Therefore, we started by estimating a saturated model, in which all 10 endogenous variables q (the ordinal scaled CAT domains and the binary diagnostic categories) but not the two exogenous variables p (gender and age) are interrelated. Model fit was assessed by the χ^2 test, the Comparative Fit Index (CFI), the Tucker-Lewis index (TLI), and the Root-Mean-Square Error of Approximation (RMSEA). However, for the known hypersensitivity of χ^2 in larger samples (such as ours), the emphasis was put on CFI, TLI and RMSEA. In the case of any of these three model-fit indices being unsatisfactory, a second, optional step was planned to derive a trimmed, well-fitting final model in an iterative procedure by testing nested models with the χ^2 difference test and comparison of goodness-of-fit indices. Data were analysed using SPSS v22.0. Path analyses were carried out with Mplus version 7.4 (Muthén & Muthén, 1998–2011).

4.4.5 Clinical diagnoses, CAT and suicidality (Study V)

First, the means and SDs for suicide risk scores were calculated, broken down as a function of the patients' socio-demographic background, MINI disorders and CAT domain cases. Differences between the groups with or without co-occurrence of clinical diagnoses and childhood adversities were tested by t-test. Spearman correlations (r_s) were calculated between suicide risk scores and CAT severity domains. In the general linear model, variance was explained by current clinical diagnoses and CAT domains, while the effects of gender, age, marital status and social relationships were controlled. In post hoc sensitivity analyses, current major depression, manic, hypomanic, and psychotic and panic episode were replaced by their life-time episodes. The multivariate analyses were carried out for the entire sample and for females and males separately. Data were analysed using SPSS v22.0, and $p < .05$ were considered significant.

4.4.6 Risk patients (Study VI)

First, suicidal ideation (SUI0, SUI9 and SUI18) was cross-tabulated against background characteristics and tested by Fisher's Exact test. The means for BDI and CAT scores were separately calculated for females and males and tested by t-test. CAT domains were correlated (Spearman) with baseline and follow-up BDI and SUIs.

In multivariate analyses, generalized ordinal logistic modelling was carried out for SUI scores over the whole study period (baseline to 9 to 18 months) while time as a factor was controlled. In logistic modelling, independent variables were added in three blocks. The first block (Model 1) contained background characteristics, time factor and CAT severity scores as predictors. In the second stage (Model 2), baseline clinical depression was added, and in the third stage (Model 3), BDI at baseline, and at 9- and 18-month follow-ups were added. In Model 2, baseline clinical depression and in Model 3, baseline depression, together with current depressive symptoms, were treated as mediators. These analyses were carried out for the whole sample and for females and males separately. Data were analysed using SPSS v24.0, and p values < .05 were considered significant.

5 Results

5.1 Psychometric properties of TADS (Study I)

5.1.1 Distribution and frequency of items and core domains

Frequencies of individual items are shown in Table 1, and descriptive statistics for the TADS domain scores in Table 2. Over 70% of the general population subjects reported that they had experienced abuse or neglect at least sometimes (Table 2) with approximately 50% of the sample reporting emotional and physical neglect with the median score for EmoNeg (median 4) being twice as high as that for PhyNeg (median 2). Abuse was less frequent, with over 37% reporting EmoAb and 23% PhyAb at a level of “sometimes” or more frequently (Table 2). Only 5.5% reported experience of SexAb (Table 2), mostly by indicating that they were touched or forced to touch someone else in a sexual way in their childhood (item 22: 4.1%, Table 1).

5.1.2 Internal consistency of TADS and its five core domains

Internal consistency of the total TADS score of the five domains was 0.92 for the sum of original raw items and 0.89 for the sum of dichotomised items. Corresponding figures for the total TADS sum score of all 43 items were 0.94 and 0.92. Internal consistencies of the five domains, indicated by Cronbach's α and calculated for the original raw items and for the dichotomised items, were generally better for the original raw items (Table 2). While internal consistency was good for EmoNeg, EmoAb and SexAb, and acceptable for PhyAb, it was questionable for PhyNeg. When the two items with poor inter-method reliability of raw scores were excluded from PhyNeg (item 2) and PhyAb (item 17), respectively, internal consistency improved to 0.64 and 0.78 for the original raw items, and 0.60 and 0.72 for the dichotomised items, respectively. When item 17 was replaced by item 42 (I was afraid of someone in my family), internal consistency of PhyAb was acceptable with Cronbach's α 0.79 for the raw items and 0.73 for the dichotomised items. Consequently, in further analyses of inter-method reliability and concurrent validity,

as well as in the normative data, the revised domains were used, i.e., PhyNegR without item 2 and PhyAbR including item 42 instead of item 17.

5.1.3 Inter-method reliability of items and core domains

As illustrated in Figure 2 (from Study I), the means scores of self-reported and interview-assessed original TADS items were almost identical. In line with this, the inter-method reliability values of items in terms of both raw (ICC) and dichotomized scores (CR and κ) were good to excellent, the only exceptions being items 2, 17 and 36 (Table 1).

As regards the five revised core domains, ICCs of totals of both the raw scores and the dichotomized scores were all good to excellent (Table 2). Furthermore, all five domains appeared to hold some clinical utility for indicating the presence of any respective adversity when compared alongside the gold standard of an interview assessment (Table 2). This did not hold for either TADS totals (Table 2), however, where by comparison the presence of any adversity was overestimated.

Table 1. TADS items and rating (in Finnish; English items in original article Salokangas et al., 2016a): original (i.e., unrevised) score frequencies (in %), proportion of item scores ≥ 2 in the general population sample (N=692), and inter-method reliability of self-rating of ' ≥ 2 ' to gold-standard interview assessment (N=100).

Item-nr.	Statement	0 ei koskaan	1 harvoin	2 joskus	3 usein	4 melkein aina	ICC (raw score)	≥ 2	CR for ' ≥ 2 '	k for ' ≥ 2 '	PI* for ' ≥ 2 '
1(r) ³	Minulla oli turvallinen olo lapsena ja tunsin, että minua suojeltiin	1.9	5.6	10.8	27.6	54.0	0.809	18.4	0.880	0.639	
2 ³	Minulla oli usein nälkä lapsena	44.1	31.8	15.2	7.1	1.9	0.538	24.1	0.790	0.364	-0.090
3	Minua kiusattiin koulussa	28.9	36.1	24.4	7.1	3.5	0.802	35.0	0.750	0.457	
4 ³	Jouduin usein pitämään likaisia tai kuluneita vaatteita koulussa	71.4	16.2	7.4	4.0	1.0	0.841	12.4	0.920	0.717	
5(r) ¹	Tunsin, että minua arvostettiin ja pidettiin tärkeänä lapsena	3.9	9.8	17.5	33.8	35.0	0.829	31.2	0.840	0.620	
6 ³	Vanhempani olivat usein humalassa tai muuten päihtyneitä	64.0	18.8	8.1	8.4	0.7	0.922	17.2	0.940	0.797	
7	Minua on kiusattu töissä	65.3	23.6	8.1	2.3	0.7	0.918	11.1	0.910	0.657	
8(r) ¹	Minun perheeni oli lämmin ja rakastava	3.8	7.7	17.6	27.2	43.8	0.852	29.0	0.850	0.619	
9 ⁴	Minua lyötiin lapsena niin kovaa, että minulle tuli mustelmia, haavoja tai ruhjeita	82.1	9.8	4.6	2.9	0.6	0.865	8.1	0.960	0.811	
10 ²	Tunsin, että vanhempani eivät hyväksyneet minua	66.5	15.5	10.4	5.6	2.0	0.804	18.1	0.880	0.611	
11(r)	Kun olin lapsi, lähetyvilläni oli aikuinen, johon saatoin luottaa	7.2	11.4	9.0	22.9	49.5	0.803	27.6	0.840	0.574	
12 ²	Joku perheenjäsenistäni nöyryytti minua lapsuudessani	63.2	17.3	9.4	6.1	4.0	0.831	19.5	0.850	0.615	
13(r) ¹	Lapsuudenperheessäni huolehdittiin toinen toisistaan	2.7	6.6	13.3	28.5	48.8	0.809	22.7	0.900	0.688	
14 ²	Uskon olevani paha ihminen	62.9	26.2	8.2	1.6	1.2	0.793	11.0	0.930	0.593	
15	Uskon, että joku on kuollut minun takiani	93.1	3.0	1.3	1.2	1.4	0.835	3.9	0.980	0.740	
16 ⁴	Minua on vakavasti pahoinpidelty fyysisesti	82.8	9.5	5.6	1.6	0.4	0.709	7.7	0.920	0.592	
17 ⁴	Aikuiset (kuten opettajat, lääkärit, hoitajat) huomasivat mustelmia, haavoja tai ruhjeita, kun minua oli hakattu	94.9	2.6	1.4	0.3	0.7	0.084	2.5	0.950	0.025	0.010
18(r)	Minun lapsuuteni oli täydellinen	8.5	9.4	25.1	39.5	17.5	0.840	43.1	0.800	0.584	
19	Minua vaivaa yksi hyvin häpeällinen salaisuus	74.6	14.2	6.5	3.2	1.5	0.865	11.1	0.910	0.589	
20 ⁴	Luulen, että minua pahoinpideltiin fyysisesti lapsena	83.4	7.7	4.8	3.2	1.0	0.865	9.0	0.920	0.670	
21(r) ¹	Kunnioitan itseäni	2.2	4.0	16.8	36.3	40.8	0.634	23.0	0.870	0.457	
22 ⁵	Lapsuudessani joku kosketti minua tai yritti saada minut koskemaan heitä seksuaalisesti	89.0	6.8	3.0	1.0	0.1	0.795	4.2	0.960	0.646	
23	Minulla on kokemuksia, joista tunnen kovaa syyllisyyttä	46.7	36.4	12.1	3.9	0.9	0.635	16.9	0.840	0.243	0.020
24 ⁴	Minä olen joutunut henkeä uhkaaviin tilanteisiin	64.7	20.8	12.0	2.5	0.0	0.788	14.5	0.850	0.542	

Item-nr.	Statement	0 ei koskaan	1 harvoin	2 joskus	3 usein	4 melkein aina	ICC (raw score)	≥2	CR for '≥2'	k for '≥2'	PI* for '≥2'
25 ⁵	Jouduin salailemaan seksuaaliseen hyväksikäyttöön liittyviä asioita lapsena	97.0	1.4	0.9	0.1	0.6	0.902	1.6	0.980	0.658	
26 ²	Tunsin, että minua vihattiin perheessäni, kun olin lapsi	77.2	11.1	6.6	4.0	1.0	0.893	11.7	0.940	0.765	
27(r)	Minun perheeni oli "maailman paras"	8.7	8.8	17.2	31.1	34.2	0.751	34.7	0.820	0.570	
28	Muut ihmiset ovat käyttäytyneet huonosti minun takiani	64.6	26.6	7.7	1.2	0.0	0.683	8.8	0.930	0.551	
29	Lapsena tunsin itseni ulkopuoliseksi perheessäni	58.7	19.8	13.2	4.8	3.6	0.873	21.5	0.890	0.724	
30 ⁵	Minut on raiskattu	95.8	2.3	1.4	0.3	0.1	0.815	1.9	0.990	0.795	
31(r) ³	Jos olin lapsena sairas ja/tai tarvitsin hoitoa, minut vietiin lääkäriin tai sairaanhoitajan luokse	3.8	4.5	7.2	16.5	68.1	0.671	15.5	0.880	0.557	-0.020
32 ²	Tunsin, että minua lannistettiin, arvosteltiin ja että minut saatiin tuntemaan itseni huonommaksi lapsena	56.8	19.4	10.0	10.8	3.0	0.863	23.8	0.860	0.645	
33 ⁵	Joku lähenteli minua seksuaalisesti lapsena	91.8	5.8	2.0	0.4	0.0	0.766	2.5	0.970	0.559	
34	Tunnen aiheuttaneeni vahinkoa tai haittaa jollekin toiselle ihmiselle	82.5	11.4	3.9	1.3	0.9	0.609	6.1	0.920	0.386	-0.020
35(r)	Lapsena minulla oli ystäviä, joille saatoin puhua henkilökohtaisista ongelmistani	10.1	13.7	14.6	31.9	29.6	0.763	38.4	0.800	0.576	
36	Olen kokenut rotusyrjintää	97.0	1.3	1.2	0.4	0.1	0.382	1.7	0.990	0.000	-0.010
37(r)	Menestyin hyvin koulussa	1.4	6.9	31.2	33.2	27.2	0.742	39.6	0.780	0.490	
38	Olen menettänyt itselleni hyvin läheisen ihmisen	26.6	29.5	26.7	7.8	9.4	0.615	43.9	0.660	0.323	-0.120
39	En usko ansaitsevani menestystä elämässäni	67.0	20.3	9.7	2.5	0.6	0.623	12.7	0.890	0.304	-0.070
40(r) ¹	Minun lapsuuden perheeni oli kannustava ja tukeva	6.1	9.8	16.9	24.9	42.3	0.834	32.8	0.820	0.589	
41 ⁵	Luulen, että minua käytettiin seksuaalisesti hyväksi lapsuudessani	94.5	2.7	1.9	0.7	0.1	0.936	2.7	1.000	1.000	
42	Pelkäsin jotain perheenjäsentäni	59.0	15.8	12.3	6.6	6.4	0.860	25.3	0.810	0.541	
43(r)	Minun oli helppo saada ystäviä lapsena	3.2	9.8	21.0	36.8	29.2	0.835	34.0	0.850	0.590	

* The prevalence index (PI) was only calculated if for Cohen's k and the concordance rate (CR) produced contradictory results according to their guidelines for clinical usefulness (Burn et al. 2009), i.e., $k \geq 0.40$ and $CR \geq 75\%$.

(r) indicates items whose score was revised prior to creating the binary '≥2' score or calculating sum scores and intra-class coefficient (ICC).

¹ item of EmoNeg; ² item of EmoAb; ³ item of PhyNeg; ⁴ item of PhyAb; ⁵ item of SexA.

Table 2. TADS core domains: descriptive statistics and internal consistency by Cronbach's α (N=692), as well as construct validity of totals by the intra-class coefficient (ICC) and of at least any one domain item ≥ 2 by CR, κ and PI (N=100).

	TADS domains	Mdn	mean	SD	range	≥ 2 *	a [#]	a [§]	ICC [#]	self-rating [*]	inter-view [*]	ICC [§]	CR	k	PI
EmoNeg	Emotional neglect (max. 20)	4.00	4.88	4.36	0–19	51.2%	0.874	0.831	0.915	51.0%	40.0%	0.899	0.790	0.543	-0.090
EmoAb	Emotional abuse (max. 20)	2.00	3.08	4.00	0–19	37.4%	0.859	0.794	0.928	40.0%	41.0%	0.908	0.830	0.647	-0.190
PhyNeg ^R	Physical neglect (max. 20/16)	2.00	3.29	3.07	0–17	49.7%	0.624	0.579	0.922	41.0%	38.0%	0.910	0.850	0.686	-0.210
PhyAb ^R	Physical abuse (max. 20)	0.00	1.50	2.53	0–16	23.1%	0.764	0.696	0.906	36.0%	38.0%	0.885	0.800	0.571	-0.260
SexAb	Sexual abuse (max. 20)	0.00	0.50	1.76	0–16	5.5%	0.885	0.849	0.875	7.0%	9.0%	0.937	0.960	0.729	-0.840
Total 1 ^R	Sum score of the 5 core domains (max. 100/96)	9.00	13.26	12.66	0–81	72.3%	0.918	0.894	0.958	66.0%	62.0%	0.893	0.740	0.437	0.280
Total 2	Sum score of the 43-item scale (max 172)	22.00	28.47	21.37	0–123	93.6%	0.940	0.920	0.956	95.0%	92.0%	0.943	0.910	0.262	0.870

* proportion of subjects with any item score ≥ 2 in respective domain

based on sum of original raw items

§ based on sum of dichotomised ' ≥ 2 ' items

^R the original domains PhyNeg and PhyAb were used in descriptive statistics and internal consistency (Cronbach's α), while PhyNegR and PhyAbR were used in construct validity (ICC, CR, κ and PI and related % in self- and interview-rating).

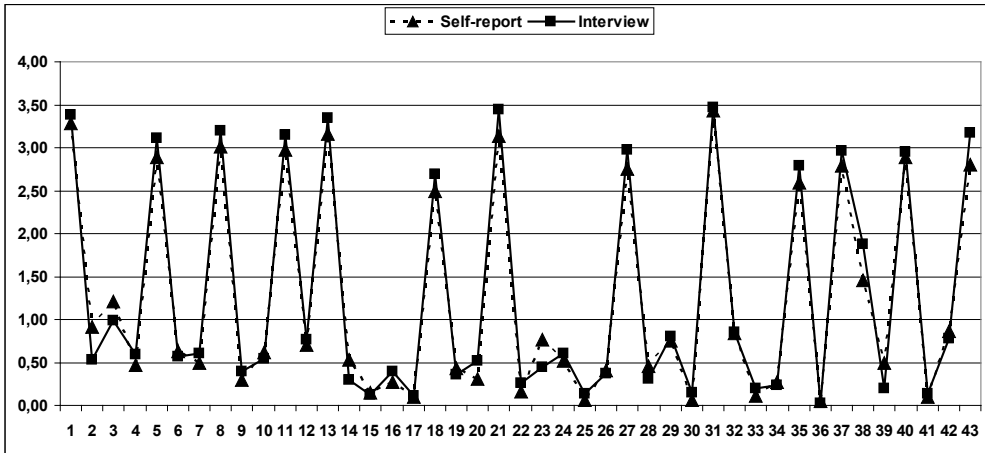


Figure 2. Mean scores of TADS items by self-report and interview.

5.1.4 Concurrent validity of TADS and its core domains

In assessing the concurrent validity, presence of depression (DEPS score >8) and help-seeking from mental health services were used as proxy measures of traumatisation in terms of a negative impact on mental health. For participants who had affirmed at least some experience of childhood adversity in the TADS domains and totals, depression and help-seeking were significantly more frequent with effect sizes of 0.18 to 0.33 and 0.14 to 0.30 respectively, thus indicating good criterion validity of TADS and all of its domains. The effect of EmoNeg and EmoAb on the proxy measures ‘current depression’ (0.33/0.31) and ‘help-seeking’ (0.28/0.30) were strongest.

5.1.5 Diagnostic accuracy

In general, the diagnostic accuracy measures of binary TADS caseness gave comparable figures for both proxy measures (Table 3). As expected, sensitivity for the total of TADS domains and total TADS scale was very high, but specificity was low, especially for the total scale. Totals for the TADS domains demonstrated high sensitivity but lower specificity to depressiveness. Of the TADS domains, SexAb showed low sensitivity but high specificity for both depressiveness and help-seeking and a moderate positive likelihood ratio for depressiveness. Also PhyAbR showed quite low sensitivity but high specificity. For other TADS domains, sensitivity and specificity figures were relatively balanced.

Table 3. Diagnostic accuracy of TADS caseness for depressiveness and help-seeking, respectively, as proxy measure of traumatization.

	Sensitivity depression	Specificity depression	PPV depression	NPV depression	PLR depression	NLR depression
TADS caseness (at least any one item of ≥ 2)						
EmoNeg	0.844	0.569	0.323	0.938	1.958	0.274
EmoAb	0.674	0.699	0.353	0.898	2.239	0.466
PhyNegR	0.674	0.547	0.266	0.873	1.488	0.596
PhyAbR	0.444	0.821	0.377	0.858	2.487	0.676
SexAb	0.156	0.969	0.553	0.825	5.032	0.871
Total of domains	0.933	0.329	0.253	0.953	1.390	0.204
Total of scale	0.978	0.074	0.205	0.932	1.056	0.300
	Sensitivity help- seeking	Specificity help- seeking	PPV help- seeking	NPV help- seeking	PLR help- seeking	NLR help- seeking
TADS caseness (at least any one item of ≥ 2)						
EmoNeg	0.743	0.572	0.393	0.857	1.736	0.449
EmoAb	0.615	0.715	0.446	0.833	2.159	0.538
PhyNegR	0.615	0.546	0.335	0.792	1.354	0.705
PhyAbR	0.390	0.829	0.459	0.785	2.279	0.736
SexAb	0.257	0.902	0.495	0.765	2.630	0.824
Total of domains	0.658	0.699	0.449	0.846	2.187	0.489
Total of scale	0.995	0.086	0.288	0.977	1.088	0.062

PPV = positive predictive value, NPV = negative predictive value, PLR = positive likelihood ratio (guidance for interpretation of the increase in the likelihood of event: >10 = large and often conclusive; $5-10$ = moderate; $2-5$ = small; $1-2$ = minimal; 1 = none), NLR = negative likelihood ratio (guidance for interpretation of the decrease in the likelihood of event: ≥ 0.5 = minimal; $0.2-0.5$ = small; $0.1-0.2$ = moderate; <0.1 = large and often conclusive).

5.2 Adverse childhood experiences and perceived attitude of others (Study II)

5.2.1 Univariate analyses

Women, the married or cohabitating, the highly educated, the full-time working subjects, and the subjects without previous mental care reported higher AoO scores. There were no gender or age differences in the DEPS scores. The singles, those who had completed secondary school, the unemployed (or work situation unknown) and the participants who had received mental care reported higher DEPS scores. There were no gender differences in the CAT total scores and both genders reported EmoNeg the most. Females reported SexAb more often than males and males reported EmoAb more often than females (Table 4).

DEPS, CAT and its domains correlated strongly ($<.001$) with AoO. There were also high inter-correlations ($<.001$) between CAT domains, indicating a great overlap between individual domains.

Table 4. DEPS and ACE scores by gender.

	Female (n=432)		Male (n=260)		All (n=690)		p
	mean	SD	mean	SD	mean	SD	
DEPS	5,21	5,10	4,72	5,30	5,03	5,18	0,233
EmoAb	3,42	4,11	2,52	3,76	3,08	4,00	0,004
PhyAb	2,30	3,28	2,19	3,06	2,26	3,20	0,666
SexAb	0,73	2,16	0,10	0,49	0,49	1,76	<0,001
EmoNeg	5,03	4,42	5,04	4,50	5,03	4,44	0,981
PhyNeg	2,34	2,68	2,58	2,70	2,43	2,68	0,271
ACE total	13,83	13,94	12,43	12,05	13,30	13,27	0,178

5.2.2 Path analyses

In the path analyses, DEPS and AoO were in turn treated as mediators and, correspondingly, AoO and DEPS as outcomes (Figure 3). Comparison between models revealed that the indirect/total effect ratio was higher when AoO was treated as a mediator than when DEPS was a mediator.

In the first analysis? with DEPS as a mediator, when the effects of gender, age and previous mental care were controlled, CAT total and all its domains had significant direct and indirect effects on AoO, via DEPS, both in the whole sample and for females and males separately, with one exception; in males SexAb had no significant effect on AoO. Additionally, in the whole sample and in both genders, EmoNeg had a significant direct and indirect specific effect on AoO when the effects of other CAT domains were taken into account. In males, also EmoAb had a direct and indirect specific effect on AoO (Table 5a).

In the second analyses with AoO as mediator, CAT total and all its domains, except SexAb, had significant direct and indirect effects on DEPS in the whole sample and in females and males separately. In the whole sample, SexAb had a direct, in females, only an indirect, and in males, no effect on DEPS. In the whole sample and in females, EmoNeg had a significant direct and indirect effect, in males only an indirect specific effect on DEPS. In males, also EmoAb had an indirect specific effect, via AoO, on DEPS (Table 5b).

The indirect/total effect ratios were for AoO as a mediator 1.5 or higher for CAT total and EmoAb in males, for EmoNeg in all and both genders, and for PhyNeg in females, indicating that in these cases the indirect effect of AoO on DEPS was greater than vice versa.

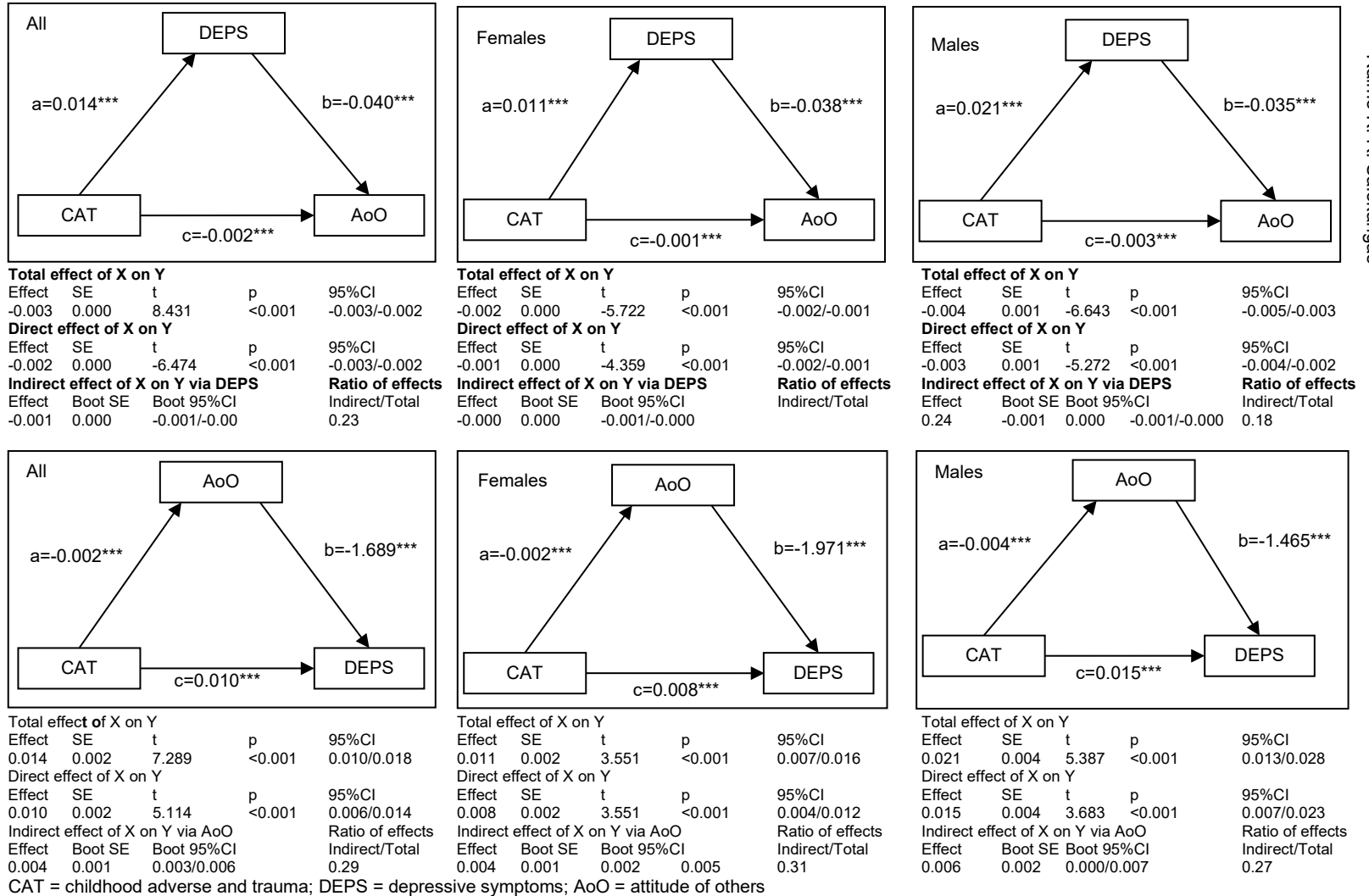


Figure 3. Path analyses for all and females and males separately; the effects gender (in all), age and previous mental care are controlled.

Table 5. Path analyses for AoO (A) and DEPS (B); the effects of gender, age and previous mental care controlled

A: X=CAT, Y= AoO, M=DEPS

		All					d	Females					d	Males					d
		Effect	t	p	CI95%			Effect	t	p	CI95%			Effect	t	p	CI95%		
CAT total	a	-0.003	-8.431	<0.001	-0.003	-0.002		-0.002	-5.722	<0.001	-0.002	-0.001		-0.004	-6.643	<0.001	-0.005	-0.003	
	b	-0.002	-6.474	<0.001	-0.003	-0.002	0.23	-0.001	-4.359	<0.001	-0.002	-0.001	0.24	-0.003	-5.272	<0.001	-0.004	-0.002	0.18
EmoAb	a	-0.007	-7.028	<0.001	-0.009	-0.005		-0.004	-3.789	<0.001	-0.006	-0.002		-0.012	-6.453	<0.001	-0.016	-0.008	
	b	-0.005	-5.274	<0.001	-0.007	-0.003	0.26	-0.003	-2.590	0.01	-0.005	-0.001	0.33	-0.010	-5.210	<0.001	-0.014	-0.006	0.18
	c	0.000	-0.268	0.789	-0.004	0.003		0.003	1.629	0.104	-0.001	0.006		-0.008	-2.472	0.014	-0.013	-0.002	0.12
PhyAb	a	-0.007	-5.910	<0.001	-0.009	-0.005		-0.005	-3.838	<0.001	-0.008	-0.002		-0.010	-4.390	<0.001	-0.015	-0.006	
	b	-0.005	-5.383	<0.001	-0.007	-0.003	0.28	-0.004	-2.767	0.006	-0.006	-0.001	0.30	-0.008	-3.369	<0.001	-0.012	-0.003	0.24
	c	-0.002	-0.880	0.379	-0.005	0.002		-0.001	-0.274	0.784	-0.004	0.003		0.000	-0.006	0.996	-0.007	0.007	
SexAb	a	-0.005	-2.108	0.035	-0.009	0.000		-0.005	-2.745	0.006	-0.009	-0.002		-0.200	-1.421	0.157	-0.048	0.008	
	b	-0.003	1.410	0.159	-0.007	0.001	0.36	-0.004	-2.060	0.040	-0.007	-0.002	0.28	-0.013	-0.969	0.333	-0.039	0.013	
	c	0.001	0.400	0.689	-0.003	0.005		-0.002	-0.741	0.459	-0.006	0.003		-0.009	-0.661	0.509	-0.034	0.017	
EmoNeg	a	-0.008	-9.390	<0.001	-0.010	-0.006		-0.006	-6.789	<0.001	-0.008	-0.005		-0.010	-6.303	<0.001	-0.013	-0.007	
	b	-0.006	-7.426	<0.001	-0.008	-0.005	0.21	-0.005	-5.362	<0.001	-0.007	-0.003	0.21	-0.008	-5.059	<0.001	-0.011	-0.005	0.18
	c	-0.006	-4.876	<0.001	-0.009	-0.004	0.18	-0.006	-3.810	<0.001	-0.009	-0.003	0.19	-0.007	-3.090	0.002	-0.011	-0.003	0.14
PhyNeg	a	-0.008	-5.916	<0.001	-0.011	-0.006		-0.008	-5.011	<0.001	0.037	-0.011		-0.009	-3.498	<0.001	-0.014	-0.004	
	b	-0.006	-4.573	<0.001	-0.009	-0.004	0.25	-0.006	-4.106	0.001	-0.009	-0.003	0.21	-0.007	-2.553	0.011	-0.012	-0.002	0.28
	c	0.002	0.959	0.337	-0.002	0.006		-0.001	-0.446	0.656	-0.006	-0.004		0.006	1.598	0.111	-0.001	0.012	

		B: X=CAT, Y= DEPS, M=AoO																	
		All						Females						Males					
		Effect	t	p	CI95%		d	Effect	t	p	CI95%		d	Effect	t	p	CI95%		d
CAT total	a	0.014	7.289	<0.001	0.010	0.018		0.011	5.112	<0.001	0.007	0.016		0.021	5.387	<0.001	0.013	0.028	
	b	0.010	5.114	<0.001	0.006	0.014	0.29	0.008	3.551	<0.001	0.004	0.012	0.31	0.015	3.683	<0.001	0.007	0.023	0.27
EmoAb	a	0.042	6.514	<0.001	0.030	0.055		0.032	4.278	<0.001	0.018	0.047		0.060	4.858	<0.001	0.035	0.084	
	b	0.031	4.759	<0.001	0.018	0.044	0.27	0.024	3.252	0.001	0.010	0.038	0.26	0.041	3.169	0.002	0.015	0.066	0.32
	c	0.015	1.431	0.153	-0.006	0.036		0.007	0.573	0.567	-0.017	0.032		0.020	1.003	0.317	-0.020	0.060	0.37
PhyAb	a	0.044	5.453	<0.001	0.028	0.059		0.036	3.870	<0.001	0.018	0.054		0.058	3.830	<0.001	0.028	0.087	
	b	0.030	3.847	<0.001	0.015	0.046	0.31	0.025	2.810	0.005	0.008	0.043	0.29	0.039	2.263	0.009	0.010	0.069	0.32
	c	0.006	0.511	0.61	-0.018	0.030		0.007	0.473	0.637	-0.022	0.036		0.010	0.440	0.661	-0.034	0.054	
SexAb	a	0.037	2.624	0.009	0.009	0.065		0.034	2.488	0.013	0.007	0.062		0.140	1.577	0.116	-0.035	0.316	
	b	0.031	2.286	0.023	0.004	0.058		0.023	1.708	0.089	-0.003	0.049	0.34	0.101	1.185	0.237	-0.067	0.268	
	c	0.012	0.825	0.41	-0.017	0.041		0.008	0.564	0.573	-0.021	0.038		0.071	0.827	0.409	-0.098	0.239	
EmoNeg	a	0.042	7.316	<0.001	0.031	0.053		0.037	5.467	<0.001	0.024	0.051		0.049	4.851	<0.001	0.029	0.069	
	b	0.029	4.843	<0.001	0.017	0.040	0.32	0.025	3.631	<0.001	0.012	0.039	0.32	0.034	3.198	0.002	0.013	0.055	0.31
	c	0.022	2.467	0.014	0.005	0.040	0.37	0.024	2.100	0.036	0.002	0.046	0.37	0.023	1.534	0.126	-0.007	0.052	0.33
PhyNeg	a	0.045	4.767	<0.001	0.027	0.064		0.060	3.527	<0.001	0.018	0.062		0.058	3.452	<0.001	0.024	0.091	
	b	0.029	3.068	0.002	0.010	0.047	0.37	0.023	2.090	0.037	0.001	0.045	0.42	0.041	2.492	0.013	0.009	0.073	0.29
	c	-0.013	-0.970	0.332	-0.040	0.013		-0.018	-1.067	0.287	-0.051	0.015		-0.001	-0.047	0.962	-0.046	0.044	

a = total effect of CAT on AoO/DEPS

b = direct effect of CAT on AoO/DEPS

c = specific direct effect of CAT on AoO/DEPS

d = ratio of indirect effect to total effect X to Y

ACE total = sum of adverse childhood experiences

EmoAb = emotional abuse

PhyAb = physical abuse

SexAb = sexual abuse

5.3 CAT and alcohol problems (Study III)

5.3.1 Univariate Analyses

As expected, males used alcohol more frequently than females, and they also reported more separate APs than females. Females had received treatment for mental problems more often than males. In both genders, the frequency of alcohol use associated strongly with APs. Male gender, middle age (in males separately), divorced/separated marital status, lower level of education and previous treatment for mental problems associated significantly with APs.

Table 6. Means for depressive symptoms and CAT domains by gender (A). Correlations between depressive symptoms and CAT domains with alcohol problems (Aps) in females and males (B).

A: Means of APs	Females (n=431)		Males (n=259)		All (n=690)		p1
	mean	SD	mean	SD	mean	SD	
Depressive symptoms	5.21	5.10	4.73	5.31	5.03	5.18	0.234
CAT cases							
Emotional Abuse (EmoAb)	0.96	1.43	0.65	1.26	0.84	1.38	0.004
Physical Abuse (PhyAb)	0.39	0.94	0.46	0.89	0.42	0.92	0.398
Sexual Abuse (SexAb)	0.19	0.78	0.02	0.14	0.13	0.63	<0.001
Emotional Neglect (EmoNeg)	1.40	1.73	1.38	1.70	1.39	1.72	0.914
Physical Neglect (PhyNeg)	0.83	1.10	0.95	1.23	0.87	1.15	0.182
Sum of CAT domain scores (CAT total)	3.78	4.75	3.46	4.10	3.66	4.52	0.368
B: Correlations with APs							
	r	p2	r	p2	r	p2	
Depressive symptoms	0.237	<0.001	0.386	<0.001	0.287	<0.001	
CAT severity scores							
Emotional Abuse (EmoAb)	0.063	0.192	0.174	0.005	0.084	0.027	
Physical Abuse (PhyAb)	0.203	<0.001	0.182	0.003	0.187	<0.001	
Sexual Abuse (SexAb)	0.201	0.001	0.222	<0.001	0.111	0.003	
Emotional Neglect (EmoNeg)	0.089	0.064	0.134	0.032	0.104	0.006	
Physical Neglect (PhyNeg)	0.133	0.006	0.038	0.543	0.089	0.019	
Sum of CAT domain scores (CAT total)	0.155	0.001	0.167	0.007	0.141	<0.001	

r=Pearson's correlation coefficient

p1=significance between genders

p2=significance for correlations

Significant associations **bolded**

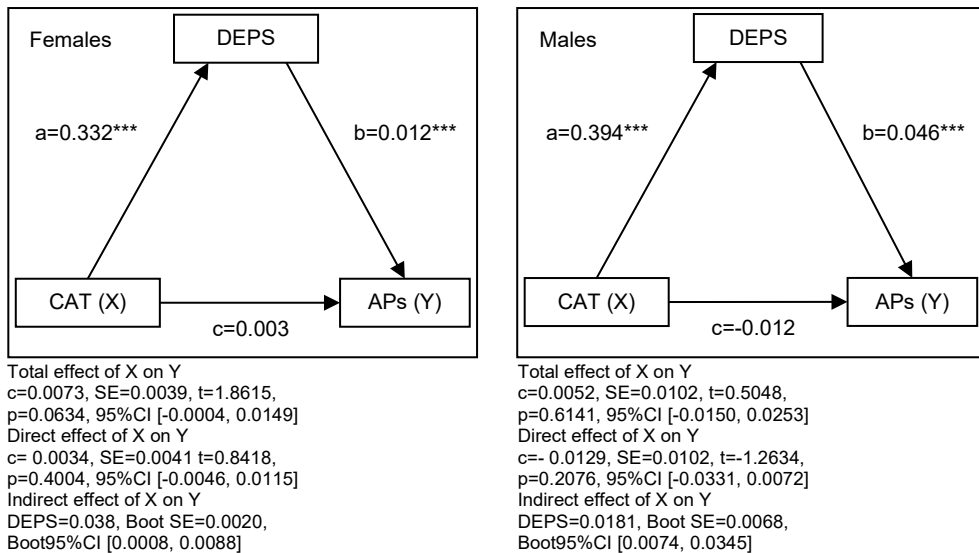
Depressive symptoms associated significantly with APs both in females and in males. In both genders, PhyAb and SexAb correlated significantly with APs. In females, PhyNeg was also associated with APs, while in males, EmoAb and EmoNeg correlated significantly with APs (Table 6). Depressive symptoms correlated strongly with CAT total and domains, indicating that they may mediate the effect of CAT domains on APs.

5.3.2 Multivariate Analyses

In the mediation analyses, the effects of background characteristics were controlled. In the whole sample and in females and males separately, after taking the mediator (DEPS, depressive symptoms) into account, the direct effect of CAT on APs was non-significant, while the indirect effects via the mediator DEPS were significant in the whole sample and in females and males separately (Figure 4 for females and males only).

In the whole sample and in females and males separately, the effects of CAT total and all its domains on APs were significantly mediated via DEPS, and there was no significant direct effect between CAT and APs with two exceptions. In females, PhyAb and SexAb had direct effects on APs even when the mediating effect via DEPS had been taken into account (Table 7).

When the effects of other CAT domains were controlled, in the whole sample, the effects of PhyAb, SexAb, and EmoNeg on APs were mediated via DEPS. In females, both PhyAb and SexAb had direct and indirect effects and EmoNeg had an indirect effect on APs. In males, EmoAb, SexAb, and EmoNeg had indirect effects on APs, but there were no significant direct effects (Table 7).



CAT=childhood adverse and trauma experiences, DEPS=depressive symptoms, APs=alcohol problems; * $p<0.5$, ** $p<0.01$, *** $p<0.001$

Figure 4. Mediation analyses for all females and males separately; the effect of background characteristics is controlled.

Table 7. Path analyses for alcohol problems (APs); the effects of background characteristics controlled.

CAT domains and models		All					Females					Males				
		coeff.	t	p	CI95%		coeff.	t	p	CI95%		coeff.	t	p	CI95%	
CAT total	a	0.352	8.853	<0.001	0.274	0.430	0.332	7.019	<0.001	0.239	0.424	0.394	5.378	<0.001	0.250	0.539
	b	0.025	6.149	<0.001	0.017	0.033	0.012	2.899	0.004	0.004	0.019	0.046	5.512	<0.001	0.030	0.062
	c	-0.002	-0.414	0.679	-0.011	0.007	0.003	0.842	0.400	-0.002	0.012	-0.013	-1.263	0.208	-0.033	0.007
EmoAb	a	0.966	7.379	<0.001	0.709	1.222	0.844	5.291	<0.001	0.530	1.157	1.215	5.315	<0.001	0.765	1.665
	b	0.026	6.509	<0.001	0.018	0.034	0.014	3.544	<0.001	0.006	0.021	0.045	5.417	<0.001	0.029	0.062
	c	-0.020	-1.425	0.155	-0.048	0.008	-0.016	-1.191	0.234	-0.042	0.010	-0.031	-0.978	0.329	-0.094	0.032
	d	0.260	1.400	0.162	-0.104	0.624	-0.089	-0.379	0.705	-0.551	0.373	0.983	3.365	0.001	0.408	1.558
	e	0.024	5.953	<0.001	0.016	0.033	0.010	2.478	0.014	0.002	0.018	0.042	4.767	<0.001	0.025	0.060
	f	-0.040	-1.999	0.046	-0.079	-0.001	-0.058	-3.034	0.003	-0.095	-0.020	-0.010	-0.242	0.809	-0.092	0.072
PhyAb	a	1.229	6.377	<0.001	0.851	1.607	1.503	6.460	<0.001	1.046	1.961	0.678	1.990	0.047	0.007	1.348
	b	0.024	5.933	<0.001	0.016	0.031	0.010	2.504	0.013	0.002	0.018	0.043	5.386	<0.001	0.027	0.059
	c	0.021	1.021	0.307	-0.019	0.061	0.047	2.377	0.018	0.008	0.086	-0.018	-0.411	0.681	-0.103	0.068
	d	0.587	2.466	0.014	0.120	1.054	1.069	3.556	<0.001	0.478	1.660	0.431	-1.140	0.255	-1.176	0.314
	e	0.024	5.953	<0.001	0.016	0.033	0.010	2.478	0.014	0.002	0.018	0.042	4.767	<0.001	0.025	0.060
	f	0.041	1.609	0.108	-0.108	0.092	0.062	2.497	0.013	0.013	0.110	-0.009	-0.166	0.868	-0.113	0.095
SexAb	a	1.330	4.818	<0.001	0.788	1.872	1.249	4.483	<0.001	0.701	1.800	8.206	4.132	<0.001	4.295	12.117
	b	0.023	5.910	<0.001	0.016	0.031	0.010	2.623	0.009	0.003	0.018	0.039	4.785	<0.001	0.023	0.055
	c	0.056	1.947	0.052	-0.001	0.112	0.072	3.232	0.001	0.028	0.116	0.472	1.783	0.076	-0.049	0.994
	d	0.755	2.667	0.008	0.199	1.311	0.618	2.070	0.039	0.031	1.204	8.402	4.444	<0.001	4.678	12.126
	e	0.024	5.953	<0.001	0.016	0.033	0.010	2.478	0.014	0.002	0.018	0.042	4.767	<0.001	0.025	0.060
	f	0.057	1.868	0.062	-0.003	0.117	0.065	2.652	0.008	0.017	0.112	0.486	1.772	0.078	-0.054	1.027
EmoNeg	a	0.846	8.197	<0.001	0.643	1.049	0.785	6.104	<0.001	0.532	1.037	0.932	5.366	<0.001	0.590	1.273
	b	0.026	6.255	<0.001	0.018	0.034	0.013	3.312	0.001	0.005	0.021	0.046	5.532	<0.001	0.030	0.063
	c	-0.011	-0.973	0.331	-0.033	0.011	-0.004	-0.358	0.721	-0.025	0.017	-0.032	-1.320	0.188	-0.080	0.016
	d	0.718	5.093	<0.001	0.441	0.994	0.696	3.712	<0.001	0.328	1.065	0.805	3.870	<0.001	0.395	1.214
	e	0.024	5.953	<0.001	0.016	0.033	0.010	2.478	0.014	0.002	0.018	0.042	4.767	<0.001	0.025	0.060
	f	0.000	-0.017	0.986	-0.303	0.030	0.004	0.231	0.817	-0.027	0.034	-0.015	-0.505	0.614	0.074	0.044
PhyNeg	a	0.667	4.308	<0.001	0.363	0.971	0.763	3.736	<0.001	0.362	1.164	0.541	2.286	0.023	0.075	1.007
	b	0.025	6.332	<0.001	0.017	0.033	0.012	3.098	0.002	0.004	0.019	0.044	5.485	<0.001	0.028	0.060
	c	-0.006	-0.398	0.691	-0.038	0.025	0.018	1.125	0.261	-0.014	0.051	-0.032	-1.070	0.285	-0.092	0.027
	d	-0.391	-2.045	0.041	-0.767	-0.016	-0.411	-1.569	0.117	-0.927	0.104	-0.482	-1.783	0.076	-1.015	0.050
	e	0.024	5.953	<0.001	0.016	0.033	0.010	2.478	0.014	0.002	0.018	0.042	4.767	<0.001	0.025	0.060
	f	-0.004	-0.214	0.830	-0.045	0.036	0.016	0.749	0.454	-0.026	0.058	-0.021	-0.555	0.723	-0.713	0.496

coeff.=coefficient estimate

CAT=childhood adverse and trauma experiences

a=effect of CAT on DEPS

b=effect of DEPS on APs

c=direct effect of CAT on APs

DEPS=depressive symptoms

d=effect of CAT on DEPS; effects of other CAT domains controlled

e=effect of DEPS on APs; effects of other CAT domains controlled

f=direct effect of CAT on APs; effects of other CAT domains controlled

5.4 CAT and psychiatric disorders (Study IV)

5.4.1 Frequency of CAT and mental disorder

As expected, mental disorders were more frequent in PsychC than in PrimC patients. Major depressive and generalized anxiety disorder were most prevalent (Table 8). Co-morbidity was also common in the 205 patients with a current disorder: 87 (42.4%) met one, 87 (42.5%) two or three, and 31 (15.1%) four or more diagnostic criteria. Most patients (85.8%) confirmed that at least one CAT item had occurred at least “sometimes” in their youth; more than half reported EmoNeg (67.5%), PhyNeg (57.8%) and EmoAb (52.0%), slightly fewer PhyAb (47.7%), and fewest SexAb (13.7%). The severity in each domain, except SexAb, was higher in PsychC than in PrimC patients (Table 8).

5.4.2 Bivariate associations between the CAT domains and mental disorders

All the severities of CAT domains were highly significantly correlated with each other, whereby SexAb was least linked to other domains ($.279 \leq p \leq .197$). Furthermore, all diagnostic categories were significantly interrelated, though mostly less frequently than CAT domains among themselves. Correlations between CAT domains and diagnostic categories became significant in only 14 of the 25 instances and were generally highest for PhyAb and EmoNeg. ANYPSY was not related to any domain, and SexAb only to ANYDEP. ANYSUB was only related to PhyAb and EmoNeg.

5.4.3 Path modelling of the relationship between CAT domains and axis-I diagnostic categories

Although as expected, given our large sample size, the χ^2 test became significant ($\chi^2(65) = 680.528, p < .001$); already the saturated model produced an excellent model fit as indicated by RMSEA of 0.000 (90%CI 0.000–0.062), CFI of 1.000 and TLI of 1.018 (Figure 5). Again, the severities of the CAT domains were highly interrelated, as were diagnostic categories with the exception of ANYPSY and ANYSUB (Figure 5). Female gender was associated with EmoAb and male gender with ANYMAN and ANYSUBS. Age associated negatively with ANYANX and ANYSUBS. PhyAb had significant effects on ANYDEP, ANYMAN, ANYPSY and ANYANX, and EmoNeg on ANYDEP, ANYANX and ANYSUBS (Figure 5).

Table 8. Sociodemographic and clinical characteristics of patients from primary (PrimC) and psychiatric care (PsychC).

	PrimC (n=255; 61.4%)	PsychC (n=160; 38.6%)	Total sample (n=415; 100%)	Statistics $\chi^2_{(df)}$ / U, p
Gender, % male	27.8%	28.8%	28.2%	0.040 ₍₁₎ , 0.842
Age; Mdn, mean (SD)	52.0; 49.3 (15.1)	46.9, 45.0 (10.9)	49.7, 47.6 (13.8)	32640.0, 0.002**
Marital status, %				6.244 ₍₂₎ , 0.044*
Single	15.3%	14.4%	14.9%	
Married / cohabiting	55.7%	66.9%	60.0%	
Divorced or separated / widowed	29.0%	18.8%	25.1%	
MINI categories and diagnoses, %				
Any depressive disorder (ANYDEP)	23.9%	58.1%	37.1%	49.282 ₍₁₎ , <0.001***
Major depressive episode (MDD)	20.8%	45.6%	30.4%	28.692 ₍₁₎ , <0.001***
Dysthymia (DYS)	5.5%	29.4%	14.7%	44.732 ₍₁₎ , <0.001***
Any manic disorder (ANYMAN)	2.7%	3.8%	3.1%	0.327 ₍₁₎ , 0.567
Manic episode (MAN)	1.6%	2.5%	1.9%	0.451 ₍₁₎ , 0.492 ^F
Hypomanic episode (HYPOMAN)	1.2%	1.3%	1.2%	0.004 ₍₁₎ , 1.0 ^F
Any psychotic disorders (ANYPSY)	1.6%	5.6%	3.1%	5.331 ₍₁₎ , 0.038 ^{F*}
Any anxiety disorder (ANYANX)	16.1%	48.1%	28.4%	49.617 ₍₁₎ , <0.001***
Generalised anxiety disorder (GAD)	14.5%	39.4%	24.1%	33.234 ₍₁₎ , <0.001***
Panic disorder (PANIC)	1.2%	8.8%	4.1%	14.354 ₍₁₎ , <0.001 ^{F***}
Social phobia (SOC)	1.2%	12.5%	5.5%	24.080 ₍₁₎ , <0.001 ^{F***}
Agoraphobia (AGO)	0%	0%	0%	not calculated
Obsessive-compulsive disorder (OCD)	1.6%	15.0%	6.7%	28.189 ₍₁₎ , <0.001 ^{F***}
Posttraumatic stress disorder (PTSD)	1.2%	3.8%	2.2%	3.069 ₍₁₎ , 0.094 ^F
Any substance dependency (ANYSUBS)	9.4%	16.3%	12.0%	4.338 ₍₁₎ , 0.037*
Alcohol dependency (ALC)	8.6%	14.4%	10.8%	3.359 ₍₁₎ , 0.067
Drug dependency (DRUG)	1.2%	3.1%	1.9%	1.974 ₍₁₎ , 0.270 ^F
Any eating disorder (ANYEAT)	0%	0%	0%	not calculated
Anorexia or Bulimia nervosa	0%	0%	0%	not calculated
Any MINI diagnosis	34.5%	73.1%	49.4%	58.648 ₍₁₎ , <0.001***
CAT domain severity; Mdn, mean (SD)				
Emotional neglect (EmoNeg, range 0–5)	1, 1.6 (1.8)	3, 2.8 (1.9)	2, 2.1 (1.9)	13549.0, <0.001***
Emotional abuse (EmoAb, range 0–5)	0, 0.9 (1.3)	1, 1.8 (1.7)	1, 1.2 (1.5)	14057.0, <0.001***
Physical neglect (PhyNeg, range 0–4)	1, 0.9 (1.1)	1, 1.4 (1.3)	1, 1.1 (1.2)	16052.0, <0.001***
Physical abuse (PhyAb, range 0–5)	0, 0.7 (1.1)	1, 1.1 (1.3)	0, 0.9 (1.2)	15630.0, <0.001***
Sexual abuse (SexAb, range 0–5)	0, 0.3 (0.9)	0, 0.5 (1.2)	0, 0.4 (1.0)	19318.0, 0.128

* p<0.05, ** <0.01, *** <0.001; ^F indicates use of Fisher's exact test for any expected cell frequency <5

Wilcoxon test of EmoNeg > EmoAb: Z=-10.642, p<0.001.

Wilcoxon test of PhyNeg > PhyAb: Z=-4.068, p<0.001.

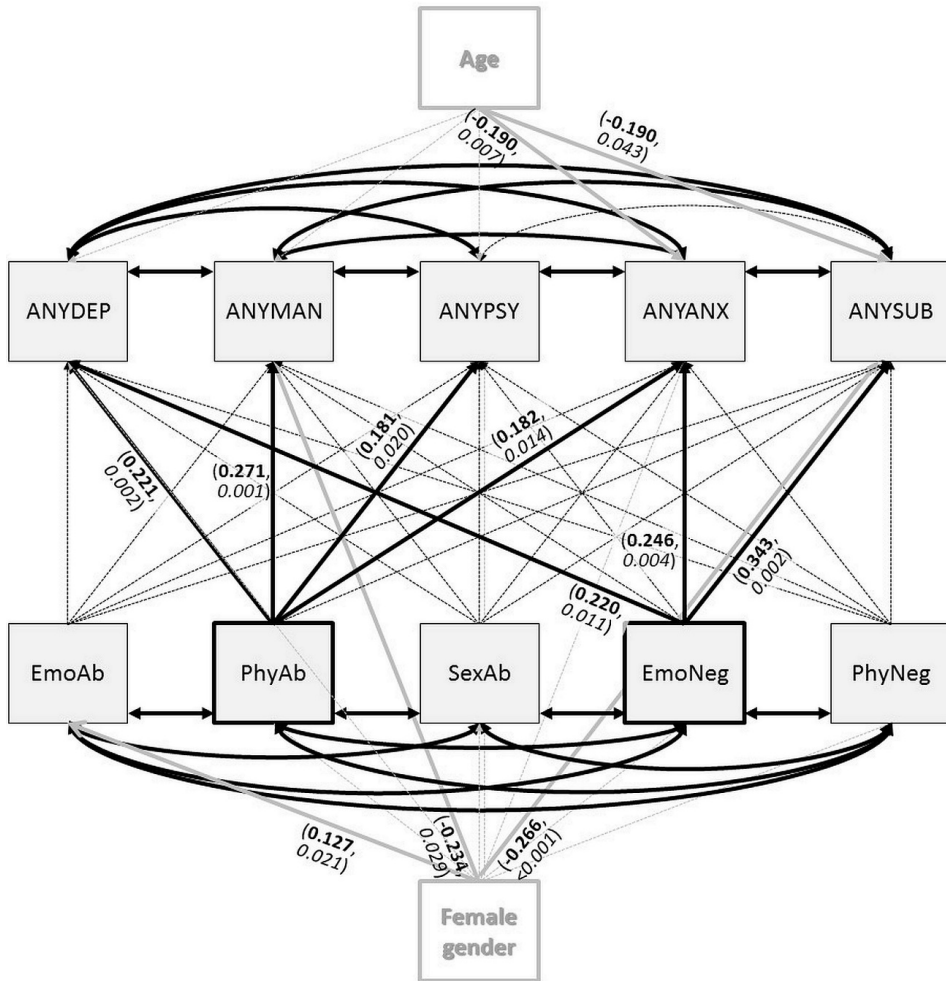


Figure 5. Path model of the relation between CAT domain severities and diagnostic categories with consideration of the influence of gender and age. Dashed lines indicate non-significant paths ($p > 0.05$), thick lines significant paths with standardized estimates in bold and p-values in italics. ANYDEP: any depressive disorder; ANYMAN: any manic disorder; ANYPSY: any psychotic disorder; ANYANX: any anxiety disorder; ANYSUB: any substance dependency; PhyAb: physical abuse; EmoAb: emotional abuse; SexAb: sexual abuse; EmoNeg: emotional neglect; PhyNeg: physical neglect. Significant interrelations (estimate, p-value) of diagnostic categories and CAT domains, respectively (from top to bottom, left to right): ANYDEP–ANYMAN: 0.300, 0.006; ANYDEP–ANYPSY: 0.394, 0.001; ANYDEP–ANYANX: 0.601, <0.001; ANYDEP–ANYSUB: 0.357, 0.001; ANYMAN–ANYPSY: 0.359, 0.020; ANYMAN–ANYANX: 0.368, 0.004; ANYMAN–ANYSUB: 0.249, 0.049; ANYPSY–ANYANX: 0.373, 0.005; ANYANX–ANYSUB: 0.374, <0.001; PhyAb–EmoAb: 0.600, <0.001; PhyAb–SexAb: 0.219, <0.001; PhyAb–EmoNeg: 0.510, <0.001; PhyAb–PhyNeg: 0.515, <0.001; EmoAb–SexAb: 0.243, <0.001; EmoAb–EmoNeg: 0.667, <0.001; EmoAb–PhyNeg: 0.518, <0.001; SexAb–EmoNeg: 0.254, <0.001; SexAb–PhyNeg: 0.291, <0.001; EmoNeg–PhyNeg: 0.649, <0.001.

5.5 Psychiatric disorders, CAT and risk of suicide (Study V)

5.5.1 Bivariate analyses

Older people reported lower levels of suicide risk, while a small number of social relationships and poor health associated with suicide risk. As expected, risk of suicide was more prevalent among the patients who were currently attending psychiatric care. All MINI diagnoses, except hypomania, and all CAT domains, except SexAb and PhyNeg, associated significantly with risk of suicide. The number of clinical diagnoses and CAT domains had a dose-dependent effect on suicide risk (Table 9).

Co-occurrence of many diagnoses (co-morbidity), as well as many CAT domains, was high, indicating that their effects on suicide risk might mainly be nonspecific. Spearman correlation coefficients between all CAT domain scores, except SexAb, were very high ($r_s > .439$, $p < .001$), while the correlation between SexAb and other CAT domains was considerable ($r_s > .249$, $p < .001$). Suicide risk correlated significantly with EmoAb ($r_s = .316$, $p < .001$), PhyAb ($r_s = .261$, $p < .001$), EmoNeg ($r_s = .283$, $p < .001$) and PhyNeg ($r_s = .178$, $p < .001$), but not with SexAb ($r_s = .075$, $p = .126$).

5.5.2 Multivariate analyses

In the general linear model for the entire sample, of the clinical diagnoses, major depression, social phobia, alcohol and drug dependence, and of CAT domains, EmoAb associated specifically with risk of suicide when the effects of gender, age, marital status, perceived health and social relationships had been controlled (Table 10). Of background controlling factors, only psychiatric care associated with risk of suicide. In females, CAT domains had no specific association, while their current mania, hypomania and drug dependence had specific associations with risk of suicide. In males, dysthymia and social phobia of psychiatric disorders and EmoAb of CAT domains associated specifically with risk of suicide (Table 10).

In post hoc analyses, current major depression, manic, hypomanic and psychotic and panic episode were replaced by corresponding life-time episodes. Other diagnoses (generalized anxiety, social phobia, obsessive-compulsive disorder, post-traumatic stress disorder, alcohol dependence and drug dependence) were current episodes, but because of their clinical nature they also represent a longer period than only a short episode.

In the comparative general linear model (Table 10), major depression ($p = .015$; 95% CI 0.236–2.148), social phobia ($p = .038$; 95% CI 0.105–3.839), alcohol use ($p = .017$; 95% CI 0.293–3.017) and drug dependence ($p < .001$; 95% CI 3.046–8.894) associated significantly with risk of suicide.

Table 9. Suicide risk scores by background. MINI diagnoses and CAT domains.

	N	%	Mean	SD	p
Total	415	100.00	1.88	4.51	
Gender					0.148
Men	117	28.19	2.39	5.38	
Women	298	71.81	1.68	4.12	
Age					0.003
19–24	35	8.43	2.06	5.49	
25–44	127	30.60	2.13	4.15	
45–54	120	28.92	2.89	5.97	
55–64	90	21.69	0.82	2.62	
65–80	43	10.36	0.40	1.05	
Mariatal status					0.47
Single	62	14.94	2.42	5.09	
Married	179	43.13	1.48	3.61	
Cohabiting	69	16.63	2.28	5.40	
Divorced/Separated	72	17.35	2.24	5.10	
Widowed	33	7.95	1.45	4.41	
Number of social relationships					0.011
0	48	11.57	3.69	6.16	
1	52	12.53	2.52	3.86	
2	42	10.12	1.62	3.83	
3	273	65.78	1.48	4.32	
Health					<0.001
Very good	11	2.65	0.00	0.00	
Good	120	28.92	1.00	3.35	
Moderate	200	48.19	1.90	4.61	
Poor	77	18.55	2.95	5.16	
Very poor	7	1.69	7.86	7.84	
Treatment place					<0.001
Primary care	255	61.45	0.79	2.06	
Psychiatric care	160	38.55	3.63	6.42	
Clinical disorders					
Major depression	126	30.36	3.95	6.24	<0.001
Dysthymia	61	14.70	4.05	6.79	<0.001
Mania	8	1.93	7.25	8.01	0.001
Hypomania	5	1.20	4.40	5.32	0.21
Psychotic disorder	13	3.13	5.77	8.27	0.002
Generalised anxiety	100	24.10	4.16	6.57	<0.001
Panic disorder	17	4.10	5.18	7.32	0.002
Social phobia	23	5.54	6.48	7.61	<0.001
Obsessive-compulsive disorder	28	6.75	6.54	7.72	<0.001
Post-traumatic stress disorder	9	2.17	6.33	8.57	0.003
Alcohol dependence	45	10.84	5.13	6.61	<0.001
Drug dependency	8	1.93	10.00	8.25	<0.001
Number of MINI diagnoses					<0.001
0	210	50.60	0.37	1.16	
1	87	20.96	2.17	5.21	
2–3	87	20.96	3.38	5.31	
4+	31	7.47	7.10	7.89	
CAT domains					
Emotional abuse	216	52.05	2.76	5.52	<0.001
Physical abuse	198	47.71	2.90	5.79	<0.001
Sexual abuse	57	13.73	2.65	5.13	0.164
Emotional neglect	280	67.47	2.30	4.68	0.007
Physical neglect	240	57.83	2.22	4.82	0.073
Any TADS domain case	356	85.78	2.12	4.81	0.008
Number of CAT cases					<0.001
0	68	16.39	0.26	0.96	
1	71	17.11	1.48	3.98	
2	78	18.80	1.19	3.10	
3	62	14.94	3.00	6.29	
4	102	24.58	2.42	4.83	
5	34	8.19	3.88	6.24	

Table 10. General linear model for suicide risk scores in all and females and males separately.

	All					Female					Male				
	B	t	p	CI95%		B	t	p	CI95%		B	t	p	CI95%	
Gender	1.488	0.929	0.354	-1.662	4.638										
Male	0.310	0.654	0.514	-0.622	1.241										
Female	-														
Age	-0.022	-1.205	0.229	-0.059	0.014	-0.018	-0.920	0.359	-0.057	0.021	-0.056	-1.260	0.211	-0.146	0.033
Marital status															
Single	-1.141	-1.139	0.255	-3.112	0.829	-1.300	-1.214	0.226	-3.409	0.808	-1.933	-0.839	0.404	-6.510	2.644
Married	-1.315	-1.676	0.095	-2.857	0.227	-1.507	-1.878	0.061	-3.087	0.073	-0.933	-0.460	0.647	-4.966	3.100
Cohabiting	-0.835	-0.909	0.364	-2.642	0.972	-1.302	-1.344	0.180	-3.208	0.605	0.287	0.132	0.895	-4.018	4.592
Divorced/Separated	-0.706	-0.814	0.416	-2.410	0.998	-0.712	-0.799	0.425	-2.466	1.042	-0.748	-0.331	0.742	-5.243	3.746
Widowed	-					-					-				
Social relationships	0.014	0.068	0.946	-0.396	0.424	0.147	0.620	0.536	-0.320	0.615	-0.244	-0.557	0.579	-1.112	0.625
Health	0.224	0.748	0.455	-0.365	0.814	0.172	0.517	0.606	-0.484	0.829	0.225	0.362	0.718	-1.011	1.461
Treatment place															
Psychiatric care	1.374	2.937	0.004	0.454	2.293	1.701	3.430	0.001	0.725	2.678	0.762	0.696	0.488	-1.411	2.934
Primary care	-					-					-				
Clinical disorders															
Major depression	1.178	2.323	0.021	0.181	2.176	0.968	1.744	0.082	-0.125	2.060	1.634	1.495	0.138	-0.538	3.806
Dysthymia	0.706	1.178	0.239	-0.472	1.885	-0.294	-0.449	0.654	-1.581	0.994	3.805	2.735	0.008	1.041	6.569
Mania	1.711	1.118	0.264	-1.299	4.722	8.167	3.204	0.002	3.148	13.187	-3.174	-1.384	0.170	-7.728	1.381
Hypomania	2.187	1.203	0.230	-1.388	5.762	5.079	2.407	0.017	0.925	9.233	-2.382	-0.695	0.489	-9.187	4.423
Psychotic disorder	0.499	0.419	0.676	-1.846	2.845	0.037	0.023	0.982	-3.129	3.203	-1.205	-0.492	0.624	-6.071	3.662
Generalised anxiety	0.322	0.572	0.568	-0.784	1.427	0.633	1.044	0.297	-0.560	1.826	-1.173	-0.895	0.373	-3.777	1.431
Panic disorder	0.480	0.450	0.653	-1.617	2.577	0.111	0.094	0.925	-2.197	2.418	-1.100	-0.460	0.646	-5.847	3.647
Social phobia	2.256	2.353	0.019	0.371	4.141	0.871	0.759	0.448	-1.387	3.129	4.952	2.666	0.009	1.263	8.641
Obsessive-compulsive disorder	1.071	1.108	0.268	-0.829	2.970	0.940	0.905	0.366	-1.106	2.987	3.564	1.519	0.132	-1.097	8.225
Post-traumatic stress disorder	-0.444	-0.303	0.762	-3.329	2.440	0.360	0.246	0.806	-2.516	3.235	-9.063	-1.906	0.060	-	0.384
Alcohol dependence	1.649	2.365	0.019	0.278	3.020	1.776	1.947	0.053	-0.020	3.571	0.563	0.422	0.674	-2.087	3.213
Drug dependency	5.978	3.990	<0.001	3.032	8.923	4.732	3.006	0.003	1.633	7.831	8.679	1.915	0.059	-0.322	17.680
CAT domains															
Emotional abuse	0.155	2.034	0.043	0.005	0.305	0.064	0.800	0.424	-0.093	0.220	0.583	2.984	0.004	0.195	0.972
Physical abuse	0.187	1.957	0.051	-0.001	0.374	0.155	1.446	0.149	-0.056	0.366	0.058	0.280	0.780	-0.354	0.470
Sexual abuse	0.074	0.916	0.360	-0.085	0.233	0.080	1.021	0.308	-0.074	0.234	-0.142	-0.419	0.676	-0.817	0.532
Emotional neglect	-0.090	-1.286	0.199	-0.229	0.048	-0.080	-0.977	0.329	-0.241	0.081	-0.127	-0.880	0.381	-0.413	0.159
Physical neglect	-0.074	-0.993	0.321	-0.221	0.073	0.009	0.114	0.909	-0.151	0.169	-0.179	-1.063	0.291	-0.512	0.155
Significant associations bolded	Adjusted R Squared = 0.252					Adjusted R Squared = 0.276					Adjusted R Squared = 0.334				

5.6 Suicide thoughts in patients with risk of psychosis

5.6.1 Bivariate analyses

At baseline, more than half of the CHR patients reported SUI; whilst at the follow-up points the corresponding figure was one third. At baseline examination, 43.0% of females and 28.2% of males (34.5% of total) ($p=.020$) fulfilled the criteria of major depression. Depression symptoms decreased significantly from baseline to both follow-up points (both $p<.001$), but not between follow-up points ($p=.870$). The gender difference in depression symptoms displayed a trend at baseline, was significant at 9-month follow-up, and no longer significant at 18-month follow-up (Table 11).

Table 11. Distributions of background characteristics. Percentage of the subjects with any suicidal ideas and depressive symptoms by gender.

	All n=238 %	At baseline n=238 %	9 months n=181 %	18 months n=152 %
All	100	54.6	33.7	34.9
Gender				
Females	45	57.9	38.1	36.6
Males	55	51.9	29.9	33.3
p		0.212	0.157	0.400
Age (mean 22.4 years; range 15–35)				
-20	47.5	57.5	35.6	37.5
21+	52.5	52.0	31.9	32.5
p		0.235	0.355	0.317
Marital status				
Single	81.1	56	33.1	33.6
Ever married	18.9	48.9	36.1	40.7
p		0.244	0.438	0.311
Education years				
-12	43.3	62.1	35.9	37.5
13+	56.7	48.9	32.0	33.0
p		0.028	0.349	0.341
Ethnicity				
White	83.6	53.3	32.9	36.0
Non-white	16.4	61.5	37.9	29.6
p		0.220	0.372	0.347
BDI mean (SD)				
All		19.6 (10.4)	12.4 (10.3)	13.0 (10.3)
Females		21.0 (9.6)	14.6 (11.4)	14.4 (10.8)
Males		18.4 (11.0)	10.5 (8.9)	11.8 (9.7)
p		0.054	0.008	0.121

EmoNeg was the most prevalent CAT domain in both genders. Females reported EmoAb and EmoNeg more often than males ($p=.004$); otherwise there were no gender differences in CAT domains. The sum of CAT severity scores correlated significantly with depression symptoms and SUIs, and depression symptoms

correlated significantly with SUIs at baseline and at both follow-up times, indicating that depression symptoms may act as a mediator between CAT and SUI. Strong inter-correlations between SUI scores point to the persistence of SUI. Patients with baseline depression reported higher CAT scores and overall SUI scores than those without depression. For females, the differences between those with and without baseline depression were significant ($p = .017$ and $p < .001$), but not for males ($p = .233$ and $p = .583$) (Figure 6).

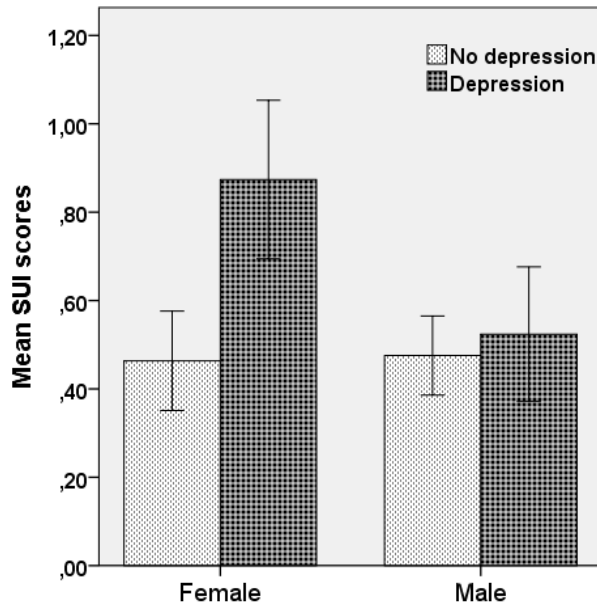


Figure 6. Means of suicidal ideation (SUI) scores (CI 95%) in females and males by baseline clinical depression. Interaction Gender*Depression $F=7.288$, $p=0.007$.

5.6.2 Multivariate analyses

In the total sample, the sum of CAT severity scores, as well as all CAT domains except PhyNeg, significantly predicted SUI over the entire study period, even when the effect of baseline depression was controlled. However, when the effects of depression symptoms were controlled, the association between CAT and SUI was no longer significant (Table 12), indicating that the effect of CAT on SUI was mediated via concurrent depression symptoms.

Table 12. Repeated ordinal logistic models for the BDI item "Thoughts of killing himself".

	Model	All				Female				Male			
		Sig.	Exp(B)	LCI95%	UCI95%	Sig.	Exp(B)	LCI95%	UCI95%	Sig.	Exp(B)	LCI95%	UCI95%
CAT tot	1	<0.001	1.112	1.065	1.161	0.011	1.078	1.018	1.141	<0.001	1.175	1.097	1.258
	2	<0.001	1.098	1.051	1.148	0.103	1.051	0.990	1.116	<0.001	1.169	1.091	1.253
	3	0.159	1.036	0.986	1.088	0.523	0.978	0.913	1.047	0.009	1.107	1.025	1.196
EmoAb	1	<0.001	1.331	1.156	1.532	0.028	1.223	1.022	1.463	<0.001	1.601	1.267	2.023
	2	0.001	1.270	1.099	1.466	0.199	1.130	0.938	1.361	<0.001	1.566	1.235	1.987
	3	0.644	1.039	0.885	1.219	0.371	0.910	0.739	1.120	0.050	1.304	1.000	1.701
PhyAb	1	<0.001	1.413	1.186	1.682	0.117	1.242	0.947	1.630	<0.001	1.559	1.234	1.970
	2	0.001	1.352	1.131	1.616	0.359	1.140	0.861	1.509	0.001	1.518	1.196	1.926
	3	0.235	1.119	0.930	1.347	0.328	0.858	0.631	1.166	0.035	1.313	1.019	1.690
SexAb	1	0.003	1.256	1.081	1.460	0.219	1.148	0.921	1.430	0.001	1.448	1.163	1.803
	2	0.007	1.234	1.059	1.439	0.424	1.096	0.875	1.372	0.001	1.437	1.152	1.793
	3	0.202	1.110	0.946	1.302	0.921	1.012	0.804	1.272	0.169	1.186	0.930	1.511
EmoNeg	1	<0.001	1.269	1.127	1.428	0.020	1.201	1.029	1.402	<0.001	1.415	1.172	1.709
	2	0.001	1.224	1.085	1.380	0.152	1.124	0.958	1.319	0.001	1.392	1.151	1.684
	3	0.293	1.073	0.941	1.225	0.695	0.965	0.808	1.153	0.054	1.229	0.996	1.517
PhyNeg	1	0.051	1.191	0.999	1.420	0.129	1.204	0.947	1.531	0.196	1.188	0.915	1.544
	2	0.077	1.174	0.983	1.402	0.252	1.154	0.903	1.474	0.175	1.201	0.922	1.564
	3	0.504	1.070	0.877	1.306	0.988	0.998	0.744	1.337	0.314	1.161	0.868	1.551

Model 1: Background factors and time factor controlled

Model 2: Background factors, time factor and baseline clinical depression

Model 3: Background factors, time factor, baseline clinical depression and BDI scores at baseline, 9 months and 18 months without the item "Thoughts of killing himself" controlled

LCI95%: Lower confidence limit,

UCI95%: Upper confidence limit

Statistically significant figures **bolded**

In females, only EmoAb, EmoNeg and total CAT scores were significantly associated with overall SUI, but when the effect of baseline depression was taken into account, these associations were no longer significant. In males, however, EmoAb, PhyAb and total CAT scores displayed significant associations with SUIs, after controlling for baseline depression and concurrent depressive symptoms, indicating direct effects between these CAT scores and overall SUIs. In the case of SexAb and EmoNeg, before depressive symptoms were added as predictors, CAT scores demonstrated a significant association with SUI (Table 12).

6 Discussion

6.1 The Trauma And Distress Scale

The methods to assess adverse childhood experiences can be retrospective or prospective, can use a standardised or non-standardised collection of information, and can be used in clinical and population samples (Hardt & Rutter, 2004; Oh et al., 2018). The Trauma And Distress Scale (TADS) (Patterson et al., 2002) was developed in the European Prediction of Psychosis Study (EPOS; Klosterkötter et al., 2005) for assessment of childhood adversities and trauma (CAT) in patients at clinical high risk of psychosis. The aim was to produce a self-report instrument suitable for retrospective assessment of CAT and its domains in this clinical population. Items for TADS were initially selected from several scales including the Childhood Trauma Questionnaire (CTQ; Bernstein et al., 1994), the Child Abuse and Trauma Scale (CATS; Sanders & Becker-Lausen, 1995), and the Early Trauma Inventory– Self Report (Bremner, Bolus, & Mayer, 2007).

TADS was translated into Finnish and since then has been used in several Finnish studies (e.g., Joukamaa et al., 2008; Tikka et al., 2012; Luutonen et al., 2013). By employing a large Finnish population sample, we aimed to examine the psychometric properties of TADS and to create normative data which are often lacking for similar measures (Burgermeister, 2007; Pietrini et al., 2010; Thabrew, de Sylva, & Romans, 2012). First, we found that all CAT subscales, except PhyNeg, exhibited acceptable or excellent internal consistency, indicating that TADS and its subscales reliably assess the target construct of retrospective ‘childhood trauma’. Second, inter-method reliability, as measured by a comparison of the self-reported and interview-reported trauma scores, was sufficiently high for individual items, subscales and TADS totals with no indication of a general bias towards either under- or over-reporting. There was, however, some indication of better inter-method reliability for raw-score-based subscales and TADS totals compared to dichotomised scores. While the ICCs of raw score sums all indicated excellent agreement, k values of dichotomized domains and totals were poorer and fell below the threshold for clinical utility for totals.

Inter-method reliability was poor overall for three items (2, 17 and 36; Table 1), two of which had originally been part of the physical neglect and abuse domains,

respectively, and negatively affected their internal consistency. These were removed from the respective domains and in the case of PhyAb, replaced by an item with excellent inter-method reliability. Finally, emotional neglect appeared to be over-reported in self-reports compared to interviews, hence self-reports should be treated with some caution for this scale.

Childhood adversity has frequently been associated with adult mental disorder, particularly depression (e.g., Kessler et al., 2010; Fryers & Brugha, 2013; Lindert et al., 2014), and so the DEPS screen of positive cases and help-seeking for mental problems were used as proxy measures of the construct 'traumatisation' in examining TADS's concurrent validity. Effect sizes indicated small to moderate associations between proxy measures and TADS categories (caseness). Because the relationship between childhood trauma and adult mental ill health is complex and significantly mediated by many interacting factors (Kessler et al., 2010; Fryers & Brugha, 2013), the small to moderate effect sizes suggest good concurrent validity of TADS.

Depression and help-seeking status also enabled an approximate comparison of diagnostic accuracy measures for the TADS domains and total caseness. As expected, the total TADS scale (43 items) had very low specificity for proxy measures and, therefore, may not be suitable for detecting early traumatisation. The total TADS domains demonstrated low specificity for depressiveness but higher specificity for help-seeking, which is likely to be an indicator of a much wider range of psychiatric symptoms or disorders, and thus indicates the instrument's clinical utility. Because of the low reported frequency of sexual abuse events, the sensitivity for SexAb remained low, but its high specificity and moderate positive likelihood ratio for depressiveness supports the view that childhood sexual abuse is specifically related to clinical depression in adulthood (Lindert et al., 2014).

In conclusion, the results regarding TADS and its five revised sub-scale domains, indicate good psychometric properties in terms of internal consistency, content, inter-method reliability and concurrent validity for adults from a Finnish community sample. As regards TADS's utility, it seems possible to improve it while retaining good content validity in terms of the five core domains of childhood trauma by employing only 24 of the measured items. Overall, TADS appears to be a useful instrument for the assessment of retrospectively reported childhood adversity and trauma beyond the contextual framework of its original development for the prediction of psychosis in clinical high-risk samples.

6.2 CAT experiences and perceived attitude of others (AoO)

The main hypotheses regarding the associations of CAT with AoO and depression symptoms (DEPS) were confirmed: CAT associated significantly with negative AoO

and DEPS. CAT and all its domains, except SexAb, had direct and indirect – via DEPS – associations with negative AoO, and direct and indirect – via negative AoO – associations with DEPS. Of the five core CAT domains, EmoNeg had specific direct and indirect effects on negative AoO and on DEPS.

Females' perception of other people's attitudes towards them tends to be more positive than that of males. It seems that females take a more positive stand to other people and trust them more than males. It is possible that this gender difference has its origin in individuals' childhood: boys are inclined to extravert behavioural problems (e.g. Bongers et al., 2003), and may therefore receive negative attention more often than girls from their parents and other attachment figures, and may consequently develop negative representational models more often than girls, the effect of which is seen as perceived negative AoO even in adulthood. The fact that the total effects of CAT total on AoO and DEPS were stronger in males than in females indicates that adverse childhood experiences may in general have stronger effects on negative perceived AoO and depressive symptoms in males than in females. These gender differences are emphasised by the fact that DEPS seems to be gender-neutral (Salokangas et al., 2002).

In the analyses regarding the specific effects of CAT domains, the greatest gender differences were found in EmoAb, SexAb and EmoNeg. In males, EmoAb and EmoNeg had specific effects on negative AoO directly and via DEPS, while their effects on DEPS were mediated via AoO, indicating that, in males, adverse childhood emotional experiences greatly and specifically disturb their trust in other people and also make them vulnerable to depression. In females, EmoNeg had specific direct and indirect effects on negative AoO and on DEPS, while SexAb had rather strong indirect effects on DEPS via AoO, indicating that depression in females is considerably but not specifically mediated via perceived negative attitude of others.

In previous studies, mood disorders and symptoms have been associated with disturbed ability to infer the mental states of others (Bora, Bartholomeusz, & Pantelis, 2016, Wang et al., 2008, Weightman, Air, & Baune, 2014), and with how individuals have perceived other people and their attitude towards them (Weightman, Air, & Baune, 2014). Individuals with depressive disorders are inclined to interpret their interpersonal relations negatively and this bias towards negative emotions seems to persist even in the remission phase (Weightman, Air, & Baune, 2014). In line with clinical studies, in the present population study, DEPS associated with perceived negative AoO. Thus, as CAT consistently associates with depression in adulthood, treating it as a mediator between CAT and AoO was justified.

However, as Bowlby (1977, 1973) and others (Abramson, Metalsky, & Alloy, 1989; Beck, 2008; Harris, 2001) have suggested, childhood adversities, such as repeated critical comments, verbal humiliation and lack of emotional warmth, may

lead to dysfunctional attitudes and attribution styles which in turn may act as vulnerability factors for depression; in other words, they may mediate the effect of CAT on depression. Indeed, the present path analyses showed that a great deal of the effect of CAT and its domains on DEPS was mediated via AoO. The indirect/total effect rates for AoO as a mediator were almost systematically higher than those for DEPS as a mediator. Among participants without previous mental care, these rates were even greater than in the whole sample, indicating that perceived negative AoO mediates the effects of CAT on current depression symptoms much more strongly than vice versa.

All CAT domains, except SexAb, associated with negative AoO and DEPS, indicating that various adverse childhood experiences have long-term effects on how individuals perceive other people and their attitude towards themselves, as well as on depressive symptoms. This is in line with the attachment theory (Bowlby, 1973) stating that the representational models of attachment modes, developed during childhood and adolescence, tend to persist into adult life (Bowlby, 1977), and also with previous findings demonstrating that various ACEs have detrimental effects on these representational models (Bifulco et al., 2002; Bongers et al., 2003; Bora, Bartholomeusz, & Pantelis, 2016; Bowlby, 1977; Germine et al., 2015), leading to dysfunctional attitudes, attribution styles and depressive mood (Abramso, Metalsky, & Alloy, 1989; Beck, 2008; Harris, 2001). A new finding was that the association between CAT and perceived negative AoO was found in a general population sample.

Our previous finding that 72% of the present sample of the general population reported that they had experienced some abuse or neglect at least sometimes (Salokangas et al., 2016a) indicates that ACEs and their possibly negative effects on interpersonal relationships concern a great number of people, and also that the negative interpretation of other people's attitude towards themselves increases their vulnerability to depression. Of the five core CAT domains (Burgermeister, 2007), only emotional neglect – the most frequent CAT domain (Akyuz et al., 2005; Dubowitz & Bennet, 2007; Salokangas et al., 2016a) – had a specific indirect effect on negative AoO, as well as on DEPS, indicating that emotional neglect was the major specific factor influencing both AoO and DEPS.

The domain of emotional neglect (Patterson et al., 2002) comprises the following five items which are reversed for calculating the domain score: "When I was young, I felt valued or important", "My family was emotionally warm and loving", "When I was young, my family looked after each other", "I respect myself", "My family was supportive and encouraging when I was young". These items nicely represent the two key facets of secure (as opposed to insecure) attachment: 1) Self is perceived as worthy of love and attention, and 2) others are viewed as warm and responsive, as put forward by Bowlby (1973). In Rohner's (1986) concept of the parental

acceptance-rejection syndrome, emotional rejection comes close to the emotional neglect of ACE. According to Rohner (2004), children and adults, who have experienced being rejected in their relationship with their parents, report specific forms of psychological maladjustment including impaired self-adequacy and negative worldview.

In the present study, we were able to confirm, on the population level, the findings of Bowlby and Rohner based on individual psychology. Moreover, we also showed that, although ACEs as a whole may disturb the way in which we perceive our fellow human beings and their attitude towards us, the childhood experiences of being emotionally rejected or neglected have the most harmful specific effect on our ability to trust other people. In addition, these attitudinal disturbances may make us vulnerable to depressive mood and clinical depression, even to psychotic experiences (Salokangas et al., 2012b).

6.3 CAT and psychiatric disorders

6.3.1 CAT and alcohol problems

In accordance with other studies (Kendler, Edwards, & Gardner, 2015; Nolen-Hoeksema & Hilt 2006), in the present population study, reported alcohol problems were associated with amount of alcohol use, and were more common in males than in females. In males, the associations of alcohol problems with socio-demographic background variables were more consistent than in females, although there were no significant gender differences in the distributions of background characteristics. It was also found that females had sought help for their mental problems more often than males, and that the use of mental health services was associated with alcohol problems in both genders. In both genders, depressive symptoms strongly associated with alcohol problems; actually the correlation coefficient in males was higher than in females, indicating that depression is in males more closely connected with alcohol problems than in females.

In line with several previous studies (Goldstein, Flett, & Wekerle, 2010; Fenton et al., 2013; Elliott et al., 2014; Dragan & Hardt, 2016; Kestilä et al., 2008; Brady & Back, 2012; Patten et al., 2016; Thabrew, de Sylva, & Romans, 2012; Schwandt et al., 2013; Shin, Hassamal, & Groves, 2015), in the present study, CAT experiences associated extensively with reported problems due to the use of alcohol. However, a great majority of these associations between CAT experiences and alcohol problems were explained by or mediated via depressive symptoms. In a large pooled sample, the effect of childhood (sexual or physical) abuse and exposure to violent crime on substance dependency was mediated via mood and anxiety disorders (Douglas et al., 2010), while in a population study, significant mediated effects were found between

emotional abuse and alcohol-related problems via psychological distress (Shin, Hassamal, & Groves, 2015). In the present population study, the effects of all five CAT domains on alcohol problems were mainly mediated via depressive symptoms. This was true although the effects of previous treatment for mental problems and the frequency of use of alcohol were taken into account, indicating that depressive symptoms acted as a specific mediator between CAT and adult alcohol problems.

Both in clinical and in population samples, CAT experiences have been associated with depression or depressive symptoms (Mandelli, Petrelli, & Serretti, 2015; Salokangas et al., 2016a), and in the present study, depressive symptoms also associated with alcohol problems and explained most of their variance. Thus, it is possible that CAT experiences induce vulnerability to depression, and that individuals with this vulnerability are disposed to abuse of alcohol and alcohol problems. It was interesting that in males – both in univariate and multivariate analyses – depressive symptoms had consistently stronger associations with alcohol problems than in females, indicating that depression makes males more vulnerable than females to alcohol abuse. In other words, males may self-medicate their depression using alcohol more often than females, who instead seek help from mental services, as was also found in the present study.

On the other hand, it can also be possible that abuse of alcohol along with alcohol problems contributes to the occurrence of depressive mood in general and particularly in individuals with CAT experiences. Raistrick, Heather and Godfrey (2006) propose that alcohol dependence or regular drinking can be a predisposing factor of anxiety and depression, and that anxiety and depression can, furthermore, be a product of alcohol dependency or a precursor to it. Both pathways have also often been seen in clinical practice. In the present study, however, when the effect of the mediating factor, depressive symptoms, had been taken into account, the effect of CAT experiences on alcohol problems was no longer significant, indicating that in the general population the main route from childhood adverse and trauma experiences to adult alcohol problems leads via depressive mood, not conversely.

There were two exceptions, however. In females, in addition to the indirect effect via depressive symptoms, childhood sexual abuse also had a direct effect on adult alcohol problems. Females also reported more sexual abuse than males, as has been found in many previous studies (Molnar, Berkman, & Buka, 2001; Bebbington et al., 2009; Devries et al., 2014; Rehan et al., 2017). It seems that childhood sexual abuse has a longstanding detrimental effect on females' self-esteem, making them vulnerable to both depression and alcohol abuse, which may then exacerbate each other. In population samples, the prevalence of alcohol problems in sexually and physically abused women was higher than in non-abused women, while in males the corresponding difference was inconclusive (Raistrick, Heather, & Godfrey, 2006). Although sexual abuse has a similar effect on mental disorders in both genders

(Devries et al., 2014), its effect on alcohol problems seems to be more direct in females than in males.

In females, childhood physical abuse seemed to have a direct effect comparable with sexual abuse; it had both a direct and an indirect effect on alcohol problems. In males, childhood physical abuse had no direct effect on alcohol problems, and its effect on depressive symptoms was barely significant. Contrary to our results, a meta-analysis (Norman et al., 2012) suggests that the effect of physical abuse on alcohol problems is stronger in males than females. However, in a recent Finnish population-based study (Rehan et al., 2017), childhood physical abuse was associated with adult alcohol problems in females, but not in males. Unfortunately, mediating processes were not analysed in this study. It is possible that in females, sexual and physical abuse are related to each other, so that sexually abused females have often also experienced physical abuse.

Regardless of which of these pathways from CAT experiences to alcohol problems dominate, interventions targeted at both CAT experiences and depressive mood are important when individuals with alcohol problems are treated. However, it is possible that intervention targeted at depressive symptoms alone may considerably alleviate alcohol problems associated with CAT experiences.

6.3.2 CAT and clinical disorders

Both in correlation and path analyses, there were significant interrelations between the severities of CAT domains, as well as between the presence of mental disorders from different diagnostic categories. As evidenced by the path model, these interrelations accounted for several of the significant bivariate correlations between CAT domains and mental disorders. In line with the majority of studies that frequently focus selectively on bilateral relations between distinct mental disorder and preselected or single CAT domains (Enoch, 2011; Brady & Back, 2012; Varese et al., 2012; Bonoldi et al., 2013; Lindert et al., 2014; Mandelli, Petrelli, & Saretti, 2015; Fernandes & Osório, 2015; Aas et al., 2016), all types of CAT domains, except sexual abuse (SexAb), associated significantly with all but psychotic and substance abuse disorders. In the path model, these significant associations broke down into physical abuse (PhyAb) and emotional neglect (EmoNeg), indicating that these two domains moderated or mediated the significant bivariate correlations between the other three CAT domains and mental disorders. Thereby, depressive and anxiety disorders were linked to both PhyAb and EmoNeg, while manic and psychotic disorders were specifically related to PhyAb, and substance dependence specifically to EmoNeg. Gender and age did not moderate these relations.

It was striking that SexAb that has received more attention than any other CAT domain for its assumed major contribution to mental ill health (Nelson, Baldwin, &

Taylor, 2012; Thabrew, de Sylva, & Romans, 2012; Hanson & Adams, 2016) played no significant role in relation to psychiatric disorders. Although, commonly, sexual abuse is least correlated with other CAT domains (Shin, Hassamal, & Groves, 2015), probably because of its infrequent occurrence, studies have reported that the odds of SexAb are significantly elevated in the presence of other forms of child maltreatment or a family history of dysfunction, and that SexAb would add to the odds of developing adult mental disorders in the presence of other CAT domains (Schilling et al., 2016; Turner et al., 2017). The low frequency of SexAb may explain why, also in the present study, its association was significant only with depressive disorders. In path analysis, this association, when the effects of other CAT domains had been taken into account, was no longer significant. Thus, as recently reported for the effects of CAT on the neural circuits underlying mentalising (van Schie et al., 2017), the main role of SexAb on axis-I disorders might at least partly be explained in terms of a moderator of the effect of some other CAT. Consequently, in clinical practice, focus should not be mainly on sexual abuse but comprehensively on all categories of CAT.

Second, our results are striking as they indicate that EmoNeg, although thought to be less severe and traumatising than EmoAb, but not EmoAb, was a predictor of mental disorder, in particular of depressive, anxiety and substance disorder. As EmoNeg had a higher severity compared to EmoAb, this indicates that a chronic family atmosphere that, passively, does not provide sufficient feelings of security and appreciation can have more deleterious effects than the more occasional, “one-off” episodes of actively delivered rejection, humiliation, being hated or made to feel bad or inferior. Contrary to our nonsignificant direct effect of EmoAb on ANYDEP, a recent meta-analysis of the effect of CAT on adult depression (Mandelli, Petrelli, & Serretti, 2015) found emotional abuse to be slightly more strongly associated with depression than combined emotional and physical neglect, followed by sexual abuse and physical abuse. However, their definition of emotional abuse also includes aspects related to EmoNeg of TADS, such as indifference that causes the child to feel worthless, unloved or inadequate. Interestingly, all effects of CAT except neglect were higher in community than in clinical studies (Mandelli, Petrelli, & Serretti, 2015). In a mixed sample, emotional neglect during childhood associated most strongly with the emergence of depression and anxiety and their co-occurrence (Hovens et al., 2010). It thus seems probable that EmoNeg associates with depressive and anxiety disorders more specifically than EmoAb.

For substance use disorders, the evidence on potential main effects of certain CAT domains is conflicting (Enoch, 2011). While each CAT domain seems to increase the odds for drug misuse/dependency, some studies report major effects of sexual abuse, others of emotional neglect/abuse, with the effect of emotional neglect/abuse perhaps being stronger in women (Enoch, 2011). Thus, it is possible

that the specific effect of EmoNeg on ANYSUB was moderated by the high prevalence of women in our study, which showed ANYSUB itself to be related to both (younger) age and (male) gender. However, gender played no significant role in a recent community study that found emotional abuse to be associated via psychological distress to specifically alcohol dependence, when the effects of other CAT domains, but not of comorbidities, were controlled in structural equation modelling (Shin, Hassamal, & Groves, 2015). In any case, emotional neglect seems to play a rather prominent role in explaining the occurrence of substance abuse. Unfortunately, the same emotionally neglecting treatment is often repeated when substance abusers try to seek help from health care services (Ebsworth & Foster, 2017).

Third, our results are striking for the significant role of PhyAb that added to the effect of EmoNeg to a similar degree in the case of ANYDEP and to a lesser degree in the case of ANYANX, and that was unique for ANYMAN. In meta-analyses, the independent impact of physical abuse/neglect on depressive and anxiety disorders has been not only smaller than that of emotional abuse/neglect but also smaller than that of sexual abuse (Fernandes & Osório, 2015; Mandelli, Petrelli, & Serretti, 2015). Again, this indicates that much of the assumed single effect of sexual abuse is explained by the effects of co-occurring CAT domains when these are appropriately taken into account. Furthermore, our result suggests that physical abuse, i.e., bodily assaults on a child that posed a risk of or resulted in injury, might be particularly damaging, resulting in depressiveness and generally heightened anxiety when no emotional support is provided to overcome these experiences.

In the present study, we did not evaluate the role of social support which may moderate the effects of CAT even at the biological level (Holz, Tost, & Meyer-Lindenberg, 2019). The moderating effect of social support may be complicated and vary according to the time-point of trauma exposure. Punamäki et al. (2005a) studied Palestinians living in conditions of military violence and found that exposure to childhood maltreatment was associated with low levels of social support, whereas exposure to adulthood military violence was associated with high levels of social support. High level and satisfactory social support moderated the association between exposure to military violence in adulthood and mental health symptoms, but not between childhood maltreatment and mental health symptoms. On the other hand, war trauma was not directly associated with maternal-fetal attachment but was mediated through a low level of social support and maternal prenatal mental problems. Intensive maternal-fetal attachment predicted optimal sensorimotor and language development and mother-infant emotional availability but not newborn health or maternal postpartum mental health (Punamäki et al., 2017).

Generally, depression is more prevalent in females than in males. In a war situation, lifetime trauma was associated with anxiety and mood disorders in

females, but not in males (Punamäki et al., 2005b). In the present study, however, when all associations between CAT and clinical disorders were taken into account, no gender difference was found between CAT and ANYDEP or ANYANX.

In the case of the association between PhyAb and ANYMAN, the dominant role of PhyAb was surprising in light of studies on bipolar disorder that have indicated a dominant role of sexual abuse and emotional neglect for bipolar I and II disorders, respectively (Aas et al., 2016). In a study on bipolar patients differentiating depressive and (hypo)manic episodes, depressive but not (hypo)manic episodes were related to physical abuse that was also related to self-harm and lower global functioning (Larsson, Aas, & Klungsoyr, 2013). Yet, in patients with bipolar disorder, physical abuse increases the risk for comorbid substance use and anxiety disorder, in particular for panic disorder (Aas et al., 2016; Pavlova et al., 2016). Finally, it is possible that vulnerability to mania predisposes children to shortsighted and restless behaviour and to the risk of becoming violently punished. In any case, this result should be replicated in future larger samples, and more studies are needed on the various mediators or moderators of the association between ANYMAN and PhyAb in bipolar patients.

6.4 CAT and suicidality

6.4.1 Association of CAT and psychiatric disorders with suicidality

In line with earlier studies (Beautrais et al., 1996; Kessler, Borges, & Walters, 1999; Thibodeau et al., 2013; Isometsä, 2014; Afifi et al., 2009; Pickles et al., 2010; Bruwer et al., 2014; McLafferty et al., 2015; Ng et al., 2018; Reigstad & Kvernmo, 2017; Suokas et al., 2010; Gallagher et al., 2014), a great majority of psychiatric diagnoses and CAT domains associated significantly with the risk of suicide. The number of psychiatric diagnoses and CAT domains had a dose-dependent effect on suicide risk: the more diagnoses or CAT domains the patients had, the more severe was their risk of suicidal ideation and behaviour. In multivariate analyses, current major depression, social phobia, alcohol and drug dependency of the psychiatric diagnoses, and emotional abuse of the CAT domains associated specifically with the risk of suicide. There were also remarkable gender differences in specific associations between CAT domains and psychiatric diagnoses and suicide risk.

It is worth noting that young age, perceived poor health and low social support, in line with previous studies (Isometsä, 2014; Goodwin & Marusic, 2011; Almeida et al., 2012), had a highly significant association with suicide risk, but no significant independent effect in the multivariate model; psychiatric disorders, depression in

particular, explained away their effects. It seems that clinical depression is the key mediator between background factors and suicide risk.

In accordance with previous studies (Beautrais et al., 1996; Kessler, Borges, & Walters, 1999; Isometsä, 2014), major depression had a specific association with the risk of suicide also in the present sample. It was notable, however, that the suicide risk score in the patients with major depression was lowest of all diagnostic groups. This unexpected finding is possibly explained by the fact that comorbidity among patients with depression was lower than for other diagnoses (post-hoc checking). It is also possible that depressive patients were treated more effectively than the patients with other diagnoses.

There were interesting gender differences in dysthymia and manic episodes. In males, dysthymia associated significantly and positively with suicide risk, while in females, this (non-significant) association was negative. It seems that specifically chronically lowered mood increases suicide risk in males, but not to the same extent in females. On the other hand, in females, manic and hypomanic episodes associated positively with suicide risk, while in males these associations (non-significant) were negative, indicating that manic behaviour increases suicide risk specifically in females. However, the low number of manic/hypomanic episodes limits the reliability of the findings.

Co-morbidity with other diagnoses is common in bipolar patients and extremely common in bipolar patients with a history of childhood maltreatment; they also have a higher risk of suicide attempts compared with the bipolar patients without childhood maltreatment (Gallagher et al., 2014; Schaffer et al., 2015). In a prospective national 36-year follow-up study, the absolute risk of suicide among men was highest in bipolar disorder, followed by unipolar affective disorder, and among women in schizophrenia, followed by bipolar disorder (Nordentoft, Mortensen, & Pedersen, 2011). The results of our study suggest that in female patients, increased risk of suicidal ideation and behaviour is specifically related to manic episodes.

An extensive literature demonstrates that the risk of attempted and completed suicides is increased in patients with schizophrenia, psychotic depression and other psychotic disorders, and that psychotic patients with co-morbid depression are at particular risk of suicide (Hor & Taylor, 2010; Nordentoft, Madsen, & Fedyszyn, 2015; Zalpuri & Rothschild, 2016). According to our results, current psychotic episode, because of its co-morbidity with depression and because of the few subjects with current psychotic episode, had no independent effect on suicide risk, while with lifetime psychotic episodes the independent association was significant, but only in females. Thus, it seems that the association between current psychotic episode and suicide risk is mainly due to co-morbidity with other disorders, but in accordance with a prospective study (Nordentoft, Mortensen, & Pedersen, 2011), more long-

term vulnerability to psychotic breakthroughs may have a suicide-risk-increasing effect particularly in females.

Anxiety disorders in general and PTSD in particular associate with suicidal behaviour (Thibodeau et al., 2013; Bentley et al., 2016). However, findings concerning a specific association between anxiety disorders and suicidal behaviour have been contradictory (Nepon et al., 2010; Richardson et al., 2012; Uebelacker et al., 2013). In the present study, the effect of general anxiety on the risk of suicidal ideation and behaviour was reduced by the effect of major depression; only social phobia had an independent association with the risk of suicide, in males particularly. Individuals with social anxiety often avoid seeking assistance, leading to co-morbid mental disorders, greater disability, and an increased risk of suicide (Kasper, 2006). In accordance with our results, Gallagher et al. (2014) recently found that social anxiety symptoms at baseline associated with suicidal ideation at 18 months' post-baseline, even after controlling for baseline depressive symptoms and ideation.

Similarly with earlier studies (Borges & Loera, 2010; Yuodelis-Flores & Ries, 2015; Petersen et al., 2009) alcohol and drug dependence consistently associated with the risk of suicide. In males, however, alcohol abuse had no specific association with suicide risk, indicating that co-morbid affective disorders, dysthymia and social anxiety in particular, are more decisive regarding the suicide risk of men. Suicidal behaviour is a significant problem for co-morbid individuals seeking addiction treatment. Major depression, bipolar disorder, borderline personality disorder and post-traumatic stress disorder are especially associated with suicidal behaviour among those with addictive disorders (Yuodelis-Flores & Ries, 2015).

In line with previous studies (Afifi et al., 2009; Pickles et al., 2010; Bruwer et al., 2014; Kim et al., 2013), most types of CAT measured in the present study were associated with the risk of suicide, while co-occurrence of CAT with psychiatric disorders further increased the suicide risk. In a review, maltreated individuals with depressive, anxiety, and substance use disorders had an earlier age at onset, greater symptom severity, more comorbidity, as well as greater risk for suicide and poorer treatment response than non-maltreated individuals with the same diagnoses (Teicher & Samson, 2013). These findings emphasise that the risk of suicidal thoughts and behaviour in patients with co-occurrence of several psychiatric disorders and CAT domains is extremely high and, therefore, they need special attention in clinical practice.

Specific associations between CAT domains and suicidal ideations and behaviour vary considerably. According to a review, various forms of childhood maltreatment maintain an independent association with adolescent suicidal ideation and suicide attempts (Harford, Yi, & Grant, 2014). In a national study, after adjusting for demographic variables and psychiatric disorders, childhood physical, emotional, and sexual abuse were directly related to the risk of violent behaviour toward self

and others (Ystgaard et al., 2004). In the present study, only emotional abuse associated independently with the risk of suicide. The finding that the independent effect of physical abuse was almost significant ($p=.051$) in the main analysis suggests that also childhood physical abuse may increase the risk of suicidal ideation and behaviour. On the basis of previous studies and the present study, it seems that childhood abuse does, but neglect does not, have an independent effect on adult suicidal ideation and behaviour.

Contrary to several previous studies (Ng et al., 2018; Miller et al., 2013; Molnar, Berkman, & Buka, 2001; Angst et al., 2014), sexual abuse was not associated with suicide risk in the present study. Similarly, in a prospective cohort of street youth, it was found that physical abuse, emotional abuse, and emotional neglect, but not sexual abuse, associated with suicide attempts (Bernegger et al., 2015). It is possible that the association between sexual abuse and risk of suicide varies between cultures. In a population sample (Salokangas et al., 2016a), similarly to the present study also using a population sample, sexual abuse associated significantly with depressive symptoms and help-seeking for mental problems, as it did in a high-risk sample with paranoid symptoms (Salokangas et al., 2016b), but in the present study sexual abuse played a smaller role than other CAT domains.

6.4.2 CAT and suicidality in CHR patients

In accordance with a recent meta-analysis of CHR patients (Taylor et al., 2015), more than half of the present CHR subjects revealed SUI at baseline, and about 35% during the follow-up period, indicating that among CHR subjects the rate of SUI is high and remains at a high level throughout the follow-up. There is also some evidence that suicidal ideation and behaviour in CHR individuals is higher than in other clinical groups (D'Angelo et al., 2017; Granö et al., 2013; Taylor et al., 2015). SUI correlates strongly with suicide attempts (Victor & Klonsky, 2014), and suicide attempts correlate with completed suicides (Nrugham et al., 2010). Consequently, paying special attention to CHR subjects may be warranted because of their high level of SUI and increased risk of suicidal behaviour. In cross-sectional studies on CHR subjects, various mental disorders and symptoms (D'Angelo et al., 2017; Taylor et al., 2015), as well as trauma history, have been associated with SUI and suicidal behaviour (Grivel et al., 2017). To our knowledge, this is the first prospective study of CHR patients exploring the effects of CAT experiences in maintaining SUI, with separate analyses for females and males along the lines suggested by Miller et al. (2013).

In line with earlier studies (Afifi et al., 2009; Beautrais et al., 1996; Isometsä, 2014; Kessler, Borges, & Walters, 1999; Miller et al., 2013), CAT experiences and all their domains, except physical abuse, were significantly associated with SUI over

the total study period. However, a considerable proportion of the effect of CAT on SUI was mediated via depression status, and there were considerable gender differences in the pathway from CAT to suicidal ideas.

In the complete sample, when clinical depression was used as a controlling co-factor, CAT experiences had direct effects on follow-up SUI, in accordance with previous studies (Miller et al., 2013). However, when females and males were analysed separately, the picture changed. In females, the effects of CAT experiences (abuse and neglect) were mediated via baseline depression, while in males all CAT domains, except physical neglect, predicted SUI when the effect of baseline clinical depression was taken into account. Even when the effects of concurrent depression symptoms were controlled, emotional and physical abuse predicted SUI. These results suggest that for female CHR patients, the effect of CAT experiences in maintaining SUI is not overly strong, and is mainly mediated via clinical depression. By contrast, for CHR males, CAT strongly and directly increased the risk of ongoing SUI, and it was only partly mediated by concurrent depression.

It appears possible that childhood maltreatment sensitises females more strongly than males to adult depression and, in the case of CAT experiences (abuse and neglect), depressive mood maintains SUI in severely disturbed CHR subjects. It is also possible that CHR females with depression more easily recall, or perhaps are more willing to disclose their emotionally painful childhood experiences than males. This view is supported by the fact that, in the present study, females reported more emotional CAT experiences than males. In clinical practice with CHR females presenting with depression, particular attention should be paid to the possible presence of SUI and its likely associations with a history of childhood maltreatment. In the treatment of depressive CHR females, psycho- and pharmaco-therapeutic interventions for treating depression should be made available, alongside psychotherapeutic interventions to help ameliorate the impact of CAT experiences and risk of suicidal ideation.

It was striking that CAT experiences so extensively and robustly predicted the persistence of suicidal ideation in CHR males, and that the effect was not mediated via baseline depression and only partly via concurrent depression symptoms. This finding is important from a clinical perspective as for male CHR patients, who often display a complex presentation of symptoms, any existing SUI is more likely to be “hidden” as it has a less exclusive association with depressive mood and may therefore be more easily missed during examination. Therefore, particularly for CHR males, a “watching brief” should be maintained for the possibility of SUI and its association with childhood maltreatment even in the absence of depression.

An interesting gender difference concerns sexual abuse. In population studies (Bebbington et al., 2009; Devries et al., 2014; Molnar, Berkman, & Buka, 2001), the prevalence of childhood sexual abuse has been reported to be higher in females than

in males, while in the present CHR sample males reported childhood sexual abuse as frequently as females. It is possible that, compared with the general population, childhood sexual abuse is more concentrated among male than female CHR help-seekers. It could also be the case that the overall younger age of the present sample and good engagement with participants over the extended study period led to a more accurate rate of disclosure of childhood trauma than found in some prevalence studies, suggesting that for those at risk of developing psychosis, sexual abuse is more equally experienced across gender.

The findings do appear to suggest, however, that for young CHR individuals the relationship of sexual abuse and SUI varies by gender, although not consistently. In a recent meta-analysis (Devries et al., 2014), the association between sexual abuse and SUI was similar for females and males, while in other studies (Miller et al., 2013; Molnar, Berkman, & Buka, 2001) effects of sexual abuse on suicidal behaviour were more pronounced in males than in females. In the present CHR sample, childhood sexual abuse was significantly associated with maintaining SUI in males, but not in females. Even after controlling for the effects of clinical depression, the association between sexual abuse and SUI remained for males. In a cross-sectional study (Martin et al., 2004), self-reported sexual abuse was independently associated with suicidal thoughts, plans, threats, deliberate self-injury, and suicide attempts in young males, after controlling for current levels of depression, hopelessness, and family dysfunction. In young females, the relationship between sexual abuse and suicidality was mediated fully by depression, hopelessness and family dysfunction. Of course, we have no way of accounting for any potential bias caused by the lack of data on completed suicides in those who have experienced sexual trauma in childhood. This may impact differentially younger and older cohorts. In the present study, when concurrent depressive symptoms were controlled for, the effect of sexual abuse on suicidal ideation was no longer significant. This is similar to the finding of a population study by Bebbington et al. (2009); they controlled for the effect of gender but did not analyse their data separately for females and males.

The different findings from these studies may partly be explained by the focus on different samples: population vs. CHR patients. One previous prospective study found that childhood sexual abuse may have a similar impact on the likelihood of mental health problems in males and females, but that males may be more likely to receive support from health services (Spataro et al., 2004). Briere and Elliott (2003) also found a similar global impact on self-reported sexual abuse for both males and females, but no impact of the sex of the abuser on the outcomes. In the well-established American Adverse Childhood Experiences research, which has established a dose-response relationship for childhood adversities and the risk of a range of physical and mental health outcomes (Anda et al., 2006), higher levels of childhood sexual contact were reported by females but no differences were found in

likelihood of detrimental long-term outcomes, including physical and mental health problems (Dube et al., 2005; Mersky, Topitzes, & Reynolds, 2013).

6.5 Theoretical aspects of CAT effects

Traditionally, childhood maltreatment and adversities have been understood as unspecific stress events and/or subjective traumatic experiences, which can disturb the development of sense of self, have detrimental effects on early psychosocial development and manifest as adult mental disturbances (Freud, 1926; Winnicott, 1971; Yates, 2004). However, depending on the severity, repetition and timing of childhood adversities, as well as on the context where stressful events occur, the early adverse experiences, in addition to causing detrimental effects, may also promote a lifelong resilience to stress (e.g. Yates 2004, Flinn, Nepomnaschy, Muehlenbein, & Ponzi, 2011; Hinkelmann et al., 2013; De Bellis & Zisk, 2014; Koss & Gunnar, 2018).

6.5.1 Psychological approach

The developmental theory, more precisely the organisational theory of development, adopts various psychobiological aspects (biology, cognition, self-development, and attachment) of development, and defines adaptation with respect to the quality of integration of the individual's biological and behavioural systems (Sroufe, 1990 & 2005; Yates, 2004). In this theory, early attachment (Bolwby, 1973 & 1977) is a starting point for later adaptation and relates to further developmental processes underlying both continuity and change. Positive adaptation occurs when the integration of biological, socioemotional, cognitive, and representational capacities promotes a flexible negotiation of both contemporaneous and future developmental issues. Maladaptation (i.e., psychopathology) occurs when a deviation from normal patterns of adaptation compromises subsequent development (Yates 2004; Sroufe, 2005). Because the relations among successive adaptations are probabilistic rather than deterministic, the organizational model also accommodates individual differences in patterns of adaptation over time. A single developmental starting point may yield divergent outcomes, and different patterns of early adaptation may converge on a single developmental endpoint (Yates, 2004, Sroufe, 2005). According to the organizational theory of development, psychopathology is conceptualised as deviation from otherwise normative developmental processes and pathways to 1) motivational (positive expectations of others), 2) attitudinal (favourable self-representations), 3) instrumental (skills to negotiate developmental issues effectively), 4) emotional (ability to regulate emotions, arousal and impulse), and 5) relational (capacity to engage in reciprocal and emphatic relationship)

competences (Sroufe, Egeland, & Carlson, 1999; Yates, 2004, Sroufe, 2005). Childhood maltreatment and trauma experiences can undermine positive adaptation at each level of competence.

In line with the developmental theory, in the population sample (Study II), CAT experiences as a whole can be seen to have influenced three normative processes involving motivational, attitudinal and emotional competence. Negative other- and self-representations, related to childhood negative representations of attachment figures and self-esteem (Bowlby, 1969, 1977), exert a direct effect on perceived negative attitude of others, while depression, as an indicator of dysregulation, acts as a mediator via CAT and perceived negative attitude of others. Moreover, of all CAT domains, only emotional neglect had a specific association with the perception of negative attitude of others, emphasising the central role of negative representations of childhood attachment figures and low self-esteem (Bowlby, 1969, 1977) and their continuity into adulthood (Bowlby, 1973; Sroufe, 2005).

Yates (2004) applied the organisational developmental theory to describe the relation between childhood trauma and self-injurious behaviour. He suggests that the effects of traumatic experiences could disturb all competence levels leading to 1) negative expectations of others, 2) negative self-representations, 3) inability to use verbalisation of stressful experiences (“speechless terror”), 4) dysregulation of emotions, and 5) inability to engage in reciprocal relationship. In Study V, all CAT experiences associated with the risk of suicide, but the majority of their effects were mediated via various clinical disturbances corresponding to the emotional and relational competence levels. However, it should be noted that this is a speculation because, specifically in this study, mediation analyses were not carried out. However, particularly in males, emotional abuse had an independent effect on the risk of suicide. This refers to negative self-representations and self-blame at the motivational and attitudinal competence levels associating with suicidal behaviour.

The prospective study (Study VI) on “thoughts of killing oneself” highlights gender differences in the psychosocial development. In males, the sum of CAT experiences and emotional and physical abuse separately associated significantly with thoughts of killing oneself, despite the fact that baseline and current depression levels were controlled. It is possible that in particular abusive childhood maltreatment can extensively damage males’ psychosocial development and lead to negative self- and other-representations with a predisposition to self-blame and isolation, as well as to difficulties in verbalising anxious emotions constructively and in engaging in reciprocal relationships. In females, thoughts of killing oneself were mediated via depression (emotional competence level) related to a reduced ability to regulate emotions.

The extensive associations between CAT experiences and various mental disorders (Studies III and IV) can be understood through deficits in all

developmental processes and competence levels (Yates, 2004). They include disturbed integration of expressive and cognitive skills to treat developmental issues effectively, affect dysregulation with an inability to regulate emotions and impulses, vague self-boundaries with difficulties in reciprocal and emphatic relationships, as well as negative other- and self-representations. In all mental disorders, particularly in severe disorders, like psychoses, the integration of basic biological functions, the ability to regulate emotions and impulses, the ability to differentiate between the self and others, as well as negative other-representations with social isolation can be severely disturbed. Interestingly, Sroufe (2005) found that disorganised attachment more often than other non-secure attachment histories (e.g. avoidant and anxious) is associated with severe psychopathology. In mood disorders, like depression, the emphasis is in negative self-representations with self-blame (attitudinal competence) and an inability to regulate emotions (emotional competence). It has been found that an avoidant attachment history is often related to conduct problems, resistant attachment to anxiety disturbances (Sroufe, 2005), and both avoidant and resistant attachment to depression (Duggal, Carlson, Sroufe, & Egeland, 2001). In alcohol problems particularly (Study III), difficulties in regulating emotions (depression) act as a mediator between CAT experiences and alcohol problems. However, in females, physical and sexual abuse, possibly related to negative self- and other-representations, had direct effects on alcohol problems. Related to severe mental disorders, genetic predisposition may play an important interactive role with CAT experiences.

It was striking that when the effects of all associations between CAT domains and clinical disorders were taken into account, only emotional neglect and physical abuse associated specifically with psychiatric disorders (Study IV). Of the CAT domains, emotional neglect refers to negative attachment figures and self-representations (Bowlby, 1969 & 1977) and their associations through reduced emotional competence to affective and drug abuse disorders. The fact that physical abuse associated specifically with all major psychiatric disorders (depression, mania, psychosis, anxiety) may indicate severe childhood maltreatment, disorganised attachment, emotional unavailability (Sroufe, 2005), and severe developmental disturbances in instrumental, emotional and relational competences including biological dysregulation in the central nervous system. These aspects are considered in the next section.

6.5.2 Biological approach

Stressful CAT experiences may induce a cascade of stress-mediated effects on hormones (e.g. glucocorticoids and vasopressin-oxytocin) and noradrenergic neurotransmitters and thus affect important developmental processes, including

neurogenesis, synaptic overproduction and pruning, as well as myelination, during their sensitive periods (Teicher, 2000; Teicher et al. 2002). These effects would likely target specific stress-susceptible brain regions including the hippocampus, amygdala, neocortex, cerebellum and white matter tracts (Teicher et al., 2002). In addition to the early stress possibly causing damaging long-term effects, it can also increase CNS resistance and resilience to and be favourable for adaptation to adult stress situations (Teicher, 2000; Teicher & Samson, 2016).

The hypothalamic-pituitary-adrenal (HPA) axis is one of the core stress systems, responsive to many stressors including early-life stressors like CAT (Macri et al., 2011; Koss & Gunnar, 2018), and involved in the neurobiology of many mental disorders (Baumeister, Lightman, & Pariante, 2014). While exposure to mild or moderate stressors early in life has been shown to enhance HPA regulation and promote a lifelong resilience to stress, early-life exposure to extreme or prolonged stressors can induce a hyper- or hypo-reactive HPA axis and may contribute to lifelong vulnerability to stress (Flinn et al., 2011; Hinkelmann et al., 2013; De Bellis & Zisk, 2014). CAT may sensitise neuroendocrine, autonomic and behavioural responsiveness to stress as well as to HPA axis dysregulation. This sensitisation, which can be interpreted both as a psychological and a biological phenomenon, extends to adult life, and when a new emotional stressor or traumatic reminder is experienced, the HPA axis response will be enhanced with higher ACTH and higher cortisol levels (De Bellis & Zisk, 2014).

The time point when an environmental stress-event falls on a developing offspring, the duration and repetitiveness of stress exposure and an individual's gender may also be decisive as to whether the effect of life-stress is shifted in the direction of resilience or vulnerability (De Bellis & Zisk, 2014; Koss & Gunnar, 2018). There is some indication that children who have experienced physical and sexual abuse during their first five years of life are more likely to have externalised symptoms and HPA dysregulation than those who have suffered abuse after the age of five (Cicchetti et al., 2010). Prepubertal children may be more sensitive to negative feedback control mechanisms for cortisol output than older school-age children who show higher cortisol levels. For example, sexually abused prepubertal children with major depression exhibited significantly lower mean baseline ACTH concentrations compared with control children (De Bellis et al., 1996).

A few studies indicate that there are also gender differences in effects of CAT on HPA axis function. In non-symptomatic subjects, CAT associated with corticotrophin-releasing factor more strongly in males than in females (DeSantis et al, 2011), while in physically maltreated girls, a speech stressor correlated with increased oxytocin and blunted cortisol, but no changes were found in oxytocin in boys and non-maltreated girls (Seltzer et al., 2014).

Of the CAT domains, chronic neglect seems to lead to revealing patterns of hypocortisolism and blunted responses to laboratory stress tasks, while the studies on physical and emotional abuse indicate that if the HPA axis is involved in transducing the adversity into psychopathology, the process is likely to be more complex (Koss & Gunnar, 2018). In addition to corticosteroid regulation, the HPA axis also regulates the immune system and the inflammation processes. It is hypothesised that childhood adversities may lead to dysregulated HPA-axis functioning and elevated inflammation via distinct underlying mechanisms, and that the timing of adversity may contribute to variation in these linkages (Kuhlman et al., 2017). An increased level of inflammation at the time when childhood adversity occurs may increase vulnerability to adult life-stress and prolong its detrimental effects. The function of the HPA axis is also associated with the main neurobiological transmitters (catecholamines): noradrenalin, serotonin and dopamine, which are directly related to major mental disorders, like depression, anxiety and psychosis. Children and adults with childhood trauma have demonstrated higher (locus coeruleus) noradrenaline activity and deviances in serotonin transporter activity (Bellis & Zisk, 2014).

Animal studies have shown that pre- and neonatal stress of moms influences neuronal development of their offspring by inducing dysfunctional neuronal and synaptic networks specifically in limbic structures, like hippocampus and amygdala, and the prefrontal cortical brain area. Structural deficits in these brain areas may directly contribute to behavioural deviances, such as anxiety and depression-like behaviour and deficits in cognitive development, as well as deficits in the HPA axis function (Gröger et al., 2016). Also in human studies, childhood maltreatment (often very severe neglect) has been associated with brain changes: e.g. smaller intracranial volume, cerebral and frontal cortex and several other brain structures, as well as their functions: lower IQ, attention, memory, inhibitory control etc. (Bellis & Zisk, 2014). Larger ventral ventricles have been seen only in maltreated males. This suggests that males (their CNS) may be more vulnerable to childhood maltreatment than females (Bellis & Zisk, 2014).

Telomeres, located at the end of chromosomes, are considered to be a molecular clock for cellular ageing, and their shortening has been associated with childhood maltreatment. In a prospective study, children who had experienced two or more types of violence had increased telomere erosion, a marker of premature cellular ageing, compared with children who had not experienced violence (Shalev et al., 2013). Thus, decreased telomere maintenance may be one potential mechanism for adverse brain development, structural and functional abnormalities in the adult central nervous system and mental disorders in children with a history of trauma (Bellis & Zisk, 2014). Telomere erosion may partly explain why the individuals with CAT experiences exhibit increased premature mortality (Brown et al., 2009).

An epigenetic hypothesis suggests that stress-induced neuronal and synaptic changes may be the result of alterations in genetic functions, possibly through DNA methylation. In rats, good care of offspring (liking and grooming) reduced HPA axis reactivity, decreased anxiety behaviours, and enhanced cognitive capabilities in adulthood. These alterations were paralleled by decreased methylation levels in DNA and facilitated acetylation in the hippocampus, which together result in an increased expression of glucocorticoid receptors (Weaver et al., 2004). On the other hand, in an experimental approach where infant rats were exposed to abusive mothers, it was shown that the maltreated rats in adulthood displayed persisting changes in the methylation of DNA, resulting in alterations of gene expression (Roth et al., 2009).

These molecular DNA changes caused by environmental stress can be more or less permanent and transmittable to next generations. Multigenerational transmission of phenotypic qualities, according to Lamarck's evolution theory, proposes that the environment can directly alter phenotypes during lifetime and that these phenotypes can be directly transmitted to the descendants (Gröger et al., 2016). There is increasing experimental evidence that perinatal stress exposure (preconception, prenatal, and postnatal) may represent an environmental factor inducing behavioural changes across multiple generations, potentially mediated by transgenerational epigenetic inheritance (Franklin et al., 2010; Richards, 2006). Very recently, it was shown that mothers exposed in pregnancy to intimate partner violence expressed elevated depression, posttraumatic stress disorder and anxiety symptoms, while children who experienced maternal intimate partner violence after being born had similar psychiatric problems. However, when maternal intimate partner violence occurred both during and after pregnancy, children did not reveal psychiatric problems. These children also showed more DNA methylation in heterochromatin-like regions, which has been associated with stress/disease resilience. Thus, children exposed to prenatal stress may experience resilience driven by epigenomewide interactions (Serpeloni et al., 2019).

Pre- and perinatal stress may affect children's health prospects also via changing their chromosomes' telomeres. Very recently, Chan et al. (2019) found that nearly a quarter (23.5%) of 774 pregnant women had experienced intimate partner violence (23.2% psychological abuse, 3.5% physical abuse and 1.8% sexual abuse) by their current partner before childbirth. Of these abuse types, psychological and sexual abuse, but not physical abuse, associated specifically with their new-borns' biology, in the form of telomere shortening. This finding indicates that maternal exposure to intimate partner violence may exert a life-long impact on the offspring's health.

In summary, it is possible that CAT can sensitise young children by causing changes in their genetic matrix and in developing neuronal structures and networks, making them vulnerable to adult life-stress and mental problems. Childhood

sensitisation can be understood as “memory scars” in the neuronal network, as well as negative psychodynamic representations which, in connection with adult life-stress, become activated and manifested as psychological ill-being or psychiatric disorders like anxiety and depression. Structural and functional CNS abnormalities may reduce its “buffering capacity” or resilience to resist external or internal stress. On the other hand, it is possible that prenatal stress may cause epigenetic changes which strengthen an individual’s resilience to exceptionally stressful environments.

It is likely that effects of CAT on mental ill health vary among individuals and that there are several mechanisms which may act independently, inter-actively and cumulatively. However, it is comforting to know that the undesirable effects of CAT do not have to be irreversible, but may even be biologically reversible. In children, supportive and understanding childcare have been associated with a buffering of HPA axis to stress (Gunnar 1998), and in adults, social support with a decrease in the cortisol response to stress (Heinrichs et al, 2003).

7 Strengths and Limitations

7.1 The Trauma And Distress Scale (Studies I, II and III)

Although the TADS data come from a large adult general population and primary care samples with broad age ranges, the high level of non-responders may limit the representativeness of the results in possibly biasing the reporting of childhood adversity, depression and help-seeking. However, the rates of reported depression (20%) and life-time help-seeking (27%) are in line with the previous prevalence reports of mild to moderate self-reported depression symptoms of 14% in adults in a Finnish community sample (Koivumaa-Honkanen et al., 2004), and of a rate of help-seeking for mental health problems of 23% in young adults in a Swiss community sample (Schultze-Lutter et al., 2014). Thus, it is unlikely that a response bias towards more distressed individuals has driven the high reported rate of childhood adversity. Females and young adults were particularly over-represented among study participants. It is hard to say whether these differences in response rate had any large effect on the results obtained. However, analyses were carried out separately for females and males and the effect of age was taken into account, thus the possible gender and age biases due to the different response rates could, at least partly, be controlled. Additionally, it must be noted that the Finnish population is very demographically homogenous and the proportion of non-Caucasian people is very low. This fact clearly limits the generalization of the results to other countries with more multicultural populations.

Compared with other studies (Kessler et al., 2010; Christoffersen et al., 2013; Saed, Talat, & Saed, 2013; Barbosa et al., 2014; Schüssler-Fiorenza et al., 2014), the figures for CAT domain cases were rather high: for emotional (51.2%) and physical (49.7%) neglect, and for emotional (37.4%) and physical (23.1%) abuse, while the prevalence of sexual abuse (5.5%) was as high as in German (Iffland et al., 2013) and Brazilian population samples (Barbosa et al., 2014), but lower than in the Boston area study (Chiu et al., 2013), and higher than in the WHO study (Kessler et al., 2010). Yet, the use of different instruments and definitions of adversity impedes direct comparisons between separate studies (Burgermeister, 2007; Thabrew, de Sylva, & Romans, 2012).

One limitation is the lack of a ‘gold standard’ measure for the retrospective assessment of the complex construct of “traumatisation”. Based on consistent reports of a causal link between childhood adversities, traumatisation and adult mental ill health (e.g., Kessler et al., 2010; Fryers & Brugha, 2013; Lindert et al., 2014), we chose a self-report measure of current depression and report of life-time help-seeking for mental disorders that, despite their differing time frames of reference, led to impressively similar results. In other studies of the present study program, CAT domains consistently associated with various indicators of ill health (i.e., negative attitude, alcohol problems, clinical disorders and suicidality), supporting a good construct validity for the TADS used in all the individual studies of the present study program.

TADS does not define the exact ages when adverse or traumatic events have occurred. Theoretically, a traumatic experience will cause the greatest developmental change during periods of major reorganization and integration among the biological and behavioural systems of the individual. The timing of trauma is important with respect to chronology, as well as relative to the individual’s integrative position (Yates, 2004). TADS is focused on childhood in general (e.g. “when I was young”) and includes questions related to long-term situations (e.g. “My family was emotionally...”). In a retrospective survey, carried out years after childhood, it would be difficult to remember exact time points, while longer emotionally stressful time periods are more easily recalled and also relevant for therapeutic purposes.

7.2 Cross-sectional study design (Studies II, III, IV and V)

The cross-sectional study design and retrospective assessment of CAT experiences do not allow strong causal conclusions. However, there is some evidence that adverse childhood experiences can be reliably assessed retrospectively (Maughan & Rutter, 1997), and that retrospective recall bias is likely to be conservative, leading to underreporting of childhood adversities (Hardt & Rutter, 2004). In Studies II and III, this limitation was partly tackled by using the PROCESS macro for SPSS (Hayes, 2013 and 2014), which offers a possibility to test directly and indirectly mediated effects in cross-sectional samples. Still, it is possible that the effect between CAT and perceived attitude of others/alcohol problems may be partly bidirectional.

7.3 Self-reported CAT (Studies II, III, IV, V and VI)

CAT was assessed by TADS which was found to be a valid, reliable and clinically useful instrument for assessing retrospectively reported childhood traumatisation

(Salokangas et al., 2016a). Yet, it is possible that an interview would be an even more reliable method for assessing childhood adversities. However, Rohner (2004) has argued that individuals' subjective experiences constitute a genuine reality to them, as is their way to act also in relation to other people. It is also found that childhood traumas rather than childhood life events are important risk factors for depression and anxiety and their co-occurrence (Hovens et al., 2010). This argument regarding the significance of childhood subjective CAT experiences on adult mental ill health concerns all studies of this study program.

7.4 CAT and psychiatric disorders (Studies IV and V)

The PsychC sample was randomly selected but the PrimC sample was not, as it was weighted in favour of those with depressive symptoms in order to increase the number of patients with psychiatric disorders. The associations between CAT and diagnostic categories were higher in PrimC than in PsychC but, due to larger variances, highest in the combined sample, indicating that combining the PrimC and PsychC samples emphasized the associations between CAT and psychiatric diagnoses. Females were overrepresented, but the effect of gender was taken into account in path analysis.

Clinical disorders (DSM-IV axis-I diagnoses) were assessed by telephone with the Mini International Neuropsychiatric Interview (MINI 5.0.0; Lecrubier et al., 1997) that possesses good validity in telephone settings (Sheehan, Lecrubier, & Sheehan, 1998). Yet, telephone interview may limit the reliability of diagnostic and CAT assessment. However, our previous study (Salokangas et al., 2016a) has shown that TADS is a reliable instrument with good concordance between the self-reported and telephone-interviewed TADS domains.

As MINI does not allow the assessment of lifetime diagnoses for all disorders, only current disorders were considered. Despite its size, the study sample did not allow for the path modelling of single disorders, although efforts were made to increase the number of PrimC patients with psychiatric disorders by selecting them using the DEPS screen. Furthermore, personality and some axis-I disorders, such as somatoform disorders, are not covered by MINI, whereas others, such as eating disorders, were clearly underrepresented in our sample.

Risk of suicide (Study V) was defined by the MINI instrument's Suicidal Scale with six items. In a prospective study (Roaldset, Linaker, & Bjørkly, 2012), the Suicidal Scale of MINI was a significant predictor of suicidal behaviour and suicidal behaviour+non-suicidal self-injury. According to the authors, the MINI Suicidal Scale may be useful for making a clinical judgment with an emphasis on the risk profile of the individual instead of a categorical grouping of patients into low-,

moderate-, and high-risk groups. On the other hand, in a recent study on the instruments for assessment of suicide risk, none of the 15 analysed instruments fulfilled the requirements for sufficient diagnostic accuracy (Runeson et al., 2017).

We assessed associations between suicide risk and several psychiatric disorders and multiple types of CAT in the same study sample. Many earlier studies have focused on a few types of CAT and/or on a limited number of psychiatric disorders. We also analysed the role of co-morbidity and co-occurrence of CAT in relation to suicide risk to elicit independent factors in the severity of risk of suicide. These are clear strengths of the study.

7.5 CAT and suicidality in CHR patients (Study VI)

A main strength of the CHR study was the prospective design and assessment of disorders and symptoms by well-trained mental health professionals. This enabled prospective prediction where the effect of baseline states, including clinical depression and follow-up depression symptoms were taken into account. Employing suicidal ideation concurrently with reported depression symptoms, we were able to remove the time difference between the second-stage mediator and outcome to help reduce the direct effect of predictors as found in a population survey (Bebbington et al., 2009).

In addition to the total score, the Trauma and Distress Scale (TADS) measures emotional and physical abuse, emotional and physical neglect and sexual abuse (Salokangas et al., 2016a), which are generally regarded as the five core childhood adversity domains (Burgermeister, 2007; Thabrew, de Sylva, & Romans, 2012). In Study I, TADS proved to be a reliable instrument with good concordance between self-reported and telephone-interviewed TADS domains (Salokangas et al., 2016a). However, it is possible that participants may not have been able to recollect or have been reluctant to report all CAT experiences; this would attenuate the observed relationships and work against our hypotheses.

In earlier studies (Miller et al., 2013; Molnar, Berkman, & Buka, 2001), previous clinical disorders have been used as controlled or mediating factors. In the current prospective study design with two follow-up assessments, we were able to evaluate the impact of two mediating factors, baseline clinical depression and depression symptoms, at two time points. It was thus expected that using concurrent mediating factors would reduce the effect of predictors, as has been found in a population survey (Bebbington et al., 2009). However, in the present study, the effect of CAT experiences on suicidal ideation persisted in CHR males even when the effect of current depression was taken into account. This finding emphasises the need for paying special attention to suicidal ideation in non-depressive CHR males who have faced CAT experiences.

8 Concluding Remarks

The major results of this study program can be summarised as follows:

8.1 TADS is a feasible instrument for the assessment of CAT in various populations

Although TADS was originally developed for the assessment of childhood adverse and trauma experiences in clinical high risk to psychosis patients, it proved to be a feasible instrument to be used with population and other clinical samples. Its psychometric properties proved to be good to acceptable. The original TADS is rather long including 43 items. However, its revised version with 24 items of the five core domains is much shorter and therefore more suitable also for clinical use.

8.2 CAT experiences are common and their frequencies vary with study populations and sociodemographic characteristics

In this section major epidemiological results are presented for the use of researchers. The CAT experiences are common in the general population and as expected more common in a clinical population. Table 13 summarises percentages of the individuals who reported CAT domain cases (i.e., abuse/neglect reported at least sometimes).

Table 13. CAT domain cases and their cumulative numbers (%) in various samples: general population sample (All, DEP, H-S, NoDH), patient sample (PrC, PsC) and psychosis risk sample (CHR).

CAT	All (n=689)	DEP (n=150)	H-S (n=189)	NoDH (n=444)	PrC (n=255)	PsC (n=160)	CHR= (236)	OR DEP	OR H-S
EmoAb	37.4	66.0	61.9	25.2	42.4	67.5	66.9	4.64	4.13
PhyAb	23.1	41.3	39.7	16.0	23.1	36.9	35.6	3.21	3.24
SexAb	5.5	14.0	13.8	2.3	11.8	16.9	20.3	5.00	6.53
EmoNeg	51.2	82.7	74.6	39.2	58.4	81.6	87.3	6.46	4.00
PhyNeg	49.6	66.7	61.9	43.9	59.6	72.5	53.0	2.46	1.98
CAT tot	72.3	92.0	87.3	64.2	81.2	93.1	93.6	5.72	3.45
0	27.7	8.0	12.7	35.8	23.1	5.6	6.4		
1	24.2	14.7	16.9	26.8	19.2	13.8	13.6		
2	18.0	16.7	15.3	19.1	21.2	15.0	28.4		
3	16.7	28.7	25.4	12.4	11.0	21.3	23.7		
4	10.2	23.3	20.1	5.0	19.2	33.1	18.2		
5	3.2	8.7	9.5	0.9	6.3	11.3	9.7		

EmoAb=Emotional abuse; PhyAb=Physical abuse; SexAB=Sexual abuse; EmoNeg=Emotional neglect; PhyNeg=Physical neglect

DEP=Depression; H-S=Help-seeking; NoDH=No DEP nor H-S; PrC=Primary care; PsC=Psychiatric outpatient care;

CHR=Clinical high-risk; OR DEP=Odds ratio for DEP; OR H-S=Odds ratio for H-S.

In the general population sample, the participants with depression symptoms or help-seeking had higher figures than those without depression or help-seeking. Thus, in addition to the population sample, TADS showed a good concurrent validity also in relation to psychiatric samples.

In the population and psychiatric outpatient samples and separately among participants with psychiatric disorder (depression or high risk of psychosis), EmoNeg was the most prevalent CAT domain, while in the other samples it was the second most frequent. Also PhyNeg and EmoAb were reported rather frequently. However, SexAb was reported less frequently. In a Finnish twin sample of 13024 participants, aged 18–49 years, prevalence of CAT cases (at least sometimes) was assessed by CTQ. In this study, approximately 15 % reported EmoAb, 10 % PhyAb, 3 % SexAb, 22 % EmoNeg and 8 % PhyNeg. EmoNeg was the most prevalent in both genders and in all age groups. (Pezzoli 2019 and personal information). In another Finnish sample of 186 psychiatric outpatients, aged 21–61 years, with major depression, prevalence of CAT cases (at least sometimes) was assessed by TADS. Also in this depression sample, EmoNeg (84 %) was most prevalent followed by EmoAb (63 %), PhyNeg (60 %), PhyAb (31 %) and SexAb (10 %) (Honkalampi et al., 2019). The order and magnitude of CAT domain frequencies were quite similar to the corresponding samples in the present study.

In all samples, the co-occurrence of several CAT domains was very common. Even among the participants who had no depression and who had not sought help for mental problems one third reported more than two CAT domains. In another study population study, the co-occurrence of CAT domains was very similar (Dong

et al., 2004). Therefore, in addition to the number of CAT domains, studying their specific associations is also important.

As expected, in the population sample, all CAT domains increased the risk of depression and help-seeking (Table 13). Interestingly, the sum of CAT cases and EmoNeg increased the risk of depression more than the risk of help-seeking, while an opposite tendency was observed for SexAb. It is possible that the individuals who had experienced sexual abuse in childhood sought help not only for their manifest psychiatric symptoms but also for their emotional distress caused by their violated mental integrity.

While females reported EmoAb and SexAb more often than males, this relation was reversed for PhyAb (Table 14). When the effect of age was taken into account in ANOVA, females still reported EmoAb ($p=.002$; CI95% 0.124–0.547) and SexAb ($p<.001$; CI95% 0.077–0.265) more often than males, but the gender difference disappeared in PhyAb. Similar gender differences in occurrence of EmoAb and SexAb were found in a world-wide meta-analysis (Stoltenborgh, van IJzendoorn, Euser, & Bakermans-Kranenburg, 2011) and in a Finnish, population-based, twin sample (Pezzoli et al. 2019). In a national sample, men experienced physical abuse during childhood more often than women. However, physical abuse had negative consequences for both boys and girls; generally more detrimental for girls (Thompson, Kingree, & Desai, 2004).

Table 14. CAT cases (%) by gender in the general population sample.

Gender	n	EmoAb	PhyAb	SexAb	EmoNeg	PhyNeg	CAT total
Female	432	42.1	20.4	7.6	50.2	49.1	70.4
Male	260	29.6	27.7	1.9	52.7	50.8	75.4
p	692	.001	.032	.001	.583	.695	.162

The association between age and CAT cases was not linear. The proportion of CAT domain cases, except for SexAb, was lowest among participants aged 25–34 years, and higher in the age ranges below and above that age group. SexAb showed no age association (Table 15).

Table 15. CAT cases (%) by age in the general population sample.

Age	n	EmoAb	PhyAb	SexAb	EmoNeg	PhyNeg	CAT total
18–24	81	44.4	18.5	3.7	56.8	48.1	79.0
25–34	226	25.7	15.5	3.1	41.6	42.0	61.5
35–44	110	36.4	23.6	7.3	46.4	52.7	72.7
45–54	86	48.8	34.9	9.3	65.1	57.0	80.2
55–64	87	43.7	26.4	9.2	57.5	49.4	74.7
65–74	79	41.8	29.1	5.1	54.4	59.5	81.0
75+	23	52.2	34.8	0.0	60.9	56.5	82.6
p	692	<.001	.004	.136	.004	.086	.001

The proportion of CAT cases was generally lowest among participants living in a marital or cohabiting relationship (Table 16). In the case of PhyNeg, there were no associations with marital relationship. Nor was the association between SexAb and marital status significant. When the effect of gender and age were taken into account in ANOVA, divorced participants more often reported EmoAb ($p=.001$; CI95% 0.134–0.553), PhyAb ($p<.001$; CI95% 0.326–0.787) and SexAb ($p=.006$; CI95% 0.062–0.379) than the participants living in marital or cohabited relationships.

Table 16. CAT cases (%) by marital status in the general population sample.

Marital status	n	EmoAb	PhyAb	SexAb	EmoNeg	PhyNeg	CAT total
Single	136	41.2	19.9	5.1	55.1	41.2	70.6
Married	458	32.5	19.7	4.6	47.4	51.1	70.1
Divorced	71	57.7	43.7	11.3	60.6	53.5	83.1
Widowed	23	47.8	43.5	8.7	69.6	56.5	91.3
p	688	<.001	<.001	.125	.028	.161	.022

8.3 CAT experiences associate with perceived negative attitudes in the adult general population

CAT experiences have long-standing effects on individuals' social perception, beyond mental problems. Specifically, emotional neglect experienced in childhood seems to lead to the perception that other people take a negative attitude towards us.

The emotional neglect is common: more than half of the participants drawn from the general population reported that they had experienced emotional neglect at least sometimes in their childhood. Taking into account that the self-reported negative effects of parental rejection, which comes close to the concept of emotional neglect, are universal regardless of differences in culture, ethnicity, or language (Rohner, 2004); the emotional neglect experienced during childhood may shadow many adults' mutual social life, and consequently damage the trusting atmosphere in the whole society.

From a clinical point of view, there are two possibilities to benefit from the finding that CAT in general and emotional neglect specifically predicts negative AoO. With patients suffering from mental problems, particularly from depression, it is useful to study how they perceive other people and themselves and use these findings in therapeutic intervention. On the other hand, if the patients report experiences of childhood emotional neglect, also dealing with current social relationships and their distortions may free emotional resources for recovery from mental illnesses.

8.4 CAT associates extensively with adult mental ill health

8.4.1 Alcohol problems

All CAT domains associate significantly with reported alcohol problems. In most CAT domains, the effect on alcohol problems is mediated via depressive symptoms. In females, SexAb and PhyAb have a direct effect on alcohol problems, while in males the corresponding effects are mainly mediated via depressive mood. In treating individuals with alcohol problems, interventions concerning CAT experiences and depressive symptoms are mandatory.

8.4.2 Clinical disorders

Emotional abuse and neglect, and physical abuse associate most strongly with current mood and anxiety disorders. However, there are considerable inter-correlations within CAT domains, as well as comorbidity between clinical diagnoses. Of all five CAT core domains, physical abuse and emotional neglect have the strongest specific associations with adult psychiatric disorders and might transmit main effects of other CAT domains onto mental disorders. Consequently, in clinical practice, special attention should be paid to physical abuse and emotional neglect and their therapeutic interventions. Additionally, Finnish researchers have found that CAT experiences also associate with alexithymic features (Honkalampi et al., 2019) and reduced sense of coherence (Jussmäki & Nikulainen, 2018).

8.4.3 Suicidality

In the clinical sample, most psychiatric disorders and CAT domains associate with the risk of suicide. However, when the effect of co-morbidity and overlap of CAT domains are controlled, major depression, social phobia, alcohol and drug dependency, and emotional abuse seem to increase the risk of suicide. The risk profile varies between the genders. In post hoc ANOVA, when the effect of gender was controlled, emotional abuse ($p=.001$; CI95% 0.081–0.296) and physical abuse ($p=.0007$; CI95% 0.047–0.292) associated specifically with the risk of suicide. In CHR patients, all CAT domains except physical neglect predict suicidal ideations. The effect of CAT on suicidal ideation is mediated via clinical depression and concurrent depression symptoms. In post hoc ANOVA, when the effect of gender was controlled, physical abuse ($p=.042$; CI95% 0.011–0.619) and emotional neglect ($p=.048$; CI95% 0.002–0.460) associated specifically with the sum of suicidal thoughts.

8.5 Gender associates with the frequency of CAT experiences and their effects on adult ill health

Gender proved to be a central moderating factor affecting the frequency of CAT experiences, but its effect varied with the questions studied. First, both in the population and clinical samples, females reported more emotional and sexual abuse than males. In a recent Finnish population study (Rehan et al., 2017), compared with males, females reported more severe emotional and sexual abuse, as well as severe emotional neglect, similarly to our CHR sample.

The effects of CAT experiences on adult perceived negative attitude of others seem to be stronger in males than in females. In males, adverse emotional experiences (emotional abuse and neglect) strongly and specifically disturb their trust in other people and also make them vulnerable to depression. In females, emotional neglect has specific direct and indirect effects on perceived negative attitude of others, while their depression is considerably but not specifically mediated via perceived negative attitude of others.

Males use more alcohol, have more alcohol problems and their alcohol problems are more strongly associated with their sociodemographic characteristics and depressive mood than in females. Drug abuse is also more prevalent among males than females. While the effects of CAT on alcohol problems in both genders are mainly mediated via depressive symptoms, in females, physical and sexual abuse also have direct effects on alcohol problems.

The effect of CAT on suicidal ideation is mediated differently in females and males. In females, the effect of CAT in general and emotional abuse and neglect in particular on suicidal ideation is mediated via baseline depression. In males, CAT in general and emotional and physical abuse in particular has a direct effect on suicidal ideation, and the effect of sexual abuse and emotional neglect is partly mediated via concurrent depression symptoms. Thus, gender differences should be taken into account when treating CHR patients with suicidal ideations.

Also the risk of suicide varied with gender. In females, manic disorders and drug dependence, whereas in males, dysthymia, social phobia, and emotional abuse associated with suicide risk. In CHR patients, there were no gender differences in suicidal ideations. However, in CHR females, the effect of CAT on adult suicidal ideations was mediated via depression, while in males CAT and its domains have mainly direct effects on maintaining suicidal ideations.

All individual studies show that gender is a central factor in moderating the effects of childhood adverse and trauma experiences on adult mental wellbeing. Therefore, in future studies, in addition to controlling for the effect of gender, it is important to also carry out analyses in females and males separately.

8.6 Specific associations of CAT domains

8.6.1 Sexual abuse

The majority of the research regarding CAT domains has dealt with abuse. In particular, sexual abuse has received more attention than any other CAT domain for its assumed major contribution to mental ill health (Thabrew et al., 2012). Why was sexual abuse not more evident? There were at least two reasons. First, compared with other CAT domains, sexual abuse was not so frequent in the general population or in clinical samples. Secondly, all CAT domains had a high co-occurrence with each other, but in sexual abuse, this co-occurrence rate was smaller than for other CAT domains. Post hoc analyses showed that in the general population (Sample I), contingency coefficient for sexual abuse (severity scores) was 0.310, for emotional abuse 0.413, for physical abuse 0.427, for emotional neglect 0.377, and for physical neglect 0.398. For digotomised CAT domains, the corresponding figures were 0.153, 0.264, 0.218, 2.48 and 0.215. In another population study, participants with a history of child sexual victimization probably experienced multiple instances of sexual abuse, but rarely in the context of other forms of abuse and neglect (Pezzoli et al., 2019). Thus, the “effect load” of sexual abuse was lower than that of other CAT domains, and therefore its association with adult mental problems remained smaller than that of other CAT domains and was clearest only in the case of depressive disorders and symptoms.

8.6.2 Emotional neglect

In addition to its most frequent occurrence, emotional neglect also proved to be the most specific effector of all the CAT domains. It was striking that emotional neglect, not abuse, associated specifically with affective (mood and anxiety) and substance abuse disorders (Study IV). At the population level, emotional neglect associated specifically with perceived negative attitude of other people (Study II), indicating that the effect of childhood emotional neglect is not limited to psychiatric disorders but touches on a larger group of people, even the whole society. Additionally, post hoc analyses of the CHR sample indicated that emotional abuse, together with physical abuse, have a specific effect on suicidal ideas. Thus, it is surprising that the central role of childhood emotional neglect has so often been ignored or totally forgotten (Stoltenborgh, Bakermans-Kranenburg, & van IJzendoorn, 2013).

It is difficult to say to what extent self-reported experience of childhood emotional neglect, as well as experiences of other CAT domains, are etiological factors for psychiatric disorders and to what extent they relate to the individual's personality and his/her sensitivity to experience and/or interpret childhood events as

traumatic. Bowlby (1977) has suggested that the negative representational models of attachment figures, built during childhood and adolescence, tend to persist and can manifest in neurotic symptoms and personality disorders. Possibly, both pathways can play some role and via interaction with each other emphasise their own effects.

Even genetic predisposition may play an important role; actually a double role: genetic factors may affect childhood victimization, as well as modify effects of childhood adversities. In a twin sample Pezzoli et al. (2019) found moderate additive genetic influence on emotional abuse (.56), sexual abuse (.49) and emotional neglect (.42), but a lower effect on physical abuse (.33) and physical neglect (.26). Additionally, the risk of occurrence of multiple CAT domains seems to be influenced by genetic and shared environmental more than unique environmental factors, while the risk of experiencing one form of victimization might be largely influenced by unique environmental factors (Pezzoli et al., 2019).

On the other hand, Guloksuz et al. (2019) found that polygenic risk scores for schizophrenia in healthy individuals had an interactive association with other childhood adversities, except physical abuse or neglect. For example, bullying, emotional abuse, sexual abuse and emotional neglect increased the probability of schizophrenia more than their added effects. This means that genetic liability, which can also be manifested as personality features, may multiply the detrimental effects of childhood adverse and traumatic experiences.

As the attachment theory (Bowlby, 1977) proposes, a disregarding and neglecting emotional atmosphere may damage shy and sensitive children's emotional self-esteem and self-confidence, making them vulnerable to adult affective and abusive disorders. Additionally, shy and sensitive children – often described as introverts – may need more warm and supportive emotional attention than other children, and if they do not get it they experience themselves as abandoned and rejected.

It is likely that both these pathways play some role and that their importance varies from one individual to another. It must also be remembered that a CAT domain rarely occurs alone, but usually concurrently with other domains, and the greater the number of CAT domains the greater the effects of CAT domains on adult disorders. Specifically regarding emotional neglect, we can thus hypothesise that if the composition of CAT domains includes emotional neglect – a maltreated child has been left emotionally alone and/or disregarded – the effect of childhood maltreatment is extremely damaging to the development of the child's emotional integrity and self-confidence. This emotional vulnerability extends also to abusive disorders because affective disorders and lack of self-confidence are risk factors also for alcohol and drug abuse. Additionally, feeling of emotional neglect may also indicate low or totally lacking social support which could alleviate the detrimental effect of other CAT domains.

Regardless of direction of effects, the findings that emotional neglect specifically associates with common psychiatric disorders and with the perception that other people take a negative attitude towards them, has two important consequences. First, sensitive and non-confident children need special attention and encouragement in their early years. In addition, a stable and harmonic family life would help introvert and sensitive children to strengthen their self-confidence and to grow up into a resilient person who can successfully face adult challenges, even when adversities occur. Parents' discord and divorce probably have an opposite effect. It is also possible, as some professionals have suggested, that parents' intensive devotion to the use of the internet and social media may increase children's feeling of being neglected (Pajulo, 2017 and 2018). One can speculate that the remarkably increased numbers of children who have been taken into custody (Kuoppala, Forsell, & Säkkinen 2019) may indicate children's increased emotional neglect in their families and in our society as a whole.

Second, in treatment of individuals with affective and abusive disorders, it is important to pay attention to the patient's childhood adversities and among them to emotional neglect in particular. Psychotherapeutic treatment of early experiences of emotional neglect and disregarding experiences may heal the patient's painful childhood memories, also memories other than neglect, and so improve clinical recovery.

8.6.3 Physical abuse

Childhood physical abuse was reported less frequently than emotional neglect but its specific association with psychiatric disorders, including also suicidal thoughts and risk of suicide, was even more extensive than that of emotional neglect. In addition to affective disorders, physical abuse associated specifically also with manic and psychotic disorders but – unexpectedly – not with substance abuse disorders (Study IV). Contrary to emotional neglect, at the population level, physical neglect played a smaller role (Study I). Thus, it seems that physical abuse relates specifically to major psychiatric disorders, possibly to their most severe forms.

Often, these disorders, manic and psychotic in particular, are preceded by deviant features of personality (Fink, 1991; Howes & Falkenberg, 2011; Simonsen & Newton-Howes, 2012). It is thus possible that the children with manic and psychotic psychiatric disorders predisposing features, like labile and schizoid personality or otherwise disturbing behaviour, can be predisposed to physical abuse and violence at home (punishment) or at school (bullying). This pathway from childhood maltreatment to adult affective disorders corresponds with that of emotional neglect. On the other hand, the individuals who in their adulthood become manic or psychotically disturbed may already in their childhood behave in such disturbing

ways that they often end up physically abused. This correlative nature of the association between childhood physical abuse and adult severe mental disorder is supported by a recent study showing that polygenic risk scores for schizophrenia among healthy individuals correlated significantly with reported childhood physical abuse but not with other CAT domains. The effects of genetic liability and childhood physical abuse in schizophrenia were additive not multiplicative as they were in other CAT domains (Guloksuz et al., 2019). Yet, in addition to the fact that childhood physical abuse may correlate with genetic and other vulnerabilities to severe psychiatric disorders, it can also increase the risk of these vulnerable children becoming severely disturbed in adulthood or at least prevent their possibilities to achieve a healthier trajectory.

Child physical abuse is a widespread, global phenomenon affecting the lives of millions of children all over the world (Stoltenborgh, Bakermans-Kranenburg, van IJzendoorn, & Alink, 2013). In recent years, protection of small children has received increasing attention from professionals and public media; for example, actions have been taken to reduce children's physical punishment at home and their bullying at school. Also in clinical practice, it is important to pay attention to childhood physical abuse and its consequences for the patient's psychological and social development, as well as its associations with psychiatric disorders and suicidality. Understanding psychotherapeutic intervention to the often occurring emotions of rage and hate may heal the psychic wounds related to the childhood physical maltreatment.

8.6.4 Damage to human basic needs for safety and to be loved

The specific effect of emotional neglect and physical abuse on mental ill health be understood in the light of two psychological theories: Maslow's motivation theory and Bowlby's attachment theory.

In Maslow's theory of self-actualisation (1943 and 1954), human inherent needs form a hierarchy. The most basic are physiological needs (e.g. hunger and thirst), next safety needs (e.g. security, comfort and stability), then belongingness and love needs (e.g. affection and identification), then esteem needs (e.g. prestige and self-respect) and finally need for self-actualisation. According to Maslow, a lower needs must be adequately satisfied before the next higher need can fully emerge in a person's development, and psychopathology is resulting from a blocking or twisting of developing this structure (Krech et al. 1982, 437-438 and 559).

Emotional neglect and physical abuse touches on the very basic needs of safety and belongingness. The emotional disregarding, impassive and indifferent attitude of the parents towards their child, and being rejected or excluded outside the family

by peers may severely damage a child's and an adolescent's psychic integrity and self-esteem, predisposing him/her to a distrusting attitude towards other people and making him/her vulnerable to adult mental problems and disorders. Similarly, parental outbursts of rage, threats of punishment, rough handling or actual physical punishment may violate a child's or a youth's basic sense of safety and belongingness.

The border between safety and love needs is hardly very sharp. Accordingly, emotional distance and coldness and physical maltreatment may also cause a sense of not-to-be loved by the parents and not-to-belong to the circle of school mates, peers and friends: the need for love is threatened. Thus, the central role of childhood emotional neglect and physical abuse can be understood by their common threat against the very basic human needs for safety and to be loved.

Maslow's view of human development is rather pessimistic; if one of the early needs does not become adequately satisfied, progression to next stage and finally to self-actualisation is not possible. Bowlby's attachment theory can be seen more optimistic, although it also acknowledges that children's early psychosocial development play a central role in their adult prosperity. Early psychologists believed that the attachment of the infant to its mother was formed through learned associations (conditionings) of satisfaction of biological needs. In his rhesus monkey experiments, Harlow (1959) showed that attachment between monkey baby and surrogate mother was not formed through simple satisfaction of hunger but touching and contact comfort seemed to be critical factors in the process of attachment forming.

Bowlby (1969) believed that human infants are born with a genetically determined predisposition to stay very close to those adults who care for them (mostly parents) and that the parent in turn are predisposed to respond with behaviours that will ensure the safety of their offspring (Krech et al. 1982, 567-269). He argued that the attachment system functions to provide a secure base for the infant to explore the physical and psychological environment. However, the infant-parent relationship is not always without problems. In their experimental "strange situations", Ainsworth et al. (1978) could identify the groups of securely and insecurely infants and found that the mothers differed in their sensitivity to respond their child's needs. Attachment was proved to be a two-way bonding, which implies a mutual relationship between mother and child.

According to Bowlby (1969, 1977), in interaction with the attachment figures (most often with parents), children develop representational models that allow them to predict and interpret the behaviour of attachment figures and view themselves in relation to others. Representational models of attachment figures, built during childhood and adolescence, tend to persist relatively unchanged into and throughout adult life. If the childhood representational models are negative they can in adulthood

manifest in psychopathological problems. A disregarding and neglecting emotional atmosphere may specifically damage shy and sensitive children's emotional self-esteem and self-confidence, making them vulnerable to adult suspicious attitude and affective and abusive disorders. Physical abuse influences to the same direction but its specific effect may be more detrimental and manifests in adult severe mental disorders.

However, mother-child attachment is not the only attachment relationship. Harlow & Harlow (1965) preferred to speak about affectional systems distinguishing infant to mother, mother to infant, infant to peers, heterosexual relations, and adult male to infant systems. Thus, individuals may, during their whole lifespan, have several attachment or affectional figures that can strength and modify even improve their childhood-driven representational models. Later interactions with siblings, peers, teachers and friends provide a possibility for corrective experiences. The impact of the first relationship probably greatly influences the quality of future ones, and the sums of these relationships is of importance to both the individual and society (Krech et al. 1982).

8.7 CAT is related to family malfunctioning

A number of CAT experiences (Table 1, study I) were related to the participants' families and family malfunctioning. In the present studies, however, differences between CAT domains related to maladaptive family functioning and other CAT experiences were not analysed separately. In a Finnish population sample, family-specific CAT domains were more common than family unspecific victimisation. Additionally, genetic (0.47) and shared environmental (0.20) risk factors (mainly family-bound) contributed to the co-occurrence of individual instances of child victimization more than unique environmental risk factors (0.33) (Pezzoli et al., 2019). McLaughlin et al. (2012) made this distinction between family-centred vs. non-family-centred maltreatment and found that CAT experiences reflecting maladaptive family functioning were more strongly associated than other CAT experiences with the onset of a great variety of psychiatric disorder classes: fear (e.g., panic disorders and social phobia), distress (e.g., depression, dysthymia, generalized anxiety disorder), behaviour (e.g., attention-deficit/hyperactivity and conduct disorders), and substance disorders (e.g., alcohol and drug abuse). In a Finnish birth cohort study of 12-year-old children, the effect of economic pressure faced by families during economic recession was transmitted via the parents' mental health and marital interaction to children's internalizing and externalizing symptoms at the age of 18 years. On the other hand, children's prerecession mental problems associated with poor parenting (Solantaus, Leinonen, & Punamäki, 2004). These studies clearly indicate that parents' mental health and their mutual interaction, i.e.

family coherence and function, form a central basis for the children's undisturbed development, as has been emphasized by Maslow (1943), Bowlby (1977) and several later researchers e.g. Lindert et al., (2014), Mandelli, Petrelli, & Serretti (2015), Pirkola et al., (2005), Repetti, Taylor, & Seeman (2002), and Weich et al., (2009). Therefore, early family-centred educational and therapeutic interventions directed to support parents in their education tasks and to improve parents' and children's mental health can prevent children from adverse and traumatic experiences. Societal measures to help families facing economic and other difficulties can contribute to the same goal. At the level of the whole society, it is a question of values of family life. Societal actions should be taken to support a stable and harmonious family life and respect toward children and their wellbeing. Also, the public media have an important role to play in these actions.

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