



## A scientometric review of the association between childhood trauma and sleep

Vassileios Karatzoglou<sup>a,1</sup>, Alessandro Carollo<sup>b,1</sup>, Evangelia Karagiannopoulou<sup>a</sup>, Gianluca Esposito<sup>b</sup>, Xóté Tadhg Ó. Séaghdha<sup>c</sup>, Dagmara Dimitriou<sup>d,\*</sup>

<sup>a</sup> Department of Psychology, University of Ioannina, Ioannina 45110, Greece

<sup>b</sup> Department of Psychology and Cognitive Science, University of Trento, 38068 Rovereto, Italy

<sup>c</sup> ReducingSAD - The National Organisation for Reducing Stress, Anxiety & Depression, Johann Aberli Strasse, CH-2503 Biel/Bienne, Switzerland

<sup>d</sup> Sleep Education and Research Laboratory, Psychology and Human Development, UCL Institute of Education, London WC1H 0AA, UK

### A B S T R A C T

Sleep is a complex state which involves interactions between neurophysiological, psychological and neurochemical processes which in turn have an important impact on brain functioning, immune responses, mental health, and quality of life. The incidence of Adverse Childhood Experiences (ACEs) varies across different countries and have been linked with lifespan sleep disturbances with further effects on people's physical and mental health functioning. This review aims to explore the significance of ACE and its impact on sleep by identifying key documents, thematic trends, and knowledge gaps in the literature. A document co-citation analysis of 882 documents from Scopus was conducted to achieve this goal. Research trends focused on the long-term consequences of childhood adverse events with respect to sleep, with emphasis on the role of type, timing and accumulation of these experiences. A recent study has also taken advantage of machine learning and network analysis for discovering essential factors could offer useful information about adults with history of childhood adversity and sleep problems. The studies show unanimously that ACEs are associated with multiple sleep disturbances/disorders which can persist into adulthood, with consequences for suboptimal cognitive and behavioral functioning. Such neurobiological scars can be associated with an increased risk of mental disorders. Future studies are needed that focus on longitudinal analysis of the relationship between early adversity, sleep, and resilience characteristics in adult populations exploring the use of objective assessment measures as well as neurobiological markers.

### 1. Introduction

Sufficient sleep duration and quality are among the most important factors in maintaining the balance between physiological and psychological well-being (Pilcher et al., 1997). Nevertheless, published data suggest that sleep duration and quality not only deteriorate across an individual's lifespan, but also show geographical variations (Baiden et al., 2015; Carskadon, 2011; Dahl & Harvey, 2007; Vgontzas et al., 2013) leading to a negative association with respect to cognitive and emotional functioning as well as quality of life (Mander et al., 2017). The impact of chronic sleep disturbances have been associated with a variety of physical and mental disorders including obesity (Matthews & Pantescio, 2016; Wu et al., 2015), cardiovascular disease (Hall et al., 2018), cancer (Mangar et al., 2023), autism (Cohen et al., 2014; Halstead et al., 2021; Mangar et al., 2023) depression (Guo et al., 2014), suicidality (Gallicchio & Kalesan, 2009; Liu & Buysse, 2006).

While an important factor that significantly reduces the quality of sleep of people living in modern technologically advanced societies is

the use of social media (Azhari et al., 2022; Dimitriou et al., 2015; White et al., 2011) other factors such as psychological trauma (Sadeh, 1996), cannot be underestimated. Early traumatic events, such as child maltreatment, abuse and neglect are prevalent worldwide (Ashour et al., 2024; Stoltenborgh et al., 2015), with resulting psychological sequelae that could persist into adulthood or even throughout life (Hovens et al., 2010). In particular, maltreatment is widely reported as an important predictor of poor sleep health (Chapman et al., 2013; John-Henderson et al., 2018; Kajeepeta et al., 2015; Rojo-Wissar et al., 2019; Windle et al., 2018). When considering the psychosocial perspective, it has been suggested that experiences of childhood abuse and frequent revictimization lead to the development of unhealthy sleep patterns that may persist into adulthood (Babson & Feldner, 2010; Bader, Schaefer, et al., 2007; Greenfield et al., 2011; Spilsbury, 2009).

It is thus important to explore the characteristics of early childhood adverse experiences such as the timing, frequency of exposure as well as the accumulation of these types of experiences (Bader, Schaefer, et al., 2007; Wang et al., 2016). It is recognized that adverse events

\* Corresponding author.

E-mail address: [d.dimitriou@ucl.ac.uk](mailto:d.dimitriou@ucl.ac.uk) (D. Dimitriou).

<sup>1</sup> Joint first author.

experienced during childhood are independently linked with poorer outcomes in health status, even when taking into account adversity during adulthood (Lei et al., 2023). Moreover, it was suggested that they might sensitize individuals to maladaptive and/or harmful coping behaviors such as substance use in response to stress (Myers et al., 2014). Furthermore, some recent data suggest that the timing of early adversity, trauma and/or abuse is associated with differential effects on brain development (Andersen et al., 2008; Zhu et al., 2019). In the same vein, some data suggest that individuals who are exposed to adverse events in early childhood or adolescence may be predisposed to develop insomnia (Wang et al., 2016). Accordingly, several studies have indicated the existence of a dose-response relationship between exposure to numerous types of adverse events and pervasive effects on health across the lifespan (Hughes et al., 2017). Particular focus has been given to examining the relationship between cumulative early adverse experiences and poor sleep quality (Baiden et al., 2015; Brindle et al., 2018; Chapman et al., 2011; Desch et al., 2023; McWhorter et al., 2019; Rojo-Wissar et al., 2019; Sheehan et al., 2020). Nevertheless, the relationship between early adversities and sleep seems to be poorly defined with limited data leading to unclear conclusions (Bader, Schaefer, et al., 2007; Bader, Schäfer, et al., 2007; Heath et al., 1996; Koskenvuo et al., 2010; Ram-sawh et al., 2011).

Given the developmental relevance and health significance of studying ACEs, some potential mechanisms have been related to the impact of ACEs on physical, psychological and neurobiological systems. The two main described regulator mechanisms by which early adversity impacts long-term health highlight brain development and functioning of the Hypothalamic-Pituitary-Adrenal (HPA) axis and the immune system (Chiang et al., 2015; Danese & McEwen, 2012; Nusslock & Miller, 2016; Repetti et al., 2011; Tottenham, 2012; Tottenham & Sheridan, 2010). The bio-behavioral response to continued stress causes changes in gene expression leading to dysregulation of the functioning of the HPA axis resulting in sleep adversity (Agorastos et al., 2019; Fuligni et al., 2021). Early adverse events have been linked to diminished cortisol levels during acute stress responses (Bunea et al., 2017), alongside disruptions in the circadian rhythm of cortisol, which holds significant sway over sleep cycles (Bin Eid et al., 2022; Chiang et al., 2017; King et al., 2020; Kumari et al., 2013; Pendry & Adam, 2007). These alterations in the functioning of the HPA axis have been found to predict a range of adverse mental and physical health outcomes, including depression and obesity (Adams et al., 2021; Turner et al., 2020). Moreover, early maltreatment experiences can exert an impact on the immune system, precipitating chronic low-grade inflammation. This may stem from heightened inflammatory responses to both biological and psychosocial threats or reduced sensitivity to anti-inflammatory signals (Miller & Cole, 2012; Prather et al., 2015). Such chronic low-grade inflammatory responses have been associated with detrimental health effects, such as depression, cardiovascular disease, and cancer (Pearson et al., 2003; Shrotriya et al., 2018; Valkanova & Ebmeier, 2013).

While several systematic reviews and meta-analyses have recently investigated the association between ACEs and sleep problems (e.g., Brindle et al., 2018; Brown et al., 2022; Liu et al., 2023; Schønning et al., 2022; Vadukapuram et al., 2022; Yu et al., 2022), no study has yet outlined the overall structure of knowledge in this field using a data-driven approach. Such an approach would provide an up-to-date synthesis of the literature on ACEs and sleep problems by capturing trends, patterns, and developments over time using all available documents. Therefore, the current study bridges this gap by employing a scientometric approach. Scientometrics, positioned at the convergence of scientific mapping and bibliometric analysis, involves visualizing the temporal evolution of a research domain and applying quantitative techniques to bibliometric data (Donthu et al., 2021; Nakagawa et al., 2019; Sabe et al., 2022). In particular, the aim of this scientometric review is to further explore the literature on the relationship between ACEs and sleep, identifying impactful documents and major thematic

domains of research. Specifically, we conducted a document co-citation analysis (DCA) to analyze the citations and relevance of existing literature (Carollo et al., 2021; Chen et al., 2010, 2014). DCA is based on the quantitative relationships between a vast array of documents and their references. Overall, DCA helps identify influential works, key areas of research, emerging topics, and shifts in scientific focus.

## 2. Materials and methods

### 2.1. Data collection from Scopus

For this review, we collected data from Scopus. A single database was exclusively utilized for the article search to ensure the database's cleanliness, adhering to the standard practice in scientometric studies (Cortese et al., 2022; Sabe et al., 2022). The Scopus platform was chosen as the database due to its extensive coverage of indexed journals and recent publications (Falagas et al., 2008; Lim, Carollo, et al., 2022). Publications were collected with the string TITLE-ABS-KEY (“attachment trauma\*” OR “early adversit\*” OR “childhood trauma\*” OR “traumatic experience\*” OR “childhood maltreatment\*” OR “early life stress” OR “adverse childhood experience\*”) AND (“sleep” OR “insomnia”) AND (LIMIT-TO (LANGUAGE, “English”). Research keywords were selected to cover the literature on early traumatic experiences, considering both the abuse and neglect perspectives, and sleep disturbances. Terms of specific childhood adversities (e.g., malnutrition, migration) or specific sleep aspects (e.g., collapse of the upper airway, uncontrollable urge to move the legs) were excluded to avoid skewing the research towards specific experiences/contexts. The search was performed on November 24, 2023, resulting in 882 documents published between May 1964 and January 2024. The publication timeframe was solely determined by Scopus' availability, and no predetermined temporal exclusion criteria were applied. Titles and abstracts were manually inspected to gather relevant literature while minimizing noise from unrelated publications. Initially, an analysis of the bibliometric properties of the sample of citing documents was conducted using the *bibliometrix* package for R (Aria & Cuccurullo, 2017).

### 2.2. Data import

The scientometric analysis employed CiteSpace software (v. 6.1.R6 Advanced). After inputting the 882 documents retrieved from Scopus, 62,822 citations were identified, with 62,151 (98.93 % of total references) deemed valid and eligible for analysis. To meet validity criteria, references must include author, publication year, title, source, volume, pages, and DOI (Chen et al., 2014; Neoh et al., 2023). Entries with irregular citation formats were excluded as invalid. The data loss in this study (1.07 % of total references) is considered negligible for scientometric reviews, typically ranging between 1.00 % and 5.00 % (Chen, 2016).

### 2.3. Document co-citation analysis (DCA)

For the scientometric analysis, document co-citation analysis (DCA) was employed to delineate the dominant research areas, drawing upon principles of graph theory. This method examines the frequency of co-citations, where two or more documents are cited together in source articles (Small, 1980). Clusters of research sharing common thematic interests are identified through frequent co-citations among research papers (Carollo et al., 2021; Chen et al., 2010). The resulting network from DCA encompasses documents frequently cited together, along with those citing them (i.e., documents sourced from Scopus). Within this network, individual documents are depicted as nodes, occurrences of co-citations as links, and link weights are determined by the frequency of co-citations between documents (Trujillo & Long, 2018).

The parameters of DCA were fine-tuned to ensure a well-balanced network. Multiple DCA analyses were conducted and compared, each

utilizing different settings for three node selection criteria: g-index, TOP N, and TOP N%, as detailed in (Lim, Carollo, et al., 2022; Neoh et al., 2022, 2023). These criteria determined the articles included in the network, thus shaping the final DCA network. The g-index, a measure of an author's top publications' citation scores (Alonso et al., 2009; Egghe, 2006), signifies the average number of citations for the most highly cited publications (Chen, 2016). TOP N and TOP N% criteria select the N and N% most cited documents within a given time slice (e.g., one year) as network nodes, respectively (Chen et al., 2014). Through multiple DCA analyses, various node selection criteria and their respective factor values were compared to generate the optimal network. Specifically, DCA analyses compared different criteria, including: g-index with scale factor  $k$  at 5, 10, 25; TOP N with scale factor  $N$  at 5, 10, 50; and TOP N% with scale factor at 10. By evaluating their impact on structural metrics, the number of included nodes, and identified clusters, the optimal node selection criterion and scale factor for generating the final network were determined. The final network was produced through a DCA analysis with the g-index scale factor  $k$  set at 10. The literature search and generation of the document co-citation analysis (DCA) network are depicted in Fig. 1.

#### 2.4. Metrics of interest

The findings from the CiteSpace analysis are elucidated through both structural and temporal metrics. Structural metrics, encompassing modularity, silhouette scores, and betweenness centrality, offer insights into the network's organisation and connectivity (Aryadoust et al., 2019; Chen et al., 2010; Rouseeuw, 1987). The modularity index indicates the network's divisibility into cohesive clusters, with higher values suggesting better-defined groupings (Chen et al., 2010). Silhouette scores assess cluster cohesion and separation, with higher scores indicating clearer boundaries and internal consistency (Aryadoust & Ang, 2021). Betweenness centrality measures a node's importance in connecting different network segments, often reflecting influential works in the scientific literature (Aryadoust et al., 2019).

Temporal metrics, including citation burstiness and sigma indexes, provide insights into the dynamic nature and impact of individual documents within the network (Chen, 2017; Chen et al., 2009; Kleinberg & Tardos, 2003). Citation burstiness identifies sudden spikes in a document's citations, indicating periods of heightened influence (Chen, 2017). Sigma index combines centrality and burstiness to gauge a

document's novelty and its overall influence on network dynamics (Chen et al., 2009).

### 3. Results

#### 3.1. Bibliometric analysis of the citing documents

The main sources of the citing documents were the *Journal of Affective Disorders* ( $n = 34$  documents), *Frontiers in Psychiatry* ( $n = 21$  documents), and *Sleep Medicine* ( $n = 17$  documents). The five most productive authors resulted to be Etain (14 documents), Zhang (10 documents), Courtet (9 documents). When examining the corresponding authors' affiliations by country, the United States of America ( $n = 296$  documents; frequency = 0.38; single country publications (SCP) = 266; multiple country publications (MCP) = 30) – followed by China ( $n = 74$  documents; frequency = 0.096; SCP = 59; MCP = 15), and Canada ( $n = 354$  documents; frequency = 0.045; SCP = 2; MCP = 9) emerged as the most frequently represented countries in the sample. The most frequently cited documents were authored by Arborelius et al. (1999; total citations = 1199; total citations per year = 47.96) and by McEwen (2012; total citations = 804; total citations per year = 67.00). A total of 1976 keywords selected by the authors indexed the documents. The most frequent keywords included: depression ( $n = 103$  documents), sleep ( $n = 100$  documents), adverse childhood experiences ( $n = 98$  documents), trauma ( $n = 87$  documents), childhood trauma ( $n = 70$  documents), insomnia ( $n = 56$  documents) (Fig. 2).

#### 3.2. DCA network

The ultimate DCA network comprises 472 nodes (i.e., documents) and 1240 links (i.e., co-citations), suggesting an average of 2.627 connections with other references per node. With a modularity-Q index of 0.8475 and a mean silhouette score of 0.9318, the network exhibits strong divisibility into homogeneous clusters, representing distinct thematic domains of research (see Fig. 3).

#### 3.3. Thematic clusters

Eight major thematic clusters were identified in the literature. Clusters were assigned labels using the Log-Likelihood Ratio (LLR) algorithm, known for its accuracy among automated labeling methods in CiteSpace (Lim et al., 2023). Despite this, a manual inspection was undertaken to suggest more appropriate clusters' labels, ensuring they align closely with the thematic focus of the documents within each cluster [as, for instance in (Carollo et al., 2023)]. The eight major clusters were manually labeled as 'early trauma's consequences on physical and mental health' (cluster #0; number of documents in the cluster (i.e., size) = 67; silhouette = 0.851; average year of publication = 2016), 'childhood trauma long-term consequences on sleep' (cluster #1; size = 46; silhouette = 0.959; average year of publication = 2009), 'developmental trajectories of childhood trauma' (cluster #2; size = 31; silhouette = 0.936; average year of publication = 2013), 'neurobiological disorders related to trauma and sleep' (cluster #3; size = 28; silhouette = 0.991; average year of publication = 2010), 'lifelong mechanisms of action of early trauma in sleep' (cluster #4; size = 19; silhouette = 0.956; average year of publication = 2017), 'adverse childhood experiences and insomnia' (cluster #5; size = 17; silhouette = 0.999; average year of publication = 2002), 'childhood trauma and depression' (cluster #13; size = 10; silhouette = 0.994; average year of publication = 2018) and 'childhood trauma and health' (cluster #37; size = 3; silhouette = 0.994; average year of publication = 2016) (Table 1).

#### 3.4. Citation burstiness

The final network featured a total of 5 documents exhibiting citation

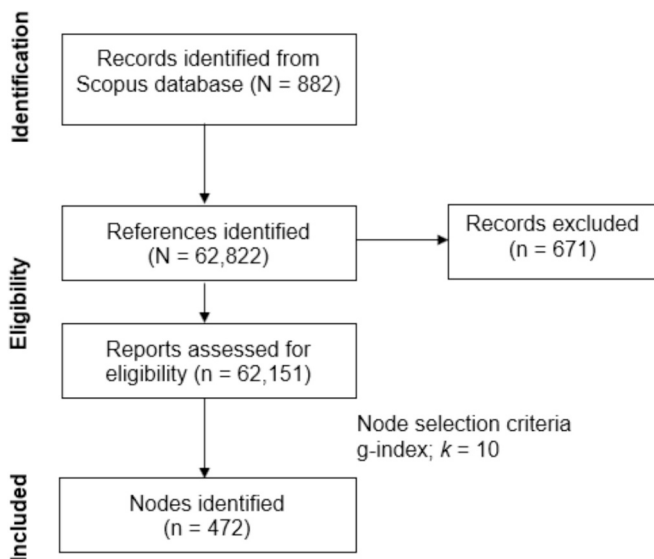


Fig. 1. Flow Chart depicting the literature search, evaluation steps, and network generation according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Keyword Co-Occurrences

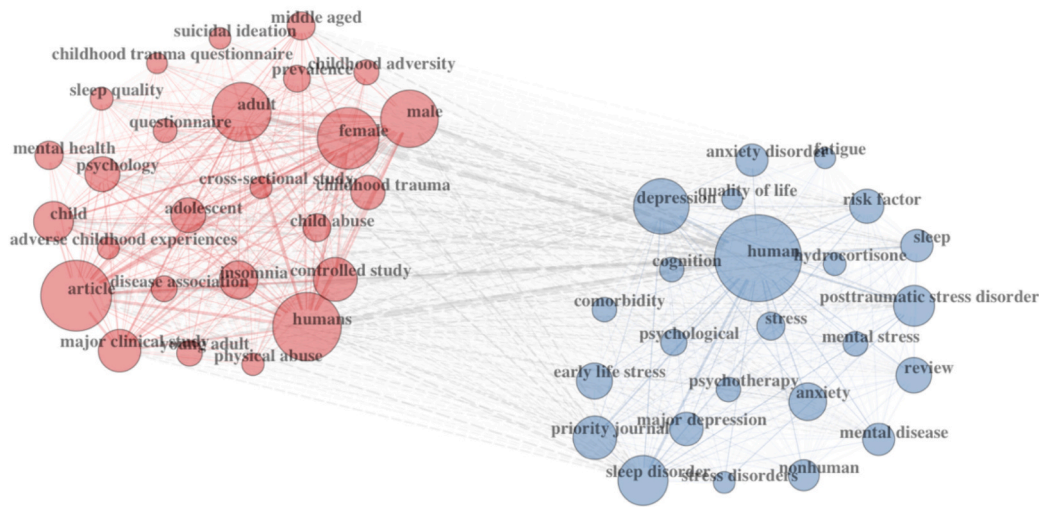


Fig. 2. Top 50 keywords' co-occurrences.

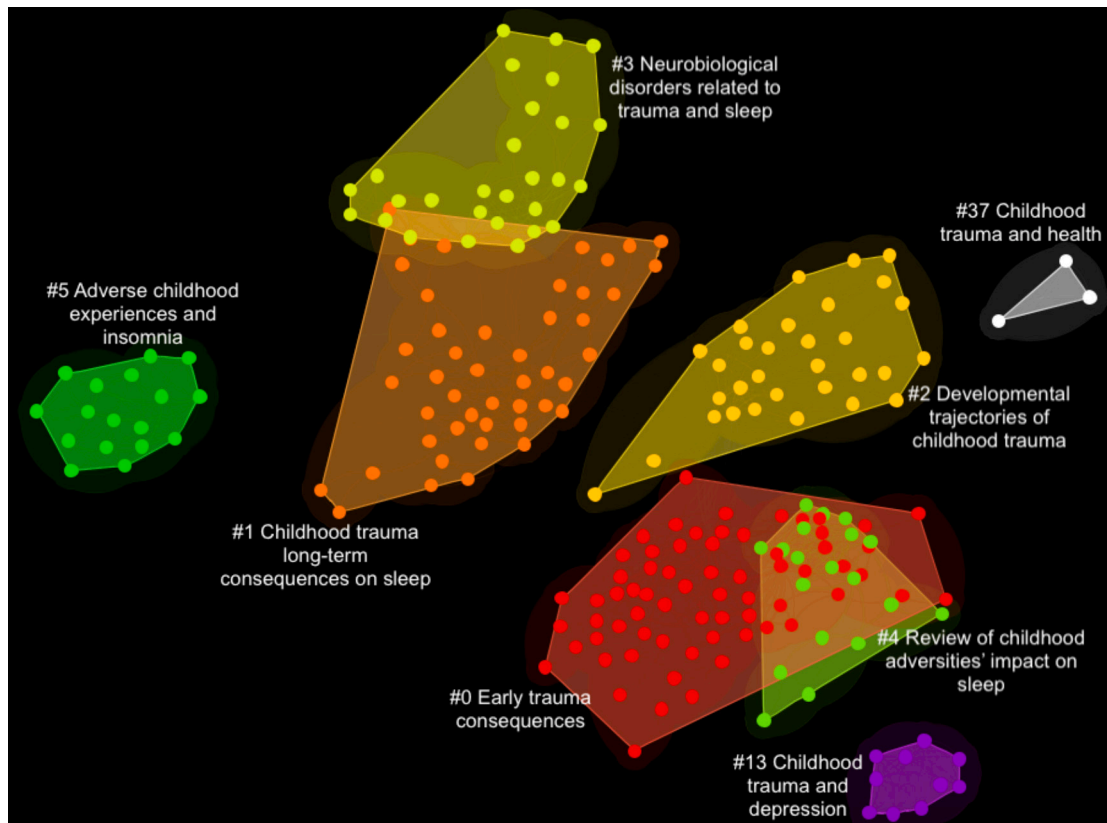


Fig. 3. Document co-citation analysis network of the literature on childhood trauma, generated with CiteSpace software (Chen, 2006).

bursts (see Table 2). Among them, the document authored by Kajeepeta et al. (2015) displayed the strongest burst index, registering at 7.47 (with a burst duration of 6 years). In their review paper, the authors synthesized evidence on the correlation between early childhood adversities and sleep disorders, emphasizing the impact of sexual abuse on adult women. They proposed that this relationship is reinforced by the accumulation and severity of early adverse experiences, highlighting the importance of studying the long-term health and social implications for abused women. Their systematic review documented significant

associations between various sleep disorders (e.g., sleep apnea, narcolepsy, nightmares, sleep paralysis) and a history of childhood adversity. Notably, strong correlations were identified between family conflict during middle childhood and insomnia in adulthood, as well as between childhood sexual abuse and sleep disturbances a decade later. Furthermore, the study revealed that the intensity and frequency of early adverse experiences amplified these associations.

The subsequent documents with notable bursts were authored by Wang et al. (2016) (strength = 6.05; burst duration = 5 years),

**Table 1**  
Metrics of the eight major thematic clusters identified using DCA analysis.

Cluster ID	Size	Silhouette	Mean publication year	LLR label	Suggested label
0	67	0.851	2016	Poor sleep quality	Early trauma's consequences on physical and mental health
1	46	0.959	2009	Adult sleep disorder	Childhood trauma long-term consequences on sleep
2	31	0.936	2013	Developmental trajectories	Developmental trajectories of childhood trauma
3	28	0.991	2010	Neurobiological mechanism	Neurobiological disorders related to trauma and sleep
4	19	0.956	2017	Systematic review	Lifelong mechanisms of action of early trauma in sleep
5	17	0.999	2002	Sleep	Adverse childhood experiences and insomnia
13	10	0.994	2018	Large sample size	Childhood trauma and depression
37	3	0.994	2016	Case-control study	Childhood trauma and health

**Table 2**  
Five most impactful documents in the network with their main metrics.

Reference	Citation burstness	Publication year	Burst began	Burst ended	Burst duration (years)
Kajeepeta et al.	7.4728	2015	2018	2024	6
Wang et al.	6.0559	2016	2019	2024	5
Koskenvuo et al.	5.5494	2010	2011	2017	6
Hughes et al.	5.1014	2017	2022	2024	2
Greenfield et al.	4.758	2011	2014	2018	4

Koskenvuo et al. (2010) (strength = 5.54; burst duration = 6 years), Hughes (Hughes et al., 2017) (strength = 5.10; burst duration = 2 years), and Greenfield (Greenfield et al., 2011) (strength = 4.75; burst duration = 4 years). Both Kajeepeta (Kajeepeta et al., 2015) and Koskenvuo (Koskenvuo et al., 2010) showed the bursts with the longest duration.

#### 4. Discussion

Following a qualitative investigation of the citing articles and cited references, we will delve into discussions concerning the eight major thematic clusters. These clusters are discussed in chronological order, organized by the average publication year of the documents. For each cluster, we will identify the primary citing articles, along with their coverage (i.e., the amount of documents in the cluster cited by the paper) and their global citation score (GCS; i.e., the total number of citations received by the publication in Scopus). The accuracy of clusters' LLR labels has been checked and, where appropriate, manually replaced to better characterise their thematic content.

##### 4.1. Cluster #5 'adverse childhood experiences and insomnia'

In cluster #5, both major citing articles were authored by Bader (Bader, Schaefer, et al., 2007; Bader, Schäfer, et al., 2007), with coverage of 12 and 10 articles and GCS of 125 and 36, respectively. The primary theme of this cluster revolves around the relationship between ACEs and primary insomnia in adults. Although the automatically generated LLR cluster label was 'sleep,' it was manually revised to 'adverse childhood experiences and insomnia' for improved accuracy.

These key citing documents underscore ACEs as potential contributors to adult insomnia onset. Previous studies have supported severe sleep disruptions following exposure to traumatic events (Kato et al., 1996; Ohayon & Shapiro, 2000). Bader and colleagues, in their first study, examined the impact of pre-sleep stress, while their second study investigated the role of current stress levels and depression in this relationship. Both studies evaluated the sleep of fifty-nine adults (age range 21–55) using polysomnography (PSG) and actigraphy, alongside assessing early traumatic experiences through the Childhood Trauma Questionnaire (Bernstein, 1998).

Stressful life events, such as adverse experiences in early age (including physical, sexual, emotional abuse, and neglect), are recognized as significant precipitating factors for physical and mental health problems in adulthood, including insomnia (Bastien et al., 2004; Felitti et al., 1998; Goodwin & Stein, 2004; Spertus et al., 2003). Repeated or prolonged experiences of stress appear to render adults with childhood trauma vulnerable to stress-related disorders. Hyperarousal in traumatized individuals is believed to play a central role in the development and persistence of sleep disturbances, reflecting the organism's preparation phase to cope with potential negative events (Morin et al., 1993; Perlis et al., 1997). The mechanisms underlying hyperarousal may involve persistent stress-related neurophysiological patterns, such as chronically elevated levels of catecholamines and heightened hypothalamic-pituitary-adrenal (HPA) axis activity, resulting in increased stress reactivity (Otte et al., 2005; Perry & Pollard, 1998).

In this context, childhood trauma emerges as a risk factor for insomnia symptom development. However, contrary to the assumptions in Bader and colleagues' studies, neither pre-sleep stress induced by negative memory recall nor current levels of stress and depression appeared to be related to group differences in sleep.

##### 4.2. Cluster #1 'childhood trauma long-term consequences on sleep'

In cluster #1, the primary citing documents include those authored by Kajeepeta (2015), Gelaye et al. (2015), and Palagini et al. (2015), with coverage of 13, 10, and 8 articles, respectively, and GCS values of 231, 29, and 46. The primary theme of this cluster revolves around the relationship between stress and ACEs, and their short- and long-term effects on sleep. While the LLR-generated cluster label was 'adult sleep disorder,' it was manually revised to 'childhood trauma long-term consequences on sleep' to accurately reflect the cluster content, encompassing sleep problems and disorders across a wide age range, as opposed to solely referencing disorders, as suggested by the LLR label.

The citing articles within this cluster explore the associations between childhood adversities and sleep disorders in adults (Chapman et al., 2008; Kajeepeta et al., 2015; Palagini et al., 2015; Semiz et al., 2008). Kajeepeta's major study highlights the influence of childhood adversity on sleep disorders among women (Agargun et al., 2002, 2003; Chambers & Belicki, 1998), with research indicating a heightened risk of negative outcomes among women following an ACE (Fisher et al., 2009; Haatainen et al., 2003; Ramsawh et al., 2011). Additionally, Gelaye et al.'s study focuses on the association between childhood physical and/or sexual abuse and stress-related sleep disturbances among Peruvian women during early pregnancy, with factors such as depression and experience of intimate partner violence identified as mediators. Previous studies also suggest that women with childhood histories of abuse are more likely to experience poor sleep compared to those without such a history (Greenfield et al., 2011).

Palagini et al.'s systematic review aims to identify the early life origins of insomnia, examining the role of prenatal and early life stress. Insomnia, prevalent among 6%–10% of adults, is linked to activation of the hypothalamic-pituitary-adrenal axis and long-lasting modifications in stress reactivity, which may persist into adulthood. Exposure to stress in early life may lead to vulnerability to hyperarousal reactions to

negative life events, contributing to the development of insomnia. Additionally, epigenetic mechanisms may be involved in the development of maladaptive stress responses and HPA axis dysfunction, making individuals vulnerable to psychopathological conditions in adulthood.

Common features emerging from these studies include graded relationships between the number of ACEs and sleep disorders, with sleep disturbances in adulthood serving as predictors of early trauma history and consequences of further health problems. Preclinical studies highlight the brain's sensitivity to remodeling by environmental factors, such as stress exposure, leading to 'early-life programming' of individual health and diseases, consistently highlighted in the articles within this cluster.

#### 4.3. Cluster #3 'neurobiological disorders related to trauma and sleep'

The major citing articles in cluster #3 were authored by Aas (Aas et al., 2016) with a coverage of 10 articles and GCS of 196, Felger and Lotrich (2013) with a coverage of 5 articles and GCS of 746, and Aubert (Aubert et al., 2016) with a coverage of 4 articles and GCS of 9. This cluster appears to include a wider body of work investigating the association of early adverse experiences and sleep in mental and physical conditions. The articles included in this cluster cover the effects of the relationship between childhood trauma and sleep (Aas et al., 2016; Felger & Lotrich, 2013) mainly in people with mental health conditions (Aas et al., 2016; Aubert et al., 2016) as well as in individuals with inflammatory diseases (Bertini et al., 2013; Bonaz & Bernstein, 2013; Felger & Lotrich, 2013). Since the automatically generated LLR cluster label was 'neurobiological mechanism', the cluster label was manually replaced with 'neurobiological disorders related to trauma and sleep' to reflect the cluster content which encompasses both neurobiological disorders and the characteristics of trauma and sleep more accurately.

The major citing articles by Aas et al. (2016) and Aubert et al. (2016) both discuss the relationship between childhood trauma and bipolar disorder with the second document taking sleep quality into account. Aubert et al. (2016) measured sleep quality and history of childhood trauma of 493 euthymic bipolar disorder patients aged over 18 years using the PSQI (Buysse et al., 1989) and the Childhood Trauma Questionnaire (CTQ) (Bernstein, 1998), respectively. Many studies have consolidated the level of proof for the association between childhood trauma and bipolar disorders (BD) (Alvarez et al., 2011; Etain et al., 2010), with emotional abuse having a dose-effect in this disorder. Also, it is supported that childhood trauma may influence aggression (Garno et al., 2008), hostility or impulsivity in BD patients increasing suicide attempts (Etain et al., 2013; Parmentier et al., 2012). In fact, it could be related to the effects of childhood trauma on the brain inhibitory control networks (Elton et al., 2014). Similarly, sleep disturbances observed in BD (Geoffroy et al., 2015; Ng et al., 2015) and constitute a core symptom which frequently arises and/or persists during euthymia phase (Geoffroy et al., 2014; Harvey, 2008; Harvey et al., 2015), with childhood trauma possibly playing a role in this relationship. Sleep disturbances described in BD include lower sleep efficiency, longer slow-wave sleep and alterations of circadian rhythms (Harvey, 2008; Harvey et al., 2011; Samalin et al., 2014) with insomnia and parasomnia also referred.

Felger and Lotrich (2013) discuss the role of cytokines in depressive disorder, which is related to both early trauma and sleep. Other citing articles also discuss about diseases, such as inflammatory bowel disease (IBD, Bonaz and Bernstein, 2013) and others related to psychoneuro-immunology (Bertini et al., 2013). Cytokines are important for the development and healthy brain function, influencing neurogenesis, neurocircuitry and synaptic remodeling (Yirmiya & Goshen, 2011) to produce behavioral alterations. However, Felger and Lotrich (2013) in their study point out that cytokines may serve as mediators of both environmental (e.g., childhood trauma, stress and poor sleep) and genetic (functional gene polymorphisms) factors that contribute to depression among other disorders. Repeated or long-lasting experiences of stress in early life sensitize individuals to related events leading to

greater physiological and emotional responses to future stressors (Heim et al., 2000), which in turn increase the risk for psychological and physical conditions. Several biological pathways (including neuroplasticity, inflammation, circadian systems, and the HPA axis) are likely to play a role in the relationship between childhood trauma and risk of disorders (e.g., BD) and disease, with sleep sometimes contributing positively and sometimes negatively in this relationship.

#### 4.4. Cluster #2 'developmental trajectories of childhood trauma'

The major citing articles in cluster #2 were authored by Agorastos et al. (2019) with a coverage of 9 articles and GCS of 193, Duke and Borowsky (2018b) with a coverage of 4 articles and GCS of 18, and Nielsen et al. (2019) with a coverage of 3 articles and GCS of 27. From the citing articles, the scope of the articles in this cluster appears to be the determination of childhood traumatic experiences' effects in neurological (Heim et al., 2009), biological (Strüber et al., 2014) and psychological sciences (McGowan, 2013). Similarly, the scope of the cited references is also largely centred around these areas of study (Brindle et al., 2018; Doolin et al., 2019; Michels et al., 2019). Since the automatically generated LLR cluster label was 'developmental trajectories', the cluster label was manually replaced with "developmental trajectories of childhood trauma" to reflect the cluster content more accurately.

Early life stress during critical developmental periods could exert a programming effect on sensitive neuronal brain networks related to the stress response and thus lead to enduring hyper- or hypo-activation of the stress system and altered glucocorticoid signaling, as stated by Agorastos et al. (2019). In their review evidence from human research was associated with early life stress exerting long-lasting adverse effects on the most known neurobiological allostatic pathways (hypothalamic-pituitary-adrenal axis, autonomic nervous system, immune system and inflammation, oxidative stress, cardiovascular system, gut microbiome, sleep and circadian system, genetics, epigenetics, structural, and functional brain correlates). It is suggested that a close association of early life stress (childhood trauma) with adverse physical health (i.e., cardiovascular, gastrointestinal, neuromusculoskeletal, pulmonary, inflammatory and metabolic diseases) (Berntsen et al., 2012; Hovens et al., 2012; Koenen et al., 2007; Scott et al., 2011; Wang et al., 2010). Similarly, Duke and Borowsky (2018a) in their study examined the relationship between ACEs and health outcomes especially in adolescents. The authors assessed the early traumatic experiences of a sample of 126,868 adolescent students through questions drawn from the Minnesota Student Survey (MSS). A wide range of adverse childhood experiences were associated with health indicators (body mass index, sleep duration, dietary and physical activity), after adjustment for demographic covariates. A graded relationship was reported between ACEs and chronic negative health outcomes in adulthood (i.e., smoking, substance use, obesity) (Anda et al., 1999; Dube et al., 2003; Williamson et al., 2002).

The third major citing article by Nielsen et al. (2019) supports that childhood adversities at a very early age (0-6 years) can result in the development of nightmares, even in adulthood (Csóka et al., 2011; Lereya et al., 2017). It also supported that adversity of early separation is associated with lower sleep spindle density, a known index of both psychopathology and early nightmare-onset as well as sleep-related memory consolidation. In the study participants aged 18-50 were assessed with the Traumatic Antecedents Questionnaire (TAQ) (Park et al., 2020) for exposure to lifetime and age-specific traumatic adverse experiences. Sleep quality, occurrence of nightmares and sleep spindles were assessed with the Sleep Disorders Questionnaire Abbreviated version (SDQ-A) (Douglass et al., 1994) and the Nightmare Distress Questionnaire (NDQ) (Belicki, n.d.) and PSG, respectively. Results support the possibility that nightmares may be caused by an accumulation of adverse experiences. Furthermore, nightmares of healthy individuals caused by early adversity may share similar

pathophysiological mechanisms with PTSD nightmares. Although most studies support a causal relation between early life stress (childhood trauma) and psychobiological maladjustment in later life, the developmental course of such changes has not been elucidated as yet. Specific periods of non-linear neurodevelopment led to greater stress system plasticity, which represent important vulnerability periods (Kuhlman et al., 2017; Tallot et al., 2016; Thompson et al., 2008). Thus, ACEs are most likely to have a differential impact on stress system activity and sleep parameters, according to the specific developmental period of exposure (Sullivan, 2012).

#### 4.5. Cluster #0 'early trauma's consequences on physical and mental'

The major citing articles in cluster #0 were authored by Straub (2023) with a coverage of 8 articles and GCS of 0, Rojo-Wissar (Rojo-Wissar et al., 2021) with a coverage of 7 articles and GCS of 14, and Schønning (Schønning et al., 2022) (with a coverage of 6 articles and GCS of 8. Articles included in this cluster focus on identifying long-term consequences of childhood trauma experiences on physical, mental health through sleep. For example, 12,039 participants in the longitudinal study by Desch et al. (2023) were divided into six age sub-groups from 7 to 43 years old, with 908 abused and/or neglected children included in Javakhishvili's and Widom's (2021) study. The ACEs and sleep problems were assessed through structured interviews and several sleep-related questions. These articles examined the relationship between early trauma and reduced sleep across a wide age range (Desch et al., 2023; Guo et al., 2023; Javakhishvili & Widom, 2021; Schønning et al., 2022), while examining individuals from different geographic regions (Chapman et al., 2013; Guo et al., 2023; Hoag et al., 2015; Kovács-Tóth et al., 2021). The results obtained from the studies indicate possible differences in what impact early trauma may have on the sleep of individuals experienced at different developmental periods and different countries of origin. The automatically generated LLR cluster label was 'poor sleep quality', but this label was manually replaced with 'early trauma's consequences on physical and mental health' for great specificity and clarity.

As highlighted by Straub (2023) a large range of long-term health effects of early, persistent and severe trauma. Early ACEs have negative effects on adult life through a form of long-term programming that results in disease. It was reported that ACEs through stress increase the incidence of mental illness, chronic pain, sleep disorders, chronic inflammation and other diseases. The brain and immune system are intertwined through connectors which are involved in chronic immune activation, so one of the stressful childhood traumatic experiences effects in the brain and body periphery is the elevated inflammation. The connection between brain and immune system succeeded by direct connectors originating from the brain, indirect connectors functioning through hormonal and neuronal pathways, extracorporeal (environmental factors) and pleiotropic connectors (genetic factors). In the second major article by Rojo-Wissar et al. (2021) highlighted the robust association between cumulative ACEs in adolescence and sleep/health problems throughout life (Hughes et al., 2017; Kalmakis & Chandler, 2015). Previous studies have found that a higher ACE score is associated with poor sleep indices (Baiden et al., 2015; Brindle et al., 2018; Chapman et al., 2011; McWhorter et al., 2019; Rojo-Wissar et al., 2019; Sheehan et al., 2020). The third major citing document by Schønning et al. (2022) focuses on disturbed sleep of children and adolescents as a less studied effect of childhood maltreatment (McPhie et al., 2014). Childhood maltreatment is linked to negative health outcomes because of increased levels of anxiety, depression and post-traumatic stress (Danielson et al., 2005; Lansford et al., 2002). In addition, the most common sleep problem in childhood and adolescence is symptoms of insomnia (difficulties initiating sleep, frequent night awakenings) which may lead to daytime impairment (Calhoun et al., 2014).

In the major citing documents of this cluster, it is pointed out that it is likely that childhood adversities experienced during adolescence were

associated with poor health outcomes independently of adversities during adulthood (Simons et al., 2021). This may find adolescents under significant biological changes which may sensitize them to maladaptive or harmful coping behaviors (e.g., substance use) in response to stress (Myers et al., 2014). In fact, research evidence reveals that the timing of ACE is associated with differential effects on brain development (Andersen et al., 2008; Zhu et al., 2019). All the above-mentioned changes may render the effects of ACEs on sleep and health more severe and/or enduring (McMakin & Alfano, 2015).

#### 4.6. Cluster #4 'lifelong mechanisms of action of early trauma in sleep'

The major citing articles in cluster #4 were authored by Brown (Brown et al., 2022) with a coverage of 10 articles and GCD of 10, Vadukapuram (Vadukapuram et al., 2022) with a coverage of 7 articles and GCS of 5, and Yu (Yu et al., 2022) with a coverage of 3 articles and GCS of 10. The focus of the articles in this cluster appears to be related to the review of the early adverse experiences' impact on sleep from early childhood to adulthood. More specifically, the dominant articles in this cluster are reviews that examine the relationship between early adversity and adverse sleep outcomes or even the occurrence of sleep disorders, including cross-sectional as well as longitudinal studies. In fact, these reviews examine the effects of early trauma on various characteristics of sleep (e.g., sleep duration, sleep efficiency, sleep quality, etc.). Insomnia appears to be the most frequently occurring sleep disorder in adult (Brown et al., 2022) and adolescent (Schønning et al., 2022) populations with a history of early trauma. It is also pointed out that multiple traumatic experiences at a young age have a cumulative impact on sleep outcomes (Yu et al., 2022). Since the automatically generated LLR cluster label was 'systematic review', the cluster label was manually replaced with 'lifelong mechanisms of action of early trauma in sleep' for greater clarity and specificity.

In relation to definitions, the majority of articles in this cluster review the association of early adverse experiences with sleep parameters from childhood and adolescence to adulthood (Brown et al., 2022; Schønning et al., 2022; Vadukapuram et al., 2022; Yu et al., 2022). Brown and her colleagues point out that both behavioral sleep disturbances and early adverse experiences are likely to affect multiple domains of functioning. Especially, maltreatment can exacerbate psychological distress, alter neurobiological mechanisms implicated in healthy development and place individuals at risk for the development of sleep disturbances, either in childhood or in adulthood (Bunea et al., 2017; Leggett et al., 2016). Both sleep disturbances and early adversities share similar neurobiological mechanisms, including brain development and functioning of the hypothalamic-pituitary-adrenal (HPA) axis and immune system (Fuligni et al., 2021). In this way, early adversities, especially during critical developmental periods, may be a key pathway by which they influence long-term sleep. Some possible mechanisms through which ACEs may affect sleep in either the short or long term are inflammation and hypertension (Petrov et al., 2016) and emotional regulation difficulties (Tinajero et al., 2020). In the same vein, Vadukapuram and his colleagues, based on reviewed studies, support that early adverse experiences increase the odds of developing chronic short sleep duration, that is, <6 h of sleep per night compared with optimal sleep duration of 7–9 h per night during adulthood. In fact, reduced sleep duration can lead to a series of sleep problems over time (Vadukapuram et al., 2022). Schønning et al. point to the impact of multiple early adversities that appear to increase the risk of developing sleep problems (Schønning et al., 2022). The studies included in this cluster are in line with extensive literature documenting that forms of early adversity and traumatic experiences often co-occur (Brown et al., 2019), with some research showing dose-response impacts on outcomes (Anda et al., 2006).

#### 4.7. Cluster #37 'childhood trauma and health'

The major citing articles in cluster #37 were authored by [Lim, Wood, et al. \(2022\)](#) with a coverage of 3 articles and GCS of 1, and [Walsh \(Walsh et al., 2022\)](#) with a coverage of 1 article and GCS of 0. The focus of the articles in this cluster appears to be related to physical and sleep disorders, where the ACEs act as covariates that lead to the worsening of the already existing health problems. The automatically generated LLR cluster label was 'case-control study', but this label was manually replaced with 'childhood trauma and health' for greater clarity and specificity.

The study by Lim and colleagues sought to investigate the relationship of COVID-19 vaccinations as a stressor for those with a Functional Neurological Disorder (FND). FND can activate the body's stress response which in this study included symptoms such as arm and leg weakness, as well as seizures. The history of ACEs was found to be a covariate that may sensitize or dysregulate stress system(s). This is in keeping with other studies showing an increased incidence of ACEs in those with FND potentially triggered by vaccinations or other physical or emotional stressors (such as childhood trauma) ([Kozłowska et al., 2017](#); [Yang et al., 2023](#)) reflecting the young persons' biological system inability to activate restorative processes that could help the mind, body, and brain return to baseline function.

The second study by [Walsh et al. \(2022\)](#), aimed to determine the differences on NREM parasomnias among childhood, adolescence and adulthood. NREM parasomnia may first appear in adulthood ([Mason & Pack, 2007](#)), but when it appears in childhood can have serious social implications such as triggering sleepwalking and anti-social behaviour ([Bargiotas et al., 2017](#)). A history of trauma was also found to more frequently coincide with the onset of NREM behaviors in children and adolescents. It is suggested that adult-onset slow-wave sleep disorders may be confounded by psychiatric disorders resulting in nocturnal sleep disruption and that unresolved traumatic life experiences perpetuate NREM disorders arising in childhood comprise one of the strongest external risk factors for triggering and perpetuating these disorders in adolescence. Results show that NREM behaviors (sleepwalking and night terrors) were more common in children and adolescents with trauma history, indicating that trauma can be a precipitating or propagating factor in NREM parasomnias. The early psychological trauma (irrespective of duration) of an exceptionally threatening or/and catastrophic nature is likely to cause pervasive distress, with further consequences for physical and psychological health.

#### 4.8. Cluster #13 'childhood trauma and depression'

The major citing article in this cluster was authored by [Jin et al. \(2024\)](#) with a coverage of 10 articles and GCS of 0. This cluster's automatically generated LLR label is 'large sample size', which was manually replaced with 'childhood trauma and depression' for greater clarity and specificity. The citing article aims to identify influential factors related to depression in college students with childhood trauma history, through machine learning methods. [Jin et al. \(2024\)](#) conducted a survey of 96,218 college students from Jilin in Northeast China, in which they used the Childhood Trauma Questionnaire-Short Form (CTQ-SF) ([He et al., 2019](#)) to assess the history of early traumatic experiences among others. Previous studies indicate that a history of early traumatic experiences is of high prevalence in the student population worldwide ([Kaminer et al., 2023](#); [McGavock & Spratt, 2014](#); [Smyth et al., 2008](#)). Also, studies reported that ACEs increased the likelihood of the incidence of depression in adolescence ([Chang et al., 2021](#); [Ding et al., 2017](#)) and adulthood ([Negele et al., 2015](#)). Research studies reported that several socio-demographical factors contribute to depression, however, it is difficult to determine due to the small sample size or various other variables ([Greenland, 2008](#); [Lima et al., 2020](#)). For this purpose, they have used machine learning techniques (Extreme gradient boosting model; XGBoost), which utilized to compensate the overfitting

and long operation time disadvantages ([Gilbar, 2020](#); [Gu et al., 2020](#); [Liu et al., 2021](#); [Shi et al., 2021](#); [Vetter et al., 2022](#)) and characterized by satisfactory performances in classification and prediction ([AlSagri & Ykhlef, 2020](#); [Helbich et al., 2020](#)). Among other factors (total 34), it emerged that anxiety constitutes the most significant risk factor for depression, followed by sleep quality and Post-traumatic Stress Disorder (PTSD) among these young adults with experiences of childhood trauma. This finding seems to be consistent with other studies which have indicated that childhood trauma is associated with poor sleep quality in adulthood ([Brindle et al., 2018](#); [John-Henderson et al., 2018](#); [Jung & Oh, 2020](#)), with this association that can explain an increased risk for depression ([Alter et al., 2021](#)). Given the recency of the publication year of this cluster, this article reflects the beginning of machine learning use regarding the psychological consequences of early traumatic experiences, such as sleep problems ([John-Henderson et al., 2018](#); [Jung & Oh, 2020](#)) and depression ([Middeldorp et al., 2005](#); [Swendsen & Merikangas, 2000](#)).

#### 4.9. Overall evolution of the literature on childhood trauma and sleep

Overall, the research on the association between ACEs and sleep has evolved through several stages, reflecting the developments in methodology and an increased understanding of the phenomenon. Early studies, such as those in cluster #5, identified a significant link between ACEs and adult insomnia, emphasizing how chronic stress and hyperarousal from early trauma contribute to persistent sleep disturbances. As research progressed, cluster #1 expanded this understanding by examining long-term consequences, revealing that a history of ACEs correlates with various sleep disorders in adulthood, highlighting the role of stress reactivity and neurobiological mechanisms. Later, cluster #3 introduced a focus on neurobiological disorders, exploring how childhood trauma influences sleep through pathways linked to mental and physical health conditions, such as bipolar disorder and inflammatory diseases. This led to cluster #2's investigation into the developmental trajectories of trauma, identifying critical periods of vulnerability during neurodevelopment and their long-term impacts on sleep. Further developments came with cluster #0, which examined the broad spectrum of health consequences from ACEs, emphasizing how early trauma contributes to enduring health issues, including sleep disorders. Recent reviews in cluster #4 underscore the cumulative effects of early trauma on sleep across the lifespan, highlighting shared neurobiological mechanisms between trauma and sleep disorders. Finally, cluster #37 and cluster #13 represent contemporary research trends, with studies using machine learning to investigate the links between childhood trauma, sleep disorders, and mental health outcomes such as depression.

#### 4.10. Study limitations

The scientometric approach employed in this study provides insight into the literature on childhood traumatic experiences and sleep. However, there are some intrinsic limitations in this approach of deconstructing the literature. At first, the sample of documents used in the scientometric analysis may not be exhaustive as it is limited to articles that are indexed by Scopus and their cited references, meaning that some relevant documents might have been involuntarily excluded. Another important factor that might alter the outcomes of a scientometric analysis is the chosen search string for the literature search. So, it is possible that some relevant documents in the field were excluded because the title, abstract and keywords eluded the search string. However, the current analysis was highly comprehensive of the literature as it was conducted on a sample of 822 documents, as well as the 62,151 references that they cite. It is also possible that, despite controlling and optimising the searching string, some noise is included in the data. For instance, this might be the case when using "traumatic experiences" in the search string, which might capture traumatic experiences not limited to childhood. It is also worth noting that the current

scientometric review is based on a dataset that is slightly smaller than what was suggested by Haghani (2023), who recommends collecting at least about one thousand documents to conduct a scientometric review. However, despite these potential limitations, the analysis outlined robust thematic clusters of research that closely align with the literature of interest. In addition, the DCA scientometric approach is strongly based on the quantitative relationships between documents, without considering qualitative relationships. Frequent co-citation does not necessarily indicate the value of documents, on the contrary, certain publications may receive many citations because they are impactful or because they receive considerable criticism from related topic works. For this reason, the results of the current paper were followed by a qualitative discussion of the clusters to qualitatively identify research trends (Hicks et al., 2015; Lim et al., 2023). It should be noted that since the formation of the clusters was based on the analysis of the dataset and not defined a priori, the analysis was exploratory in nature.

## 5. Conclusion

The association of ACEs with sleep was reviewed using a scientometric approach. This analysis proved useful in bringing to light the main research themes and most cited publications regarding the relationship between early traumatic experiences and sleep problems. Current research trends place special emphasis on the longitudinal consequences of early adversity on sleep, considering characteristics of these experiences (type, severity, accumulation) as well as health status (e.g., presence of depression, post-traumatic stress disorder, etc.) of these individuals. Moreover, the relevant literature has largely focused on the investigation of insomnia as well as the presence of depressive symptoms as a result of early traumatic experiences. Until now, the role of neurobiological markers (e.g., hormone levels, heart rate, brain activity, etc.), resulting from early stress, in the occurrence of sleep disturbances/ disorders is worthy of further exploration. Identifying how early stress influences these markers can reveal the mechanisms through which it contributes to sleep disorders. For instance, elevated cortisol levels, altered heart rate variability, and disrupted brain activity patterns may offer valuable insights into how early adversity leads to chronic sleep problems. This knowledge would support the development of targeted interventions that address the specific neurobiological changes associated with and that maintain sleep disturbances. Moreover, the objective assessment of sleep disorders in relation to ACEs, albeit well described in the literature, will form a key methodological feature in the design of new studies. The combination of objective sleep assessment with the information regarding neurobiological markers of early adversities will enhance our understanding of the relationship between childhood trauma and sleep. In this way, it will be possible to identify clear developmental trajectories that link individual ACEs characteristics to objective sleep outcomes through the effect of neurobiological markers. Furthermore understanding the connections between early life adversity and sleep health at different developmental periods, one of the major research efforts that emerged from the results of the current manuscript, may inform counseling and interventions in the hope of preventing various health problems that can ensue in both children and adults as a result of adverse sleep profiles.

## CRedit authorship contribution statement

**Vassileios Karatzoglou:** Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Evangelia Karagiannopoulou:** Writing – review & editing, Writing – original draft, Supervision. **Alessandro Carollo:** Supervision, Software, Methodology, Formal analysis, Data curation. **Gianluca Esposito:** Writing – review & editing, Writing – original draft, Validation, Supervision. **Stephen Mangar:** Writing – review & editing, Writing – original draft. **Xóté Tadhg Ó. Séaghdha:** Writing – review & editing, Writing – original draft, Supervision, Conceptualization. **Dagmara Dimitriou:**

Writing – review & editing, Writing – original draft, Supervision, Project administration, Conceptualization.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

## Data availability

No data was used for the research described in the article.

## References

- Aas, M., Henry, C., Andreassen, O. A., Bellivier, F., Melle, I., & Etain, B. (2016). The role of childhood trauma in bipolar disorders. *International Journal of Bipolar Disorders*, 4(1), 1–10.
- Adams, R. E., Santo, J. B., & Bukowski, W. M. (2021). Indirect effects of HPA axis dysregulation in the association between peer victimization and depressed affect during early adolescence. *Psychoneuroendocrinology*, 132, Article 105356.
- Agargun, M. Y., Kara, H., Ozer, O., Kiran, U., Selvi, Y., & Kiran, S. (2002). Sleep-related violence, dissociative experiences, and childhood traumatic events. *Sleep and Hypnosis*, 4, 52–57.
- Agargun, M. Y., Kara, H., Özer, Ö. A., Selvi, Y., Kiran, Ü., & Kiran, S. (2003). Nightmares and dissociative experiences: The key role of childhood traumatic events. *Psychiatry and Clinical Neurosciences*, 57(2), 139–145.
- Agorastos, A., Pervanidou, P., Chrousos, G. P., & Baker, D. G. (2019). Developmental trajectories of early life stress and trauma: A narrative review on neurobiological aspects beyond stress system dysregulation. *Frontiers in Psychiatry*, 10, 118.
- Alonso, S., Cabrerizo, F. J., Herrera-Viedma, E., & Herrera, F. (2009). h-Index: A review focused in its variants, computation and standardization for different scientific fields. *Journal of Informetrics*, 3(4), 273–289.
- ALSagri, H. S., & Ykhlef, M. (2020). Machine learning-based approach for depression detection in twitter using content and activity features. *IEICE Transactions on Information and Systems*, 103(8), 1825–1832.
- Alter, S., Wilson, C., Sun, S., Harris, R. E., Wang, Z., Vitale, A., ... Yehuda, R. (2021). The association of childhood trauma with sleep disturbances and risk of suicide in US veterans. *Journal of Psychiatric Research*, 136, 54–62.
- Alvarez, M.-J., Roura, P., Osés, A., Foguet, Q., Solà, J., & Arrufat, F.-X. (2011). Prevalence and clinical impact of childhood trauma in patients with severe mental disorders. *The Journal of Nervous and Mental Disease*, 199(3), 156–161.
- Anda, R. F., Croft, J. B., Felitti, V. J., Nordenberg, D., Giles, W. H., Williamson, D. F., & Giovino, G. A. (1999). Adverse childhood experiences and smoking during adolescence and adulthood. *JAMA*, 282(17), 1652–1658.
- Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., ... Giles, W. H. (2006). The enduring effects of abuse and related adverse experiences in childhood: A convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neuroscience*, 256, 174–186.
- Andersen, S. L., Tomada, A., Vincow, E. S., Valente, E., Polcari, A., & Teicher, M. H. (2008). Preliminary evidence for sensitive periods in the effect of childhood sexual abuse on regional brain development. *The Journal of Neuropsychiatry and Clinical Neurosciences*, 20(3), 292–301.
- Arborelius, L., Owens, M. J., Plotsky, P. M., & Nemeroff, C. B. (1999). The role of corticotropin-releasing factor in depression and anxiety disorders. *The Journal of endocrinology*, 160(1), 1–12.
- Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, 11(4), 959–975.
- Aryadoust, V., & Ang, B. H. (2021). Exploring the frontiers of eye tracking research in language studies: A novel co-citation scientometric review. *Computer Assisted Language Learning*, 34(7), 898–933.
- Aryadoust, V., Tan, H. A. H., & Ng, L. Y. (2019). A Scientometric review of Rasch measurement: The rise and progress of a specialty. *Frontiers in Psychology*, 10, 2197.
- Ashour, R., Halstead, E. J., Mangar, S., Lin, V. K. Q., Azhari, A., Carollo, A., ... Dimitriou, D. (2024). Childhood experiences and sleep problems: A cross-sectional study on the indirect relationship mediated by stress, resilience and anxiety. *Plos One*, 19(3), Article e0299057.
- Aubert, E., Jaussent, I., Olié, E., Ducasse, D., Azorin, J., Bellivier, F., ... Gard, S. (2016). Effect of early trauma on the sleep quality of euthymic bipolar patients. *Journal of Affective Disorders*, 206, 261–267.
- Azhari, A., Toms, Z., Pavlopoulou, G., Esposito, G., & Dimitriou, D. (2022). Social media use in female adolescents: Associations with anxiety, loneliness, and sleep disturbances. *Acta Psychologica*, 229, Article 103706.
- Babson, K. A., & Feldner, M. T. (2010). Temporal relations between sleep problems and both traumatic event exposure and PTSD: A critical review of the empirical literature. *Journal of Anxiety Disorders*, 24(1), 1–15.
- Bader, K., Schaefer, V., Schenkel, M., Nissen, L., & Schwander, J. (2007). Adverse childhood experiences associated with sleep in primary insomnia. *Journal of Sleep Research*, 16(3), 285–296.
- Bader, K., Schäfer, V., Schenkel, M., Nissen, L., Kuhl, H.-C., & Schwander, J. (2007). Increased nocturnal activity associated with adverse childhood experiences in

- patients with primary insomnia. *The Journal of Nervous and Mental Disease*, 195(7), 588–595.
- Baiden, P., Fallon, B., den Dunnen, W., & Boateng, G. O. (2015). The enduring effects of early-childhood adversities and troubled sleep among Canadian adults: A population-based study. *Sleep Medicine*, 16(6), 760–767.
- Bargiotas, P., Arnet, I., Frei, M., Baumann, C. R., Schindler, K., & Bassetti, C. L. (2017). Demographic, clinical and polysomnographic characteristics of childhood-and adult-onset sleepwalking in adults. *European Neurology*, 78(5–6), 307–311.
- Bastien, C. H., Vallières, A., & Morin, C. M. (2004). Precipitating factors of insomnia. *Behavioral Sleep Medicine*, 2(1), 50–62.
- Bernstein, D. (1998). Childhood trauma questionnaire. In *Manual/The Psychological Corporation A retrospective self-report*. Harcourt Brace & Company.
- Berntsen, D., Johannessen, K. B., Thomsen, Y. D., Bertelsen, M., Hoyle, R. H., & Rubin, D. C. (2012). Peace and war: Trajectories of posttraumatic stress disorder symptoms before, during, and after military deployment in Afghanistan. *Psychological Science*, 23(12), 1557–1565.
- Bertini, M., Conti, C., & Fulcheri, M. (2013). Psychoneuroimmunology and health psychology: Inflammation and protective factors. *Journal of Biological Regulators and Homeostatic Agents*, 27(3), 637–645.
- Belicki, K. Nightmare Distress Questionnaire. *Dreaming*.**
- Bin Eid, W., Lim, M., Gabrieli, G., Kölbl, M., Halstead, E., Esposito, G., & Dimitriou, D. (2022). Habilitation of sleep problems among mothers and their children with autism spectrum disorder: Insights from multi-level exploratory dyadic analyses. *Frontiers in Rehabilitation Sciences*, 3, Article 915060.
- Bonaz, B. L., & Bernstein, C. N. (2013). Brain-gut interactions in inflammatory bowel disease. *Gastroenterology*, 144(1), 36–49.
- Brindle, R. C., Cribbet, M. R., Samuelsson, L. B., Gao, C., Frank, E., Krafty, R. T., ... Hall, M. H. (2018). The relationship between childhood trauma and poor sleep health in adulthood. *Psychosomatic Medicine*, 80(2), 200.
- Brown, S. M., Rienks, S., McCrae, J. S., & Watamura, S. E. (2019). The co-occurrence of adverse childhood experiences among children investigated for child maltreatment: A latent class analysis. *Child Abuse & Neglect*, 87, 18–27.
- Brown, S. M., Rodriguez, K. E., Smith, A. D., Ricker, A., & Williamson, A. A. (2022). Associations between childhood maltreatment and behavioral sleep disturbances across the lifespan: A systematic review. *Sleep Medicine Reviews*, 64, Article 101621.
- Bunea, I. M., Szentágotai-Tátrai, A., & Miu, A. C. (2017). Early-life adversity and cortisol response to social stress: A meta-analysis. *Translational Psychiatry*, 7(12), 1274.
- Buyssse, D. J., Reynolds, Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Research*, 28(2), 193–213.
- Calhoun, S. L., Fernandez-Mendoza, J., Vgontzas, A. N., Liao, D., & Bixler, E. O. (2014). Prevalence of insomnia symptoms in a general population sample of young children and preadolescents: Gender effects. *Sleep Medicine*, 15(1), 91–95.
- Carollo, A., Balagtas, J. P. M., Neoh, M. J.-Y., & Esposito, G. (2021). A scientometric approach to review the role of the medial preoptic area (MPOA) in parental behavior. *Brain Sciences*, 11(3), 393.
- Carollo, A., Corazza, O., Rabin, O., Coppola, A., & Esposito, G. (2023). Understanding the evolving nature of novel psychoactive substances: Mapping 10 years of research. *Emerging Trends in Drugs, Addictions, and Health*, 100055.
- Carskadon, M. A. (2011). Sleep in adolescents: The perfect storm. *Pediatric Clinics*, 58(3), 637–647.
- Chambers, E., & Belicki, K. (1998). Using sleep dysfunction to explore the nature of resilience in adult survivors of childhood abuse or trauma. *Child Abuse & Neglect*, 22(8), 753–758.
- Chang, J.-J., Ji, Y., Li, Y.-H., Yuan, M.-Y., & Su, P.-Y. (2021). Childhood trauma and depression in college students: Mediating and moderating effects of psychological resilience. *Asian Journal of Psychiatry*, 65, Article 102824.
- Chapman, D., McKnight-Eily, L., Perry, G., & Anda, R. (2008). Short communication: The relationship between depression and sleep apnea and insomnia: A brief review. *Life style and health research progress*, 9–15.
- Chapman, D. P., Liu, Y., Presley-Cantrell, L. R., Edwards, V. J., Wheaton, A. G., Perry, G. S., & Croft, J. B. (2013). Adverse childhood experiences and frequent insufficient sleep in 5 US States, 2009: A retrospective cohort study. *BMC Public Health*, 13(1), 1–9.
- Chapman, D. P., Wheaton, A. G., Anda, R. F., Croft, J. B., Edwards, V. J., Liu, Y., ... Perry, G. S. (2011). Adverse childhood experiences and sleep disturbances in adults. *Sleep Medicine*, 12(8), 773–779.
- Chen, C. (2006). CiteSpace II: Detecting and visualizing emerging trends and transient patterns in scientific literature. *Journal of the American Society for Information Science and Technology*, 57(3), 359–377.
- Chen, C. (2016). *CiteSpace: A practical guide for mapping scientific literature*. NY, USA: Nova Science Publishers Hauppauge.
- Chen, C. (2017). Science mapping: A systematic review of the literature. *Journal of Data and Information Science*, 2(2), 1–40.
- Chen, C., Chen, Y., Horowitz, M., Hou, H., Liu, Z., & Pellegrino, D. (2009). Towards an explanatory and computational theory of scientific discovery. *Journal of Informetrics*, 3(3), 191–209.
- Chen, C., Dubin, R., & Kim, M. C. (2014). Emerging trends and new developments in regenerative medicine: A scientometric update (2000–2014). *Expert Opinion on Biological Therapy*, 14(9), 1295–1317.
- Chen, C., Ibekwe-SanJuan, F., & Hou, J. (2010). The structure and dynamics of cocitation clusters: A multiple-perspective cocitation analysis. *Journal of the American Society for Information Science and Technology*, 61(7), 1386–1409.
- Chiang, J. J., Bower, J. E., Irwin, M. R., Taylor, S. E., & Fuligni, A. J. (2017). Adiposity moderates links from early adversity and depressive symptoms to inflammatory reactivity to acute stress during late adolescence. *Brain, Behavior, and Immunity*, 66, 146–155.
- Chiang, J. J., Taylor, S. E., & Bower, J. E. (2015). Early adversity, neural development, and inflammation. *Developmental Psychobiology*, 57(8), 887–907.
- Cohen, S., Conduit, R., Lockley, S. W., Rajaratnam, S. M., & Cornish, K. M. (2014). The relationship between sleep and behavior in autism spectrum disorder (ASD): A review. *Journal of Neurodevelopmental Disorders*, 6(1), 1–10.
- Cortese, S., Sabé, M., Chen, C., Perroud, N., & Solmi, M. (2022). Half a century of research on attention-deficit/hyperactivity disorder: A scientometric study. *Neuroscience & Biobehavioral Reviews*, 104769.
- Csóka, S., Simor, P., Szabó, G., Kopp, M. S., & Bódizs, R. (2011). Early maternal separation, nightmares, and bad dreams: Results from the Hungarian study. *Epidemiological Panel. Attachment & Human Development*, 13(2), 125–140.
- Dahl, R. E., & Harvey, A. G. (2007). Sleep in children and adolescents with behavioral and emotional disorders. *Sleep Medicine Clinics*, 2(3), 501–511.
- Danese, A., & McEwen, B. S. (2012). Adverse childhood experiences, allostasis, allostatic load, and age-related disease. *Physiology & Behavior*, 106(1), 29–39.
- Danielson, C. K., de Arellano, M. A., Kilpatrick, D. G., Saunders, B. E., & Resnick, H. S. (2005). Child maltreatment in depressed adolescents: Differences in symptomatology based on history of abuse. *Child Maltreatment*, 10(1), 37–48.
- Desch, J., Bakour, C., Mansuri, F., Tran, D., & Schwartz, S. (2023). The association between adverse childhood experiences and insomnia symptoms from adolescence to adulthood: Evidence from the Add Health study. *Sleep Health*, 9(5), 646–653.
- Dimitriou, D., Le Cornu Knight, F., & Milton, P. (2015). The role of environmental factors on sleep patterns and school performance in adolescents. *Frontiers in Psychology*, 6, 1717.
- Ding, H., Han, J., Zhang, M., Wang, K., Gong, J., & Yang, S. (2017). Moderating and mediating effects of resilience between childhood trauma and depressive symptoms in Chinese children. *Journal of Affective Disorders*, 211, 130–135.
- Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, 133, 285–296.
- Doolin, K., Andrews, S., Carballo, A., McCarthy, H., O'Hanlon, E., Tozzi, L., & Frodl, T. (2019). Longitudinal diffusion weighted imaging of limbic regions in patients with major depressive disorder after 6 years and partial to full remission. *Psychiatry Research: Neuroimaging*, 287, 75–86.
- Douglass, A. B., Bomstein, R., Nino-Murcia, G., Keenan, S., Miles, L., Zarccone, ... Dement, W. C. (1994). The sleep disorders questionnaire I: creation and multivariate structure of SDQ. *Sleep*, 17(2), 160–167.
- Dube, S. R., Felitti, V. J., Dong, M., Chapman, D. P., Giles, W. H., & Anda, R. F. (2003). Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use: The adverse childhood experiences study. *Pediatrics*, 111(3), 564–572.
- Duke, N. N., & Borowsky, I. W. (2018a). Adverse childhood experiences: Evidence for screening beyond preventive visits. *Child Abuse & Neglect*, 81, 380–388.
- Duke, N. N., & Borowsky, I. W. (2018b). Health status of adolescents reporting experiences of adversity. *Global Pediatric Health*, 5, Article 2333794X18769555.
- Egghe, L. (2006). Theory and practise of the g-index. *Scientometrics*, 69(1), 131–152.
- Elton, A., Tripathi, S. P., Mletzko, T., Young, J., Cisler, J. M., James, G. A., & Kilts, C. D. (2014). Childhood maltreatment is associated with a sex-dependent functional reorganization of a brain inhibitory control network. *Human Brain Mapping*, 35(4), 1654–1667.
- Etain, B., Aas, M., Andreassen, O. A., Lorentzen, S., Dieset, I., Gard, S., ... Melle, I. (2013). Childhood trauma is associated with severe clinical characteristics of bipolar disorders. *The Journal of Clinical Psychiatry*, 74(10), 2585.
- Etain, B., Mathieu, F., Henry, C., Raust, A., Roy, I., Germain, A., ... Bellivier, F. (2010). Preferential association between childhood emotional abuse and bipolar disorder. *Journal of Traumatic Stress*, 23(3), 376–383.
- Falagas, M. E., Pitsouni, E. I., Malietzis, G. A., & Pappas, G. (2008). Comparison of PubMed, Scopus, web of science, and Google scholar: Strengths and weaknesses. *The FASEB Journal*, 22(2), 338–342.
- Felger, J. C., & Lotrich, F. E. (2013). Inflammatory cytokines in depression: Neurobiological mechanisms and therapeutic implications. *Neuroscience*, 246, 199–229.
- Felitti, V. J., Anda, R. F., Nordenberg, D., Williamson, D. F., Spitz, A. M., Edwards, V., & Marks, J. S. (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, 14(4), 245–258.
- Fisher, H., Morgan, C., Dazzan, P., Craig, T. K., Morgan, K., Hutchinson, G., ... McGuffin, P. (2009). Gender differences in the association between childhood abuse and psychosis. *The British Journal of Psychiatry*, 194(4), 319–325.
- Fuligni, A. J., Chiang, J. J., & Tottenham, N. (2021). Sleep disturbance and the long-term impact of early adversity. *Neuroscience & Biobehavioral Reviews*, 126, 304–313.
- Galliechio, L., & Kalesan, B. (2009). Sleep duration and mortality: A systematic review and meta-analysis. *Journal of Sleep Research*, 18(2), 148–158.
- Garno, J. L., Gunawardane, N., & Goldberg, J. F. (2008). Predictors of trait aggression in bipolar disorder. *Bipolar Disorders*, 10(2), 285–292.
- Gelaye, B., Kajeepeta, S., Zhong, Q.-Y., Borba, C. P., Rondon, M. B., Sánchez, S. E., ... Williams, M. A. (2015). Childhood abuse is associated with stress-related sleep disturbance and poor sleep quality in pregnancy. *Sleep Medicine*, 16(10), 1274–1280.
- Geoffroy, P., Scott, J., Boudebessé, C., Lajnef, M., Henry, C., Leboyer, M., ... Etain, B. (2015). Sleep in patients with remitted bipolar disorders: A meta-analysis of actigraphy studies. *Acta Psychiatrica Scandinavica*, 131(2), 89–99.
- Geoffroy, P. A., Boudebessé, C., Bellivier, F., Lajnef, M., Henry, C., Leboyer, M., ... Etain, B. (2014). Sleep in remitted bipolar disorder: A naturalistic case-control study using actigraphy. *Journal of Affective Disorders*, 158, 1–7.

- Gilbar, O. (2020). Examining the boundaries between ICD-11 PTSD/CPTSD and depression and anxiety symptoms: A network analysis perspective. *Journal of Affective Disorders*, 262, 429–439.
- Goodwin, R. D., & Stein, M. B. (2004). Association between childhood trauma and physical disorders among adults in the United States. *Psychological Medicine*, 34(3), 509–520.
- Greenfield, E. A., Lee, C., Friedman, E. L., & Springer, K. W. (2011). Childhood abuse as a risk factor for sleep problems in adulthood: Evidence from a US national study. *Annals of Behavioral Medicine*, 42(2), 245–256.
- Greenland, S. (2008). Invited commentary: Variable selection versus shrinkage in the control of multiple confounders. *American Journal of Epidemiology*, 167(5), 523–529.
- Gu, S.-C., Zhou, J., Yuan, C.-X., & Ye, Q. (2020). Personalized prediction of depression in patients with newly diagnosed Parkinson's disease: A prospective cohort study. *Journal of Affective Disorders*, 268, 118–126.
- Guo, L., Deng, J., He, Y., Deng, X., Huang, J., Huang, G., ... Lu, C. (2014). Prevalence and correlates of sleep disturbance and depressive symptoms among Chinese adolescents: A cross-sectional survey study. *BMJ Open*, 4(7), Article e005517.
- Guo, X., Lin, L., Qin, K., Li, J., Chen, W., & Guo, V. Y. (2023). Adverse childhood experiences and depressive symptoms among middle-aged or older adults in China and the mediating role of short sleep duration. *Journal of Affective Disorders*, 340, 711–718.
- Haatainen, K. M., Tanskanen, A., Kylmä, J., Honkalampi, K., Koivumaa-Honkanen, H., Hintikka, J., ... Viinamäki, H. (2003). Gender differences in the association of adult hopelessness with adverse childhood experiences. *Social Psychiatry and Psychiatric Epidemiology*, 38, 12–17.
- Haghani, M. (2023). What makes an informative and publication-worthy scientometric analysis of literature: A guide for authors, reviewers and editors. *Transportation Research Interdisciplinary Perspectives*, 22, Article 100956.
- Hall, M. H., Brindle, R. C., & Buysse, D. J. (2018). Sleep and cardiovascular disease: Emerging opportunities for psychology. *American Psychologist*, 73(8), 994.
- Halstead, E., Sullivan, E., Zambelli, Z., Ellis, J. G., & Dimitriou, D. (2021). The treatment of sleep problems in autistic adults in the United Kingdom. *Autism*, 25(8), 2412–2417.
- Harvey, A. G. (2008). Sleep and circadian rhythms in bipolar disorder: Seeking synchrony, harmony, and regulation. *American Journal of Psychiatry*, 165(7), 820–829.
- Harvey, A. G., Murray, G., Chandler, R. A., & Soehner, A. (2011). Sleep disturbance as transdiagnostic: Consideration of neurobiological mechanisms. *Clinical Psychology Review*, 31(2), 225–235.
- Harvey, A. G., Soehner, A. M., Kaplan, K. A., Hein, K., Lee, J., Kanady, J., ... Neylan, T. C. (2015). Treating insomnia improves mood state, sleep, and functioning in bipolar disorder: A pilot randomized controlled trial. *Journal of Consulting and Clinical Psychology*, 83(3), 564.
- He, J., Zhong, X., Gao, Y., Xiong, G., & Yao, S. (2019). Psychometric properties of the Chinese version of the childhood trauma questionnaire-short form (CTQ-SF) among undergraduates and depressive patients. *Child Abuse & Neglect*, 91, 102–108.
- Heath, V., Bean, R., & Feinauer, L. (1996). Severity of childhood sexual abuse: Symptom differences between men and women. *American Journal of Family Therapy*, 24(4), 305–314.
- Heim, C., Bradley, B., Mletzko, T., Deveau, T., Musselman, D., Nemeroff, C., ... Binder, E. (2009). Effect of childhood trauma on adult depression and neuroendocrine function: Sex-specific moderation by CRH receptor 1 gene. *Frontiers in Behavioral Neuroscience*, 3, 41.
- Heim, C., Newport, D. J., Heit, S., Graham, Y. P., Wilcox, M., Bonsall, R., ... Nemeroff, C. B. (2000). Pituitary-adrenal and autonomic responses to stress in women after sexual and physical abuse in childhood. *JAMA*, 284(5), 592–597.
- Helbich, M., Hagenauer, J., & Roberts, H. (2020). Relative importance of perceived physical and social neighborhood characteristics for depression: A machine learning approach. *Social Psychiatry and Psychiatric Epidemiology*, 55, 599–610.
- Hicks, D., Wouters, P., Waltman, L., De Rijke, S., & Rafols, I. (2015). Bibliometrics: The Leiden Manifesto for research metrics. *Nature*, 520(7548), 429–431.
- Hoag, J. R., Wu, H., & Grady, J. J. (2015). Impact of childhood abuse on adult sleep quality among low-income women after Hurricane Ike. *Sleep Health*, 1(4), 293–299.
- Hovens, J. G., Giltay, E. J., Wiersma, J. E., Spinhoven, P., Penninx, B. W., & Zitman, F. G. (2012). Impact of childhood life events and trauma on the course of depressive and anxiety disorders. *Acta Psychiatrica Scandinavica*, 126(3), 198–207.
- Hovens, J. G., Wiersma, J. E., Giltay, E. J., Van Oppen, P., Spinhoven, P., Penninx, B. W., & Zitman, F. G. (2010). Childhood life events and childhood trauma in adult patients with depressive, anxiety and comorbid disorders vs. controls. *Acta Psychiatrica Scandinavica*, 122(1), 66–74.
- Hughes, K., Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., ... Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. *The Lancet Public Health*, 2(8), e356–e366.
- Javakishvili, M., & Widom, C. S. (2021). Childhood maltreatment, sleep disturbances, and anxiety and depression: A prospective longitudinal investigation. *Journal of Applied Developmental Psychology*, 77, Article 101351.
- Jin, Y., Xu, S., Shao, Z., Luo, X., Wang, Y., Yu, Y., & Wang, Y. (2024). Discovery of depression-associated factors among childhood trauma victims from a large sample size: Using machine learning and network analysis. *Journal of Affective Disorders*, 345, 300–310.
- John-Henderson, N. A., Williams, S. E., Brindle, R. C., & Ginty, A. T. (2018). Changes in sleep quality and levels of psychological distress during the adaptation to university: The role of childhood adversity. *British Journal of Psychology*, 109(4), 694–707.
- Jung, G., & Oh, J. (2020). The relationship between childhood trauma, eating disorders, and sleep quality among registered hospital nurses in South Korea. *Healthcare*.
- Kajepeta, S., Gelaye, B., Jackson, C. L., & Williams, M. A. (2015). Adverse childhood experiences are associated with adult sleep disorders: A systematic review. *Sleep Medicine*, 16(3), 320–330.
- Kalmakis, K. A., & Chandler, G. E. (2015). Health consequences of adverse childhood experiences: A systematic review. *Journal of the American Association of Nurse Practitioners*, 27(8), 457–465.
- Kaminer, D., Bravo, A. J., Mezquita, L., & Pilatti, A. (2023). Adverse childhood experiences and adulthood mental health: A cross-cultural examination among university students in seven countries. *Current Psychology*, 42(21), 18370–18381.
- Kato, H., Asukai, N., Miyake, Y., Minakawa, K., & Nishiyama, A. (1996). Post-traumatic symptoms among younger and elderly evacuees in the early stages following the 1995 Hanshin-Awaji earthquake in Japan. *Acta Psychiatrica Scandinavica*, 93(6), 477–481.
- King, L. S., Graber, M. G., Colich, N. L., & Gotlib, I. H. (2020). Associations of waking cortisol with DHEA and testosterone across the pubertal transition: Effects of threat-related early life stress. *Psychoneuroendocrinology*, 115, Article 104651.
- Kleinberg, J., & Tardos, É. (2003). *Introduction to algorithms* (p. 482). COMS: Cornell University Course Notes.
- Koenen, K. C., Moffitt, T. E., Poulton, R., Martin, J., & Caspi, A. (2007). Early childhood factors associated with the development of post-traumatic stress disorder: Results from a longitudinal birth cohort. *Psychological Medicine*, 37(2), 181–192.
- Koskenvuo, K., Hublin, C., Partinen, M., Paunio, T., & Koskenvuo, M. (2010). Childhood adversities and quality of sleep in adulthood: A population-based study of 26,000 Finns. *Sleep Medicine*, 11(1), 17–22.
- Kovács-Tóth, B., Oláh, B., Papp, G., & Szabó, I. K. (2021). Assessing adverse childhood experiences, social, emotional, and behavioral symptoms, and subjective health complaints among Hungarian adolescents. *Child and Adolescent Psychiatry and Mental Health*, 15(1), 1–12.
- Kozłowska, K., Griffiths, K. R., Foster, S. L., Linton, J., Williams, L. M., & Korgaonkar, M. S. (2017). Grey matter abnormalities in children and adolescents with functional neurological symptom disorder. *NeuroImage: Clinical*, 15, 306–314.
- Kuhlman, K. R., Chiang, J. J., Horn, S., & Bower, J. E. (2017). Developmental psychoneuroendocrine and psychoneuroimmune pathways from childhood adversity to disease. *Neuroscience & Biobehavioral Reviews*, 80, 166–184.
- Kumari, M., Head, J., Bartley, M., Stansfeld, S., & Kivimäki, M. (2013). Maternal separation in childhood and diurnal cortisol patterns in mid-life: Findings from the Whitehall II study. *Psychological Medicine*, 43(3), 633–643.
- Lansford, J. E., Dodge, K. A., Pettit, G. S., Bates, J. E., Crozier, J., & Kaplow, J. (2002). A 12-year prospective study of the long-term effects of early child physical maltreatment on psychological, behavioral, and academic problems in adolescence. *Archives of Pediatrics & Adolescent Medicine*, 156(8), 824–830.
- Leggett, A. N., Liu, Y., Klein, L. C., & Zarit, S. H. (2016). Sleep duration and the cortisol awakening response in dementia caregivers utilizing adult day services. *Health Psychology*, 35(5), 465.
- Lei, M.-K., Berg, M. T., Simons, R. L., & Beach, S. R. (2023). Specifying the psychosocial pathways whereby child and adolescent adversity shape adult health outcomes. *Psychological Medicine*, 53(13), 6027–6036.
- Lereya, S. T., Winsper, C., Tang, N. K., & Wolke, D. (2017). Sleep problems in childhood and borderline personality disorder symptoms in early adolescence. *Journal of Abnormal Child Psychology*, 45, 193–206.
- Lim, M., Carollo, A., Neoh, M. J. Y., & Esposito, G. (2022). Mapping miRNA research in schizophrenia: A scientometric review. *International Journal of Molecular Sciences*, 24(1), 436.
- Lim, M., Carollo, A., Neoh, M. J. Y., Sacchiero, M., Azhari, A., Balboni, G., ... Esposito, G. (2023). Developmental disabilities in Africa: A scientometric review. *Research in Developmental Disabilities*, 133, Article 104395.
- Lim, N., Wood, N., Prasad, A., Waters, K., Singh-Grewal, D., Dale, R. C., ... Kozłowska, K. (2022). COVID-19 vaccination in young people with functional neurological disorder: A case-control study. *Vaccines*, 10(12), 2031.
- Lima, E., Davies, P., Kaler, J., Lovatt, F., & Green, M. (2020). Variable selection for inferential models with relatively high-dimensional data: Between method heterogeneity and covariate stability as adjuncts to robust selection. *Scientific Reports*, 10(1), 8002.
- Liu, J., Teh, W. L., Tan, R. H. S., Tan, Y. B., Tang, C., Chandwani, N., & Subramaniam, M. (2023). Sleep disturbance as transdiagnostic mediator between adverse childhood experiences and psychopathology in children and adolescents: A structural equation modeling meta-analysis. *JCPP Advances*, 3(3), Article e12156.
- Liu, J., Wu, J., Liu, S., Li, M., Hu, K., & Li, K. (2021). Predicting mortality of patients with acute kidney injury in the ICU using XGBoost model. *PLoS One*, 16(2), Article e0246306.
- Liu, X., & Buysse, D. J. (2006). Sleep and youth suicidal behavior: A neglected field. *Current Opinion in Psychiatry*, 19(3), 288–293.
- Mander, B. A., Winer, J. R., & Walker, M. P. (2017). Sleep and human aging. *Neuron*, 94(1), 19–36.
- Mangar, S., Abbadasari, M., Carollo, A., Esposito, G., Ahmed, H., Shah, T., & Dimitriou, D. (2023). Understanding sleep disturbances in prostate cancer—A scientometric analysis of sleep assessment, aetiology, and its impact on quality of life. *Cancers*, 15(13), 3485.
- Mason, T. B., & Pack, A. I. (2007). Pediatric parasomnias. *Sleep*, 30(2), 141–151.
- Matthews, K. A., & Panteco, E. J. (2016). Sleep characteristics and cardiovascular risk in children and adolescents: An enumerative review. *Sleep Medicine*, 18, 36–49.
- McGavock, L., & Spratt, T. (2014). Prevalence of adverse childhood experiences in a university population: Associations with use of social services. *British Journal of Social Work*, 44(3), 657–674.
- McGowan, T. (2013). *Enjoying what we don't have: The political project of psychoanalysis*. U of Nebraska Press.

- McMakin, D. L., & Alfano, C. A. (2015). Sleep and anxiety in late childhood and early adolescence. *Current Opinion in Psychiatry*, 28(6), 483.
- McPhie, M. L., Weiss, J. A., & Wekerle, C. (2014). Psychological distress as a mediator of the relationship between childhood maltreatment and sleep quality in adolescence: Results from the Maltreatment and Adolescent Pathways (MAP) Longitudinal Study. *Child Abuse & Neglect*, 38(12), 2044–2052.
- McWhorter, K. L., Parks, C. G., D'Aloisio, A. A., Rojo-Wissar, D. M., Sandler, D. P., & Jackson, C. L. (2019). Traumatic childhood experiences and multiple dimensions of poor sleep among adult women. *Sleep*, 42(8), Article zsz108.
- Michels, N., Van de Wiele, T., Fouhy, F., O'Mahony, S., Clarke, G., & Keane, J. (2019). Gut microbiome patterns depending on children's psychosocial stress: Reports versus biomarkers. *Brain, Behavior, and Immunity*, 80, 751–762.
- Middeldorp, C., Cath, D., Van Dyck, R., & Boomsma, D. (2005). The co-morbidity of anxiety and depression in the perspective of genetic epidemiology. A review of twin and family studies. *Psychological Medicine*, 35(5), 611–624.
- Miller, G. E., & Cole, S. W. (2012). Clustering of depression and inflammation in adolescents previously exposed to childhood adversity. *Biological Psychiatry*, 72(1), 34–40.
- Morin, C. M., Stone, J., Trinkle, D., Mercer, J., & Remsberg, S. (1993). Dysfunctional beliefs and attitudes about sleep among older adults with and without insomnia complaints. *Psychology and Aging*, 8(3), 463.
- Myers, B., McLaughlin, K. A., Wang, S., Blanco, C., & Stein, D. J. (2014). Associations between childhood adversity, adult stressful life events, and past-year drug use disorders in the National Epidemiological Study of Alcohol and Related Conditions (NESARC). *Psychology of Addictive Behaviors*, 28(4), 1117.
- Nakagawa, S., Samarasinghe, G., Haddaway, N. R., Westgate, M. J., O'Dea, R. E., Noble, D. W., & Lagisz, M. (2019). Research weaving: Visualizing the future of research synthesis. *Trends in Ecology & Evolution*, 34(3), 224–238.
- Negele, A., Kaufhold, J., Kallenbach, L., & Leuzinger-Bohleber, M. (2015). Childhood trauma and its relation to chronic depression in adulthood. *Depression Research and Treatment*, 2015.
- Neoh, M. J. Y., Carollo, A., Lim, M., Corazza, O., Coppola, A., & Esposito, G. (2022). The novel psychoactive substances epidemic: A scientometric perspective. *Addiction. Neuroscience*, 100060.
- Neoh, M. J. Y., Carollo, A., Lim, M., Dimitriou, D., & Esposito, G. (2023). A scientometric review of obstructive sleep apnea and obesity. *Applied Sciences*, 13(2), 753.
- Ng, T. H., Chung, K.-F., Ho, F. Y.-Y., Yeung, W.-F., Yung, K.-P., & Lam, T.-H. (2015). Sleep-wake disturbance in interepisode bipolar disorder and high-risk individuals: A systematic review and meta-analysis. *Sleep Medicine Reviews*, 20, 46–58.
- Nielsen, T., Carr, M., Picard-Deland, C., Marquis, L.-P., Saint-Onge, K., Blanchette-Carrière, C., & Paquette, T. (2019). Early childhood adversity associations with nightmare severity and sleep spindles. *Sleep Medicine*, 56, 57–65.
- Nusslock, R., & Miller, G. E. (2016). Early-life adversity and physical and emotional health across the lifespan: A neuroimmune network hypothesis. *Biological Psychiatry*, 80(1), 23–32.
- Ohayon, M. M., & Shapiro, C. M. (2000). Posttraumatic stress disorder in the general population. *Comprehensive Psychiatry*, 41(6), 469–478.
- Otte, C., Neylan, T. C., Pole, N., Metzler, T., Best, S., Henn-Haase, C., ... Marmar, C. R. (2005). Association between childhood trauma and catecholamine response to psychological stress in police academy recruits. *Biological Psychiatry*, 57(1), 27–32.
- Palagini, L., Drake, C. L., Gehrman, P., Meerlo, P., & Riemann, D. (2015). Early-life origin of adult insomnia: Does prenatal-early-life stress play a role? *Sleep Medicine*, 16(4), 446–456.
- Park, K., Shim, G., & Jeong, B. (2020). Validation of the traumatic antecedents questionnaire using item response theory. *Brain and Behavior*, 10(12), Article e01870.
- Parmentier, C., Etain, B., Yon, L., Misson, H., Mathieu, F., Lajnef, M., Cochet, B., Raust, A., Kahn, J.-P., & Wajsbrot-Elgrabli, O. (2012). Clinical and dimensional characteristics of euthymic bipolar patients with or without suicidal behavior. *European Psychiatry*, 27(8), 570–576.
- Pearson, T. A., Mensah, G. A., Alexander, R. W., Anderson, J. L., Cannon, R. O., III, Criqui, M., ... Myers, G. L. (2003). Markers of inflammation and cardiovascular disease: Application to clinical and public health practice: A statement for healthcare professionals from the Centers for Disease Control and Prevention and the American Heart Association. *Circulation*, 107(3), 499–511.
- Pendry, P., & Adam, E. K. (2007). Associations between parents' marital functioning, maternal parenting quality, maternal emotion and child cortisol levels. *International Journal of Behavioral Development*, 31(3), 218–231.
- Perlis, M. L., Giles, D. E., Buysse, D. J., Tu, X., & Kupfer, D. J. (1997). Self-reported sleep disturbance as a prodromal symptom in recurrent depression. *Journal of Affective Disorders*, 42(2–3), 209–212.
- Perry, B. D., & Pollard, R. (1998). Homeostasis, stress, trauma, and adaptation: A neurodevelopmental view of childhood trauma. *Child and Adolescent Psychiatric Clinics*, 7(1), 33–51.
- Petrov, M. E., Davis, M. C., Belyea, M. J., & Zautra, A. J. (2016). Linking childhood abuse and hypertension: Sleep disturbance and inflammation as mediators. *Journal of Behavioral Medicine*, 39, 716–726.
- Pilcher, J. J., Ginter, D. R., & Sadowsky, B. (1997). Sleep quality versus sleep quantity: Relationships between sleep and measures of health, well-being and sleepiness in college students. *Journal of Psychosomatic Research*, 42(6), 583–596.
- Prather, A. A., Vogelzangs, N., & Penninx, B. W. (2015). Sleep duration, insomnia, and markers of systemic inflammation: Results from the Netherlands Study of Depression and Anxiety (NESDA). *Journal of Psychiatric Research*, 60, 95–102.
- Ramsawh, H. J., Ancoli-Israel, S., Sullivan, S. G., Hitchcock, C. A., & Stein, M. B. (2011). Neuroticism mediates the relationship between childhood adversity and adult sleep quality. *Behavioral Sleep Medicine*, 9(3), 130–143.
- Repetti, R. L., Robles, T. F., & Reynolds, B. (2011). Allostatic processes in the family. *Development and Psychopathology*, 23(3), 921–938.
- Rojo-Wissar, D. M., Davidson, R. D., Beck, C. J., Kobayashi, U. S., VanBlargan, A. C., & Haynes, P. L. (2019). Sleep quality and perceived health in college undergraduates with adverse childhood experiences. *Sleep Health*, 5(2), 187–192.
- Rojo-Wissar, D. M., Sosnowski, D. W., Ingram, M. M., Jackson, C. L., Maher, B. S., Alfano, C. A., ... Spira, A. P. (2021). Associations of adverse childhood experiences with adolescent total sleep time, social jetlag, and insomnia symptoms. *Sleep Medicine*, 88, 104–115.
- Rousseuw, P. J. (1987). Silhouettes: A graphical aid to the interpretation and validation of cluster analysis. *Journal of Computational and Applied Mathematics*, 20, 53–65.
- Sabe, M., Pillinger, T., Kaiser, S., Chen, C., Taipale, H., Tanskanen, A., ... Solmi, M. (2022). Half a century of research on antipsychotics and schizophrenia: A scientometric study of hotspots, nodes, bursts, and trends. *Neuroscience & Biobehavioral Reviews*, 136, Article 104608.
- Sadeh, A. (1996). Stress, trauma, and sleep in children. *Child and Adolescent Psychiatric Clinics of North America*, 5, 685–700.
- Samalin, L., Llorca, P. M., Giordana, B., Milhiet, V., Yon, L., El-Hage, W., ... Filipovics, A. (2014). Residual symptoms and functional performance in a large sample of euthymic bipolar patients in France (the OPTHYUM study). *Journal of Affective Disorders*, 159, 94–102.
- Schöningh, V., Sivertsen, B., Hysing, M., Dovran, A., & Askeland, K. G. (2022). Childhood maltreatment and sleep in children and adolescents: A systematic review and meta-analysis. *Sleep Medicine Reviews*, 63, Article 101617.
- Scott, K. M., Von Korff, M., Angermeyer, M. C., Benjet, C., Bruffaerts, R., De Girolamo, G., ... Posada-Villa, J. (2011). Association of childhood adversities and early-onset mental disorders with adult-onset chronic physical conditions. *Archives of General Psychiatry*, 68(8), 838–844.
- Semiz, U. B., Basoglu, C., Ebrinc, S., & Cetin, M. (2008). Nightmare disorder, dream anxiety, and subjective sleep quality in patients with borderline personality disorder. *Psychiatry and Clinical Neurosciences*, 62(1), 48–55.
- Sheehan, C. M., Li, L., & Friedman, E. M. (2020). Quantity, timing, and type of childhood adversity and sleep quality in adulthood. *Sleep Health*, 6(2), 246–252.
- Shi, Y., Zhang, L., Wang, Z., Lu, X., Wang, T., Zhou, D., & Zhang, Z. (2021). Multivariate machine learning analyses in identification of major depressive disorder using resting-state functional connectivity: A multicenter study. *ACS Chemical Neuroscience*, 12(15), 2878–2886.
- Shrotriya, S., Walsh, D., Nowacki, A. S., Lorton, C., Aktas, A., Hullihen, B., ... Estfan, B. (2018). Serum C-reactive protein is an important and powerful prognostic biomarker in most adult solid tumors. *PLoS One*, 13(8), Article e0202555.
- Simons, R. L., Lei, M.-K., Klopach, E., Berg, M., Zhang, Y., & Beach, S. S. (2021). (Re) Setting epigenetic clocks: An important avenue whereby social conditions become biologically embedded across the life course. *Journal of Health and Social Behavior*, 62(3), 436–453.
- Small, H. (1980). Co-citation context analysis and the structure of paradigms. *Journal of Documentation*, 36(3), 183–196.
- Smyth, J. M., Hockemeyer, J. R., Heron, K. E., Wonderlich, S. A., & Pennebaker, J. W. (2008). Prevalence, type, disclosure, and severity of adverse life events in college students. *Journal of American College Health*, 57(1), 69–76.
- Spertus, I. L., Yehuda, R., Wong, C. M., Halligan, S., & Seremetis, S. V. (2003). Childhood emotional abuse and neglect as predictors of psychological and physical symptoms in women presenting to a primary care practice. *Child Abuse & Neglect*, 27(11), 1247–1258.
- Spilsbury, J. C. (2009). Sleep as a mediator in the pathway from violence-induced traumatic stress to poorer health and functioning: A review of the literature and proposed conceptual model. *Behavioral Sleep Medicine*, 7(4), 223–244.
- Stoltenborgh, M., Bakermans-Kranenburg, M. J., Alink, L. R., & van IJzendoorn, M. H. (2015). The prevalence of child maltreatment across the globe: Review of a series of meta-analyses. *Child Abuse Review*, 24(1), 37–50.
- Straub, R. H. (2023). *Early trauma as the origin of chronic inflammation: A psychoneuroimmunological perspective*. Springer Nature.
- Strüber, N., Strüber, D., & Roth, G. (2014). Impact of early adversity on glucocorticoid regulation and later mental disorders. *Neuroscience & Biobehavioral Reviews*, 38, 17–37.
- Sullivan, R. M. (2012). The neurobiology of attachment to nurturing and abusive caregivers. *The Hastings Law Journal*, 63(6), 1553.
- Swendsen, J. D., & Merikangas, K. R. (2000). The comorbidity of depression and substance use disorders. *Clinical Psychology Review*, 20(2), 173–189.
- Tallot, L., Doyère, V., & Sullivan, R. M. (2016). Developmental emergence of fear/threat learning: Neurobiology, associations and timing. *Genes, Brain and Behavior*, 15(1), 144–154.
- Thompson, J. V., Sullivan, R. M., & Wilson, D. A. (2008). Developmental emergence of fear learning corresponds with changes in amygdala synaptic plasticity. *Brain Research*, 1200, 58–65.
- Tinajero, R., Williams, P. G., Cribbet, M. R., Rau, H. K., Silver, M. A., Bride, D. L., & Suchy, Y. (2020). Reported history of childhood trauma and stress-related vulnerability: Associations with emotion regulation, executive functioning, daily hassles and pre-sleep arousal. *Stress and Health*, 36(4), 405–418.
- Tottenham, N. (2012). Risk and developmental heterogeneity in previously institutionalized children. *Journal of Adolescent Health*, 51(2), S29–S33.
- Tottenham, N., & Sheridan, M. A. (2010). A review of adversity, the amygdala and the hippocampus: A consideration of developmental timing. *Frontiers in Human Neuroscience*, 3, 1019.
- Trujillo, C. M., & Long, T. M. (2018). Document co-citation analysis to enhance transdisciplinary research. *Science Advances*, 4(1), Article e1701130.

- Turner, A. I., Smyth, N., Hall, S. J., Torres, S. J., Hussein, M., Jayasinghe, S. U., ... Clow, A. J. (2020). Psychological stress reactivity and future health and disease outcomes: A systematic review of prospective evidence. *Psychoneuroendocrinology*, *114*, Article 104599.
- Vadukapuram, R., Shah, K., Ashraf, S., Srinivas, S., Elshokiry, A. B., Trivedi, C., ... Jain, S. (2022). Adverse childhood experiences and their impact on sleep in adults: A systematic review. *The Journal of Nervous and Mental Disease*, *210*(6), 397–410.
- Valkanova, V., & Ebmeier, K. P. (2013). Vascular risk factors and depression in later life: A systematic review and meta-analysis. *Biological Psychiatry*, *73*(5), 406–413.
- Vetter, J. S., Schultebrucks, K., Galatzer-Levy, I., Boeker, H., Brühl, A., Seifritz, E., & Kleim, B. (2022). Predicting non-response to multimodal day clinic treatment in severely impaired depressed patients: A machine learning approach. *Scientific Reports*, *12*(1), 5455.
- Vgontzas, A. N., Fernandez-Mendoza, J., Liao, D., & Bixler, E. O. (2013). Insomnia with objective short sleep duration: The most biologically severe phenotype of the disorder. *Sleep Medicine Reviews*, *17*(4), 241–254.
- Walsh, C., Mitchell, L., Hrozanova, M., Kotoulas, S.-C., Derry, C., Morrison, I., & Riha, R. L. (2022). NREM sleep parasomnias commencing in childhood: Trauma and atopy as perpetuating factors. *Clocks & Sleep*, *4*(4), 549–560.
- Wang, Y., Raffeld, M. R., Slopen, N., Hale, L., & Dunn, E. C. (2016). Childhood adversity and insomnia in adolescence. *Sleep Medicine*, *21*, 12–18.
- Wang, Z., Inslicht, S. S., Metzler, T. J., Henn-Haase, C., McCaslin, S. E., Tong, H., ... Marmar, C. R. (2010). A prospective study of predictors of depression symptoms in police. *Psychiatry Research*, *175*(3), 211–216.
- White, A. G., Buboltz, W., & Igou, F. (2011). Mobile phone use and sleep quality and length in college students. *International Journal of Humanities and Social Science*, *1* (18), 51–58.
- Williamson, D. F., Thompson, T. J., Anda, R. F., Dietz, W. H., & Felitti, V. (2002). Body weight and obesity in adults and self-reported abuse in childhood. *International Journal of Obesity*, *26*(8), 1075–1082.
- Windle, M., Haardörfer, R., Getachew, B., Shah, J., Payne, J., Pillai, D., & Berg, C. J. (2018). A multivariate analysis of adverse childhood experiences and health behaviors and outcomes among college students. *Journal of American College Health*, *66*(4), 246–251.
- Wu, J., Wu, H., Wang, J., Guo, L., Deng, X., & Lu, C. (2015). Associations between sleep duration and overweight/obesity: Results from 66,817 Chinese adolescents. *Scientific Reports*, *5*(1), Article 16686.
- Yang, T., Roberts, C., Winton-Brown, T., Lloyd, M., Kwan, P., O'Brien, T. J., ... Malpas, C. B. (2023). Childhood trauma in patients with epileptic vs nonepileptic seizures. *Epilepsia*, *64*(1), 184–195.
- Yirmiya, R., & Goshen, I. (2011). Immune modulation of learning, memory, neural plasticity and neurogenesis. *Brain, Behavior, and Immunity*, *25*(2), 181–213.
- Yu, H. J., Liu, X., Yang, H. G., Chen, R., & He, Q. Q. (2022). The association of adverse childhood experiences and its subtypes with adulthood sleep problems: A systematic review and meta-analysis of cohort studies. *Sleep Medicine*, *98*, 26–33.
- Zhu, J., Lowen, S. B., Anderson, C. M., Ohashi, K., Khan, A., & Teicher, M. H. (2019). Association of prepubertal and postpubertal exposure to childhood maltreatment with adult amygdala function. *JAMA Psychiatry*, *76*(8), 843–853.