Exploring the Role of Connectedness in Anorexia Nervosa: A Scoping Review

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Abstract

Background. Anorexia nervosa (AN), typically characterised by a disturbed body image and intense fear of gaining weight, is a multifaceted mental disorder. Considering this multifaceted nature and taking into account that AN can cause social and emotional loneliness, investigating the role of connectedness holds potential benefits. **Aim.** This review aims to provide an overview of the existing body of literature on the role of connectedness for people with AN to identify relevant research gaps, thereby guiding future research directions. **Method.** A scoping review was conducted following the PRISMA guidelines. The systematic search was carried out in three databases (Scopus, PsychInfo, Web of Science), using a relevant search string. Data relevant to the role of connectedness, measurement, diagnosis of AN, main findings, and form of connectedness were analysed using descriptive numeric analysis and thematic analysis. **Results.** The studies were published between 2003 and 2022. Sample sizes ranged from one to 332. Results showed that high levels of connectedness emerged as a protective factor while low levels of connectedness pose a risk for the development and maintenance of AN. Further, most research is conducted on the role of connectedness to others, compared to connectedness to the self and the world. Moreover, a universal measurement of connectedness seems to be missing. **Conclusion.** This review demonstrates that despite the critical role of connectedness for people with AN, there is not enough research in this field yet. Consequently, evidence for recommending connectedness as part of AN treatment is lacking. Therefore, future research is needed that examines all dimensions of connectedness and its effectiveness in treating AN.

Keywords: anorexia nervosa, connectedness, risk and protective factor, scoping review

Introduction

Eating disorders (ED) cause 10.200 deaths per year, which means one death per 52 minutes (National Association of Anorexia Nervosa and Associated Disorders (ANAD), 2024). It is estimated that among all eating disorders especially anorexia nervosa (AN) is considered to have the highest mortality rate (ANAD, 2024). Moreover, the lifetime prevalence for AN is up to 4% for women and 0.3% for men (Clemente-Suárez et al., 2023). Overall, AN is characterised by a multifactorial and complex aetiology as well as an interplay of various behaviours and factors. According to the DSM-5 criteria, typical characteristics are enormous fear of gaining weight, restricted calorie intake, low body weight and disturbed body image (Neale & Hudson, 2020). Especially the latter encourages behaviours such as excessive exercise, starvation and purging which leads to a vicious cycle that maintains the disorder (Zipfel et al., 2015). Additionally, people suffering from AN have problems with emotion regulation and rather tend to avoid them, for example, by focusing on food, weight and shape (Oldershaw et al., 2019). Moreover, a lack of interoceptive awareness inhibits the development of a stable self. Therefore, it is suggested that AN emerges as a means to regain a sense of self and forge a new identity (Oldershaw et al., 2019). Exclusion of certain food groups labelled as bad and therefore need compensatory measures or should not be eaten at all also characterises the clinical picture of AN (Neale & Hudson, 2020). Not only physical impairments result from these behaviours but also neurological ones, as white and grey matter in the brain is reduced due to malnutrition which can lead to cognitive deficits (Zipfel et al., 2015). Turning to the social environment of people with AN, it becomes apparent that the disease also causes social-emotional difficulties. This manifests in conflicts with family and friends, leading to social isolation, which means more room for the illness to develop further (Leppanen et al., 2021). Moreover, people suffering from AN react more sensitively to social rejection and negative interactions compared to healthy peers, which results in them staying away from social situations at all as they assume to be rejected anyway (Meneguzzo et al., 2020). Thus, AN can be considered a mental illness with far-reaching consequences in different areas of daily living, which can lead to high loneliness among individuals suffering from this disease.

Research showed that treatment options for AN are too strict and miss relevant aspects of recovery to guarantee long-term remission and positive treatment outcomes. For example, it is criticised that current treatment mainly focuses on weight gain and therefore leaves aside other

important aspects of recovery, for example, the psycho-social needs of individuals (Isaksson et al., 2021; van Bree et al., 2023). Despite the availability of many different treatment options for AN, such as cognitive-behavioural therapy for eating disorders (CBT-E) (Dalle Grave et al., 2016), the Maudsley model of anorexia nervosa treatment for adults (MANTRA) (Schmidt et al., 2014), interpersonal therapy (McIntosh et al., 2000), and family-based treatment (Loeb & Le Grange, 2009), high relapse rates between 35 and 57% (Glasofer et al., 2020) as well as high drop-out rates of 20-40% (DeJong et al., 2012) indicate a considerable lack of effectiveness in these approaches. Even though CBT-E is recommended as an effective first-line treatment, it focuses on behavioural components rather than on incorporating embodied experiences in treatment (Castellini et al., 2022). Further, MANTRA focuses on characteristic temperamental traits, thereby leaving aside personalisation and motivation-boosting features (Jansingh et al., 2020). Lastly, family-based treatment and interpersonal therapy try to alleviate social isolation but leave aside the relevance of promoting body awareness and feelings of connection to the self and the body which is crucial in treatment because it is seen as one of the core roots of AN (Castellini et al., 2022). Thus, taking feelings of connectedness in the treatment of AN into account could improve treatment outcomes.

Connectedness

There is not much research published on the purpose of connectedness for people suffering from AN and therefore this might be a reason why treatments are not being effective. Recent research indicates that "given the essential role of the body in the experience of the world and self, it may not be sufficient to merely understand and manage AN as an essentially, psychological disorder characterized by behavioural and cognitive disturbances." (Naess & Kolnes, 2022, p. 3). These insights underscore the relevance of considering feeling connected to the body and self and social connections in understanding people suffering from AN. Thus, exploring the concept of connectedness can be of great value. Overall, connectedness is defined as "a state of feeling connected to self, others and the wider world." (Watts et al., 2022, p. 3461). This implies that connectedness has several dimensions, namely connectedness to the self, which means feeling connected to oneself at a deeper level (i.e., being connected to senses, emotions and the body). Connectedness to others, which also closely maps to the term social connectedness in the study of Watts et al. (2022) and includes the quality and quantity of an individual's social relationships. And lastly, connectedness to the world including "self-

transcendence" as a key factor. Self-transcendence can be explained as the expansion of self-boundaries either on an interpersonal level or transpersonal level and leads to experiences of being "part of an interconnected web of life" and "connecting to a spiritual principle" (Watts et al., 2022, p.3476). The authors state that feelings of disconnection are assumed to contribute to mental illness. Conversely, this implies that higher levels of connectedness could be a protective factor for mental health and thus can be of great potential in the treatment of mental illnesses.

Connectedness to the Self

Examining connectedness to the self for people with AN is important for several reasons. Research indicates that feelings of connection to the self are disturbed in this patient group which leads to high psychological distress and results in various negative consequences (Naess & Kolnes, 2022). Taking into account that the illness is characterised by confusion around bodily symptoms with an accompanying highly distorted body image, it seems reasonable that connection to the self is disrupted. The body is not seen as a part of its own but rather as a separated, enclosed system which results from starvation and suppressing negative feelings. These difficulties in embodiment have the negative consequence of creating tension between the body's physicality and subjectivity, resulting in a vicious cycle preventing the integration of the body into the self (Naess & Kolnes, 2022). However, integrating the body into the self is important for identity development. Williams et al. (2016) assume that this is problematic for people with AN because, at some point, the ED becomes one's own identity, making it difficult to separate from it. Thus, in the absence of AN individuals no longer know who they are and therefore keep returning or holding on to their ED. This indicates that a sense of self plays a critical role in the maintenance of AN. Moreover, AN is viewed as protecting the self by detaching from feelings and keeping the person disconnected from others. These findings underscore the illness' adaptive function: AN seems to suppress confrontation with negative emotions through disconnection from the self and others, who could potentially trigger these emotions (Williams et al., 2016).

Connectedness to Others

People suffering from AN have to face interpersonal problems in their surroundings which can lead to social isolation and loosing of connections to others, thus impeding recovery processes. Leppanen et al. (2021) found that one way how AN leads to less connectedness to others is the avoidance of social events because they fear being confronted with the pressure to

eat. People suffering from AN report that they feel ashamed being around people who are eating while they are not. To avoid explanation, social gatherings with family and friends are not attended (Leppanen et al., 2021). Thus, it can be assumed that social isolation serves to secure the illness identity but in turn, has the consequence of reducing connectedness to others. Another important factor to consider when looking at why connectedness to others is reduced is that people with AN generally have difficulties sensing and expressing their emotions (Oldershaw et al., 2019). It is hypothesised that they tend to avoid close relationships as a way to circumvent experiencing and having to express emotions (Carter et al., 2012). Therefore, feeling like the strange one left out and isolated from family and friends is a feeling many people with AN encounter (Leppanen et al., 2021). Consequently, feeling misunderstood and unsupported by significant others when trying to explain their feelings and thoughts is a common issue, which leads to feeling dismissed and seeing no point in reaching out to others (Leppanen et al., 2021) thereby further reducing connection to others. Carter et al. (2012) hypothesise that interpersonal difficulties can trigger ED symptoms and therefore play an important role in the maintenance of the illness. In conclusion, low levels of connectedness to others can lead to higher vulnerability for the maintenance of AN.

Connectedness to the World

In general, connectedness to the world can help individuals create a broader meaning for their lives and thereby enhance well-being. For example, studies not focusing on AN, investigated the effect of nature connectedness and self-transcendence on well-being and hypothesised that it is mediated by spirituality (Trigwell et. al., 2014, Buser & Pertuit, 2019). Here, spirituality can be understood as a construct described as an individual experience of transcendence, meaning-making, and a feeling of integration with oneself and all things in a broader sense (Trigwell et al., 2014). Results indicate that individuals with greater nature connectedness experience higher levels of well-being because they obtain more spiritual satisfaction from their connection to nature. Thus, spirituality significantly mediates the relationship between well-being and connectedness to nature. Additionally, according to Buser and Pertuit (2019), self-transcendence can be seen as a motivational construct that helps to create a wider personal meaning. Relating this to AN, it can be assumed that connectedness to the world can facilitate a process of meaning-making for individuals with AN, leading to the

discovery of purpose in life and reconnecting with values beyond that of their ED. Nevertheless, this topic is not yet widely researched in the context of AN.

Current study

While numerous studies investigate the impact of connectedness to others, no scoping or systematic review has been conducted to provide an overarching view concerning the role of connectedness, including all dimensions, in relation to AN. Although various studies have investigated the importance of social network support by family and friends (Tiller et al., 1997; Leonidas & Dos Santos, 2014; Ramjan et al., 2024), they lack a detailed exploration of connectedness including all three dimensions. Thus, this scoping review aims to fill this gap by systematically exploring the role of the three dimensions of connectedness, for people with AN. The absence of systematic or scoping reviews in this field underlines the novelty and relevance of this work. Therefore, this review aims to provide an overview of the body of existing literature by answering the following research question: "What is the extent of evidence concerning the role of connectedness for people with anorexia nervosa?".

Methods

Research Design

To answer the research question, a scoping review was conducted. This design is particularly suitable when the aim is to answer exploratory research questions (Munn et al., 2018). A scoping review's main qualities include gathering information on a certain range of research to summarise the evidence about a particular issue and to conduct a systematic search to determine the depth of the area of interest (Colquhoun et al., 2014). Therefore, scoping reviews include different types of literature regarding study quality and design (Levac et al., 2010). As a result, they map already existing research, and highlight possible research gaps, thereby building the general foundation for potential future research (Colquhoun et al., 2014). While conducting and reporting, this scoping review abided to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-ScR) checklist (Tricco et al., 2018) (see Appendix A).

Search Strategy

A systematic search was conducted using three databases: Web of Science, PsychInfo and Scopus with the following search string: (connectedness OR "social connect*" OR "social relation*" OR "social bond*" OR "body connectedness" OR "connection to self" OR "world

connectedness" OR "nature connectedness" OR relatedness OR interrelatedness OR interrelationship) AND (anorexi* OR "anorexia nervosa" OR "anorectic behavi*" OR "restrictive eat*"). The search was conducted on the 10th of April 2024.

Eligibility Criteria

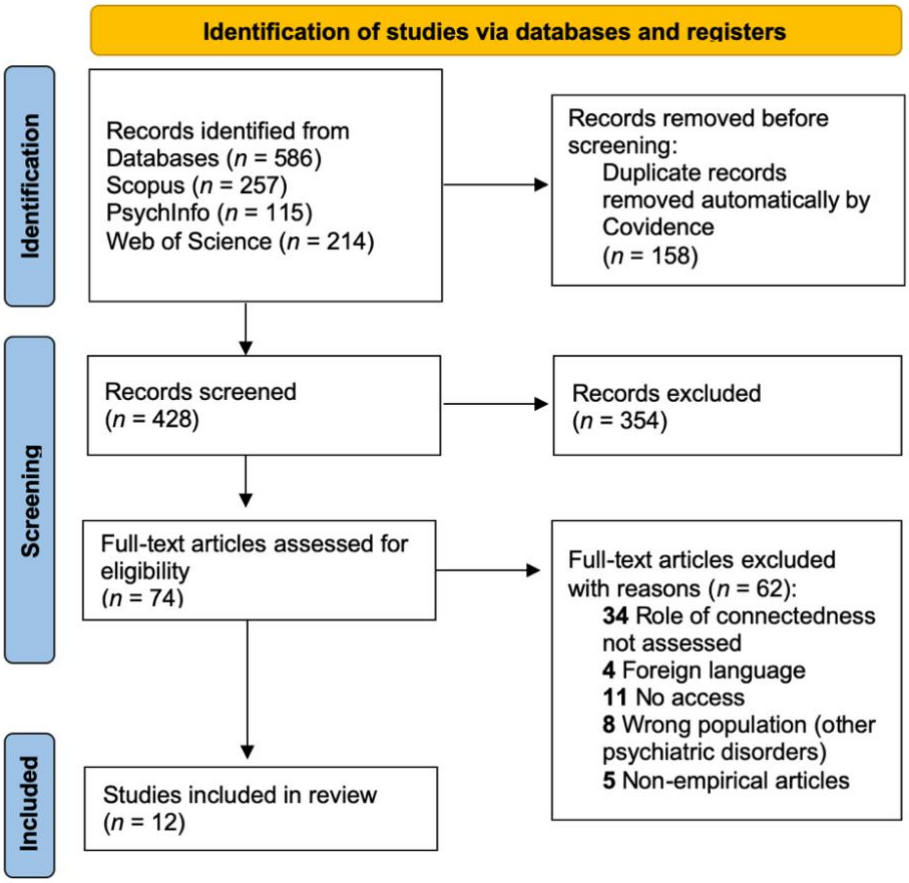
To obtain relevant and fitting data, specific inclusion and exclusion criteria were formulated apriori to the study selection. Studies were included if they reported empirical data in all designs on the role of connectedness for people with AN and if they were published in academic peer-reviewed journals. Editorials, commentaries and review papers were excluded. The study sample did not have to include solely people with diagnosed AN, the participants could also only show anorectic symptoms such as fear of gaining weight, being underweight, restrictive eating behaviour or any appearance of these in the past. The sample could also include other EDs; however, it has to be ensured that the study provides enough information on the role of connectedness in AN rather than focusing on another ED for the research to be included. Studies in which full text was not available or papers written in other languages than English or German were also excluded. In conclusion, studies representing quantitative, qualitative, observational or mixed methods data, collected to explore the role of connectedness in people with AN were included in the review.

Study Selection

After the three databases were searched using the search string, the hits found were exported with the title, keywords, abstract, authors' names, DOI, and journal name and imported into the program "Covidence". The PRISMA flow diagram (see Figure 1) shows the process of literature search and screening. While importing the data to Covidence, duplicates were removed automatically by the program. Following that, the remaining articles were scanned by reading through the titles and abstracts. Thereby, relevant articles were identified. After this scan, the abstracts of the selected articles were read carefully to determine whether they might contain relevant data for answering the research question. By doing so, valuable abstracts were saved for later full-text review. While reviewing the full texts attention was paid to the methods, results and discussion sections to assess compliance with the eligibility criteria.

Figure 1

PRISMA 2020 Flow Diagram of Literature Search and Screening Process



Data Charting

After the screening process, the included full-text articles were read thoroughly to familiarise with the data. Data extraction was done by using a charting table adapted to the JBI template for data extraction (Aromataris et al., 2024), in which the following data were extracted from the full-text: author, year, country, study aim, participant characteristics (i.e., age, gender and if they had a diagnosis of AN and how this was established), sample size, description of measurements, main findings and forms of connectedness measured (i.e., connectedness to the self, others, and the world). The data extraction process was done independently by the first author; however, the first supervisor was contacted when discrepancies emerged to get another opinion and feedback. In total, the first supervisor was contacted two times regarding clarification of terms needed for the data extraction and questions concerning the appropriate methods for the data synthesis.

Synthesis of Results

High heterogeneity across the included studies made meta-analyses unsuitable as a synthesis of the results. Instead, a descriptive numerical summary analysis and a thematic

analysis were performed. During numerical summary analysis, the extent and nature of the literature were extracted by using a charting table in Microsoft Excel where the study characteristics were summarised. Additionally, inductive thematic analysis was used to identify recurring themes related to the role of connectedness in AN and to organise and present the results in broader themes and categories (Braun & Clarke, 2006). The procedure is inductive as the coding process stayed close to the data and did not try to fit it into pre-existing coding schemes. Moreover, the authors propose a six-step approach for conducting thematic analysis, namely familiarising with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report (Braun & Clarke, 2006). According to this, the first step included reading the selected articles several times and taking notes to get a thorough understanding of the data. Subsequently, the production of initial codes and searching for themes required systematic work through the entire data to identify recurrent patterns across the data set. Following the production of the list of initial codes, they were sorted into potential themes which means checking how and which codes might be combined to inform a theme. Afterwards, the themes were reviewed again to ensure they were mutually exclusive. To clarify which part of the data was captured by the theme and what each theme was about, they were named and defined accordingly.

Results

Numerical Analysis

The selection procedure is displayed in Figure 1 and the study characteristics can be found in Table 2. Five studies were conducted in Europe, more specifically in Italy (*n*=1), Portugal (*n*=2), Austria (*n*=1) and France (*n*=1). Three studies were conducted in Norway. The remaining studies were conducted in the United Kingdom, the United States, and Australia, and one study was conducted as fieldwork and refers to data from three different locations, namely Scotland, Australia and Canada. Publication dates range from 2003 to 2022 and half of the studies are not older than 10 years. The biggest sample included 332 participants in the study by Huemer et al. (2012) and the smallest, one participant in the qualitative study from Trondalen (2003). Participants' ages ranged from 14 to 55 years. More than half of the included samples consisted of people diagnosed with AN (*n*=8). The majority of the studies had a qualitative design (*n*=8), two studies were cross-sectional, and two studies were conducted as fieldwork.

Table 2

Study Characteristics

First author and year	Country	Study design	Study aim	Participant characteristics	Sample size	Description of measurements	Main findings	Form of connectedness
Bers et al. (2013)	United States	Cross-sectional	Exploring representations of mother, father and the self, using the Differentiation-Relatedness Scale.	15-24 y., female, diagnosis: yes, diagnosis confirmed by investigator during interviews	77 (AN = 15, Psychiatric without ED = 15, Non-clinical volunteers = 47)	Differentiation-Relatedness Scale of the Object Relations Inventory to evaluate the descriptions of mother, father and the self.	AN patients show disrupted connection to mother. High neediness at same time suggests underlying factor for rejection of food is desperate longing for connection and attention from mother.	Connectedness to others
Brinchmann & Krvavac (2021)	Norway	Qualitative	Exploring the experiences of patients with severe EDs and their families with MFT.	18-22 y., female, diagnosis: yes, not specified how it was established	12 (AN = 8, bulimia nervosa (BN) = 4) and their families	Grounded theory approach, field observations, group and individual qualitative interviews	MFT leads to reduced family isolation and more connectedness and openness among family members which had positive impact on recovery. Connectedness is	Connectedness to others

First author and year	Country	Study design	Study aim	Participant characteristics	Sample size	Description of measurements	Main findings	Form of connectedness
							fostered through feeling understood and supported. Connectedness means belonging to a group.	
Cheney (2013)	Italy	Qualitative	Investigating how women negotiate social relatedness and their identities through food practices.	18-32 y., female, diagnosis: no, inclusion criterion was ED behaviours in the past	23	Semi-structured and unstructured interviews	Feelings of disconnection triggered AN behaviour to cultivate body that gives individuals greater social acceptance. Disordered eating serves as a coping mechanism to deal with negative emotions. Engagement in disordered eating is used as a way to	Connectedness to others

First author and year	Country	Study design	Study aim	Participant characteristics	Sample size	Description of measurements	Main findings	Form of connectedness
							reconstruct identity. Being thin leads to more social acceptance by peers.	
Ferreira et al. (2017)	Portugal	Cross-sectional	Clarifying the impact of recalling early memories of social safeness on disordered eating behaviour.	18-35 y., female, diagnosis: not specified	277	Social Safeness and Pleasure Scale	Low connectedness linked with higher levels of shame and social comparison, which leads to adoption of disordered eating. Current feelings of connectedness and social safeness influence adaptive eating behaviour.	Connectedness to others
Huemer et al. (2012)	Austria	Cross-sectional	Investigating emotional connectedness and individual autonomy by comparing a	16-46 y., female, diagnosis: yes, life-time DSM-IV diagnosis	332 (AN = 41 plus families, BN = 59 plus	Semi-structured interviews, Self-Rating Instruments to assess	Higher connectedness associated with lower risk of AN development. Low connectedness	Connectedness to others

First author and year	Country	Study design	Study aim	Participant characteristics	Sample size	Description of measurements	Main findings	Form of connectedness
			healthy sister and one with an ED.		families)	subjective perceptions of relationships within the family	represented risk factor for development. AN patients showed lower perceived emotional connectedness within family, compared to healthy sisters before onset of AN and at time of measurement.	
Naess & Kolnes (2022)	Norway	Qualitative	Exploring experiences of women with AN while doing NPMP.	In their forties, female, diagnosis: yes, inclusion criterion was diagnosis of AN	2	Semi-structured interviews	Through NPMP participants felt more connected to their body which had a positive influence on understanding and articulating their emotions and needs.	Connectedness to the self

First author and year	Country	Study design	Study aim	Participant characteristics	Sample size	Description of measurements	Main findings	Form of connectedness
Patching & Lawler (2009)	Australia	Qualitative	Exploring the entire individual experiences of developing and recovering from an ED.	24-51 y., female, diagnosis: one inclusion criterion was that they had to be recovered from an ED	20 (AN only = 6, BN only = 2, AN and BN = 12)	Life-history interviews	Development of disease associated with disconnection, recovery means reconnecting with others and life. Lack of connectedness in childhood led to engagement in ED behaviours and inhibited stable development of self. Engagement in ED behaviour seemed to address these issues, provided a sense of control and connectedness. Reconnecting with life and others, shifting attention from illness to world	Connectedness to the self, others and the world

First author and year	Country	Study design	Study aim	Participant characteristics	Sample size	Description of measurements	Main findings	Form of connectedness
							supported recovery. Taking new ways related to academia, relationships and careers facilitated meaning-making beyond the illness.	
Pinto et al. (2017)	Portugal	Cross-sectional	Investigate the role of inflexible eating behaviours and body appreciation as potential mediators between social safeness and disordered eating.	18-50 y., female, diagnosis: not specified	253	Social Safeness and Pleasure Scale	Current feelings of connectedness to others positively associated with positive attitude towards body and self and lower levels of disordered eating behaviour. Being in unsafe social environment is risk factor for adoption of disordered eating. Disordered eating serves as strategy to	Connectedness to others and the self

First author and year	Country	Study design	Study aim	Participant characteristics	Sample size	Description of measurements	Main findings	Form of connectedness
							control body appearance to enhance social status within group.	
Piot et al. (2019)	France	Qualitative	Exploring and understanding AN recovery from the first-person perspective.	20-30 y., female, diagnosis: yes, history of restrictive AN (ICD-10: F50)	3	Semi-structured interviews	Connectedness is a group in which a person feels understood and normal which fosters feelings of connectedness to others.	Connectedness to others
Trondalen (2003)	Norway	Qualitative	Investigating in what ways 'self-listening' can promote experiences of being connected.	26 y., female, diagnosis: yes, hospitalised two times	1	Phenomenological approach and interviews	Music; especially self-listening while playing an instrument contributes to higher feelings of self-connectedness, positively impacting well-being. Enhanced embodied	Connectedness to the self, others and the world

First author and year	Country	Study design	Study aim	Participant characteristics	Sample size	Description of measurements	Main findings	Form of connectedness
							experiences led to better understanding own emotions and fostered appreciative recognition of self. Higher connectedness led to more feelings of hope and courage.	
Warin (2006)	Australia, Canada, Scotland	Qualitative	Understanding the concept of relatedness for people with AN and how they negotiate it in their everyday worlds.	14-55 y., female and male, diagnosis: not specified, participants had history of hospitalisation due to ED behaviours	46 (female = 44, male = 2)	Multi-sited fieldwork including participant observations and interviews	There is a specific sense of belonging in inpatient settings. Engagement in ED practices was shown to be coping mechanism for identity construction during times of disconnection. Wanting to enhance connectedness led to higher engagement	Connectedness to others

First author and year	Country	Study design	Study aim	Participant characteristics	Sample size	Description of measurements	Main findings	Form of connectedness
							in ED behaviours. Connectedness to others meant having support (this could be positive or negative) as inpatients sometimes engaged in more excessive disordered eating to be seen as a "real anorectic".	
Westwood et al. (2016)	United Kingdom	Qualitative	Exploring friendship experiences before the onset of anorexia nervosa and during the illness.	18-42 y., female, diagnosis: yes, primary diagnosis of AN	10	Semi-structured interviews	Participants described difficulties in friendships before onset of AN and that AN had negative impact on their relationships. Loneliness can exacerbate disordered eating behaviours. AN is	Connectedness to others

First author and year	Country	Study design	Study aim	Participant characteristics	Sample size	Description of measurements	Main findings	Form of connectedness
							seen as something positive that allows connection to others. Support from family and friends during recovery provides valuable meaning for recovery process.	

Note. AN = anorexia nervosa; ED = eating disorder; MFT = multifamily therapy; BN = bulimia nervosa; NPMP = norwegian psychomotor physiotherapy.

Thematic Analysis

Concerning the frequency and distribution of the forms of connectedness measured, it can be argued that eight studies focused on connectedness to others only, indicating that this is the most researched dimension of connectedness regarding AN so far (Warin, 2006; Huemer et al., 2012; Bers et al., 2013; Cheney, 2013; Westwood et al., 2016; Ferreira et al., 2017; Piot et al., 2019; Brinchmann & Krvavac, 2021). One study concentrated on connectedness to the self only (Naess & Kolnes, 2022), one on connectedness to the self and connectedness to others (Pinto et al., 2017), and two studies adapted more of an all-encompassing view of all three dimensions of connectedness (i.e., connectedness to others, the self and the world) (Trondalen, 2003; Patching & Lawler, 2009). Two broader themes that recurred in the literature became apparent during the data analysis. Namely the positive impact of connectedness and the impact of low levels of connectedness. Each theme contains two related sub-themes that occurred as relevant.

Positive Impact of Connectedness on AN

Nine studies discovered that connectedness has a positive effect on people with AN (Trondalen, 2003; Patching & Lawler, 2009; Huemer et al., 2012; Westwood et al., 2016; Ferreira et al., 2017; Pinto et al., 2017; Piot et al., 2019; Brinchmann & Krvavac, 2021; Naess & Kolnes, 2022). Predominantly, the studies found that connectedness as a general construct can be seen as a protective factor against the development of AN and helps to enhance positive feelings towards others and the self, which positively impacts recovery by, for example, facilitating the ability to understand and articulate needs and emotions.

Impact on Eating Behaviour and Recovery. Overall, the findings revealed that each of the three dimensions of connectedness positively impacts AN recovery. Multiple participants of the studies addressed that current feelings of connectedness to others and the self are associated with lower levels of disordered eating behaviour and a reduced risk of developing AN. Specifically, higher connectedness to others is associated with a lower risk for AN development (Huemer et al., 2012). Further, experiencing emotional connectedness within the family system is linked to favourable developmental and maturational outcomes and Pinto et al. (2017) found that having meaningful connections with others and experiencing social support is associated with the development of a kinder attitude towards the self and the body. Thus, participants with higher levels of feelings of connectedness to others are more likely to reveal a respectful and positive attitude toward their bodies, which in turn positively affects healthy eating behaviour.

Moreover, reconnecting with life and enhancing connectedness to the world emerged as having a positive impact on recovery. For instance, participants in the study by Patching and Lawler (2009) described how reconnecting with their lives helped them shift their focus away from AN towards other important things, providing them with a sense of meaning. Especially taking new ways related to academia, careers, relationships and setting other priorities helped them to regain connection to the world around them which in turn led to a positive recovery process. Another interesting finding highlighting the positive impact of connectedness to the self is offered by the study from Trondalen (2003) who found a general positive effect on mental well-being. The participant indicated that appreciative recognition of herself through feelings of self-connectedness, which were fostered through music therapy enhanced positive feelings of hope and courage for the future.

Factors Enhancing Feelings of Connectedness. Several factors were found to strengthen connectedness including therapeutic activities, embodiment and bodily awareness techniques, and group belonging. For instance, engaging in "self-listening" during music therapy, as illustrated by Trondalen (2003), is one factor that enhances connectedness to the self and thereby leads to an embodied experience which makes the patient recognise feelings more easily. Additionally, the participant explained that through music making and thereby feeling connected between the inner and outer space, she was capable of filling her "emptiness" and create peace of mind. The author considers music an important factor because it "promotes new ways of relating" (Trondalen, 2003, p. 8) and thereby helps to experience stronger feelings of connectedness of different parts of oneself and others simultaneously, leading to a more cohesive understanding and awareness of the self. Similarly, Naess and Kolnes (2022) highlight the beneficial effect of Norwegian psychomotor physiotherapy (NPMP) for enhancing self-connectedness and bodily awareness. Breathing exercises, grounding exercises, relaxation techniques, massages, and other forms of movement and exercise during NPMP sessions lead to improved self-connectedness and holistically experiencing the body. For example, learning to sit *in* a chair rather than *on* a chair helped one participant to feel supported and more grounded. This reduced her racing thoughts as she felt more present, mentally and bodily. Overall, participants found it easier to sense their bodies' signals and were more successful in understanding and expressing their emotions, after engaging in NPMP.

Additionally, belonging to a group in which a person feels normal and understood improves connectedness to others for people with AN. For instance, participants described that being in a group with other people who are suffering from AN provides recovery support and enhances connectedness to others (Piot et al., 2019). Thereby, connectedness is valued as it provides the individual with a feeling of belonging, being normal and understood. Moreover, the positive effect of feeling understood by others was emphasised by the participants of Brinchmann and Krvavac (2021) who reported that multifamily therapy increases connectedness among family members through fostering feeling understood and supported. Furthermore, participants described feelings of safety that were created through meeting others who were in the same situation. Feeling recognised and understood facilitates open communication, thereby leading to decreased family isolation and ED symptoms, which exerts a positive influence on the overall recovery process (Brinchmann & Krvavac, 2021).

Impact of Low Levels of Connectedness

Although higher levels of connectedness, of whatever form, have some important benefits, eight studies found that connectedness can also pose a risk for people suffering from AN, more specifically when they experience low levels of connectedness (Warin, 2006; Patching & Lawler, 2009; Huemer et al., 2012; Bers et al., 2013; Cheney, 2013; Westwood et al., 2016; Ferreira et al., 2017; Pinto et al., 2017).

Influence on Disordered Eating Behaviour and Development of AN. Low connectedness was identified as a risk factor for the development and maintenance of AN. Feelings of disconnection and lack of feelings of social safeness are associated with shame and social comparison, which in turn trigger disordered eating behaviours (Ferreira et al., 2017; Pinto et al., 2017). For instance, people with a lack of positive rearing memories report experiencing lower current feelings of connectedness to others, which makes them more prone to encounter shame and engage in social comparison, influencing eating behaviour negatively (Ferreira et al., 2017). As highlighted in the study by Pinto et al. (2017), there seems to be an indirect, albeit important role of connectedness to others concerning eating behaviour. The study found that social safeness has an indirect effect on ED behaviour severity through two mechanisms, namely inflexible eating rules and body appreciation. On the one hand, this means that women who experience higher levels of connectedness to others are more likely to appreciate their body regardless of its shape and also have more flexible eating rules, resulting in a decreased

likelihood of adopting ED behaviours. On the other hand, the results indicate that being in an unsafe social environment (i.e., low feelings of connectedness to others) represents a risk factor for engagement in disordered eating patterns. This engagement should assert control over bodily appearance thereby enhancing the social status within the group (Pinto et al., 2017).

The importance of connectedness goes beyond social interactions and includes a sense of belonging and identity as well. Cheney (2013) found disordered eating like purging and restricting to serve as a coping mechanism for dealing with feelings of disconnection from others and negative life experiences. Furthermore, these feelings can drive individuals to engage in ED behaviours because they use them as a way to reconstruct their identity as it provides a sense of control and meaning in times of low levels of connectedness to others. Similarly, participants of the study by Patching and Lawler (2009) indicated that they experienced feelings of not belonging during childhood and adolescence which inhibited the development of a stable self. It was shown that engaging in disordered eating seemed to help in addressing these issues and provided the participants with a sense of connectedness to others and the self. Corresponding to this, Huemer et al. (2012) found that girls who developed AN had lower levels of perceived emotional connectedness before the onset of their illness, compared to their healthy sisters, and experienced significantly lower levels of connectedness within their families at the time of measurement. These results suggest that low levels of connectedness to others not only pose a risk factor for the development of AN but also play an important role in the course of the disease.

Connectedness as a Perpetuating Factor. Several studies underscore the value of reaching higher levels of connectedness for people with AN by investigating the behaviours they engaged in to foster these connections. Westwood et al. (2016) found that all of their participants had difficulties in their friendships before the onset of AN. These challenges included feeling lonely and disconnected from peers and problems with initiating contact. Feelings of loneliness may exacerbate disordered eating behaviours as participants explained that AN acts like a comforting blanket by giving them more confidence in social situations (Westwood et al., 2016). Social situations become easier when anorectic thoughts are present, thereby diminishing space for worries about what others might think. Participants argued that the ED is seen as something positive that enables connection to others. Similarly, connectedness acts as a perpetuating factor in inpatient settings as presented by Warin (2006). In this specific setting, engagement in disordered eating helped people with AN to create feelings of connectedness to other patients

which reinforced their identity within the group. Hence, the desire to belong could perpetuate disordered eating, as patients in this sample already showed symptoms of AN, and were in an inpatient setting and yet the desire to belong led to exacerbated symptoms of the ED. Thus, leaving AN would mean losing the feelings of connectedness that the anorectic behaviours formed between individuals (Warin, 2006). The role of the desire to belong in driving individuals to engage in disordered eating is also highlighted by participants in Cheney's study from 2013. For instance, feelings of disconnection trigger the engagement in disordered eating behaviour to reach a body that provides greater social acceptance and fosters feelings of connectedness. Consequently, the longing for connectedness to others can perpetuate AN by reinforcing disordered eating.

Corresponding to this, two other studies identified that disordered eating acted as a tool to enhance connectedness to others and thereby sustained or exacerbated anorectic symptoms (Patching & Lawler, 2009; Bers et al., 2013). Bers et al. (2013) found that one underlying factor for the rejection of food is a desperate longing for connection and attention from the mother. Aligned with this, Patching & Lawler (2009) highlight that the absence of connectedness in childhood and adolescence is linked to restrictive eating because disordered eating is seen as a tool to assert control and reestablish connectedness. Moreover, the authors stressed that a lack of connectedness combined with problematic familiar relationships inhibited the development of a stable sense of the self. To solve this issue girls engaged in disordered eating to reestablish a connection to the self and others, in order to develop a stronger sense of self (Patching & Lawler, 2009). Therefore, due to an overall lack of connectedness to the self and others, no stable identity can be developed, and ED behaviours keep being perpetuated to overcome this issue.

Discussion

The goal of the current scoping review was to explore the extent of evidence demonstrating the role of connectedness for people with AN. Overall, the findings suggest that connectedness, including all three dimensions, can act as a protective factor for people suffering from AN. Higher levels of connectedness were found to have a positive impact on eating behaviour and recovery. However, connectedness was also found to be a risk factor, more specifically, low levels of connectedness. Especially low connectedness to others can favour the development of AN and perpetuate it by reinforcing disordered eating behaviour to enhance feelings of connectedness to others.

Overall, the relationship between connectedness and AN seems to be multifaceted, with both high and low levels of connectedness impacting the course of the disease. Eight of the included studies consistently indicated that low levels of connectedness to others can be a risk factor for the maintenance and development of AN (Warin, 2006; Patching & Lawler, 2009; Huemer et al., 2012; Bers et al., 2013; Cheney, 2013; Westwood et al., 2016; Ferreira et al., 2017; Pinto et al., 2017). Some aspects of the consequences and mechanisms of low levels of connectedness to others that have been examined in the included studies are: enhanced engagement in disordered eating behaviour (Westwood et al., 2016), using disordered eating as a coping mechanism to counteract feelings of disconnection or as a way to reconstruct identity (Warin, 2006) and higher levels of shame and social comparison (Ferreira et al., 2017; Pinto et al., 2017). To determine if an individual is at risk due to experiencing low levels of connectedness, a universal measurement would be beneficial. Although one study by Bers et al. (2013) used the Differentiation-Relatedness Scale developed by Diamond, Blatt, Stayner, and Kaslow in 1991, which shows good psychometric properties in assessing the degree of differentiation and relatedness (Beheydt et al., 2020), the other included quantitative studies used no connectedness specific measurements. This indicates that a universal measurement instrument for connectedness might be missing. Watts et al. (2022) developed the Watts Connectedness Scale to measure connectedness as a construct. However, this scale was used and established in the context of psychedelic therapy. Therefore, it would be interesting for future research to investigate whether this scale can be used in other contexts to measure levels of connectedness. Moreover, three included studies highlighted that low levels during childhood and adolescence can be a risk for developing AN later in life (Patching & Lawler, 2009; Huemer et al., 2012; Ferreira et al., 2017). Although measures used in these studies to assess levels of connectedness were inconsistent and might led to mixed results, overall, low levels of connectedness to others in childhood and adolescence do have an impact on the development of AN. More research on other factors such as family dynamics, cultural factors, and mental health (e.g., Foster et al., 2017; Diendorfer et al., 2021) will provide a greater understanding of how and why low levels of connectedness develop during childhood and adolescence, thereby providing opportunities to inform the theoretical understanding of AN further.

Much of the existing research investigating the role of connectedness for people with AN focuses predominantly on connectedness to others, compared to the other two dimensions of

connectedness to the self and the world. Generally, the majority of the included studies showed that higher levels of connectedness, regardless of which dimension, have positive benefits for people with AN (Trondalen, 2003; Patching & Lawler, 2009; Huemer et al., 2012; Westwood et al., 2016; Ferreira et al., 2017; Pinto et al., 2017; Piot et al., 2019; Brinchmann & Krvavac, 2021; Naess & Kolnes, 2022). Individuals with higher connectedness to others exhibit more body appreciation (Pinto et al., 2017), more adaptive eating behaviours (Ferreira et al., 2017) and even a lower risk of AN development (Huemer et al., 2012). This aligns with other research highlighting the importance of family connectedness as a protective factor (Townsend & McWhirter, 2005) and the positive impact of body appreciation on eating behaviour (Marta-Simões et al., 2021). Fewer studies explored the dimensions of connectedness to the self and connectedness to the world. The ones that did, found positive impacts on, for example, meaning-making beyond the ED, facilitation of choosing the recovery process, and strengthening emotional and bodily awareness (Trondalen, 2003; Patching & Lawler, 2009; Naess & Kolnes, 2022), which also corresponds to previous research on the positive impact of connectedness to nature (e.g., Trigwell et al., 2014), which is considered to be a part of the overall factor "connectedness" (Watts et al., 2022). Moreover, the current findings support other research on the importance of connection to the self for overall mental health (e.g., Klussmann et al., 2020). However, there are currently too few studies to draw reliable conclusions. There is limited exploration of the consequences of low levels of connectedness to the self and the world for people with AN. Accordingly, future research should investigate the effects of low, as well as high levels of connectedness to the self and the world to provide a better understanding of how these dimensions have an impact on AN.

The current research further demonstrates, due to the lack of existing research on this topic, a constraint in the complexity of the designs of included studies. More than half of the included studies are qualitative, and the quantitative studies employed a cross-sectional design. Even though qualitative data gives a nuanced insight into the personal experiences of connectedness of people with AN, it is naturally subjective and context-specific, limiting the generalisability of findings (Fossey et al., 2002). Since the surveys included in the cross-sectional studies measured the variable of interest at one single point in time, it is difficult to detect changes over time and draw conclusions regarding causality (Setia, 2016). Thus, more longitudinal design studies can help track changes in connectedness for people with AN over

time, and how these might influence the development and maintenance of AN (Caruana et al., 2015). Moreover, the reviewed studies did not exactly cover the effectiveness of connectedness in the treatment of AN. While the included literature demonstrates that the different dimensions of connectedness play a role for people with AN, there is a lack of studies investigating how enhancing connectedness influences treatment outcomes for this illness. Additionally, most of the samples of the included studies were rather small and mainly female, which limits the generalisability of the findings as they cannot be generalised to male individuals. This leaves the question open if there are any differential effects regarding the dimensions and experienced levels of connectedness. Although men are less affected by AN than women (Clemente-Suárez et al., 2023), more research across varying populations is needed to fully grasp the theoretical implications of connectedness for AN. Additionally, larger samples will be helpful to identify more specific patterns of connectedness regarding AN.

The fact that only 12 studies were identified to fit with the topic of the current review, despite no specific time limit in publications, indicates a scarcity of research in this field. While the importance of connectedness for people with AN is noticeable, this scarcity highlights that, at this point, there is not enough evidence to recommend that connectedness should be part of AN treatment conclusively. Theoretical implications of the findings hint at the potential of connectedness, including all three dimensions, to contribute to a wider focus of AN treatment on, for example, emotional awareness, embodiment, encouraging hope and meaning-making beyond the ED, instead of mainly focusing on weight gain, as it is criticised by other recent research (e.g., Isaksson et al., 2021; van Bree et al., 2023). Consequently, more research in this field is needed to expand the evidence and explore the potential of implementing connectedness as part of treatment for AN. Further, it would be insightful to find out if there is an interplay between the three dimensions, i.e., whether an increase in one dimension also affects one or both of the other dimensions. This scoping review found indications that this might be the case, as illustrated by Pinto et al. (2017), that current feelings of connectedness to others positively affect bodily awareness and attitude towards the self, indicating an increase in self-connectedness. However, future research is needed to investigate the potential interrelationships between the dimensions and what the underlying factors for this might be, in more detail.

Limitations and Strengths

The current scoping review has some limitations. To start with, the selected search strategy could be seen as a potential limitation since it focused on systematically searching three databases only, not considering other methods like snowballing, for example (Wohlin et al., 2022). Since these databases have a certain focus, relevant articles might not have been displayed, potentially neglecting additional valuable sources of information. Even though this method is characterised by allowing good replicability, the search might have been less exploratory (Wohlin et al., 2022). Overall, the small number of included studies reflects an important research gap and further underscores the importance of further research on the role of connectedness for AN. Another limitation addresses the research process, as well as, the analysing and charting of data, which was done by a single researcher. Ideally, this should be done by at least two researchers or a research team to limit the amount of personal biases that can influence the review process during all stages (Levac et al., 2010). The lack of quality assessment of included studies within this review can be seen as another limitation. However, this is in accordance with the current guidelines for scoping reviews, since the nature of a scoping review aims to provide an overview and synthesis of the extent of the evidence and does not necessarily include quality appraisal (Tricco et al., 2018). However, conducting a quality assessment in this field of research can be of great potential to enhance the credibility of findings, which will help to bring this area of research further. Despite these limitations, this review provided meaningful contributions by emphasising the important yet underexplored role of connectedness for people with AN, thereby identifying an important research gap. Moreover, it sheds light on the impact of high and low levels of connectedness for the development, maintenance and recovery from AN. In the future, there should be more research on the topic of connectedness, including all three dimensions, not only connectedness to others, to determine to which extent connectedness can be a helpful addition to the current theoretical understanding and treatment of AN.

Conclusion

In conclusion, this scoping review aimed at exploring the extent of evidence concerning the role of connectedness for people with anorexia. Based on the systematic search and analysis of available literature on this topic, it can be concluded that to the researcher's knowledge, this scoping review is the first to examine connectedness including all three dimensions in relation to AN. The results show that, although connectedness plays an important role for people with AN,

there is yet not enough research conducted in this field. The findings suggest that higher levels of connectedness across all its dimensions act as a protective factor, positively influencing eating behaviour, attitude towards self and recovery processes, whereas low levels of connectedness are associated with a higher risk of the development and maintenance of AN. However, due to the scarcity of evidence, it is yet not possible to draw conclusions regarding the implementation and consideration of connectedness in the treatment of AN. This highlights the importance of developing a universal measurement tool to examine the effectiveness of connectedness for people with AN. Further, a better understanding of the influence and consequences of high and low levels of connectedness across all three dimensions can enable a more comprehensive insight into the development, maintenance, and recovery of AN which will help to understand its implications for the treatment of AN in more detail.

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Appendix A

Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	1
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	3-7
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	7
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	7
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	8
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	7-8
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	7-8
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	8-9
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	9-10
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	9
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe	Not done

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
		the methods used and how this information was used in any data synthesis (if appropriate).	
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	9-10
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	9
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	10-20
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	Not done
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	11-20
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	9-24
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	24-27
Limitations	20	Discuss the limitations of the scoping review process.	27-28
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	28-29
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	--

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

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