



Master's thesis

Using the Interpersonal Theory of Suicide to Inform Our Understanding of Suicidality Risk in Autism Spectrum Disorder: A Systematic Scoping Review

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Are there deviations of the Master's thesis from the proposed plan?

No

Yes, please explain below the deviations:

Due to the qualitative methodology, a word limit extension of 3000 words was granted. Additionally, the methodology changed from a systematic review to a systematic scoping review. Both deviations were approved by my supervisors.

A thesis is an aptitude test for students. The approval of the thesis is proof that the student has sufficient research and reporting skills to graduate but does not guarantee the quality of the research and the results of the research as such, and the thesis is therefore not necessarily suitable to be used as an academic source to refer to. If you would like to know more about the research discussed in this thesis and any publications based on it, to which you could refer, please contact the supervisor mentioned.

Abstract

This scoping review explores the applicability of the Interpersonal Theory of Suicide (ITS) in understanding suicidality among autistic adults and proposes autism-specific adaptations to enhance its relevance. The review systematically examines 37 studies to assess the adequacy of the ITS in capturing the unique risk processes and factors associated with suicidality in the autistic population. The findings highlight the significance of the ITS constructs—thwarted belongingness, perceived burdensomeness, and acquired capability—in understanding suicidality among autistic individuals. Furthermore, the review identifies additional risk processes, including camouflaging, restricted interests, unmet support needs, difficulties with life transitions, the burden of comorbidities, and the exacerbating effects of depression and rumination, all of which contribute to suicidality in this population. Based on these findings, an autism-specific adaptation of the ITS, known as ITS-A, is proposed. The ITS-A extends the existing components to incorporate additional features relevant to autism and emphasises the enlarged role of perceived burdensomeness. It also recognises the potential for the presence of either thwarted belongingness or perceived burdensomeness alone to drive suicidal desire. This scoping review contributes to a comprehensive understanding of suicidality among autistic adults and offers a framework on which to base tailored suicide prevention strategies.

Introduction

Suicide remains a critical global public health concern, with over 700,000 lives lost annually (World Health Organisation, 2021). This concern is particularly relevant in the context of Autism Spectrum Disorder¹(ASD), which has been associated with an elevated risk of suicidal behaviours and self-injurious acts (Blanchard et al., 2021; Cassidy et al., 2014, 2018; Hedley & Uljarević, 2018; Zahid & Upthegrove, 2017). Indeed, recent studies have shed light on the alarming overrepresentation of autistic individuals in suicide statistics, calling for urgent research and prevention efforts in this field (Cassidy et al., 2022; Hirvikoski et al., 2020; Kirby et al., 2019a; Kőlves et al., 2021; Lord et al., 2022). This heightened vulnerability observed in autistic populations may be attributed to the unique challenges that autistic individuals face, such as high levels of social rejection (Levi et al., 2023; van Roekel et al., 2010) and the presence of minority stressors such as discrimination and internalised stigma (Botha & Frost, 2020). However despite such findings, the precise impact of these experiences and the connections between them are still not fully understood as existing research has not yet adequately explained how these challenges contribute to heightened risk (Cassidy & Rodgers, 2017; Segers & Rawana, 2014).

Developing targeted preventive interventions and support strategies for this vulnerable population requires a comprehensive understanding of the specific mechanisms involved. Currently, a significant challenge lies in the absence of suicide theories and models

¹ The use of the terms “disorder” and “condition” in relation to autism is a topic of ongoing debate in both autistic and scientific communities globally. There is currently no consensus in the literature regarding the preferred terminology (Vivanti, 2020). For the purpose of this thesis, the terminology used will align with The Diagnostic and Statistical Manual of Mental Disorders (5th ed.; American Psychiatric Association, 2013), referring to “ASD” and using the term “disorder.” Additionally, the choice of terminology extends to the use of “person-first language” (PFL) and “identity-first language” (IFL) when referring to individuals with autism. This debate also lacks consensus in the literature (e.g., Botha et al., 2021; Bury et al., 2020; Wevers, 2020). Therefore, this thesis will use both PFL and IFL interchangeably to encompass the diverse perspectives on this matter. This decision is based on the understanding that both PFL and IFL aim to reduce stigma and promote respect for individuals with autism (Gernsbacher, 2017; Vivanti, 2020). As suggested by Dunn & Andrews (2015), it is important to remain flexible in language usage until clear research evidence emerges to indicate a preferred approach.

that adequately encompass the unique experiences of individuals with autism (Cassidy et al., 2021). Exploring suicide risk theories from psychopathology research fields outside of ASDs may present a viable alternative for gaining valuable insight. By leveraging existing and robust theoretical frameworks, we can deepen our understanding of the core mechanisms underlying suicidal ideation and the progression to suicide attempts, irrespective of specific psychopathological contexts. Furthermore, this approach allows for the identification of possibly unique characteristics and manifestations of suicidality² within the autistic population that may not be fully accounted for in the original framework. This in turn would open up opportunities to propose future ASD-specific iterations of such theoretical frameworks, thereby equipping clinicians with more effective tools to detect suicidal ideation and behaviours, and ultimately prevent suicide amongst autistic individuals (Cassidy, 2020).

Theoretical conceptualisation of suicide

Joiner's (2005) Interpersonal Theory of Suicide (ITS) is a widely cited theory of suicide risk which has contributed to substantial advances in the scientific and clinical understanding of suicide and related behaviours (Chu et al., 2017). It is currently the most comprehensive and influential theory in suicidology (Van Orden et al., 2010; see also Joiner et al., 2016) and has prompted numerous empirical investigations across diverse populations, such as students (e.g., Chu et al., 2016; Hagan et al., 2015; Podlogar et al., 2017); older adults (e.g., Cukrowicz et al., 2011, 2013); transgender youth (e.g., Grossman et al., 2016); individuals with chronic illness (e.g., Shim et al., 2023); psychiatric inpatients and outpatients

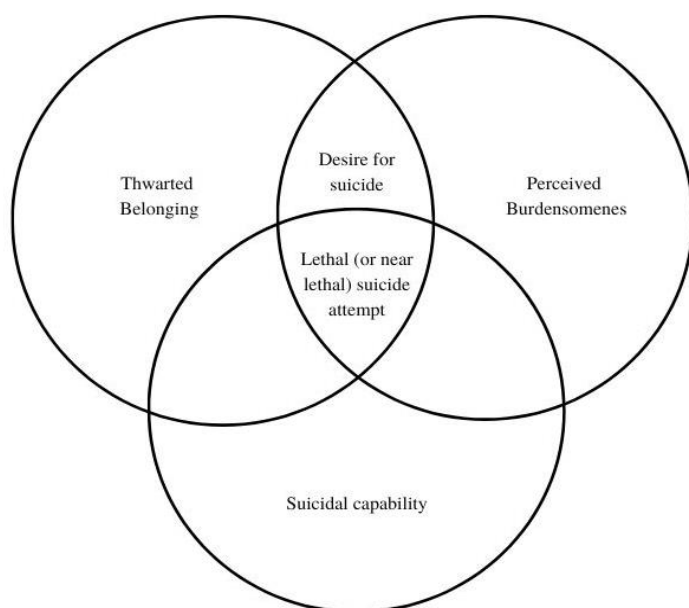
² For the sake of clarity, the following definitions, adapted from Nock et al. (2008) and Turecki & Brent (2016), are provided for key terms used throughout the thesis: "Suicide" refers to the deliberate act of an individual intentionally ending their own life. "Suicidality" encompasses a broader range of suicidal thoughts, plans, gestures, or attempts. "Suicidal ideation" includes various thoughts related to death, such as a desire to die and the intention to act upon those thoughts. It also includes the identification of methods and the formulation of a plan for suicide. "Suicidal behaviours" encompass tangible steps taken with the intent to harm oneself or cause one's own death, including suicide attempts. Suicide attempts are self-directed, potentially harmful actions carried out with the intent to die, but they do not result in fatality. Note, completed suicide falls within this category.

(e.g., King et al., 2019; Naidoo & Collings, 2019); prison inmates (e.g., Mandracchia & Smith, 2015); and sexual minorities (e.g. Silva et al., 2015). Furthermore, the ITS has advanced treatment recommendations (e.g., Joiner et al., 2009; Joiner & Van Orden, 2008; Stellrecht et al., 2006) and suicide risk assessment (e.g., Chu et al., 2015; Ribeiro et al., 2013).

As illustrated in Figure 1, the theory posits that an individual will not die by suicide unless they have both the desire to die by suicide and the acquired ability to enact lethal self-injury. More specifically, the presence of the psychological states of both ‘thwarted belongingness’ and ‘perceived burdensomeness’ lead to the desire for suicide, while the ability to carry out suicidal actions, known as ‘suicidal capability’, is required for an individual to make a lethal, or near lethal attempt (Joiner, 2005). Suicidal capability is attributed to biological changes in an individual’s fear and pain systems, which facilitate

Figure 1

Assumptions of the Interpersonal Theory of Suicide



Note. Replicated from Van Orden et al., 2010

rather than inhibit suicide attempts (Joiner, 2005). Importantly, by introducing distinct pathways for the development of suicidal desire to both nonfatal and fatal suicidal behaviours, the ITS seeks to explain why the majority of individuals who contemplate suicide do not progress to actual suicide attempts or completion.

The following section will briefly outline the essential components of the theory. It is

worthwhile noting that comprehensive accounts of this theory, including its rationale, historical significance and empirical foundations, can be found in Joiner (2005) and Van Orden et al. (2010).

Thwarted Belongingness

Maslow's hierarchy of needs, a cornerstone psychological theory, emphasises the importance of belonging and social connection in human well-being (Maslow, 1943). According to Maslow, satisfying the need for belongingness and forming meaningful relationships are essential for individuals to achieve self-actualisation and personal growth. Thwarted belongingness, a core component of the ITS, reflects the psychological pain and adverse health outcomes that arise when the fundamental need for connectedness and belonging is unmet (Cacioppo & Cacioppo, 2014; Hawkley & Cacioppo, 2010; Holt-Lunstad et al., 2010; P. N. Smith et al., 2021; Valtorta et al., 2016). Thwarted belongingness encompasses several distinct features, such as self-reported loneliness, a smaller social circle, living alone, familial conflicts, ostracism, and social withdrawal (Van Orden et al., 2010).

Perceived Burdensomeness

Perceived burdensomeness stems from a mistaken translation of self-hatred into feelings of expendability, leading individuals to believe that others would be better off if one were gone. The dimensions of perceived burdensomeness encompass perceptions of liability and self-hate, reflecting the individual's perception of being a burden and their negative self-perceptions (Van Orden et al., 2010). Factors such as family conflict, unemployment, physical illness, and perceptions of failure and brokenness have been associated with suicide across the lifespan (e.g., Gudat et al., 2019; Hill et al., 2019; Hill & Pettit, 2014; Jahn et al., 2013; Kanzler et al., 2012).

Suicidal Capability

Suicide research has highlighted the ideation-to-action framework (Klonsky & May, 2014), suggesting that the transition from suicidal ideation to engaging in suicidal behaviour requires an acquired capability. This acquired capability was originally conceptualised as a core component of ITS and refers to an individual's ability to overcome innate fears of pain and death, enabling them to engage in self-directed violence (Joiner, 2005). As suicidal behaviour and self-harm go against the most basic instinct for survival, the theory posits that acquired capability develops through repeated exposure to painful and provocative experiences, which diminish the fear of death and increase physical pain tolerance. Indeed, while thinking about suicide may reflect suicidal ideation or thoughts, a crucial indication of distress, it does not necessarily indicate an individual's capability to enact lethal self-injury (May & Victor, 2018). Rather, the ITS posits that capability involves a fearlessness about death and higher pain tolerance, acquired through traumatic and provocative experiences such as physical fights, child abuse/maltreatment, childhood bereavement, none-suicidal self-injury (NSSI), non-lethal suicide attempts, and exposure to suicide among friends and family (Anestis & Capron, 2016; Bayliss et al., 2022; Bryan et al., 2010; Feigelman & Gorman, 2008; Guldin et al., 2015; Ribeiro et al., 2014; P. N. Smith & Cukrowicz, 2010; Zatti et al., 2017). These factors expose individuals to actual or perceived pain, contributing to the development of the acquired capability (Van Orden et al., 2010).

Research conducted since the inception of the ITS has deepened our understanding of this component. A functional model proposed by P. N. Smith & Cukrowicz (2010) highlights that both genetic and environmental factors play a crucial role in the development of capability. Indeed, the influence of genetics on capability seems to be more significant than initially hypothesised by Joiner (2005) (Bayliss et al., 2022; Gallyer et al., 2020). The specific genes associated with capability for suicide have yet to be identified. It is suggested that this genetic risk contributes to individual differences in capability, and that distressing

and provocative events influence its overall development (Gallyer et al., 2020).

Consequently, the stability and rate at which capability is acquired may vary among individuals as a result of the intricate interaction between genes and environment.

ITS in Relation to ASD

There are notable overlaps between the experiences, behaviours, and characteristics commonly observed in autistic individuals and the components of the ITS. For example, ASD is defined by persistent deficits in two domains, one of which is social communication and social interaction (American Psychiatric Association, 2013). These limitations impact relationship development, which could lead to a sense of thwarted belongingness and a lack of meaningful social connections (Hedley et al., 2017; Hedley, Uljarević, Wilmot, et al., 2018). Indeed, autistic individuals frequently encounter challenges in social interaction, which have been shown to lead to feelings of loneliness, mood disturbances such as depression, and lower overall life satisfaction (Griffiths et al., 2019; Mazurek, 2014; Schmidt et al., 2015).

Factors such as limited access to and sustainability in the labour market (Espelöer et al., 2022; Riedel et al., 2016), may contribute to an increased risk for experiences of perceived burdensomeness in autistic individuals. Furthermore, extensive research has consistently demonstrated that parenting autistic children is associated with elevated levels of parenting stress and caregiver burden (e.g., Ingersoll & Hambrick, 2011; Kirby et al., 2015; Sawyer et al., 2010; Taylor & Warren, 2012; Tomeny, 2017). These challenges are not limited to the early stages of parenting but can persist throughout adolescence and into adulthood (Cadman et al., 2012; Lin, 2011; Marsack-Topolewski & Church, 2019). When autistic individuals observe these challenges experienced by their parents or caregivers, they may internalise a sense of burden and perceive themselves as adding to the difficulties faced by their loved ones.

Finally, it is hypothesised that some autistic experiences lend themselves to increased risk for suicidal capability (Cassidy, 2020). Given that ASD is associated with increased odds of adverse childhood experiences (Berg et al., 2016; Dodds, 2021; Hoover & Kaufman, 2018) and self-injurious behaviours (Blanchard et al., 2021), this may lead autistic individuals to a heightened risk of acquired capability, and thus explain the greater risk for suicidality in autistic people. Moreover, Hill & Katusic (2020) proposed that the hypo-reactivity to sensory input, including apparent indifference to pain, commonly observed in autistic individuals (American Psychological Association, 2013), might indicate an increased pain threshold and a baseline level of acquired capability. In the same vein, hyper-reactivity to sensory stimuli, such as loud sounds or bright lights, can intensify sensory experiences and potentially contribute to increased pain and the development of acquired capability (American Psychiatric Association, 2013; Hill & Katusic, 2020).

Previous Reviews

A total of eight systematic reviews focusing on suicide among individuals with autism were identified, all published in the last decade (Hannon & Taylor, 2013; Hedley & Uljarević, 2018; Mournet et al., 2023; Newell et al., 2023; O'Halloran et al., 2022; Richa et al., 2014; Segers & Rawana, 2014; Zahid & Upthegrove, 2017). Hannon & Taylor (2013) reviewed four studies and found that rates of suicidal behaviour in young people with ASD were similar to the general population. They identified common risk factors such as comorbid mental health problems, abuse, and bullying. They also suggested that ASD symptoms, like social and communication deficits, may contribute to interpersonal problems and social isolation.

Segers & Rawana (2014) conducted a review including 11 studies and three case reports. They noted a prevalence of suicidal behaviour in ASD ranging from 10.9% to 50%. Risk factors identified in their review included peer victimisation, behavioural problems,

male gender, lower socioeconomic status, and lower education level. Further, Richa et al. (2014) reviewed 11 studies and highlighted the association between suicidal ideation and depression in people with ASD. Zahid and Upthegrove (2017) combined samples across 12 reviewed studies and found that the prevalence of suicide attempts ranged from 7% to 47%, with suicidal ideation reported in up to 72% of cases. They identified self-harm and depression as primary risk factors associated with suicidal behaviour. Additionally, being male was found to increase suicide risk.

Hedley & Uljarević (2018) conducted a review including 13 studies published since January 2012. They noted a shift towards the use of larger cohorts, including one population-based study. The prevalence of suicidal ideation ranged from 11% to 66%, and suicidal attempts ranged from 1% to 35%. Various factors predicted suicidal thoughts or behaviour, including Hispanic or Black ethnicity, lower intelligence quotient (IQ), comorbid attention-deficit/hyperactivity disorder (ADHD), presence of psychotic symptoms, anxiety or mood disorders, and, contrary to previous reviews, female gender.

O'Halloran et al. (2022) conducted a systematic review and meta-analysis to examine the global prevalence of suicidality in autistic youth and investigate related risk and protective factors. They found that approximately one in four autistic youth experience suicidal ideation, and nearly one in ten attempt suicide. Autistic youth themselves are more likely to report these feelings compared to their parents' observations. The authors noted that the increased susceptibility to suicidality among autistic youth could not solely be attributed to age and sex differences. Risk factors such as adverse childhood experiences like bullying and gender-identity-related stigma were found to contribute to vulnerability, while factors like resilience acted as protective factors.

Two recently published reviews were identified. Newell et al. (2023) conducted a meta-analysis on suicidality in autistic individuals, including possibly autistic individuals

without intellectual disability. They found a high prevalence of suicidal ideation, suicide plans and suicidal attempts/behaviours. High levels of heterogeneity were observed, indicating variability across the studies. Geographical location and the inclusion of transgender or gender non-conforming samples were identified as factors influencing suicidal ideation. Age group and the measurement used to assess suicidality significantly impacted the occurrence of suicide plans. Furthermore, a correlation was found between the proportion of male participants and the prevalence of suicide plans. Finally, Mournet et al. (2023) conducted a systematic review on suicide risk among autistic adults, reviewing 45 studies. Interpersonal components and depressive symptoms were the most frequently studied factors related to suicide risk in this population. Notably, this review emphasised the need for further exploration of social and interpersonal constructs, as well as understanding the role of depressive symptoms in suicide risk.

Current Review

Previously published reviews primarily focused on examining the prevalence and risk factors associated with suicide in autistic individuals. As such, there remains an incomplete understanding of the breadth and efficacy of the ITS in addressing the mechanisms behind heightened suicide risk in autistic individuals, as well as any potential differences from non-autistic individuals. The current review seeks to fill this gap, by evaluating the ITS's utility in explaining suicidality in this population by analysing relevant studies through the lens of the ITS. Notably, the components within the ITS are multifaceted, allowing for different conceptualisations and testing approaches in various studies. Given the complexity and the need to effectively map the literature, a scoping review is deemed the most appropriate method for this thesis. Indeed, while systematic reviews are typically used to explore established topics, a scoping review is valuable for emerging or evolving subjects such as this one (Mak & Thomas, 2022).

Furthermore, a focus on studies conducted specifically on autistic adults, rather than considering the entire lifespan, would allow for a more comprehensive understanding of the applicability of ITS to autistic populations. As explained above, the ITS underscores the significance of perceived burdensomeness and thwarted belongingness as crucial factors in the development of suicidal ideation and behaviour (Joiner, 2005). Although few studies have directly tested these components using validated measures, evidence of their presence can be inferred from demographic information provided in the studies, such as employment and relationship status. Additionally, autistic adults typically possess higher levels of autonomy and decision-making capacity compared to children and adolescents. Since the ITS highlights the role of perceived burdensomeness, this factor is arguably more relevant and applicable to adults who culturally are expected to have a greater degree of autonomy (i.e. practical and financial independence) and be more pro-actively engaged in social relationships and responsibilities (i.e. these developmental tasks/milestones are considered to be reached by adulthood, rather than still the full/partial responsibility of parents, as culturally considered still appropriate in children in most societies). Furthermore, studying adults allows for a more accurate assessment of long-term consequences, as the impact of autism-related challenges may gradually manifest across their lifespan. This provides valuable insights into the appearance, persistence, and severity of suicide risk factors over time.

Research Question

This thesis aims to answer the research question, “To what extent does the ITS adequately inform our understanding of suicidality among autistic adults?” To address this research question, three specific aims have been identified, namely: (1) To determine phenomenology and risk factors for suicidality within the autistic adult population, specifically through the lens of the ITS; (2) To determine the extent to which those thoughts, feelings and behaviours relating to suicidality in autistic adults can be classified within the

ITS's three primary components; and (3) To determine if there may be ASD-specific risk processes which are not adequately captured by the ITS and whether population-specific additions or alterations need to be made to the model.

Methods

A scoping review was conducted in accordance with the parameters and checklist detailed in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA, Page et al., 2021) guidelines and the PRISMA extension for scoping reviews (PRISMA-ScR, Tricco et al., 2018) checklist. The complete methodology was preregistered on the Open Science Framework (OSF; Grieve, 2023). Please refer to Appendix A for the PRISMA-ScR Checklist completed for this review.

The inclusion criteria are detailed in Table 1. Relevant literature was identified through comprehensive searches of the following electronic bibliographic databases: Medline, PsycINFO, CINAHL, Web of Science, and SCOPUS, using a combination of the following search terms and their synonyms, as well as hierarchical family forms (i.e., MeSH and APA thesaurus terms): Autism Spectrum Disorder; Asperger; Suicide; Suicidology; Suicidal Behaviour; Attempted Suicide; Suicidality; Suicidal ideation. Selection of databases and relevant keywords was done with the assistance of an academic information specialist. See Appendix B for a complete list of Boolean search strings.

The screening of results consisted of three phases. (1) The removal of duplicate articles; (2) the screening of titles and abstracts to exclude articles on clearly unrelated topics; (3) an evaluation of the full text to establish which of the articles met the full inclusion criteria. The screening process involved multiple individuals to ensure thoroughness, with each article independently reviewed by at least two individuals.

Table 1*Scoping Review Inclusion Criteria*

Criteria	Description
Study Type	Peer-reviewed empirical studies ^a
Language	Published in the English language
Participants	At least one group of participants who have ASD, either self-identified or diagnosed ^b ; Adults (18+) ^c
Focus on Suicidality	Primary aim to explore symptoms or incidences of suicidal ideation, suicide attempt, or suicide in autistic individuals by way of at least one standardised measure ^d
Date Restrictions	N/A

Note. N/A: Not applicable.

^aThus excluding literature reviews, conference proceedings, grey literature, theses and dissertations, opinion pieces, discussion papers, and editorials

^bStudies that solely assessed participants for autistic traits or symptoms without a confirmed ASD diagnosis were excluded

^cIn cases where age range information was not explicitly provided or included both youth and adults, studies with a mean sample age of 18 years or older were deemed eligible. No restrictions were placed on gender, intellectual/cognitive abilities, or nationality of participants

^dAccepted measures included both structured and semi-structured interview (self-report, parent-report, or clinician ratings) and the use of standardised questionnaires (self-report, parent-report, or clinician ratings). Studies reporting exclusively on depression without suicidality or on non-suicidal self-injury (NSSI) e.g., banging/self-beating, scratching are excluded. This was because the inclusion of studies solely focusing on NSSI could have introduced bias in favour of the theory.

In addition, the ‘reference tracking’ method was utilised to identify articles not retrieved in initial database searches. This involved scanning of all included articles’ reference lists and using individual judgment to determine whether to examine these articles further (Moher et al., 2009). The reference lists of already existing reviews of relevant

literature were also examined. Finally, experts³ in the subject area were contacted by way of email in May 2023 to discern whether there are any newly accepted articles which may have been suitable for inclusion. No grey literature authors were contacted.

Study characteristics were charted independently by two individuals using a standardised data extraction template. The process involved extracting relevant study information based on the categories specified in Table 2. For a copy of the full data charting template, please refer to the OSF preregistration document (Grieve, 2023). Following the completion of the data extraction process, results synthesis followed a textual narrative approach to offer a coherent and comprehensive overview of the findings. Please note, the review did not incorporate a formal assessment of data quality or a critical appraisal of individual sources of evidence, as it is not typical for a scoping review. Therefore, no formal evaluation of data quality was conducted for this thesis.

Table 2

Breakdown of Data Charting Categories

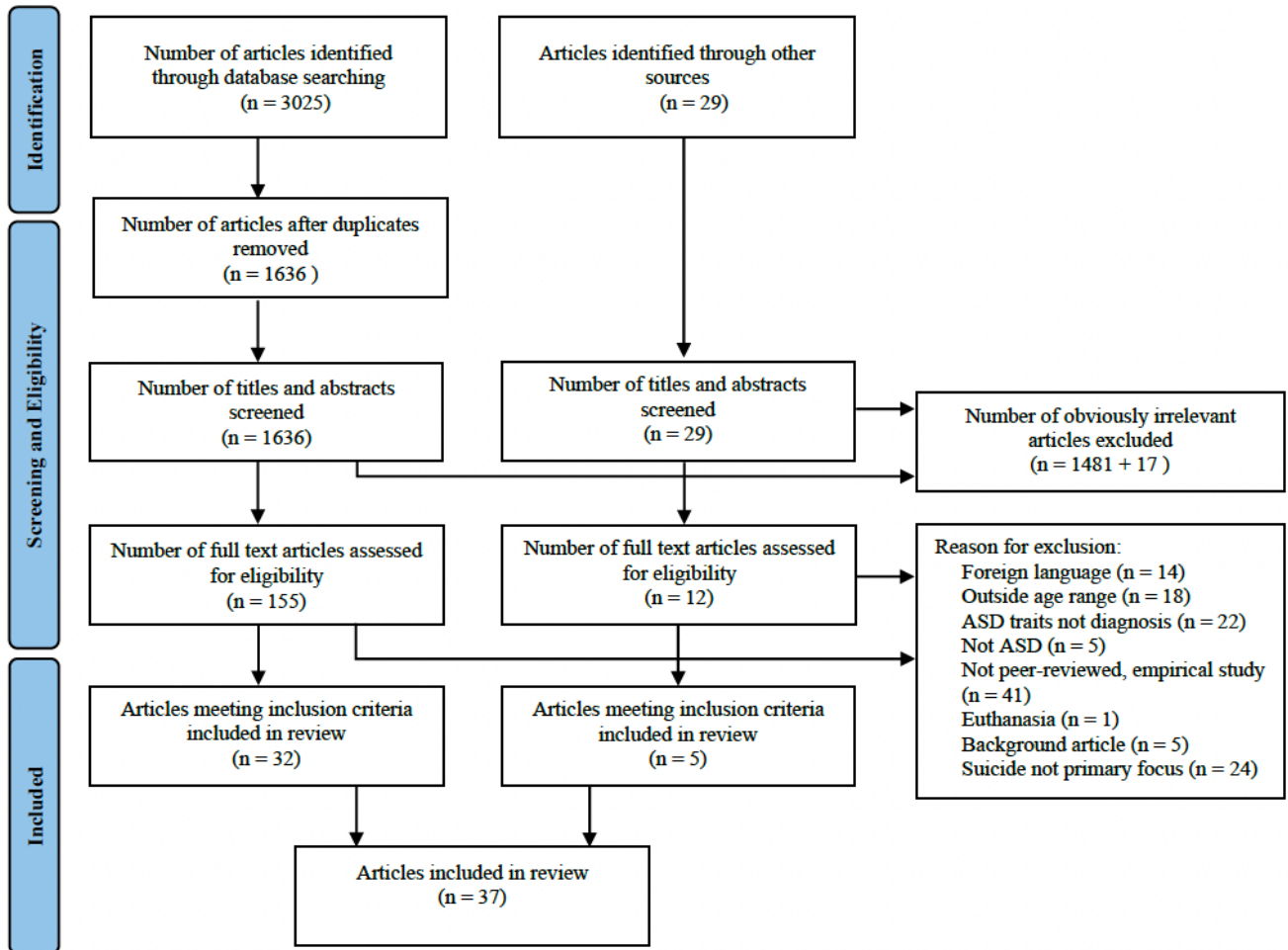
Broad category	Specifics Captured
Study characteristics	Author; Publication Year; Country of Origin; Study Design; Comparison Group; Reference to Theory
Sample characteristics	Sample Size; Mean Age; Percentage of Male Participants; Participant Race; Method of Sample Ascertainment; Autism Diagnosis Tool; Measures Employed to Assess Cognitive and Intellectual Ability; Data Source
Suicidality results	Primary Standardised Measure Employed; Prevalence Figures Coded According to Their Study-specific Operationalisation
Thwarted belongingness	Indicators and features related to the need for connectedness not being met
Perceived burdensomeness	Indicators and features related to the need for social competence not being met
Suicidal capability	Indicators and features related to suicidal capability
Associated constructs	Any additional risk/protective factors for suicidality

³ Darren Hedley, La Trobe University; Mirabel Pelton, University of Coventry; Paige Cervantes, Virginia Commonwealth University; Rachel Moseley, Bournemouth University; Sarah Cassidy, University of Nottingham; Simon Baron-Cohen, University of Cambridge; Oren Shtayermman, Thompson Rivers University

Finally, stakeholders were engaged as a final step to aid in interpreting the findings, as recommended by Arksey & O'Malley (2005). Reviews can be enhanced and the results made more useful if practitioners and consumers contribute to the work (Oliver, 2001). To ensure the results catered closely to the needs of the intended audience, we collaborated with two autistic individuals who possess relevant lived experiences. They provided valuable input on the wording and formulation of both the results and discussion sections.

Results

Database searches conducted in March 2023 resulted in 3025 findings. After excluding 1389 duplicates and 1235 studies based on title and abstract screening, 155 studies remained. Among these, 32 met the inclusion criteria. The PRISMA flow diagram in Figure 2 depicts article exclusion reasons during full-text examination. In May 2023, experts in the subject area were contacted via email, leading to the full-text screening of three additional articles, two of which were included. Additionally, reference tracking resulted in the screening of 26 articles' titles and abstracts, with nine undergoing full-text assessment. Among these, three articles met the inclusion criteria, resulting in a final sample of 37 studies. The thesis author reviewed all initially included studies and full-text possibilities, while three research assistants shared the second review. There was 91% agreement in the screening of full-text studies, and disagreements were resolved through consensus or consultation with a senior research supervisor. All studies were dually charted to ensure comprehensive coverage. The thesis author independently charted 100% of the studies, while the same set of articles was also charted by research assistants, with each assistant responsible for a portion of the studies. The data was then merged and discrepancies were resolved through consensus, resulting in a 100% agreement. In cases where there was ambiguity in an article's content, authors were contacted via email for clarification to ensure accurate reporting.

Figure 2*PRISMA Flow Diagram***Study Characteristics**

Across the 37 studies, excluding the single case study, the number of autistic participants ranged from 6 to 54,168. Most studies did not make use of comparison samples (57%). The majority of studies (92%) provided information on participant age, with 8 studies reporting ages below the lower inclusion criteria limit of 18 years but overlapping with the target range and mean age. The reported mean ages in the remaining studies ranged from 19.7 to 42.6 years. 36 studies reported on biological sex, with 95% including males and females in varying ratios. Only 32% of studies explicitly excluded participants with intellectual disability. However, it is reasonable to assume that a significant portion of the studies excluded individuals with severe communication difficulties or intellectual disabilities. This

assumption is supported by the fact that 46% of the study samples were comprised of volunteers who could understand and respond to the various advertisements associated with the studies. The majority of studies were cross-sectional (81%) and conducted in the United Kingdom and the United States. Data collection methods varied, with 57% utilising participant self-report, 24% using a combination of reports from different sources (e.g., self, parent, and clinician), and 16% involving chart review and registry/database searches.

Four studies utilised population-based samples (Cervantes et al., 2023; Hand et al., 2020; Hirvikoski et al., 2020; Kølves et al., 2021) and two studies stood out as focusing on neuroimaging and exploring brain activity in relation to suicide risk in individuals with ASD (Moxon-Emre et al., 2022; Ota et al., 2020). Overlapping samples were described in three groups of studies: Shtayermman (2007) and Shtayermman (2008); Shtayermman (2022) and Shtayermman & Fletcher (2022); and Moseley et al. (2022a), Moseley et al. (2022b), and Moseley et al. (2023).

Comprehensive information regarding sample characteristics can be found in Table 3. For any additional charting of study and sample characteristics not included in Table 3, please refer to Appendix C.

Assessment and Prevalence of Suicidality

The assessment and prevalence of suicidality varied across studies, covering different aspects such as ideation, attempts, risk, and death by suicide. Six studies exclusively focused on ideation, while four concentrated solely on attempts. Only one study exclusively reported on death by suicide (Kirby et al., 2019). It is worth noting the distinction between studies reporting the prevalence of suicidality within samples of autistic individuals (95% of studies) versus studies reporting the prevalence of ASD within samples of individuals endorsing suicidality (Kølves et al., 2021; Rydén et al., 2008).

Evaluations of suicide risk involved various methods, including self-report measures, medical record review (including national and regional registries), and clinical assessments. The majority of studies (73%) evaluated overall suicide risk with standardised measures. Additionally, qualitative analysis was employed in three studies, and two studies directly assessed the history of suicide attempts using a yes/no question (Paquette-Smith et al., 2014; Shtayermman & Fletcher, 2022).

The reporting of suicidality varied based on the primary objective of the study, such as characterising suicidality within autistic individuals, or making comparisons with a control group. Furthermore, the operationalisation of suicidality prevalence differed across studies, leading to variations in measurement approaches. For instance, studies employing interview-based measures reported the prevalence of suicidality as the percentage of individuals who provided binary (yes/no) responses to closed questions, or met specific diagnostic interview criteria. In contrast, studies utilising standardised questionnaires determined prevalence based on the percentage of individuals surpassing clinical cut-off scores, as indicated in each study's respective findings.

The prevalence of suicidality showed significant variation across the studies. Figure 3 displays the rates of suicidal ideation, while Figure 4 presents the rates of suicide attempts. Additionally, Figure 5 represents the rates of overall suicidality, where studies did not differentiate between thoughts and behaviours. The prevalence of death by suicide ranged from 0.16% in individuals with ASD and ID (Hirvikoski et al., 2020) to a maximum reported prevalence of 7.7% (Raja et al., 2011). Due to the limited number of studies reporting on death by suicide, this specific data is not presented in a figure, but can be found in Appendix E.

Table 3*Characteristics of Included Studies and Their Respective Autistic Participants*

Author(s) and year	Country	N	Mean age (sd)	% Male	ASD diagnosis	Data source
Arwert & Sizoo (2020)	Netherlands	75	35.9 (12.96)	61	National guidelines	Self
Barcelos et al. (2021)	UK	36	Median range: 25–34	50	Formal diagnosis, NOS	Self
Camm-Crosbie et al. (2019)	UK	200	38.9 (11.5)	38.5	Self-report	Self
Cassidy et al. (2018)	UK	164	Males: 41.52 (11.73), Females: 38.89 (10.47)	39.6	Self-report	Self
Cassidy et al. (2014)	UK	374	31.5 (10.9)	68.4	AAA	Self
Cervantes et al. (2023)	US	N/A	Range: 17 - 25	N/A	ICD-9	Database
Costa et al. (2020)	Luxembourg	150	33.74 (11.81)	31.33	Self-report	Self
Dell’Osso et al. (2019)	Italy	34	29.8 (12.1)	52.9	DSM-V	Self, Clinician
Dow et al. (2021)	US	98	28.2 (10.9)	68.4	Documented ASD diagnosis, NOS	Self
Hand et al. (2020)	US	21792	Median (IQR): 35 (26, 46)	74.5	ICD-9	Database
Hedley et al. (2021)	Australia	111	42.45 (13.03)	32.4	Documented ASD diagnosis, NOS	Self
Hedley et al. (2018)	Australia	185	37.11 (15.41)	50.3	Clinical Diagnosis, Excluding Self-Diagnosis	Self
Hedley et al. (2017)	Australia	76	25.15 (7.74)	90.8	Confirmed GP Diagnosis	Self
Hirvikoski et al. (2020)	Sweden	54 168	24.13 (10.95) ^a	No ID: 68.03% ID: 66.44%	Record review, ICD-9 to ICD-10 conversion	Database

Table 3 (continued)

Hooijer & Sizoo (2020)	Netherlands	74	Median (IQR): 28.5 (23–42.3)	60.8	DSM-IV, ADI-R adaption	Self
Jachyra et al. (2022)	Canada	16	22.5 (range 17 - 31)	62.5	DSM-V	Chart review
Jackson et al. (2018)	US	56	22.98 (6.01)	46.4	Institutional information sharing, self-report	Self
Kato et al. (2013)	Japan	43	33.7 (12.6)	81.4	DSM-IV, AQ-J	Self, Clinician
Kirby et al. (2019)	US	49	32.41 (15.98)	86	ICD-9, ICD-10	Database
Kølves et al. (2021)	Denmark	35 020	20-29 ^b	73.4	ICD-8, ICD-10	Database
Moseley et al. (2020)	UK	102	42.6 (14)	22.3	Self-report	Self
Moseley et al. (2022a)	UK	314	41.9 (13.4)	26.8	Self-report	Self
Moseley et al. (2022b)	UK	314	41.9 (13.4)	26.8	Self-report	Self
Moseley et al. (2023)	UK	314	41.9 (13.4)	26.8	Self-report	Self
Moxon-Emre et al. (2022)	Canada	28	23.3 (4.69)	75	DSM-5, ADOS-2	Self, Physician
Ota et al. (2020)	Japan	20	29.05 (6.39)	80	DSM-V	Self, Clinician
Paquette-Smith et al. (2014)	Canada	50	34.5 (11.2)	44	Formal ASD diagnosis, NOS, AQ	Self
Pelton et al. (2023)	UK	463	41.55 (13.9)	49	Self-Report	Self
Pelton et al. (2020)	UK	350	41.9 (range 18 – 90)	35.4	Self-Report	Self
Raja et al. (2011)	Italy	26	30.2 (9.8)	96.1	DSM-IV	Chart review
Rydén et al. (2008)	Sweden	6	31.2 (8.89)	0	ASDI, interview schedule	Self, Clinician, Chart-review
Shtayermman (2007)	US	10	19.7 (3)	90	KADI	Self, parent-report

Table 3 (continued)

Shtayermman (2008)	US	10	19.7 (3)	90	KADI	Self, parent-report
Shtayermman (2022)	US	144	36.03 (15.43)	38.9	ASD registry, NOS	Self
Shtayermman & Fletcher (2022)	US	144	36.03 (15.43)	38.9	ASD registry, NOS	Self
Takara & Kondo (2014)	Japan	37	28 (10.9) ^c	46	DSM-IV, DSM-IV-TR	Self, Clinician
Weiner et al. (2019)	France	1	21	100	DSM-V, ADI-R	Self, Clinician, Parent-report

Note. AAA: Adult Asperger Assessment; ADI-R: Autism Diagnostic Interview-Revised; ADOS-2: Autism Diagnostic Observation Schedule-2; AQ: The Autism-Spectrum Quotient; AQ-J: Autism-Spectrum Quotient - Japanese Version; ASDI: The Asperger Syndrome (and high-functioning autism) Diagnostic Interview; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; DSM-IV-TR: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text-Revision; DSM-V: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; GP: General Practitioner; ICD-8: International Classification of Diseases, Eighth Revision; ICD-9: International Classification of Diseases, Ninth Revision; ICD-10: International Classification of Diseases, Tenth Revision; ID: Intellectual disability; IQR: Interquartile range; KADI: Krug Asperger's Disorder Index; NOS: Not Otherwise Specified; UK: United Kingdom; US: United States.

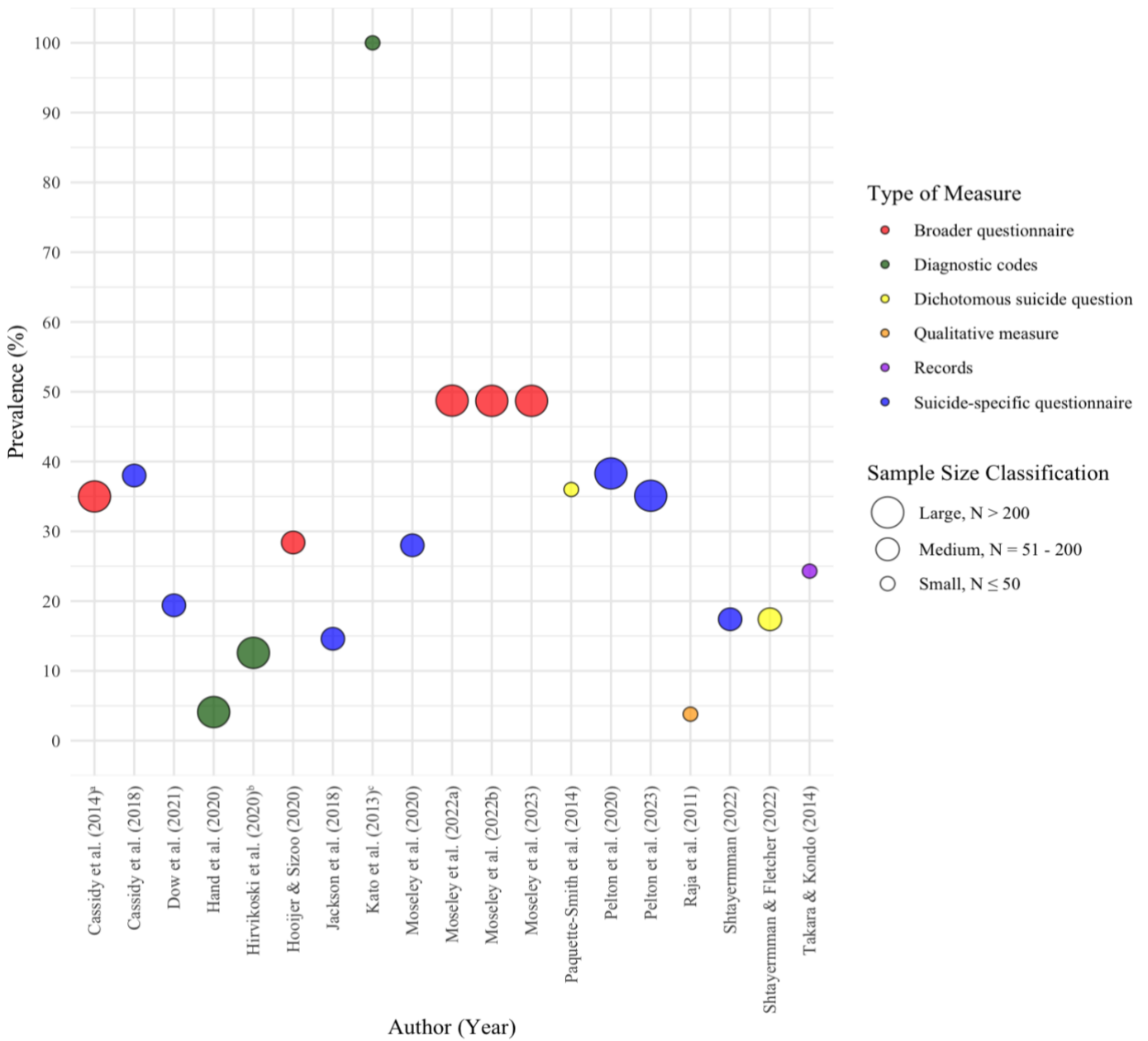
^a Age at suicide attempt in individuals with ASD without ID or ADHD.

^b 68.99% of participants fell within this age range.

^c Mean age for the participants classified as suicide attempter

Figure 3

Bubble Plot Depicting the Prevalence of Suicide Ideation by Study



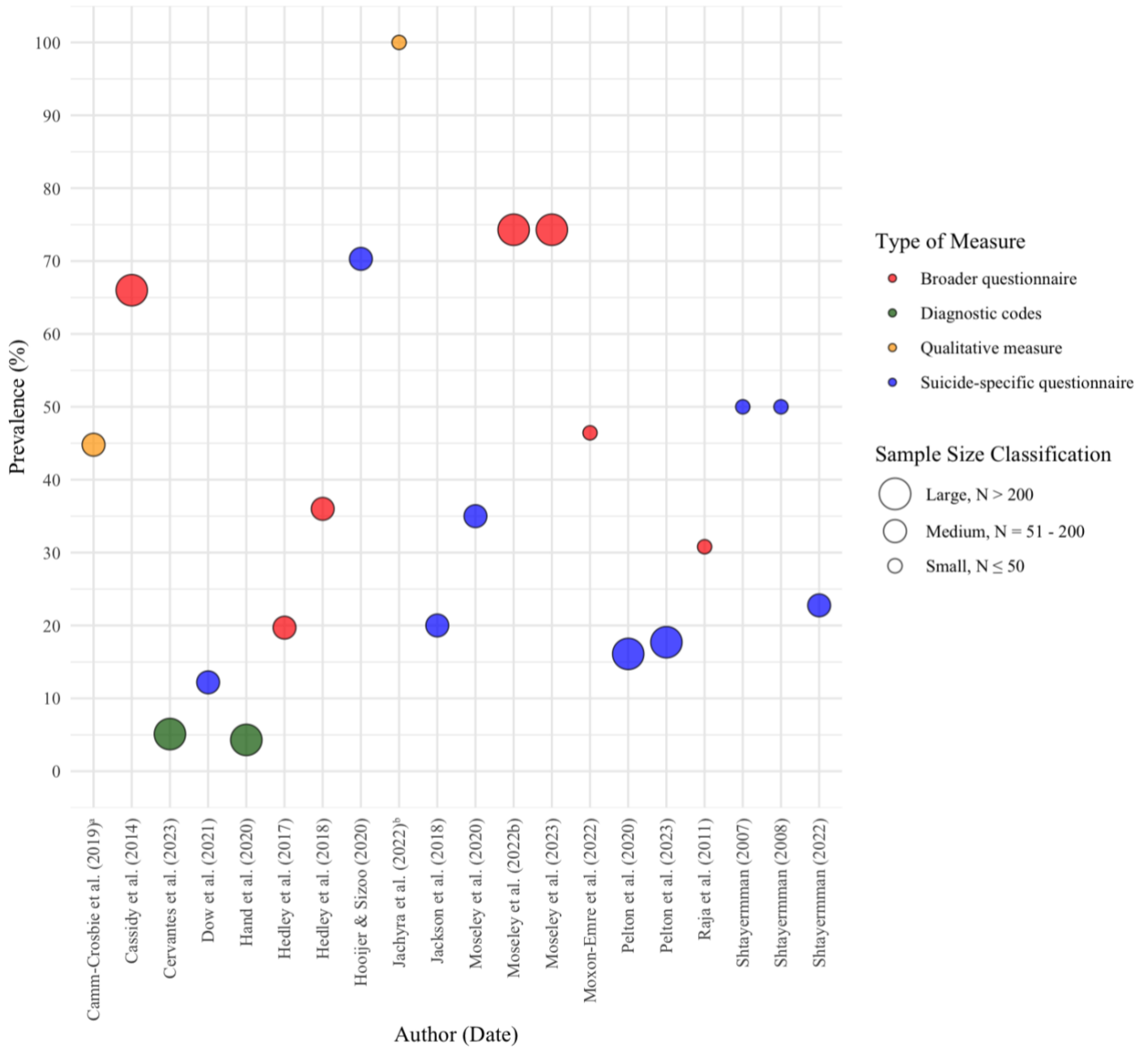
Note.

^a Single percentage for plans or attempts

^b Individuals with ASD without ID and ADHD; ^c Study focused exclusively on individuals who had attempted suicide.

Figure 4

Bubble Plot Depicting the Prevalence of Suicide Attempt by Study



Note.

^aDepicting the prevalence for participants in the ‘treatment needed’ group, participants in the ‘treatment received’ group had a lower prevalence of 34.2%

^bThe study specifically focused on individuals who expressed suicidal thoughts or engaged in suicidal behaviours, resulting in a 100% prevalence of suicidal ideation among the participants.

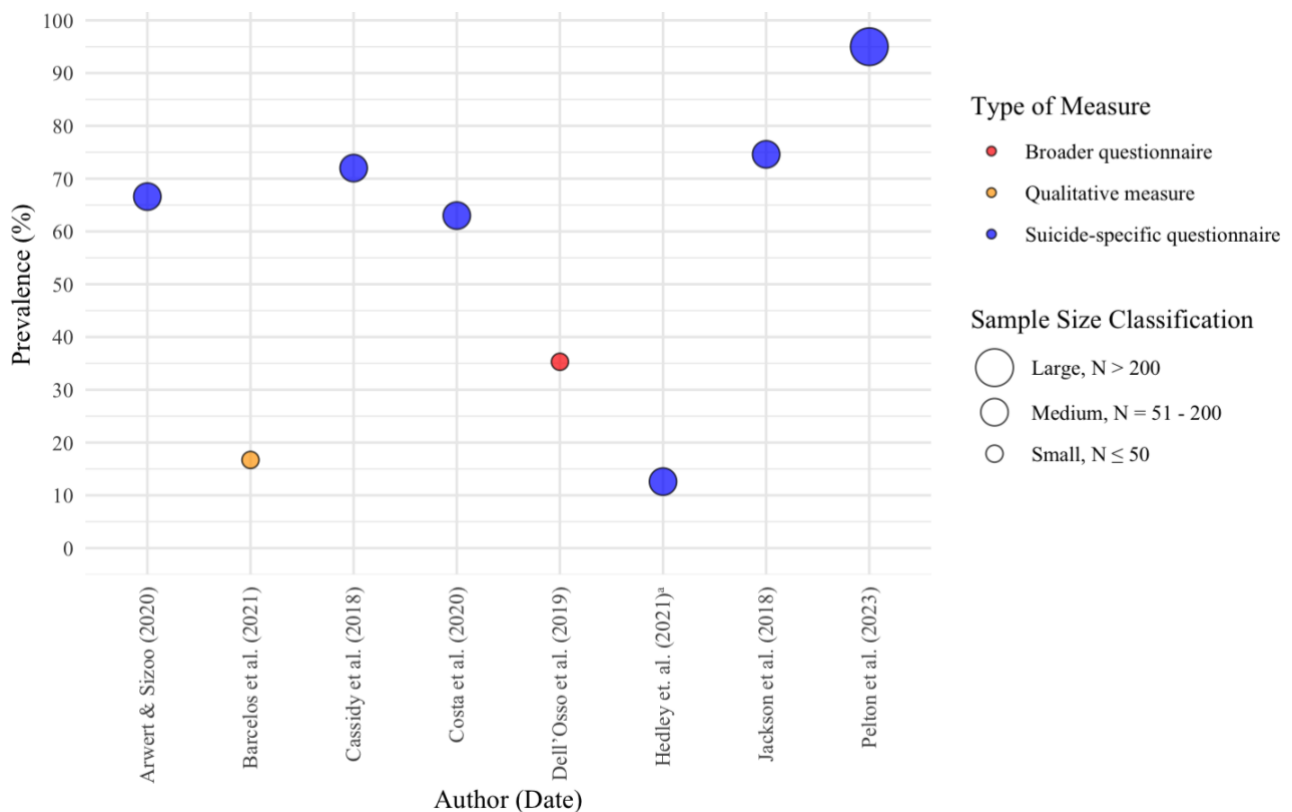
Ten studies conducted statistical analyses to determine whether individuals with ASD exhibited elevated levels of suicidal behaviours compared to control groups composed of typically developing individuals. All of these studies, with the exception of Kirby et al. (2019), consistently indicated that individuals with ASD displayed significantly higher rates of suicidal behaviours than their non-ASD counterparts.

Examination of Studies Through the Lens of the ITS

Among the included studies, a majority (68%) did not explicitly mention a suicide theory. However, among the 32% of studies that did refer to a theory, 92% specifically mentioned the ITS. Furthermore, five studies (Dow et al., 2021; Moseley et al., 2022a, 2022b, 2023; Pelton et al., 2020) directly examined components of the ITS.

Figure 5

Bubble Plot Depicting the Prevalence of Overall Suicidality Across Studies



Note. ^a Assessed as being at moderate risk of suicide

Table 4 provides a summary of the identified components of the ITS and the measures that were utilised to assess these components. For a more comprehensive examination of the ITS components investigated in each study, please refer to Appendix D.

Thwarted Belongingness

Among the 25 studies that either explicitly reported or were interpreted as reporting on aspects related to thwarted belongingness, 68% of them offered evidence supporting the significance and applicability of this component within the autistic community. These studies explored various features encompassed by thwarted belongingness, including loneliness (Barcelos et al., 2021; Hedley et al., 2018; Jackson et al., 2018), poor peer relationships, being single (Kato et al., 2013; Kõlves et al., 2021) living alone (Rydén et al., 2008), peer victimisation (Shtayermman, 2007), dissatisfaction with social relationships (Dow et al., 2021; Hedley et al., 2021), and social exclusion (Shtayermman, 2008).

Additional risk factors related to feelings of belonging and being understood were highlighted in several studies. The recurring theme of unmet support needs was evident in studies by Camm-Crosbie et al. (2019), Cassidy et al. (2018), and Paquette-Smith et al. (2014). These findings shed light on the social challenges faced by autistic individuals and highlight the perception that the existing support system fails to adequately meet their needs. For example, participants in the study conducted by Camm-Crosbie et al. (2019) described a lack of understanding of autism among care professionals. This lack of understanding was said to create significant barriers to accessing appropriate care and contributed to a sense of hopelessness, being misunderstood, and isolation. Additionally, Paquette-Smith et al. (2014) found that individuals who had previously attempted suicide exhibited higher levels of communication impairments and difficulties in attention switching. These factors further compounded challenges in social interactions and reduced help-seeking behaviours.

A subset of studies' results ($n = 8$) raised doubts regarding the applicability of the construct in autistic populations. Moseley et al. (2020) observed a non-significant negative trend between perceived social support and suicidality, questioning the effectiveness of social support in addressing the challenges faced by individuals on the autism spectrum. Similarly, Shtayermman & Fletcher (2022) did not find a significant association between results on the Multidimensional Scale of Perceived Social Support (MSPSS, Zimet et al., 1988) and suicide attempts. Additionally, Moseley et al. (2022b, 2023) found no significant association between thwarted belongingness and suicide ideation or lifetime suicide attempts among autistic individuals (including those with comorbid ADHD), while Pelton et al. (2023) reported the absence of connections from mood symptoms to somatic and thwarted belonging experiences for autistic adults compared to non-autistic adults. Takara & Kondo (2014) found no significant differences in marital status between suicide attempters and non-attempters, although suicide attempters were less likely to live alone, approaching but not reaching statistical significance. In contrast to findings in the general population, Hedley et al. (2017) reported no significant association between Appraisal or Belonging Support and depression or suicidal ideation in autistic individuals. Notably, autistic participants with higher ASD traits reported lower availability of social activities partners, but these variables did not significantly associate with depression or suicidal ideation. Finally, while not conclusively refuting the theory, Kölves et al. (2021) found that being married or cohabiting, typically protective factors against suicide attempts in the general population, offered less protection among individuals with ASD.

Perceived Burdensomeness

A total of 27 studies either explicitly reported or were interpreted as reporting on aspects related to perceived burdensomeness, 89% of which provided support for the relevance and applicability of this construct within the autistic community. These studies

explored different features of the construct, including low self-esteem, feelings of uselessness or meaninglessness (Arwert & Sizoo, 2020; Weiner et al., 2019), reliance on family (Camm-Crosbie et al., 2019), unemployment (Cassidy et al., 2018a; Raja et al., 2011; Shtayermman, 2022), lower education (Kato et al., 2013), unfulfilled academic or career potential (Cassidy et al., 2014), academic discomfort (Jackson et al., 2018), and difficulty managing life transitions (Jachyra et al., 2022). Notably, Pelton et al. (2020, 2023) found higher perceived burden in autistic individuals compared to non-autistic individuals, and Dow et al. (2021) reported that 22.4% of participants experienced feelings of making life worse for others. Furthermore, authors found that perceived burdensomeness correlated with suicidal ideation, suicidal plans and lack of control over suicidal thoughts. Similarly, Moseley et al. (2023) found perceived burdensomeness was associated with increased suicidal ideation, and directly predicted the likelihood of lifetime suicide attempts.

Additional related findings include those by Paquette-Smith et al. (2014), who reported that both suicide attempters and non-attempters utilised mental health services at comparable rates, but individuals who attempted suicide faced greater challenges in affording these services despite having similar income levels. Hedley et al. (2021) found significant negative associations between personal wellbeing and both depression and suicide risk for both women and men. Notably, personal wellbeing was evaluated across various domains, including standard of living, life achievement, and future security. In the Self-Acceptance/Self-Denial Scale of the Structural Analysis of Social Behaviour (SASB, Erickson & Pincus, 2005), Rydén et al. (2008) observed significantly lower levels of self-love among autistic individuals compared to other groups. Lastly, Barcelos et al. (2021) reported that participants who cared for a dog experienced an increased perception of being needed, and authors suggested that this reduction protected against suicidality by way of reducing feeling of perceived burdensomeness.

Table 4*Identified Components of the ITS and Relevant Validated Measures*

Author(s) and year	Thwarted Belongingness	Perceived Burdensomeness	Acquired Capability	Validated Measures Utilised
Arwert & Sizoo (2020)		X		RSES
Barcelos et al. (2021)	X	X		N/A
Camm-Crosbie et al. (2019)	X	X	X	N/A
Cassidy et al. (2018)	X	X	X	NSSI-AT
Cassidy et al. (2014)	X	X		N/A
Cervantes et al. (2023)		X	X	ICD-9 codes
Costa et al. (2020)	X	X		CES-D; TAS
Dell'Osso et al. (2019)				N/A
Dow et al. (2021)	X	X	X	Adult Living Survey; INQ
Hand et al. (2020)			X	ICD-9, ICD-10 codes
Hedley et al. (2021)	X	X		PWI-A
Hedley et al. (2018)	X			ULS-8; SSQ-6
Hedley et al. (2017)	X	X		W-ADL; ISEL-12
Hirvikoski et al. (2020)		X		ICD-9, ICD-10 codes
Hooijer & Sizoo (2020)			X	VTCI

Table 4 (continued)

Jachyra et al. (2022)	X	X	X	N/A
Jackson et al. (2018)	X	X		UCLA Loneliness Scale
Kato et al. (2013)	X	X	X	DSM-IV-TR; MINI; ICD-10 Codes
Kirby et al. (2019)		X		N/A
Kölves et al. (2021)	X	X		ICD-10 codes
Moseley et al. (2020)		X	X	ISEL-12; NSSI-AT
Moseley et al. (2022a)			X	NSSI-AT; ACWRSS; SITBI, short form
Moseley et al. (2022b)	X	X	X	INQ-15; ACWRSS; SITBI, short form
Moseley et al. (2023)	X	X	X	INQ-15; ACWRSS; SITBI, short form
Moxon-Emre et al. (2022)				N/A
Ota et al. (2020)				N/A
Paquette-Smith et al. (2014)	X	X	X	N/A
Pelton et al. (2023)	X	X	X	INQ-10
Pelton et al. (2020)	X	X	X	INQ-10; ACSSFAD; VEQ
Raja et al. (2011)	X		X	N/A
Rydén et al. (2008)	X	X	X	MINI; SASB
Shtayermman (2007)	X			Social Experiences Questionnaire
Shtayermman (2008)	X			N/A

Table 4 (continued)

Shtayermman (2022)		X		MSPSS
Shtayermman & Fletcher (2022)	X	X		MSPSS
Takara & Kondo (2014)	X	X	X	DSM-IV-TR
Weiner et al. (2019)	X	X	X	N/A

Note. AC: Acquired Capability; ACSSFAD: Acquired Capability for Suicide Scale-Fearlessness of Death; CES-D: The Center for Epidemiological Studies-Depression Scale; DSM-IV-TR: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text-Revision; ICD-9: International Classification of Diseases, Ninth Revision; ICD-10: International Classification of Diseases, Tenth Revision; INQ: Interpersonal Needs Questionnaire; INQ-10: The Interpersonal Needs Questionnaire-15; INQ-15: The Interpersonal Needs Questionnaire-15; ISEL-12: The Interpersonal Support Evaluation List-12 Item Version; MINI: Mini International Neuropsychiatric Interview; MOODS-SR: Mood Spectrum, self-report (lifetime version); MSPSS: Multidimensional Scale of Perceived Social Support; N/A: Not Applicable; NSSI-AT: The Non-Suicidal Self-Injury Assessment Tool; PB: Perceived Burdensomeness; PWI-A: Personal Wellbeing Index, Adult; RSES: The Dutch version of the Rosenberg Self-esteem Scale; SASB: Structural Analysis of Social Behaviour; SITBI: Self-Injurious Thoughts and Behaviours Interview, short form; SSQ-6: Social Support Questionnaire-Shortened Version; TAS: The Toronto Alexithymia Scale; TB: Thwarted Belongingness; ULS-8: The University of California Los Angeles Loneliness Scale-Short Form; VEQ: Vulnerability Experience Quotient; VTCI: (Verkorte) Temperament and Character Inventory; W-ADL: The Waisman Activities of Daily Living scale.

Three articles cast doubt on the relevance of the construct. Takara and Kondo (2014) reported that educational level and employment status did not differ significantly between suicide attempters and non-attempters, regardless of whether they had autism or not. Shtayermman and Fletcher (2022) observed no significant links between education, employment status, income, and suicide attempts. Additionally, Cervantes et al. (2023) found that individuals experiencing suicidal ideation or intentional self-inflicted injury were less likely to have Medicaid, a health coverage option for low-income adults and people with disabilities, relying instead on self-pay or other alternatives. Interestingly, these individuals were found to reside in areas with higher median household incomes. This finding contrasts somewhat with the research by Costa et al. (2020), which demonstrated that having dual eligibility for both Medicare (a government-funded health insurance programme) and Medicaid had a 55% higher chance of attempting suicide compared to those without dual eligibility. It is worth noting that dual eligibility did not affect the likelihood of having suicidal thoughts, but specifically increased the risk of suicide attempts.

The Interaction between Thwarted Belongingness and Perceived Burdensomeness

Two studies examined the link between thwarted belongingness and perceived burdensomeness. Pelton et al. (2020) reported that an interaction between perceived burdensomeness and thwarted belongingness was observed in the non-autistic group, but not in the autistic group. Indeed, despite reporting greater burdensomeness and thwarted belonging, the influence of these components on suicidality appeared to be attenuated in the autistic group. Furthermore, participants who expressed experiencing greater feelings of thwarted belongingness and perceived burdensomeness were found to have a higher likelihood of engaging in suicide attempts rather than having suicidal ideation or no history of suicidal behaviour. Finally, Moseley et al. (2022b) found that the combined effect of

thwarted belongingness and perceived burdensomeness on suicide risk was not stronger than the impact of each construct considered independently.

Acquired Capability

All 19 studies identified as exploring features associated with acquired capability provided evidence supporting a link between the component and suicidal tendencies in autistic individuals (e.g., Dow et al., 2021; Moseley et al., 2020, 2022a, 2022b; Pelton et al., 2020; Takara & Kondo, 2014). Takara and Kondo (2014) reported a notably higher prevalence of past suicidal behaviours among individuals, with and without ASD, who had attempted suicide compared to those who hadn't. Similarly, Moseley et al. (2022a) emphasised that the frequency of NSSI behaviours and specific types of self-harm directly and indirectly influenced lifetime suicide attempts through acquired capability. In line with this, Pelton et al. (2020) observed that individuals, both autistic and non-autistic, with lower suicidal capability were more likely to experience suicidal ideation rather than attempt suicide.

Multiple studies highlighted a significant correlation between NSSI and suicidality in autistic individuals (e.g. Cassidy et al., 2018; Hand et al., 2020; Moseley et al., 2020, 2022a). These studies also indicated that autistic individuals exhibited a higher propensity for engaging in NSSI when compared to their non-autistic counterparts (Cassidy et al., 2018; Cervantes et al., 2023). Moseley et al. (2020) reported that for every 1-point increase in suicide item scores, participants were 3.3 times more likely to report engaging in cutting behaviour. Significantly, Moseley et al. (2022a) found that both autistic and non-autistic individuals who engaged in self-harm had a higher propensity for suicide attempts compared to non-self-harming individuals. However, the correlation between NSSI and suicidality was relatively weaker among autistic individuals compared to non-autistic individuals.

Additional features of acquired capability were linked to suicidal thinking in autistic individuals. Specifically, a reduced fear of death, increased pain tolerance (Dow et al., 2021; Moseley et al., 2022a), and mental rehearsal of suicide plans (Jachyra et al., 2022; Moseley et al., 2022a). Notably, Moseley et al. (2022a) reported that these factors significantly contributed to the presence of suicidal thoughts, regardless of their involvement in NSSI. Dow et al. (2021) reported that 55.1% of participants exhibited overall fearlessness, indicating a reduced fear of engaging in self-harming behaviours. Similarly, Moseley et al. (2022b) found that a reduced fear of death was associated with a higher number of lifetime suicide attempts.

Finally, the acquired capability features of exposure to traumatic and provocative life events (Moseley et al., 2023; Pelton et al., 2020), a familial link to suicide (Kato et al., 2013; Raja, 2014; Takara & Kondo, 2014), decreased inhibition (Hooijer & Sizoo, 2020), and substance use (Camm-Crosbie et al., 2019; Jachyra et al., 2022; Kato et al., 2013) were found to be associated with suicidality. Significantly, Pelton et al. (2020) found that traumatic life events were linked to lifetime suicidality in both autistic and non-autistic individuals, with autistic individuals reporting a higher prevalence of traumatic events.

Associated Constructs

Several distinct constructs contributing to suicidality among autistic adults were reported, which were not immediately recognised as belonging to the categories of thwarted belongingness, perceived burdensomeness, or acquired capability. These constructs were thoroughly charted and can be found in Appendix E. Key findings are summarised below:

Neurophysiological markers related to suicide in autistic adults were identified by Moxon-Emre et al. (2022) and Ota et al. (2020). Furthermore, restricted interests (Dell'Osso et al., 2019; Weiner et al., 2019) and camouflaging (Camm-Crosbie et al., 2019; Cassidy et al., 2018b) were correlated with suicidality.

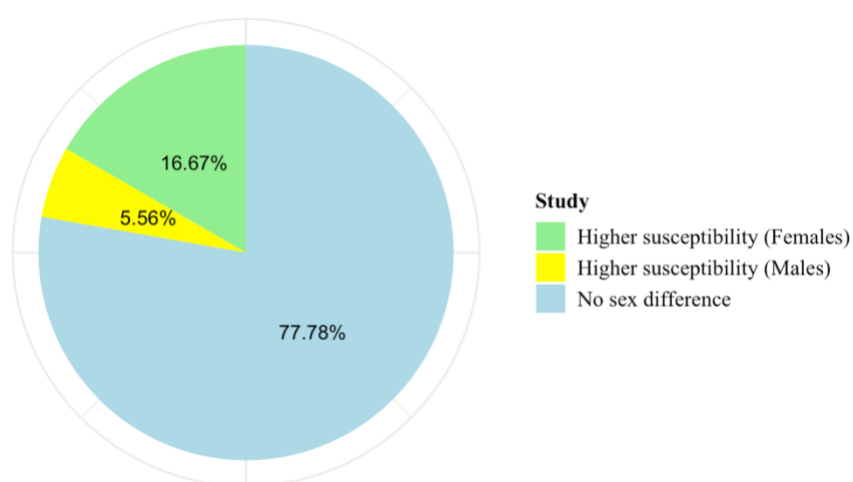
Sex differences in suicidality among individuals with ASD were investigated in 49% of the included studies. Figure 6 illustrates that the majority of these studies did not find any significant variation between males and females (Arwert & Sizoo, 2020; Cassidy et al., 2014, 2018; Costa et al., 2020; Dell’Osso et al., 2019; Hedley et al., 2018, 2021; Hooijer & Sizoo, 2020; Kirby et al., 2019; Moseley et al., 2020; Pelton et al., 2020, 2023; Raja, 2014; Takara & Kondo, 2014).

Furthermore, the relationship between age and suicidality in individuals with ASD was examined in several studies. Kato et al. (2013) and Kirby et al. (2019) found that incidences of suicide occurred at a significantly younger age in autistic individuals compared to non-autistic individuals. Further, Costa et al. (2020), Hand et al. (2020), and Takara & Kondo (2014) reported that within the autistic population, younger ages were associated with higher rates of suicidality among adults with ASD. In contrast, Dell’Osso et al. (2019) and Hooijer & Sizoo (2020) did not find a significant correlation between age and suicidality in

Figure 6

Pie Chart Depicting Sex Differences in Suicide Susceptibility

Reported Across Studies



Note: Suicide Susceptibility refers to a broad range of suicidal behaviours and thoughts, encompassing ideation, attempts, and death by suicide.

their samples.

41% of studies reported significant correlations between suicidality and comorbid neurodevelopmental and psychiatric conditions in autistic individuals (e.g., Camm-Crosbie et al., 2019; Cassidy et al., 2018; Hand et al., 2020; Hedley et al., 2017;

Hirvikoski et al., 2020; Kõlves et al., 2021; Moseley et al., 2023; Moxon-Emre et al., 2022; Raja, 2014; Rydén et al., 2008; Takara & Kondo, 2014). Notable comorbid conditions included ADHD, intellectual disability, anxiety and depression. Indeed, Cassidy et al. (2018), Hirvikoski et al. (2020) and Moseley et al. (2023) found that higher risk of suicidal behaviour and poorer mental health outcomes were associated with ASD with comorbid ADHD. In addition, individuals with ASD and intellectual disability were found to have a significantly heightened risk of both suicide ideation and attempts in three studies (Cervantes et al., 2023; Hand et al., 2020; Hedley et al., 2017). Conversely, Hirvikoski et al. (2020) found that individuals without intellectual disability had a significantly heightened risk of both suicide attempts and completed suicides. Finally, four studies reported a significant association between anxiety and suicidality (Hedley et al., 2017; Raja, 2014; Shtayermman, 2022; Shtayermman & Fletcher, 2022). Though two studies reported no such significant relationship (Barcelos et al., 2021; Moseley et al., 2022b).

Depression was reported or measured in 76% of studies, of these 61% controlled for depression. 14 studies reported a significant association between depression and suicidal thoughts and behaviour (Arwert & Sizoo, 2020; Cassidy et al., 2014, 2018; Cervantes et al., 2023; Costa et al., 2020; Dell'Osso et al., 2019; Hedley et al., 2017; Hooijer & Sizoo, 2020; Jackson et al., 2018; Moseley et al., 2022a, 2023; Shtayermman, 2007, 2008, 2022). Notably, Dow et al. (2021) found that individuals with a lifetime history of depression had higher rates of thwarted belongingness and perceived burdensomeness. Moseley et al. (2022a) reported that depression influenced habituation to NSSI and acquired capability, suggesting a higher tendency for individuals with depression to develop the capability for self-injury. In contrast to the above, two studies did not find a statistically significant association between depression and suicide risk (Hedley et al., 2021; Shtayermman and Fletcher, 2022). Finally, in Weiner et al.'s (2019) case study, it was suggested that depression may not always have

been the underlying cause of suicidality, as the autistic individual's suicidal thoughts and behaviours were not linked to a depressive episode but rather presented as a restricted interest.

Multiple studies examined the correlation between rumination and suicidality, with two specific studies (Arwert & Sizoo, 2020; Dell'Osso et al., 2019) reporting a significant relationship between these constructs. Furthermore, Jachyra et al. (2022) highlighted challenges faced by autistic individuals in managing recurring suicidal ideation with consequent emotional distress and fatigue.

Finally, several studies consistently indicated a positive correlation between a higher degree of ASD traits, as measured by standardised assessments, and increased mental health challenges and/or suicidality (Cassidy et al., 2014, 2018; Costa et al., 2020; Dell'Osso et al., 2019; Hedley et al., 2018; Jackson et al., 2018; Paquette-Smith et al., 2014; Shtayermman, 2007). For example, Cassidy et al. (2014) found that individuals who reported suicidal plans or attempts had higher scores on the Autism Spectrum Quotient (Baron-Cohen et al., 2001) compared to those who did not. Furthermore, Hedley et al. (2018) found that the severity of ASD traits was associated with higher depression levels, lower social support satisfaction and increased loneliness. Interestingly, Costa et al. (2020) reported that among autistic individuals with high levels of autistic traits, the risk of suicidality escalated when individuals also displayed increased levels of alexithymia.

Discussion

This scoping review represents the first systematic literature search conducted to assess the adequacy of the ITS in informing our understanding of suicidality among autistic adults. The search yielded 37 studies and suggests a growing trend of studies utilising ITS to understand suicidality in ASD. Indeed, within the past three years, five studies have directly examined components of the ITS in ASD populations (Dow et al., 2021; Moseley et al.,

2022b, 2022b, 2023; Pelton et al., 2020), signifying a recent focus of research in this area. Prior to this timeframe, no published studies explored the ITS components in individuals with autism, underscoring the significance of this emerging body of research.

Consistent with previous reviews, the results indicate a significant prevalence of suicidality in autistic individuals, with higher rates of suicidal thoughts and behaviours compared to non-autistic individuals. There was considerable variation in the prevalence of suicidality within the autistic population, which aligns with findings from previous reviews (Hedley & Uljarević, 2018b; Newell et al., 2023; Segers & Rawana, 2014; Zahid & Upthegrove, 2017). This variability is likely influenced by several factors, including differences in sample sizes, recruitment sources, measurement and reporting methods, as well as participant demographics and diagnostic characteristics. Given the heterogeneity in findings, it is evident that large-scale, population-based studies are necessary to provide a clearer estimate of the true rate of suicidality in individuals with ASD. Such studies would enable researchers to account for various confounding factors, enhance generalisability, and generate more robust conclusions. Furthermore, standardising measurement and reporting methods across studies would contribute to greater comparability and allow for meta-analyses to synthesise findings more effectively.

Thwarted Belongingness

The findings yield compelling evidence to support the relevance and potential extendibility of thwarted belongingness to the unique experiences of autistic individuals. Notably, several features of thwarted belongingness closely correspond to the reported experiences of autistic individuals, falling broadly into categories such as social isolation (Rydén et al., 2008; Shtayermman, 2007; Shtayermman & Fletcher, 2022), relationship difficulties (Dow et al., 2021; Hedley et al., 2021; Kato et al., 2013; Raja et al., 2011), and loneliness (Barcelos et al., 2021; Hedley et al., 2018; Jackson et al., 2018; Kölves et al.,

2021). These findings align with the features of thwarted belongingness described by Joiner (2005) and Van Orden et al. (2010).

Several included studies highlighted the importance of acknowledging that professional support needs are linked to feelings of belonging and being understood in autistic individuals. Participants in studies conducted by Camm-Crosbie et al. (2019), Cassidy et al. (2018), and Paquette-Smith et al. (2014), felt that professional care services were not always able to adequately provide the level of support they needed, and that this led to feelings of hopelessness, isolation, and reduced help-seeking behaviours. Recognising the significance of these challenges may be crucial in the context of reducing the risk of suicide among autistic individuals. Indeed, the current care focus on children with autism has the potential to mean systems inadvertently overlook the needs of autistic legal adults (aged 18+) during their socio-emotional transition into adulthood (Brede et al., 2022; Robison, 2019). The limited amount of sustained support at a critical life stage in turn may significantly exacerbate their feelings of abandonment and isolation. In addition, given findings that indicate that care professionals lack confidence in providing adequate support to autistic individuals (Maddox et al., 2020), it is crucial to prioritise autism-specific training within these sectors. Certainly, such training can help professionals develop a genuine understanding of their autistic patients' needs and create inclusive environments which promote a sense of belonging and empowerment in autistic individuals.

It is important to highlight additional findings charted as associated constructs that could align with the component of thwarted belongingness. For example, studies including a mention of camouflaging (Camm-Crosbie et al., 2019; Cassidy et al., 2018) have yielded findings that align with the concept of thwarted belongingness. Camouflaging refers to the practice of concealing and compensating for autistic traits in order to conform to social norms, and has consistently been associated with poorer well-being in autistic individuals

(e.g., Allely, 2018; Cage & Troxell-Whitman, 2019; Hull et al., 2019; Leedham et al., 2020). What makes camouflaging particularly relevant to the discussion of thwarted belongingness is that engaging in this behaviour requires self-awareness, an understanding of how others perceive oneself, and a motivation to belong (Hull et al., 2017). Consequently, the process of camouflaging can result in a sense of detachment within relationships and impede the authentic expression of one's true self, which contributes to what is known as a 'disclosure disconnect' (Ragins, 2008). This phenomenon highlights the discord between the true experiences and feelings of individuals who engage in camouflaging and their ability to fully disclose their authentic selves to others. Indeed, recent research by Cassidy et al., (2020) found that engaging in the camouflaging of autistic traits increases the likelihood of experiencing thwarted belongingness and lifetime suicidality among undergraduate students.

In addition to camouflaging, restricted interests is another phenomenon that could potentially align with an experience of thwarted belongingness among autistic individuals (Dell'Osso et al., 2019; Weiner et al., 2019). Autistic individuals with restricted interests may struggle to connect with others on topics outside their specific passions, which limits their sense of belonging and daily functioning (Boyd et al., 2011; Stocco et al., 2011). Moreover, the restricted interests of autistic individuals may be closely tied to their thinking style, making it less likely for them to compromise or adapt their interests to fit social contexts (Mercier et al., 2000). This inflexibility could contribute to difficulties in establishing and maintaining social connections, further intensifying the experience of thwarted belongingness. Given that repetitive and restricted interests and patterns of behaviour are defining characteristics of ASD (American Psychiatric Association, 2013), further exploration of their connection to suicidality may be a promising avenue for future interventions aimed at promoting social engagement and increasing a sense of belonging.

Finally, a number of studies question the overall effectiveness of social support in reducing suicidality among autistic individuals (Pelton et al., 2020, 2023; Hedley et al., 2017). Additional stressors introduced by social interactions, such as intolerance of uncertainty (Jenkinson et al., 2020) and pressures contributing to autistic burnout (see Higgins et al., 2021; Mantzalas et al., 2022; Raymaker et al., 2020) may account for the contrasting relationship between social support and mental health outcomes observed in the autistic population compared to the non-autistic population. Furthermore, recognising the subjective nature of loneliness and social dissatisfaction (Ernst & Cacioppo, 1999; Mund et al., 2022) is important in understanding how belonging may vary for autistic individuals in a neurotypical world. Indeed, individuals with varying characteristics and circumstances may interpret questions about belongingness in different ways, placing varying degrees of emphasis on societal expectations versus genuine self-expression. Further research should explore the specific factors contributing to feelings of belonging for autistic individuals and how to nurture these factors in different contexts.

Perceived Burdensomeness

The findings provide compelling evidence to underscore the relevance and potential extendibility of perceived burdensomeness in understanding the experiences of autistic individuals. Indeed, autistic individuals showed significantly higher levels of perceived burdensomeness compared to individuals without autism, and this increase was strongly linked to both suicidal thoughts and suicide attempts (Dow et al., 2021; Moseley et al., 2023; Pelton et al., 2020, 2023). Distinct features of perceived burdensomeness identified in the studies include feelings of uselessness (Arwert & Sizoo, 2020; Weiner et al., 2019), dependence on family (Camm-Crosbie et al., 2019), and unfulfilled academic or career potential (Cassidy et al., 2014, 2018; Kato et al., 2013; Raja, 2014; Shtayermman, 2022).

A significant finding concerning perceived burdensomeness and suicidality in autistic individuals related to their notable struggles in coping with and navigating life transitions, particularly the transition into adulthood (Jachyra et al., 2022; Jackson et al., 2018). Indeed, this phase involves multiple changes related to social roles, residence, work, and education, all occurring within a relatively short period (Schulenberg & Schoon, 2012; Shanahan, 2000). As autistic individuals often struggle with executive functioning (Channon et al., 2001; Ozonoff et al., 1991), coping with stress (Hirvikoski & Blomqvist, 2015), and emotion dysregulation (Mazefsky et al., 2013), they might develop a heightened sense of dependence on others for assistance during this phase. This thesis hypothesises that the inclination to rely on others is especially prominent among individuals who experienced substantial intervention or over-parenting during their childhood (Bradley-Geist & Olson-Buchanan, 2014; Segrin et al., 2012). These individuals may not have received adequate encouragement or guidance to develop self-sufficiency skills. As a result, they may develop a diminished sense of personal agency, learned helplessness, and lower self-esteem (Saxton, 2019), all of which contribute to an increased perception of burdensomeness. This hypothesis could also help to explain the findings of this thesis, which indicate that both younger age (Hand et al., 2020; Kato et al., 2013; Kirby et al., 2019; Takara & Kondo, 2014) and the presence of intellectual disabilities (Cervantes et al., 2023; Hand et al., 2020; Hedley et al., 2017) increase the risk of suicidal thoughts and attempts.

A major pattern observed in the associated constructs was the consistent association between psychiatric and neurodevelopmental comorbidities and heightened suicidality in individuals with ASD. Indeed, previous studies consistently show the substantial burden of comorbidity experienced by individuals with ASD (Bougeard et al., 2021; Joshi et al., 2010; Khachadourian et al., 2023). This finding underscores the cumulative impact of multiple health conditions, potentially leading to increased dependency, functional impairment, and an

intensified perception of burden on others. A higher number of comorbidities directly restricts individuals' ability to derive enjoyment from life, with the accumulation of potentially stigmatising labels further diminishing one's sense of wholeness and reinforcing the perception of identity being overshadowed by disorders. Certainly, while it is important to acknowledge that autistic individuals possess a wide range of abilities and support needs, they often rely on parents or caregivers in adulthood (Magiati et al., 2014), with only a small proportion employed full-time (The Autism Employment Gap, 2016). Furthermore, caregiving responsibilities significantly impact the work, finances, and time of caregivers (Ljungberg & Schön, 2023). Consequently, the elevated rates of suicidality observed in autistic individuals may be attributed to their heightened likelihood of experiencing a profound sense of burdensomeness.

Three of the included articles raised questions about the applicability of the current definition of the component (Cervantes et al., 2023; Shtayermman & Fletcher, 2022; Takara & Kondo, 2014). Notably, these studies yielded findings that suggest a diminished role in the commonly presumed influence of financial factors, such as educational level, employment status, or income level, in shaping the perception of burden among autistic adults. This suggests that alternative factors may contribute significantly to the sense of burdensomeness experienced by this population. Such factors could include a sense of uselessness and a perception of imposing emotional and time-related burdens on caregivers. Therefore, exploring the emotional and interpersonal dynamics surrounding autistic individuals may be a pivotal next step in understanding their experience of burden.

The Interaction between Thwarted Belongingness and Perceived Burdensomeness

Contrary to the theory that interaction between the two components is required to induce suicidal desire, the findings by Pelton et al. (2020) suggest that autistic individuals who experience feelings of thwarted belongingness and perceived burdensomeness are more

likely to attempt suicide rather than to just ideate about it. This suggests the concerning possibility that an increase in these emotions could escalate to actual suicide attempts rather than just suicidal ideation. Furthermore, Moseley et al. (2022b) reveal that the combined effect of thwarted belongingness and perceived burdensomeness on suicide risk did not surpass the individual impact of each construct. It is thus proposed that perceived burdensomeness and thwarted belongingness may be more commonplace and inherent experiences for autistic individuals, to the extent that perhaps only one of these components is sufficient to drive an individual toward a desire for suicide. Further investigation in this area may be essential for a comprehensive understanding of the applicability of ITS to the autistic population.

Finally, multiple included studies consistently link the severity of autism symptomatology to an increased risk of suicidal thoughts and behaviours (Cassidy et al., 2014, 2018; Costa et al., 2020; Dell’Osso et al., 2019; Hedley et al., 2018; Jackson et al., 2018; Paquette-Smith et al., 2014; Shtayermman, 2007). Though charted as an associated construct, it is argued that this finding resonates with both thwarted belongingness and perceived burdensomeness, as individuals with autistic traits may encounter increased challenges in forming social connections, meeting societal expectations and have an overall lower quality of life (e.g. de Vries & Geurts, 2015; Schuwerk et al., 2019). Indeed, autistic traits, regardless of ASD diagnosis, have been shown to contribute to the risk of suicidality (Pelton & Cassidy, 2017; South et al., 2020). For example, Pelton & Cassidy (2017) found that depression and autistic traits predicted thwarted belongingness and perceived burdensomeness, but that autistic traits did not moderate the relationship between suicidal behaviour and these components. However, it is unlikely that ASD symptom severity alone accounts for the elevated suicide rates. Rather, it seems more likely that the difficulties stemming from ASD-related challenges contribute mental health difficulties such as anxiety

and depression, increasing suicide risk (Dow et al., 2021; Gaus, 2011; Richa et al., 2014b). For example, South et al. (2020) found that, though high levels of autistic traits correlated with high levels of suicidal thoughts and behaviours, depression symptoms had a stronger association than social communication traits to suicidality. Moreover, as explained by Gaus (2011), individuals with challenges in social communication skills, self-awareness, and executive functioning often face frequent negative social interactions and struggle with daily living tasks. These experiences, in turn, contribute to the formation of negative thought patterns, increasing the risk of depression (Gaus, 2011). When coupled with an impaired ability to anticipate future experiences (Sinha et al., 2014), these factors likely play a significant role in the development of anxiety and other adverse mental health outcomes.

Acquired Capability

Several included studies investigated the connection between autistic individuals and their propensity for endorsing suicidal capability. The results were consistent with the ITS and present compelling evidence for the relevance of acquired capability in understanding the experiences of suicidal autistic individuals. Specifically, the findings demonstrated a significant correlation between NSSI and suicidality in autistic individuals (Cassidy et al., 2018; Hand et al., 2020; Moseley et al., 2020, 2022a). These findings also indicated that autistic individuals are more likely to engage in NSSI compared to non-autistic individuals (Cassidy et al., 2018; Cervantes et al., 2023). This elevated prevalence of NSSI could potentially shed light on the heightened risk of suicidality observed within autistic populations. Indeed, a meta-analysis by Franklin et al., (2017) identified NSSI as one of the most prominent indicators of future suicide attempts when investigating risk factors for suicidal thoughts and behaviours.

However, it is important to consider the study by Moseley et al. (2020), which found no statistically significant associations between participants with a longer history and a

higher lifetime incidence of NSSI and higher scores on their measure of suicidality. This suggests that the relevance and significance of factors related to acquired capability may differ between autistic and non-autistic populations, similar to the way in which the stability and development rate of capability may differ among individuals. These differences could be attributed to inherent and stable factors such as genetics (Gallyer et al., 2020; P. N. Smith & Cukrowicz, 2010), unique neurophysiological markers (Moxon-Emre et al., 2022; Ota et al., 2020), or differences in pain perception (Thaler et al., 2018; Williams et al., 2019; Yasuda et al., 2016).

Moreover, these differences may also stem from situational and dynamic factors such as experiences of trauma (Pelton et al., 2020; Warrier & Baron-Cohen, 2021), access to means (Anestis et al., 2017; Anestis & Houtsma, 2018; Klonsky & May, 2014; Shahnaz et al., 2020), and recent exposure to others' suicide attempts (Guldin et al., 2015; Hom et al., 2017; Pitman et al., 2014). Indeed, a scoping review conducted by Bayliss et al., (2022) identified several painful and provocative events, including cumulative life stressors and childhood abuse, that contributed to the development of acquired capability and differentiated suicide attempters from ideators. Notably, studies have shown that autistic children face a higher likelihood of experiencing abuse in comparison to their non-autistic peers (Hoover & Kaufman, 2018; McDonnell et al., 2020). Therefore, it is reasonable to hypothesise that the increased rates of maltreatment and exposure to traumatic events among autistic individuals may contribute to a greater acquired capability and subsequently result in a higher incidence of suicide attempts within this population.

Finally, the findings suggest a complex connection between pain tolerance, suicide capability, and self-harm, challenging certain assumptions of the theory. Moseley et al. (2022a) reported weaker connections between self-harm, mental rehearsal, and suicide attempts among autistic individuals compared to non-autistic individuals. Furthermore, there

was no clear link between higher pain tolerance and lifetime suicide attempts in both groups. These findings align with previous research indicating that pain tolerance is not a reliable indicator for distinguishing suicide attempts from ideation (Rabasco & Andover, 2020; Shahnaz et al., 2020). In fact, individuals who have attempted suicide have been found to have lower pain tolerance compared to those who have not attempted (Preece et al., 2021; Spangenberg et al., 2019).

Associated Constructs

Several associated constructs identified in the results were found to be connected to the features of the components of the ITS discussed earlier. However, some factors do not neatly fit within the bounds of a single component and instead need to be conceptualised as having connections to all three components. Biological sex is one such factor that has been extensively examined in relation to suicidality among individuals with ASD. Surprisingly, the majority of included studies suggest no significant differences in suicidality between males and females with ASD, contradicting population-based study findings that have reported higher rates of suicidality among autistic females compared to males (Hirvikoski et al., 2016; Kirby et al., 2019).

Another such factor is depression, which has long been a significant factor of interest for researchers and clinicians in the study of suicide. Although not explicitly included in the ITS model, Van Orden et al. (2010) state that depression may substantially increase the risk of suicidal ideation. Our findings not only confirm this amplifying effect of depression on ideation but also reveal its direct association with suicidal behaviours (Arwert & Sizoo, 2020; Cassidy et al., 2014, 2018; Cervantes et al., 2023; Costa et al., 2020; Dell'Osso et al., 2019; Hedley et al., 2017; Hooijer & Sizoo, 2020; Jackson et al., 2018; Moseley et al., 2022a, 2023; Shtayermman, 2007, 2008, 2022). These findings underscore the critical role of depression as a primary risk factor in the context of suicide risk for individuals with autism. Indeed, Dow et

al.'s (2021) findings showed that depression correlated with higher rates of thwarted belongingness and perceived burdensomeness in autistic individuals. Considering previous literature which suggests that depression amplifies the availability of negative information (LeMoult & Gotlib, 2019), it is plausible that depression exacerbates feelings of perceived burdensomeness and thwarted belongingness. Furthermore, Moseley et al.'s (2022a) report indicates that depression affects habituation to NSSI and acquired capability, suggesting a higher likelihood for individuals with depression to develop the capacity for self-injury. Consequently, we posit that depression not only impacts the components contributing to suicidal desire but also influences individuals' capacity to act on this desire. Given the high estimated prevalence of depression in autistic adults (Hollocks et al., 2019), this could potentially explain the elevated suicide risk observed in autistic populations.

However, it is important to acknowledge that some studies within our analysis did not find a significant association between depression and suicide risk (Hedley et al., 2021; Shtayermman & Fletcher, 2022; Weiner et al., 2019). These findings highlight the need to recognise individual differences and consider the potential influence of specific autistic traits on suicide risk.

The relationship between rumination and suicidality was investigated in several studies included in this review, demonstrating a connection between these constructs (Arwert & Sizoo, 2020; Dell'Osso et al., 2019; Jachyra et al., 2022). Rumination, characterised by repetitive thinking, has consistently been associated with anxiety, depression, and negative affect (Nolen-Hoeksema, 2000; Watkins, 2009). Furthermore, ample evidence supports the role of rumination in the onset and perpetuation of depression, exacerbating negative mood states, negative thinking patterns, and impeding problem-solving and goal-directed behaviour (Watkins & Roberts, 2020). Previous research has also found a significant link between rumination and a lifetime history of attempted suicide in the general population (Morrison &

O'Connor, 2008). Considering that restricted and repetitive behaviours, interests, or activities are a core aspect of the autism diagnosis (American Psychiatric Association, 2013), autistic individuals may already experience these repetitive behaviours and thought processes in their everyday lives, potentially rendering them more vulnerable to rumination. Indeed, studies have reported higher levels of rumination among individuals with ASD (I. C. Smith & White, 2020). Notably, Rogers & Joiner (2018) found that rumination specifically related to suicide was independently associated with a history of suicide attempts, even after accounting for other well-established risk factors, including components of the ITS. While this finding does not undermine the ITS, it does suggest that rumination may exacerbate the thoughts and experiences within the components of the ITS, highlighting the importance of considering rumination in understanding and addressing suicidal behaviours in both the general population and individuals with ASD. Further investigation in this area is necessary to deepen our understanding of this relationship.

Proposed Autism-specific Adaptions of the ITS

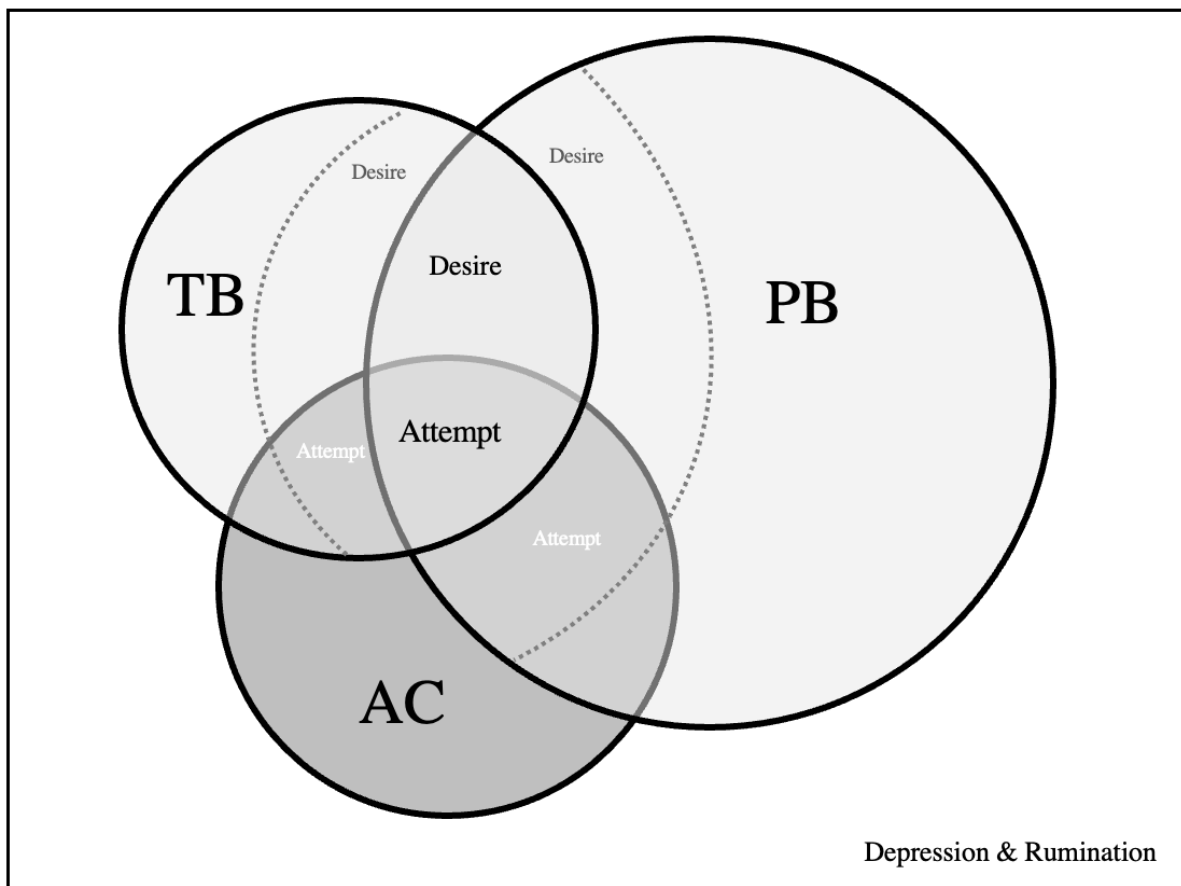
The simplicity of the ITS and its model, as shown in Figure 1, offers a significant advantage. However, given the intricate nature of human behaviour, it can be argued that this theory serves best as a foundational framework that allows for adaptation to better cater to the unique requirements of specific patient groups. In this case, autism-specific adaptations are proposed to enhance the ITS for autistic adults and their experiences of suicidality. These adaptations aim to capture the unique risk processes and factors identified in the studies included in this review. To visually represent these modifications Figure 7 has been created, which illustrates the proposed autism-specific version of the ITS, known as ITS-A.

Extension of Components: Instead of replacing or adding new components, this thesis suggests extending the existing components to incorporate additional features relevant to autism. We acknowledge the impact of camouflaging, restricted interests, and unmet support

needs on thwarted belongingness. Additionally, we recognise the feelings of difficulties around life transitions and the burden of comorbidities in relation to perceived burdensomeness. Furthermore, the extension emphasises the importance of considering both stable and dynamic elements to achieve a more comprehensive understanding of suicide capability. Finally, we acknowledge the exacerbating effect of depression and rumination on all components. To symbolise this extension of features, the borders of each construct in Figure 7 have been thickened.

Figure 7:

Proposed ITS-A Iteration



Note: AC: Acquired Capability; TB: Thwarted Belongingness; PB: Perceived Burdensomeness; Desire: The desire for suicide; Attempt: Lethal (or near lethal) suicide attempt; Depression & Rumination: The exacerbating effect of depression and rumination on all features of the ITS constructs

Emphasis on Perceived Burdensomeness: Findings indicate that autistic individuals exhibit significantly higher levels of perceived burdensomeness compared to individuals without autism. To accurately represent this, the area representing perceived burdensomeness in the new model is visually enlarged. This modification helps explain the increased suicidality observed in individuals with autism by capturing the cumulative impact of comorbidities, struggles with life transitions, and difficulties associated with autistic traits. Importantly, this modification expands the area in which suicide attempts traditionally occurs, providing an explanation for the higher suicidality observed in autistic individuals.

Role of Thwarted Belongingness and Perceived Burdensomeness: It is proposed that in certain cases, the presence of either thwarted belongingness or perceived burdensomeness alone is sufficient to drive an individual towards a desire for suicide. To illustrate this, dotted lines have been added to the model, creating additional spaces where the constructs of thwarted belongingness and perceived burdensomeness overlap with acquired capability, even without the presence of the other component. It is crucial to note that this may not hold true in all cases, which is why the overlap from the original model is maintained. The dotted lines signify the possibility that perceived burdensomeness and thwarted belongingness may be more inherent and prevalent experiences for autistic individuals. However, the overlap ensures that the complexity and variability of suicidality in this population are accounted for.

Implications and Future Directions

The findings of this thesis underscore the necessity for tailored preventative interventions that address the challenges faced by autistic individuals, such as feelings of isolation and burdensomeness. Results indicate the need for a fundamental shift in how we approach the treatment and support of autistic individuals across their lifespan. A scaffolded approach (Berk & Winsler, 1995) can be beneficial for autistic adults, providing the necessary

support to effectively navigate life transitions. To promote well-being and mitigate the risk of suicide, interventions and support programs should prioritise offering explicit and step-by-step guidance during these transitions, while emphasising the importance of setting personal milestones and teaching adaptive coping strategies. These measures aim to promote fulfilment and reduce the risk of suicide within this population.

Similarly, a fundamental shift is required in how we approach the treatment and support of autistic children. Instead of relying solely on conventional top-down approaches, care professionals should adopt a co-creative model that emphasises shared decision-making processes. Actively involving autistic individuals in their care decisions empowers them and fosters a sense of agency. This approach recognises their capabilities and aims to move away from traditional paternalistic attitudes that might unintentionally undermine their self-esteem and autonomy later in life.

Furthermore, future research should prioritise the validation and refining of the proposed adaptations of the ITS-A. Conducting empirical studies is essential to determine the applicability and effectiveness of the ITS-A in clinical practice, guiding the development of tailored interventions. The findings of this review and the proposed ITS-A can open up new avenues of research, exploring protective factors that can buffer against suicidality in autistic individuals. Indeed, while this review primarily focused on identifying risk factors, understanding and promoting factors that enhance resilience and well-being in this population is crucial. For instance, Barcelos et al. (2021) suggest that owning a dog may act as a protective factor against perceived burdensomeness in autistic individuals, as the responsibility of caring for a dog creates a sense of being needed and provides emotional support. Such innovative avenues should be considered and further explored in the context of suicide prevention for autistic individuals.

Limitations

The results presented in this scoping review should be interpreted within the context of several limitations. First, the high heterogeneity between the included studies made it difficult to determine the extent to which our current estimates accurately reflect the true prevalence of suicidality in autistic adults. Various factors, including sample size, sample ascertainment methods, and specific subgroups being investigated, contributed to variations in prevalence rates. Factors such as ASD with/without intellectual disability, comorbid ADHD, or borderline personality disorder should be considered when interpreting prevalence rates.

Furthermore, by focusing solely on individuals who self-identified or had a formal diagnosis, this review inadvertently excluded valuable insights and experiences from individuals who exhibited ASD traits but had not sought a diagnosis or did not identify themselves as having ASD. This resulted in a limited representation of the broader ASD population, potentially missing out on significant perspectives and information. Additionally, including self-identification may have introduced biases into the review. Self-identification could be subjective and influenced by various factors such as individual awareness, cultural differences, or access to diagnostic services. Consequently, the review may not have fully captured the diversity and complexity of the ASD population.

Another limitation arose from the nature of a scoping review, as a formal assessment of methodological quality was not included. This omission restricted the ability to evaluate the reliability and validity of the included studies and the overall strength of the evidence. Additionally, despite efforts to mitigate reviewer bias through consensus, the potential for human error and subjectivity in the selection of articles during the screening process could not be entirely eliminated. Therefore, reviewer bias may have influenced the final selection of articles. These limitations should be acknowledged when considering the findings of this scoping review.

Conclusion

This scoping review examined the applicability of the ITS in understanding suicidality among autistic adults. The study aimed to explore the phenomenology and risk factors associated with suicidality in this population and determine if these factors align with the ITS components. The review presents strong evidence supporting the relevance of the ITS in comprehending suicidality among autistic adults. It emphasises the significance of thwarted belongingness, perceived burdensomeness, and acquired capability in capturing the experiences and risk factors specific to suicidality in this population. Additionally, the review identifies additional risk processes and features of the components that were not considered in the original ITS framework. Based on these findings, a proposed autism-specific adaptation of the ITS is provided, which may be more suitable in explaining the heightened risk for suicidality in the autistic population. This adaptation could offer a more comprehensive framework that takes into account the unique challenges and experiences faced by autistic individuals in relation to suicidality, thereby facilitating the development and empirical testing of preventive intervention approaches.

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Appendix A

PRISMA-ScR Checklist

Section	Item	PRISMA-ScR Checklist Item	Reported on Page #
TITLE	1	Identify the report as a scoping review.	1
ABSTRACT		Structured summary	2
	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.	
INTRODUCTION	3	Rationale	11 - 12
		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.	
	4	Objectives	12 - 13
		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.	
METHODS	5	Protocol and registration	13
		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.	
	6	Eligibility criteria	14
		Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	
	7	Information sources*	13
		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.	
	8	Search	89

		Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	
	9	Selection of sources of evidence†	11 - 15
		State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	
	10	Data charting process‡	15
		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.	
	11	Data items	15
		List and define all variables for which data were sought and any assumptions and simplifications made.	
	12	Critical appraisal of individual sources of evidence§	N/A
		If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	
RESULTS	14	Selection of sources of evidence	16
		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.	
	15	Characteristics of sources of evidence	20 - 22
		For each source of evidence, present characteristics for which data were charted and provide the citations.	
		If done, present data on critical appraisal of included sources of evidence (see item 12).	
	17	Results of individual sources of evidence	29 - 31
		For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	
	18	Synthesis of results	15 - 16
		Describe the methods of handling and summarizing the data that were charted.	
DISCUSSION	19	Summary of evidence	37 - 52

	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.	
20	Limitations	52 - 53
	Discuss the limitations of the scoping review process.	
21	Conclusions	54
	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	
FUNDING	Funding	N/A
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.	

Note. 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).

From: Tricco et al. (2018)

Appendix B

Boolean Search Strings

Database	Search String
Medline	((((MH "Autism Spectrum Disorder") OR (MH "Asperger Syndrome") OR (MH "Child Development Disorders, Pervasive") OR (MH "Autistic Disorder") OR (TI "Asperger") OR (AB "Asperger") OR (TI "autis*") OR (AB "autis*"))) AND ((MH "Suicide") OR (TI "suicid*") OR (AB "suicid*"))))
PsycInfo	((((SU "Autism Spectrum Disorders") OR (TI "Asperger") OR (AB "Asperger") OR (TI "autis*") OR (AB "autis*"))) AND ((SU "Suicide") OR (SU "Suicidology") OR (SU "Suicidal Behavior") OR (SU "Attempted Suicide") OR (SU "Suicidality") OR (SU "Suicidal ideation") OR (TI "suicid*") OR (AB "suicid*"))))
Web of Science	Topic: (("asperger*" OR "autis*") AND ("suicid*"))
CINAHL	((((MH "Autistic Disorder") OR (MH "Asperger Syndrome") OR (MH "Child Development Disorders, Pervasive") OR (TI "Asperger") OR (AB "Asperger") OR (TI "autis*") OR (AB "autis*"))) AND ((MH "Suicide") OR (MH "Suicide, Attempted") OR (MH "Suicidal Ideation") OR (MH "Suicide Risk (Saba CCC)") OR (TI "suicid*") OR (AB "suicid*"))))
SCOPUS	((TITLE-ABS-KEY(asperger*) OR TITLE-ABS-KEY("autis*"))) AND (TITLE-ABS-KEY(suicid*))

Appendix C

Additional coding of study and sample characteristics

Author(s) and year	Study Design	Non-ASD Comparison Group (CG)	CG sample size	Participant race	Sample Ascertainment Method	IQ Inclusion criteria (Y/N), specify	Cognitive & Intellectual Ability Assessment Measures	Suicidality Assessment Metric
Arwert & Sizoo (2020)	Cross-sectional	No	N/A	N/A	Purposive	Y, IQ>70	Not stated	BSS
Barcelos et al. (2021)	Cross-sectional (Qualitative)	No	N/A	N/A	Volunteer	Categorized as “high-functioning autism” or “Asperger syndrome”	N/A	Qualitative interview
Camm-Crosbie et al. (2019)	Cross-sectional (Qualitative)	No	N/A	N/A	Volunteer	No	N/A	Qualitative measure
Cassidy et al. (2018)	Cross-sectional	Yes	169	N/A	Volunteer	Yes, “Without intellectual disability”	Not stated	SBQ-R
Cassidy et al. (2014)	Clinical Cohort	No	N/A	N/A	Convenience	Yes, Asperger’s diagnosis	Not stated	Patient screening questionnaire
Cervantes et al. (2023)	Cross-sectional	Yes	733 055	N/A	Purposive	No	N/A	ICD-9 codes
Costa et al. (2020)	Cross-sectional	Yes	189	N/A	Volunteer	No	N/A	SBQ-R
Dell’Osso et al. (2019)	Cross-sectional	Yes	228	N/A	Convenience	Yes, “without intellectual or language impairment”	Not stated	MOODS-SR

Dow et al. (2021)	Cross-sectional	No	N/A	76,5% white	Volunteer	Yes, high school diploma or equivalent degree	N/A	DSI-SS
Hand et al. (2020)	Case-control	Yes	21792	75.3% white	Purposive	No	N/A	ICD-9, ICD-10 codes
Hedley et al. (2021)	Cross-sectional	No	N/A	N/A	Volunteer	No	Not stated	SBQ-R
Hedley et al. (2018)	Cross-sectional	No	N/A	N/A	Volunteer	No	N/A	PHQ, item 9
Hedley et al. (2017)	Cross-sectional	No	N/A	N/A	Convenience	No	N/A	PHQ, item 9
Hirvikoski et al. (2020)	Matched case-cohort	Yes	270 840	N/A	Purposive	No	N/A	ICD-9, ICD-10 codes
Hooijer & Sizoo (2020)	Cross-sectional	No	N/A	N/A	Purposive	Yes. Participants with mental retardation excluded.	Not stated	BSS, Dutch version
Jachyra et al. (2022)	Cross-sectional	No	N/A	Majority (43.7%) white	Purposive	No	N/A	Qualitative analysis of charts
Jackson et al. (2018)	Cross-sectional	No	N/A	80.4% White	Volunteer	Yes, "enrolled in a post-secondary academic institution"	N/A	SBQ-R
Kato et al. (2013)	Cross-sectional (Retrospective)	Yes	544	N/A	Purposive	Yes, "individuals whose suicidality could not be checked by a verbal interview were excluded"	N/A	MINI, DSM-IV, ICD-10 Codes

Kirby et al. (2019)	Retrospective cohort study	Yes	8778	88% white	Purposive	No	N/A	Official records indicate death by suicide
Kölves et al. (2021)	Retrospective cohort study	Yes	6524246	N/A	Purposive	No	N/A	ICD-10 codes
Moseley et al. (2020)	Cross-sectional	No	N/A	N/A	Volunteer	No. However, most participants likely had normal to high IQ levels, as only two lacked a GCSE-level qualification, and 61% held a degree.	N/A	SBQ-R
Moseley et al. (2022a)	Cross-sectional	Yes	312	79.9% white	Volunteer	No	N/A	SITBI
Moseley et al. (2022b)	Cross-sectional questionnaire	No	N/A	79.9% white	Volunteer	No	N/A	SITBI
Moseley et al. (2023)	Cross-sectional	No	N/A	79.9% white	Volunteer	No	N/A	SITBI
Moxon-Emre et al. (2022)	Cross-sectional	No	N/A	N/A	Purposive & Volunteer	Yes, “without intellectual impairment”	GAI	MINI
Ota et al. (2020)	Cross-sectional	Yes	20	N/A	Purposive & Volunteer	Yes, IQ>70	WAIS-IV	MINI, Japanese version
Paquette-Smith et al. (2014)	Cross-sectional	No	N/A	N/A	Volunteer	No	N/A	Dichotomous (yes/no) question to assess prior attempts.

Pelton et al. (2023)	Cross-sectional	Yes	342	N/A	Volunteer	No	N/A	SBQ-R
Pelton et al. (2020)	Cross-sectional	Yes	339	N/A	Volunteer	No	N/A	SBQ-R
Raja et al. (2011)	Cross-sectional	Yes	11	N/A	Purposive	No	N/A	Chart review, clinical interviews
Rydén et al. (2008)	Cross-sectional	yes	35	N/A	Convenience	No	WAIS-III,	SUAS; medical records
Shtayermman (2007)	Cross-sectional	No	N/A	100% white	Snowball & volunteer	No	N/A	SIQ
Shtayermman (2008)	Cross-sectional	No	N/A	100% white	Snowball & volunteer	No	N/A	SIQ
Shtayermman (2022)	Cross-sectional	No	N/A	86.1% white	Volunteer	No	N/A	SIQ
Shtayermman & Fletcher (2022)	Cross-sectional	No	N/A	86.1% white	Volunteer	No	N/A	Dichotomous (yes/no) question to assess prior attempts.
Takara & Kondo (2014)	Case-control	Yes	299	N/A	Purposive	Yes, “without intellectual problems”	JART	Case history, NOS
Weiner et al. (2019)	Case study	No	N/A	N/A	Purposive	No	WAIS-IV, Tower of London	Qualitative interview, BDI

Note. BSS: Beck Scale for Suicidal Ideation; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; DSI-SS: Depressive Symptom Inventory - Suicidality Subscale; GAI: General Abilities Index from the Wechsler Adult Intelligence Scale- Fourth Edition; ICD-9: International Classification of Diseases, Ninth Revision; ICD-10: International Classification of Diseases, Tenth Revision; JART: Adult Reading Test; MINI: Mini International Neuropsychiatric Interview; MOODS-SR: The Mood Spectrum, self-report (lifetime version); NOS: Not otherwise specified; PHQ-9: Patient Health Questionnaire-9; SBQ-R: Suicide Behaviours Questionnaire-Revised; SIQ: Suicide Ideation Questionnaire; SITBI: Self Injurious Thoughts and Behaviours Interview, short form; SUAS: Suicide Assessment Scale; WAIS-III: Wechsler Adult Intelligence Scale-Third Edition; WAIS-IV: Wechsler Adult Intelligence Scale- Fourth Edition.

Appendix D

Full charting of ITS constructs

Author(s) and year	Thwarted Belongingness	Perceived Burdensomeness	Acquired Capability
Arwert & Sizoo (2020)	Not apparent	<ul style="list-style-type: none"> • Low self-esteem was associated with the presence of suicidality in the past week, as a dichotomized variable. • Self-derogatory narratives, such as "I certainly feel useless at times," could express or lead to a death-wish, even after controlling for depression. 	Not apparent
Barcelos et al. (2021)	<ul style="list-style-type: none"> • Dogs boosted owners' confidence in social interactions and became the main topic of conversation. • Owners experienced improvements in self-acceptance through dogs' affectionate Behaviours towards them. • Dogs served as social catalysts, facilitating interactions with strangers, and strengthening relationships in the neighborhood. • Having a dog had both positive and negative effects on positive relationships with others, with a general tendency towards more positive effects. 	<ul style="list-style-type: none"> • The routine of looking after the animal, including tasks like providing food, water, and walks, as well as the responsibility of being a pet owner, were directly linked to a sense of purpose in life. • Suicide prevention efforts were associated with caring for the dog, such as feeding and walking it, and this aspect appeared particularly important. • The fourth pathway involved individuals living alone with their dog and considering the dog's well-being after their own suicide. 	Not apparent

Camm-Crosbie et al. (2019)

- Taking care of a dog made owners feel needed and their feelings reciprocated.
- Owners reflected on the suffering the dog would face if they were to commit suicide, which served as a suicide prevention reason.
- Participant 14 shared their experience of how their dog acted as a protective factor and prevented them from attempting suicide again. The dog's needs being met gave them confidence and a sense of purpose, different from how they felt about burdening their family.
- Having a dog can have both positive and negative effects on autonomy, personal growth, environmental mastery, and self-acceptance, with a general tendency towards more positive effects.
- Taking care of the dog makes owners feel needed and reciprocates their feelings, leading them to consider the potential suffering the animal would experience if they were to commit suicide.
- Demonstrations of affection from the dog towards its owner make them feel important and alleviate any burdensome feelings, as they believe their dog would be worse off without them.
- The support the participant received did not meet their needs, causing their mother to have to do more for them.
- The individual expressed the belief that support of any kind
- Absent or inappropriate support led participants to feel hopeless, isolated, and alone.

- Participants expressed feelings of hopelessness and difficulty reaching out for help.
- Many participants described feeling alone with their problems and desperate due to the lack of support.
- Some participants viewed suicide as an inevitability, perceiving that support would not practically change their situation.
- Lack of treatment or support was explicitly linked to co-occurring autism and mental health diagnoses, making participants feel "too complicated."
- Negative experiences were influenced by professionals' poor knowledge of autism.
- Participants expressed reluctance to burden their limited support network with their low feelings.

However, the participant tried to suffer in silence to avoid letting their mother see the extent of their difficulties, such as the lack of food.

- The participant realized that they had never learned how to ask for help and had spent their life camouflaging their struggles, believing they had to handle everything on their own. They reached a point where they thought suicide was a better option than continuing in their condition.
- Receiving relevant support had a significant impact on their life, saving them from rock-bottom self-esteem and a diminished sense of value. They expressed gratitude for the support, as it helped them navigate life changes they couldn't manage alone.
- The absence of appropriate support or treatment suited to their needs was associated with disempowerment, perceived burdensomeness on family and friends, social exclusion and isolation, hopelessness, and considering suicide as inevitable.
- Many participants with co-occurring autism and mental

would not bring about practical change.

- They felt that therapy was being used as palliative care until they had enough energy and commitment to actually die.
- Some self-harm was reported, but it was unclear if these were the same participants who also reported suicidality.
- Regarding past attempts and substance use, the individual shared their experience of attempting suicide and needing counseling, but facing a nine-month waiting list in the NHS.
- They mentioned resorting to drug abuse during that period to cope.

Cassidy et al. (2018)

- Unmet support needs and (dis)satisfaction with living arrangements significantly correlated with suicidality.
- health diagnoses experienced a lack of treatment or support specifically related to their conditions. They felt their complexity made them ineligible for services, with mental health professionals considering their conditions as separate issues and not their responsibility unless they had a co-morbid learning disability.
- Employment accounted for a significant portion (33.4%) of the variance in SBQ-R scores.
 - Unemployed individuals were significantly more likely to have higher SBQ-R scores compared to those who were employed.
 - Being diagnosed with at least one co-occurring developmental condition was significantly associated with unemployment.
 - Participants with at least one mental health or other condition also had higher SBQ-R scores.
 - Higher levels of unmet support needs were reported by individuals with higher SBQ-R scores.
 - Satisfaction with living arrangements and employment
- The individual expressed the belief that support of any kind would not bring about practical change.
 - They felt that therapy was being used as palliative care until they had enough energy and commitment to actually die.
 - Some self-harm was reported, but it was unclear if these were the same participants who also reported suicidality.
 - Regarding past attempts and substance use, the individual shared their experience of attempting suicide and needing counselling, but

Cassidy et al. (2014)

- The lifetime experience of suicidal ideation was higher in the clinic sample compared to previous studies on adults with Asperger's syndrome and adult psychiatric patients with autism spectrum conditions.
 - The higher rate of suicidal ideation in the clinic sample may be attributed to late diagnosis of Asperger's syndrome in adulthood, with a mean age of 31 years compared to the typical average age of 11 years.
 - Difficulties such as social exclusion, unfulfilled educational potential, employment challenges, and difficulties in developing close relationships were exacerbated by the lack of appropriate support throughout their lives.
 - This evidence supports the construct of thwarted belongingness as described by Van Orden and/or Joiner, indicating that the lack of appropriate support throughout
- showed significant correlations with suicidality (total SBQ-R scores).
- Many individuals reporting suicidality faced challenges related to unfulfilled educational potential, difficulties in obtaining or maintaining employment, and struggles with job promotion.
- facing a nine-month waiting list in the NHS.
 - They mentioned resorting to drug abuse during that period to cope.
- Not apparent

individuals' lives contributed to their heightened risk of suicidal ideation.

Not apparent

- Individuals with suicidal ideation or intentional self-inflicted injury were less likely to have Medicaid compared to self-pay/other options, which is notable for individuals with low income and disabilities in the US.
- They were more likely to have resided in areas with higher median household incomes.
- Intentional self-inflicted injury was also reported, but it was difficult to determine if these cases co-occurred with suicidal ideation or were non-suicidal self-injury.
- The assessment of ICD-9 intentional self-inflicted injury, which could be interpreted as habituation, revealed that the self-inflicted injury diagnosis did not differ between the ID group (2.4%) and the ASD group (2.6%).
- Both the ID and ASD groups had statistically significantly more visits with an intentional self-inflicted injury diagnosis compared to the comparison group (0.6%; $p < 0.001$).

Cervantes et al. (2023)

Costa et al. (2020)

- People with Autism Spectrum Disorder (ASD) may be more vulnerable to social situations and struggle to find their place in society.
- Participants with ASD mentioned a higher frequency of attending therapy or currently being in therapy compared to those without ASD.

Not apparent

- Increased difficulties in identifying emotions or interpreting social situations may lead to feeling overburdened and an increased risk of suicidality.
- Depression combined with high cognitive skills may contribute to a thwarted sense of belonging, as individuals with ASD are aware of their limitations in social interaction.
- Alexithymia negatively affects interpersonal relationships and can contribute to a thwarted sense of belonging.
- One possible explanation for the higher therapy rates among individuals with ASD is that their diagnosis often requires specialized assistance, leading to increased contact with therapists.
- Dual eligibility for both Medicare and Medicaid was associated with a 55% increased likelihood of a suicide attempt compared to those without dual eligibility.
- However, dual eligibility did not impact the odds of suicidal ideation, indicating no difference between individuals with and without dual eligibility in terms of having thoughts of suicide.

Dell’Osso et al. (2019)

• Not apparent

Not apparent

Not apparent

Dow et al. (2021)

- Approximately one-third of the sample (32.6%) reported rarely feeling they belong.
- Thwarted belongingness was significantly correlated with perceived burdensomeness (.37), suicidal ideation (.24), and impulses (.29).
- Forty percent of the sample reported feeling lonely "much of" or "most" of the time.

- According to the INQ, 22.4% of participants reported occasionally or often feeling that they make life worse for others.
- Perceived burdensomeness was significantly correlated with suicidal ideation, plans, and attempts.
- Mediation analyses revealed that social dissatisfaction had a

- 55.1% of the participants reported overall fearlessness, indicating a lack of fear.
- 47.4% reported a lack of fear of death.
- Capability was significantly correlated with suicidal attempts.
- There was a significant correlation between

	<ul style="list-style-type: none"> • The same proportion expressed dissatisfaction with their social life. • Participants with a lifetime history of depression had significantly higher rates of thwarted belongingness compared to those with no history of depression. • Dissatisfaction with one's social life was strongly correlated with thwarted belongingness (.60). 	<p>significant indirect effect on suicidal ideation through perceived burdensomeness.</p> <ul style="list-style-type: none"> • Similarly, loneliness had a significant indirect effect on suicidal ideation only through perceived burdensomeness. • Participants with a lifetime history of depression exhibited higher rates of perceived burdensomeness compared to those with no history of depression. • Dissatisfaction with one's social life was significantly correlated with perceived burdensomeness. • The mediation analyses demonstrated that both social dissatisfaction and loneliness influenced suicidal ideation through their impact on perceived burdensomeness. 	<p>capability and suicide attempts, with a coefficient of .24.</p>
<p>Hand et al. (2020)</p>	<p>Not apparent</p>	<p>Not apparent</p>	<ul style="list-style-type: none"> • Among the 943 patients with suicidal ideation, 283 (30.1%) had at least one encounter during the study period for a suicide attempt or self-inflicted injury.
<p>Hedley et al. (2021)</p>	<ul style="list-style-type: none"> • Personal wellbeing was negatively associated with both depression and SBQ-R suicide risk for both women and men. 	<ul style="list-style-type: none"> • Personal wellbeing showed significant negative associations with depression 	<p>Not apparent</p>

Hedley et al. (2018)

- Personal wellbeing was assessed based on satisfaction with life across seven domains: standard of living, health, life achievement, personal relationships, personal safety, community connectedness, and future security.
- The study acknowledges the pre-existing heightened risk of suicide among autistic individuals and the potential impact of the pandemic on them.
- Reduced social support, which is typically associated with suicide risk, is considered a broad risk factor.
- On average, participants reported having just over two people they can count on for support.
- Being in a relationship did not significantly influence the primary study variables, including Autism Spectrum Quotient (AQ-short), loneliness, social support satisfaction and number, depression, and suicidal ideation.
- Depression and suicidal ideation were positively correlated with loneliness and negatively correlated with social support.

and SBQ-R suicide risk for both women and men.

- Personal wellbeing was measured based on satisfaction with life across seven domains: standard of living, health, life achievement, personal relationships, personal safety, community connectedness, and future security.

Not apparent

Not apparent

Hedley et al. (2017)

- Loneliness was negatively correlated with social support satisfaction and number.
 - The observed pattern of results remained consistent even after controlling for age.
 - Lower levels of social support and higher loneliness were associated with higher levels of depression and suicidal ideation.
 - Mediation analyses revealed that both loneliness and satisfaction with social support had significant effects on suicidal ideation through depression, with depression accounting for a substantial proportion of the total effect.
 - Neither Appraisal Support nor Belonging Support were found to be significantly associated with depressive symptoms or suicidal ideation.
 - These results do not support the hypothesis that social support, specifically appraisal or belonging, acts as a protective factor for suicidality in people with ASD.
 - The findings suggest that social support may play a lesser role in the mental health of individuals with ASD compared to the general population.
- Tangible Support was not significantly associated with suicidal ideation. Not apparent

<p>Hirvikoski et al. (2020)</p>	<p>Not apparent</p>	<ul style="list-style-type: none"> • Full siblings of individuals with ASD had an odds ratio of 1.64 for suicide attempts, indicating a significantly elevated risk compared to the general population. The risk of suicide attempts was also increased, to a lesser extent, in half-siblings (both maternal and paternal) and first cousins of individuals with ASD. 	<p>Not apparent</p>
<p>Hooijer & Sizoo (2020)</p>	<p>Not apparent</p>	<p>Not apparent</p>	<ul style="list-style-type: none"> • Individuals who expressed suicidal thoughts had high levels of harm avoidance temperament. • Harm avoidance is associated with Behavioural inhibition and anxiety, particularly in situations involving perceived uncertainty, frustration, or punishment.
<p>Jachyra et al. (2022)</p>	<ul style="list-style-type: none"> • A notable percentage (18%) of individuals reported to the emergency department (ED) after experiencing interpersonal conflicts with others. • Some individuals (18%) experienced difficulties in adapting to new scholastic programs, including adjusting to the new environment, scholastic 	<ul style="list-style-type: none"> • Autistic individuals experienced difficulties managing recurring thoughts about suicidal behaviour (STB) and described feeling emotionally unsettled and tired of thinking about suicide, indicating a sense of burden associated with these persistent thoughts. 	<ul style="list-style-type: none"> • In some cases, individuals reported ruminating about suicide, which had a debilitating effect on their well-being. • One individual described thoughts of jumping off a balcony and even considering

- demands, and social interactions.
- The findings highlight the variability in how and when suicidal thoughts and behaviours (STB) were identified among autistic individuals seeking help at the ED. STB was reported as the chief complaint for some individuals, while others mentioned it during a mental status exam conducted for other reasons.
 - This variability in presentation suggests a potential sense of social disconnection or unmet belongingness needs among individuals seeking support. They may be reaching out for various issues but also experiencing recurring thoughts of suicide, aligning with the concept of thwarted belongingness in the interpersonal theory of suicide.
 - In 31% of the cases, STB occurred in the context of conflicts or misunderstandings, often involving family or friends. These interpersonal conflicts triggered thoughts of self-harm or suicide, highlighting the role of interpersonal stressors as contributing factors to STB,
- Approximately 31% of cases reported STB shortly after experiencing life transitions, such as entering post-secondary education or transitioning to a new living arrangement. Difficulties adapting to new environments, scholastic demands, and social interactions contributed to STB in these situations.
 -
- taking a photo on the ledge as a way to "practice" their death. They had difficulty letting go of these thoughts, persisting for three days.
- Another individual shared their experience of being "stuck" thinking about their previous suicide attempt involving medication overdose, which caused emotional distress.
 - Another individual expressed exhaustion from constantly thinking about suicide, emphasizing that the thoughts just wouldn't go away.
 - These quotes illustrate the perseveration and rumination about suicidal thoughts, which further intensified the already challenging experiences.
 - Among the cases studied, alcohol use was reported by 37% of individuals, and other substances such as marijuana,

even if they do not directly align with the interpersonal theory of suicide.

methamphetamines, crack/cocaine, psilocybin mushrooms, and heroin were also documented.

Jackson et al. (2018)

- Over 75% of the participants reported feeling left out, isolated, or lacking companionship at least some of the time, indicating a common issue of loneliness among the study population.
 - Several variables were found to be significantly associated with the presence of lifetime suicidal behaviour, including loneliness, number of friends, symptoms of depression, anxiety, and stress.
 - Despite some participants reporting satisfaction with their close friends and romantic relationships, they still faced difficulties integrating into the broader campus environment.
 - The study highlights the high prevalence of struggles with feelings of isolation, being left out, and lacking companionship among the surveyed students.
 - The number of close friends reported and satisfaction with the number of close friends were
- Variables assessed in the study that were significantly associated with the presence of lifetime suicidal included academic discomfort
- Not apparent

significantly linked to loneliness.

- Being single (unmarried) was identified as a risk factor for suicidality among individuals with ASD.
 - The ASD group had a higher incidence of single individuals compared to other relationship statuses.
 - Individuals with ASD were more likely to live alone compared to living with a partner or family members.
- Lower education was associated with an increased risk of suicidal behaviour.
- Fatal cutting/stabbing and carbon monoxide intoxication were significantly more common suicide attempt methods in the ASD group compared to the non-ASD group.
 - Among individuals with ASD, 4.7% had a family history of suicide attempts, 23.3% had a personal history of suicide attempts, and 11.6% had consulted with a professional before their suicide attempt.
 - Precipitating events were reported by 37.2% of individuals with ASD prior to their suicide attempts, and 11.6% had consumed alcohol during their suicide attempt.
 - Furthermore, 46.5% of individuals with ASD had a serious medical condition at the time of their suicide attempt.

Kato et al. (2013)

			<ul style="list-style-type: none"> • Individuals with ASD were more likely to choose lethal methods of suicide, suggesting increased risk. • Additionally, individuals with ASD were less likely to attempt suicide based on events occurring within the last 24 hours, indicating that the stressors leading to suicide attempts were not spontaneous.
	<p>Not apparent</p>	<ul style="list-style-type: none"> • Approximately half (49%) of the individuals with ASD who completed suicide in the sample were indicated on their death certificate as having an occupation or being a student. • An additional 40% of individuals with ASD who completed suicide had no available occupation or student data. 	<p>Not apparent</p>
<p>Kirby et al. (2019)</p>			
<p>Kölves et al. (2021)</p>	<ul style="list-style-type: none"> • For individuals with ASD, not being in a relationship was associated with a 1.56-fold higher rate of suicidality compared to those in a relationship. • In the general population, individuals without ASD who 	<ul style="list-style-type: none"> • Individuals with ASD who were unemployed had a 2.24-fold higher incidence rate of suicide attempt compared to those who were employed (95% CI, 1.52-3.30). • Among individuals with ASD, those with vocational and 	

Moseley et al. (2020)

- were not married or cohabiting had a 2.81-fold higher rate of suicide compared to those who were married or cohabiting.

 - Interestingly, individuals with ASD who were married or cohabiting did not show a significant difference in suicide rates compared to those who were not married or cohabiting.
 - These findings suggest that the impact of being in a relationship on suicidality differs between individuals with ASD and the general population.
 - The concept of thwarted belongingness, which refers to feelings of social isolation and a lack of connection, may help explain the higher rate of suicide attempts among individuals with ASD who are not in a relationship.
 - Perceived social support showed a negative trend, suggesting that participants with greater social support tended to have lower scores on the suicidality question. However, this trend was marginally non-significant ($p = .078$).
 - Despite the trend, greater social support did not significantly decrease the likelihood of
- university education did not demonstrate a lower rate of suicide attempt compared to individuals with a basic education, which contradicts findings from other studies.

 - The association between unemployment and higher incidence of suicide attempts among individuals with ASD suggests that they may perceive themselves as burdensome, a key component of the interpersonal theory of suicide.
- Not apparent

 - No significant relationship found between self-harm distress and responses to the suicidality question ($p = .152$).
 - Higher suicidality scores associated with greater use of NSSI for regulating low-energy states, punishment or deterrence from suicide,

engaging in suicide ideation or attempts among self-harmers.

- The time-invariant risk posed by non-suicidal self-injury (NSSI) in reducing inhibitions to suicide may be a contributing factor.
- The effectiveness of social support in addressing the challenges faced by individuals with ASD and self-harm tendencies is questioned based on the findings.

and sensory stimulation ($p < .001$).

- Longer engagement in NSSI and higher lifetime incidence of NSSI tended to be associated with higher suicidality scores ($p = .075$, $p = .151$).
- Suicidality question significantly predicted presence or absence of cutting ($p < .001$), explaining 24% of the variance.
- Approximately 67.5% of participants correctly categorized as cutters or non-cutters based on suicidality question responses.
- Odds ratio indicates increased likelihood of cutting with higher suicide scores (CI 1.713, 6.442).
- Hitting oneself, punching objects, and severe scratching or pinching not significantly predicted by suicide ideation or attempts.
- No significant relationship between

self-harm distress and responses to suicidality question ($p = .152$).

- NSSI significantly associated with suicide ideation and attempts; longer engagement and higher lifetime incidence of NSSI linked to higher suicidality scores.
- Binary logistic regression supports Joiner's theory on self-injury and suicidal thoughts/behaviours.
- NSSI increases pain tolerance and decreases fear of pain and death, creating capability for lethal behaviours in those with pre-existing suicide ideation.
- Feelings about self-injury have little influence on the risk of suicidality posed by NSSI.
- Longer engagement in NSSI and higher lifetime incidence of NSSI tend to be associated with higher suicidality scores, but

Not apparent

Not apparent

not significantly ($p = .075$, $p = .151$).

- Among individuals who engaged in self-harm, the frequency of NSSI Behaviours and specific types of self-harm, such as cutting, were directly and indirectly linked to lifetime suicide attempts through acquired capability for suicide.
- Autistic individuals exhibited reduced fear of death and tendencies for mental rehearsal regardless of their NSSI status.
- Both autistic and non-autistic individuals who engaged in self-harm had a higher incidence of suicide attempts compared to those who did not self-harm.
- The relationship between NSSI and suicidality was weaker in autistic individuals, suggesting that autistic individuals were more likely to experience suicidal thoughts or Behaviours regardless

Moseley et al. (2022a)

of engaging in self-harm.

- Autistic individuals also tended to have a higher capability for suicide, regardless of self-harm involvement.
- The findings suggest that NSSI is associated with acquired capability for suicide, and individuals with higher rates of NSSI generally have a higher capability for suicide. However, the relationship between NSSI and suicidality is weaker in autistic individuals, indicating the presence of other contributing factors to their increased risk of suicidality.
- Higher incidence of NSSI was associated with increased acquired capability, including higher pain tolerance, reduced fear of death by suicide, and more mental rehearsal of suicide plans.
- The diagnosis of being autistic versus non-autistic moderated the

Moseley et al. (2022b)

- The findings cast doubt on the relevance of thwarted belongingness, as it failed to predict suicide ideation or attempts.
- Thwarted belongingness and perceived burdensomeness are key constructs in the study.
- Perceived burdensomeness was found to be highly associated with past-year relationship between NSSI and reduced fear of death by suicide, as well as mental rehearsal of suicide plans.
- The higher lifetime incidence of NSSI was associated with all three facets of acquired capability: higher pain tolerance, reduced fear of death by suicide, and more mental rehearsal of suicide plans. Autistic status was specifically linked to higher mental rehearsal of suicide plans, and the relationship between a higher frequency of NSSI and greater mental rehearsal was stronger in non-autistic participants compared to autistic participants.
- Acquired capability significantly predicted lifetime suicide attempts.
- Reduced fear of death, one aspect of acquired capability for suicide, was associated with a higher likelihood of recent suicide attempts.

- Thwarted belongingness also failed to differentiate between non-suicidal participants and those who had experienced suicide ideation and attempts.
 - Being single (not in a romantic relationship) was associated with a higher likelihood of recent suicidality.
 - This association appeared to be linked to greater feelings of burdensomeness and depression.
 - Thwarted belongingness, as measured by the INQ-15, did not successfully predict suicide ideation or attempts, nor distinguish between non-suicidal individuals and those with a history of suicidality.
- suicide ideation, past-year suicide attempts, and lifetime suicide attempts.
 - Individuals who felt that they were a burden were at a higher risk of suicide.
 - Burdensomeness and the mental rehearsal aspect of acquired capability had main effects on suicidal ideation, even after accounting for the effects of depression (anxiety did not significantly contribute to the model).
 - Past-year suicide ideation was associated with burdensomeness.
 - Participants who had attempted suicide showed greater feelings of burdensomeness and reduced fear of death compared to those who had experienced suicide ideation in the past year.
 - The INQ-15 revealed main effects of burdensomeness on both ideation and suicide attempts.
- Suicidal ideation was influenced by perceived burdensomeness and the mental rehearsal aspect of acquired capability, even when controlling for depression. Anxiety did not significantly contribute to the model.
 - Reduced fear of death was associated with a higher number of lifetime suicide attempts and differentiated individuals who had attempted suicide in the past year from those who were non-suicidal or had experienced past-year suicide ideation.
 - Past-year suicide ideation was associated with feelings of burdensomeness and mental rehearsal of suicide plans, which are facets of acquired capability.
 - Acquired capability, as measured by the ACWRSS, explained 20% of the variance in lifetime suicide attempts.

Moseley et al. (2023)

- In autistic individuals with likely ADHD, no relationship was found between higher levels of thwarted belongingness and suicidality.
- Thwarted belongingness did not significantly predict past-year suicide ideation or lifetime suicide attempts.
- It did not directly contribute to the model for past-year suicide ideation.
- Thwarted belongingness was not directly predictive of lifetime suicide attempts.
- Thwarted belongingness ($b = .01$ [$\beta = .03$], $p = .5302$, CI: -0.02, 0.04) did not contribute to the model for past-year suicidal ideation.
- Autistic participants with likely ADHD who reported higher levels of perceived burdensomeness had a greater number of suicide attempts.
- Higher rates of depression and perceived burdensomeness in autistic participants with likely ADHD were associated with increased suicidal thoughts in the past year.
- These findings partially support hypothesis 1, suggesting that higher rates of perceived burdensomeness in autistic individuals with ADHD are associated with increased suicidality.
- Perceived burdensomeness was associated with greater levels of anxiety, depression, and suicide ideation.
- Perceived burdensomeness directly predicted lifetime suicide attempts.
- It was indirectly associated with a greater number of suicide attempts through its relationship with likely ADHD.
- Perceived burdensomeness, depression, and sex (with being female associated with a greater likelihood of suicide ideation) all contributed to the
- Individuals with higher hyperactive/impulsive features had a greater exposure to painful, traumatic, and thrill-seeking events.
- Exposure to these events was associated with an increased acquired capability for suicide.
- The acquired capability for suicide, in turn, was linked to a higher number of suicide attempts.
- The data indicated that exposure to painful, traumatic, and/or thrill-seeking events increased the risk of suicide attempts independently of their effect on suicide capability.
- Acquired capability was predicted by exposure to painful and provocative events and directly contributed to the model for lifetime suicide attempts.
- Hyperactivity and impulsivity were associated with acquired capability through

		<p>model for past-year suicide ideation.</p> <ul style="list-style-type: none"> The overall model for past-year suicide ideation had a significant relationship with perceived burdensomeness, depression, and sex. 	<p>exposure to painful and provocative events.</p> <ul style="list-style-type: none"> Inattention, on the other hand, was not associated with acquired capability or lifetime suicide attempts. Perceived burdensomeness, depression, and sex (with being female associated with a greater likelihood of suicide ideation) all contributed to the model for past-year suicide ideation.
Moxon-Emre et al. (2022)	Not apparent	Not apparent	Not apparent
Ota et al. (2020)	Not apparent	Not apparent	Not apparent
Paquette-Smith et al. (2014)	<ul style="list-style-type: none"> Among those who had previously attempted suicide, the attention switching and communication subscales were higher compared to other subscales. It was hypothesized that these higher scores indicated challenges in social interactions. Communication impairments may have exacerbated difficulties in asking for help. 	<ul style="list-style-type: none"> However, there was a trend suggesting that individuals who attempted suicide experienced greater difficulty affording mental health services, despite having similar income levels. This financial barrier to accessing mental health care could potentially worsen their distress, impede effective 	<ul style="list-style-type: none"> It may be that communication impairments exacerbate deficits in attention switching could cause greater rumination or create additional challenges when having to cope with change.

Pelton et al. (2023)

- Deficits in attention switching could have contributed to greater rumination or created additional challenges when coping with change.
 - Autistic adults reported experiencing more frequent thwarted belongingness compared to non-autistic adults.
 - Exploratory analyses revealed that being autistic was directly linked to feelings of being an outsider and lacking caring and supportive friends.
 - These experiences were connected to suicidal thoughts through feelings of low mood (hopelessness or failure) and burdensomeness (believing others wish you were gone).
 - The results demonstrated that having an autism diagnosis was connected to various nodes in the network, including feelings of anxiety, not belonging, movement differences, and lacking caring and supportive friends.
 - The analysis suggested that being autistic serves as a distal risk marker for suicide, activating the network through these associated factors.
- treatment, and contribute to an increased risk of suicide.
- Autistic adults reported experiencing perceived burdensomeness more frequently than non-autistic adults.
 - The feeling of being an outsider was connected to suicidal thoughts through low mood (such as feelings of hopelessness or failure) and burdensomeness (believing that others wish you were gone).
 - The INQ-10 burdensomeness scale, which encompasses beliefs that life would be better for others if you were gone and that others wish to be rid of you, had a correlation coefficient of 0.16.
- Autistic adults reported more frequent suicidal thoughts than non-autistic adults

- Autistic individuals reported significantly higher levels of thwarted belonging compared to non-autistic individuals ($t(652.28) = 16.43, p < 0.001$).
- There was no significant difference in thwarted belonging between autistic men and women.
- Autistic individuals, when reporting higher levels of perceived burden and thwarted belonging, were more likely to endorse a past suicide attempt rather than past suicidal thoughts.
- Autistic adults reported stronger feelings of thwarted belonging, perceived burdensomeness, and a higher frequency of traumatic life events compared to non-autistic adults.
- Autistic individuals reported significantly higher levels of burdensomeness compared to non-autistic individuals.
- Autistic individuals also reported higher levels of perceived burden compared to non-autistic individuals.
- In the non-autistic group, men reported significantly lower levels of perceived burden compared to women.
- Autistic individuals were more likely to report past suicide attempts rather than past suicidal thoughts when experiencing higher levels of perceived burden and thwarted belonging.
- Autistic adults reported stronger feelings of thwarted belonging, perceived burdensomeness, and traumatic life events compared to non-autistic adults.
- Participants endorsing lower suicidal capability in both groups were more likely to report suicide ideation rather than attempt.
- There was a direct effect of trauma on lifetime suicidality in both groups.
- In the non-autistic group, lower perceived burden and thwarted belonging were associated with reporting no past suicidal Behaviour, while the interaction between the variables was significant.
- In the autistic group, stronger feelings of thwarted belonging and perceived burden were associated with reporting suicide attempt rather than

Pelton et al. (2020)

Raja et al. (2011)

- A common theme observed in the descriptions of participants (19 out of 26) was social isolation and detached interpersonal relationships.
- Many participants reported a lack of hobbies or activities that they engaged in.
- These findings indicate a prevalent pattern of limited social connections and a lack of

Majority of the participants were unemployed

ideation or no past suicidal Behaviour.

- Gender differences were observed primarily in the non-autistic group, with non-autistic men reporting higher suicidal capability and lower perceived burden compared to non-autistic women.
- Autistic individuals reported significantly higher levels of lifetime traumatic events compared to non-autistic individuals.
- No significant gender differences were found in autistic individuals regarding the components of the ITS or reported lifetime suicidality.
- 7.7% of the patients had one relative who had attempted suicide.
- 7.7% of the patients had one or more relatives who had committed suicide.

fulfilling recreational interests among the participants.

Rydén et al. (2008)

- Only 16.7% lived with partner.

- 33.3% of individuals had higher education.
 - 83.3% of individuals were currently unemployed and needed economic support.
 - In the SASD, self-love was significantly lower in the ASD group.
 - There was less self-love and more self-hate in these patients, although this dimension was not significantly different.
- Not apparent

- Frequent suicidal acts were significantly higher in the ASD group

Not apparent

Shtayermman (2007)

- The mean number of close friends reported by the adolescents and young adults was 3.1 (SD = 2.3), while parents reported a mean of 1.4 close friends (SD = 1.5).
- The participants reported a relatively low number of close friends, indicating limited social support networks.
- High levels of peer victimization were reported by the participants, as indicated by the victimization measures. This suggests that they may have experienced social exclusion, rejection, and interpersonal difficulties, intensifying their feelings of not belonging.

Shtayermman (2008)	<ul style="list-style-type: none"> • Prosocial Behaviour exhibited a strong negative correlation with current age, indicating that as the individuals' current age increased, their prosocial Behaviour decreased. • Severity of Autism Spectrum (AS) symptomatology demonstrated a strong negative correlation with the degree of total peer victimization ($r = -0.88$, $p = 0.001$), relational victimization ($r = -0.99$, $p = 0.001$), and overt victimization ($r = -0.99$, $p = 0.001$). It was strongly and positively correlated with prosocial behaviour ($r = 0.96$, $p = 0.001$). • The mean number of close friends reported by the adolescents and young adults was 3.1 ($SD = 2.3$), while the mean number reported by the parents was 1.4 ($SD = 1.5$). • Peer victimization was reported by 38% of the participants. 	Not apparent	Not apparent
Shtayermman (2022)	Not apparent	<ul style="list-style-type: none"> • Being employed had a statistically significant impact on the level of suicidal ideation. • The study found that being employed was associated with higher levels of suicidal ideation in the sample. 	Not apparent

Shtayermman & Fletcher (2022)	<ul style="list-style-type: none"> • There was no significant association found between social support and having attempted suicide. • Sexual orientation, specifically identifying as nonheterosexual, was found to be a significant predictor for suicide attempts. • Heterosexual respondents were less likely to have attempted suicide compared to nonheterosexual individuals. • Social support was not significantly associated with having attempted suicide. • There were no significant differences observed in marital status and employment between individuals who had attempted suicide and those who had not, among both ASD and non-ASD subjects. • In terms of living arrangements, suicide attempters had a slightly lower proportion of living alone compared to non-attempters, but the difference did not reach statistical significance ($p = 0.06$). 	<ul style="list-style-type: none"> • Education, employment status, social support, and income were not significantly associated with having attempted suicide. • There was no significant difference in educational level between suicide attempters and non-attempters among both ASD and non-ASD subjects. 	<p>Not apparent</p> <ul style="list-style-type: none"> • Drug overdose was the most prevalent method among non-ASD attempters, while hanging was the most prevalent method among ASD attempters. • Suicide attempters exhibited a significantly higher occurrence of past suicidal Behaviours compared to non-attempters. • Suicide attempters had a higher proportion of family history of suicide, reaching statistical significance, compared to non-attempters.
Takara & Kondo (2014)			

- In his relationships with peers, Mr. A struggles with a lack of spontaneity and has difficulty understanding social cues and implicit meaning. As a result, he feels overwhelmed by his emotions and struggles to regulate them.
 - These challenges in social interactions contribute to a sense of social isolation.
 - Mr. A expressed a sense of burden to others and believed that his existence lacked meaning.
 - He described his life in terms of a movie that did not thrill him and saw no point in living until the end.
 - This detachment and didactic tone in discussing his suicide attempt indicated a perceived burden on others.
 - Mr A exhibited a rigid, detailed, and pervasive thinking pattern related to suicide, similar to restricted interests.
 - The repetitive and inflexible suicide-oriented thinking observed in the patient was not associated with a depressive episode but followed a logical and pervasive reasoning pattern.
 - The patient's suicide-related thinking demonstrated a fascination with the topic and resembled restricted Behaviours.
 - Despite not meeting the criteria for depression, the patient's suicidal thoughts persisted and displayed a restrictive and rigid pattern.
 - The patient had a history of multiple suicide attempts, including hanging and jumping from a window, indicating an
-

Weiner et al. (2019)

acquired capability for
engaging in lethal self-
harm.

Appendix E

Complete suicidality prevalence rates and associated constructs measured

Author(s) and year	Suicide Prevalence Figures ^a	Associated Constructs Measured	Salient suicide-related findings	Depression-related findings	Depression controlled for
Arwert & Sizoo (2020)	Ideation, attempt(s): 66.6%	Rumination, Self-Esteem, Gender, Depression	Multiple regression analysis showed that both rumination and self-esteem were independently associated with the severity of suicidality. However, after controlling for depression, the significant association of rumination and self-esteem with suicidality severity was no longer maintained. Females reported higher levels of suicidal ideation compared to males, but there was no significant difference in the degree of suicidality between genders.	Even after controlling for depression, rumination remained significantly associated with attempted suicide. Depression was identified as the most important risk factor for the severity of suicidality.	Yes
Barcelos et al. (2021)	Ideation, attempt(s): 16.7%	Anxiety, Hedonic Well-Being, Eudaimonia Well-Being, General Life Satisfaction, Depression	Anxiety was not directly linked to suicidality	The majority of the participants (61.1%) were found to be moderately to severely depressed or anxious.	No
Camm-Crosbie et al. (2019)	Ideation Treatment received group: 34.2%	Treatment Experiences, Support Experiences, Mental Health Problems,	Participants reported that the process of asking for treatment and support lacked	The study found that a significant proportion of the participants, specifically 88.8%, reported experiencing depression.	No

Treatment
needed group:
44.8%

Depression,
camouflaging

transparency and felt daunting and complex. Some participants expressed uncertainty about how to explain their situation and what would happen when seeking treatment and support. Asking for support was seen as requiring a specific skill set, and individuals felt unsure about how to self-advocate for the support they needed.

The larger healthcare system was perceived as not being organized appropriately, leading to difficulties in accessing timely treatment and support.

Some participants felt dismissed for treatment or support because they were viewed as merely "coping" with their suicidal thoughts, rather than receiving adequate help.

Long waiting lists for mental health services were reported as a barrier to receiving timely help.

Lack of funding for suitable care was identified as another significant challenge in

accessing appropriate treatment and support. The study found that a majority (90.4%) of the participants had a mental health diagnosis, indicating a high prevalence of mental health conditions among individuals experiencing suicidality. The participant realized that they had never learned how to ask for help and had spent their life camouflaging their struggles, believing they had to handle everything on their own. They reached a point where they thought suicide was a better option than continuing in their condition.

Camouflaging, ADHD, depression, and anxiety are factors significantly correlated with suicidality in individuals with ASD. There is no significant difference in total Suicidal Behaviours Questionnaire-Revised (SBQ-R) scores between autistic males and autistic females, so the

The study found a strong association between depression and an increased risk of suicide. The odds ratio for depression and suicidality was 4.86, indicating a higher likelihood of suicidal thoughts or behaviours among those with depression.

Yes

Cassidy et al.
(2018)

Scoring \geq cut-off for psychiatric populations: 72%
Lifetime suicide attempts: 38%

Camouflaging, Demographics, Age of Diagnosis, Depression

results were pooled for analysis.

Autistic males and females show no significant difference in camouflaging their ASD to fit in social situations.

Predictors of SBQ-R scores include sex, age, employment, satisfaction with living arrangements, presence of at least one developmental condition, depression, anxiety, autism diagnosis, and NSSI.

The age of diagnosis is not significantly correlated with any other variables studied in the context of suicidality.

Autistic females had a higher prevalence of NSSI compared to autistic males, while no significant sex difference was observed in the general population.

Self-reported autistic traits had a modest but statistically significant association with SBQ-R scores, even after considering other relevant factors.

It's important to note that the impact of autistic traits alone on SBQ-R scores was relatively small compared to the combined influence of other variables in the analysis.

- Camouflaging one's Autism Spectrum Condition (ASC) in social situations was identified as a coping strategy.
- Camouflaging significantly predicted suicidality in the ASC group, even after controlling for various factors.
- Unmet support needs and camouflaging accounted for a significant portion of the variance in suicidality scores.
- The perception of not fitting in, which is related to camouflaging, may be a factor of thwarted belongingness.

Cassidy et al.
(2014)

Ideation: 66%
Plans or
Attempts: 35%

Empathy Quotient,
Gender, Depression,
ASD Traits

Men and women did not
differ significantly in

32% of respondents had a
lifetime experience of self-
reported history of depression.

No

terms of suicide plans/attempts. Adults with Asperger's syndrome were more likely to report a lifetime experience of suicidal ideation compared to the general UK population sample, individuals with one medical illness, two or more medical illnesses, or psychotic illness. However, adults with Asperger's syndrome were not more likely to report a lifetime experience of suicidal ideation compared to people with both drug dependency and attention-deficit hyperactivity disorder. Individuals who reported suicide plans or attempts had significantly higher AQ (Autism Quotient) scores compared to those who did not.

Individuals with a history of depression were more likely to report suicidal ideation (OR 4.3, 95% CI 2.4-7.7; p<0.0001). Individuals with a history of depression were also more likely to report suicide plans or attempts (OR 2.4, 95% CI 1.5-3.8; p<0.0001) compared to those without any history of depression.

Cervantes et al. (2023)

Ideation: 5.1%

Demographics (Age, Sex, Insurance Type, Median Household Income By Zip Code), Clinical Presentation (Psychiatric Presenting Concern, Co-Occurring

Across different groups, youth with suicidal ideation or intentional self-inflicted injury diagnoses tend to be older, have psychiatric presenting concerns, and have a

Individuals with both ASD and a mood disorder have 9.82 times higher odds of experiencing suicidal ideation or intentional self-inflicted injury compared to individuals without these conditions.

No

		<p>Mental Health Diagnoses, Level Of ID Where Applicable), Hospital Characteristics (Region, Teaching Status/Rurality), Probability Of Group Membership (Suicidality, Self-Inflicted Injury) Based On Demographic Variables (Gender, Age, ID Combined With Psychiatric Concerns), Co-Occurring ID, Depression</p>	<p>higher rate of additional mental health diagnoses. Autistic youth with suicidal ideation or intentional self-inflicted injury diagnoses are almost three times more likely to have mild intellectual disability (ID) compared to having no co-occurring ID diagnosis. Interestingly, autistic youth who visited the emergency department (ED) with a diagnosis of suicidal ideation or intentional self-inflicted injury were nearly three times more likely to have mild intellectual disability (ID) compared to having no co-occurring ID diagnosis.</p>	
<p>Costa et al. (2020)</p>	<p>Ideation, attempt(s), future risk: 63%</p>	<p>Alexithymia, Depression. ASD Traits</p>	<p>They have increased levels of alexithymia Antidepressant intake, increased autistic traits, and increased depressive symptomatology significantly contribute to higher rates of suicidality in adults with ASD. Autistic traits moderate the relationship between</p>	<p>The ASD group had significantly higher depressive symptomatology scores than the control group Younger ages and being female predicted higher depressive symptomatology scores Scoring higher on autistic traits and depressive</p> <p>Yes</p>

Dell’Osso et al. (2019)	Ideation, attempt(s): 35.3%	Broad Spectrum of Mood Symptoms, Childhood/Adolescence, Verbal Communication, Non-Verbal Communication,	<p>alexithymia and suicidality. Younger ages are associated with higher suicidality scores in adults with ASD. Gender does not have a significant effect on suicidality scores in this population. Age and gender do not significantly contribute to the model explaining suicidality in adults with ASD. High levels of autistic traits combined with increased alexithymia predict a higher risk of suicidality. Alexithymia plays a role in predicting suicidality specifically among individuals with high levels of autistic traits. The combination of high alexithymia and high autistic traits predicts a higher risk of suicidality. Higher comorbidities are associated with higher levels of suicidality in individuals with ASD. Age and sex do not show a significant correlation with</p>	<p>symptomatology predicted a higher suicidality score Adults with ASD were more likely to take antidepressant medication.</p>	No
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<p>Dow et al. (2021)</p>	<p>Ideation: 12.2% Plans: 2.1% Attempts: 19.4%</p>	<p>Empathy, Inflexibility And Adherence To Routine, Restricted Interests And Rumination, Hyper-Hypo Reactivity To Sensory Input, Gender, Age, Sex, Depression</p> <p>Demographics, Anxiety, Depression</p>	<p>suicidality in this population. The "MOODS-SR depressive component score" and the AdAS Spectrum "Restricted interests/Ruminations domain" score are identified as the best predictors of suicidality. There is a significant correlation between the AdAS Spectrum Restricted interests and rumination domain and suicidality scores. The AdAS Spectrum Restricted interests and rumination domain showed a significant correlation with suicidality scores. Rumination, characterized by repetitive thinking, is associated with anxiety and depression, and it can contribute to social isolation while hindering problem-solving and processing of negative feelings.</p> <p>A high proportion of the sample reported a lifetime history of anxiety (63%)</p>	<p>Depression findings were associated with suicide</p> <p>55.1% of participants reported experiencing depression at some point in their lives</p>	<p>No</p>
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Those with a lifetime history of depression showed significantly higher rates of thwarted belongingness and perceived burdensomeness compared to those without depression
 There was no statistical difference in capability between those with and without depression

Hand et al. (2020)

Ideation: 4.3%
 Attempt/self-inflicted injury: 4.1%

Age, Sex, Race/Ethnicity, Dual Eligibility for Medicare and Medicaid, Bipolar Depression, Unipolar Depression, Intellectual Disability (ID), Number Of Psychiatric-Related Emergency Department (ED) Visits, And Number Of Psychiatric-Related Inpatient Hospitalizations, Depression

Prevalence of mental health conditions: The study found that bipolar depression was prevalent in 24.0% of the participants, while unipolar depression was prevalent in 21.5% of the participants. 39.7% of the participants had a co-occurring ID. Individuals with bipolar and unipolar depression were more likely to experience suicidal ideation. Individuals with an intellectual disability were more likely to have a history of suicide attempt. The study found that individuals with suicidal ideation tended to be

N/A

No

younger compared to those without suicidal ideation. Mental health difficulties such as bipolar and unipolar depression were more prevalent among individuals with suicidal ideation and suicide attempts compared to those without.

The presence of intellectual disability was more common among individuals with a suicide attempt (63.0%) compared to those without (38.7%). Similarly, individuals with a suicide attempt exhibited higher rates of bipolar and unipolar depression, as well as more frequent psychiatric hospitalizations and ED visits, compared to those without.

Individuals with suicidal ideation had higher frequencies of hospitalizations and emergency department (ED) visits for psychiatric concerns.

Hedley et al. (2021)	Moderate risk: 12.6%	Participants Reported Basic Demographic and Diagnostic Information, As Well As Their Scores On The COVID-19 Impact Scale (CIS), Depression	<p>The study found very weak associations between participants' COVID-19 impact scores and their scores on the SBQ-R. Approximately 85% of the participants had completed a post-secondary qualification.</p> <p>The study found that 70% of the participants reported co-occurring diagnoses of anxiety or depression.</p> <p>The study did not find statistically significant differences between women and men regarding the associations between COVID-19 impact and personal wellbeing, depression, or suicide risk.</p>	<p>No significant association was observed between depression and suicide risk.</p> <p>The study found that 70% of the participants reported co-occurring diagnoses of anxiety or depression.</p>	Yes
Hedley et al. (2018)	Ideation: 36%	ASD Traits, Loneliness, Social Support, Depression	<p>Gender differences: The study did not find any significant differences in the strengths of relationships between the variables when comparing different genders.</p> <p>Depression and suicidal ideation exhibited a positive correlation with loneliness.</p>	48.6% of the sample returned scores in the clinical range for depression on the PHQ	Yes

Hedley et al. (2017)	Ideation: 19.7%	Co-Morbidities, Including Intellectual Disability, IQ, Depression, ASD traits	<p>Co-morbid conditions: Anxiety and depression were the most commonly self-reported lifetime diagnoses of co-morbid conditions related to suicide. ADHD was also reported as a commonly co-morbid condition.</p> <p>Intellectual disability: Approximately 10% of the participants had been diagnosed with intellectual disability at some point, and this was found to be related to suicide.</p> <p>Greater severity of Autism Spectrum Disorder (ASD) traits was associated with increased loneliness, lower satisfaction with social support, and higher depression severity.</p> <p>The Autism Spectrum Quotient (AQ-Short) was significantly associated only with ISEL-12 Belonging, indicating that individuals with higher ASD traits were less likely to report having someone available to join them in social activities.</p> <p>However, these variables (AQ-Short and ISEL-12)</p>	<p>25% of the participants in the study scored within the range of clinical depression.</p> <p>Tangible Support was found to have an indirect effect on depression.</p> <p>Depression acted as a mediator in the relationship between tangible support and suicidal ideation.</p> <p>Depression was directly linked to suicidal ideation.</p>	Yes
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Hirvikoski et al. (2020)	ASD without ID + ADHD: Attempt:12.59% Death by suicide: 0.4%	Sociodemographic, Comorbidities, Type Of Suicidal Death, Gender, Familial Liability, Depression	<p>were not significantly associated with depression or suicidal ideation in individuals with ASD. There was a significant relationship between self-reported anxiety or depression and the reporting of any suicidal ideation, $\chi^2 (1, N = 76) = 4.55, p = .033$, with individuals reporting a comorbid diagnosis being more likely to report suicidal ideation.</p> <p>Gender differences: Females with ASD without ID have a higher risk of suicidal behaviours compared to males with ASD.</p> <p>Comorbidities: The risk of suicidal behaviour is stronger in females with ASD who do not have ID or ADHD.</p> <p>Individuals with ASD without ID have a significantly increased risk of both suicide attempts and suicide.</p> <p>Comorbidity with ADHD: The risk of suicidal behaviour remains</p>	<p>The first step involved adjusting for depression only. The second step involved adjusting for depression, anxiety disorders, and substance use disorders. When adjusting for psychiatric comorbidities such as depression, anxiety disorders, and substance use disorders, the risk of suicidal behaviour was reduced but still remained significantly higher than that of the control group.</p>	Yes
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			<p>significant in individuals with ASD without ID but with comorbid ADHD after adjustment for other factors.</p> <p>Individuals with ASD without ID or ADHD had an increased risk of both attempted suicide and suicide compared to matched population-based controls.</p>		
Hooijer & Sizoo (2020)	<p>Past suicide attempt(s): 28.4%</p> <p>Current ideation: 70.3%</p>	<p>Sociodemographic Characteristics (Age, Gender, Education), Comorbid Diagnosis of Participants, Temperament And Character, Depression</p>	<p>No significant differences were found in sociodemographic characteristics (age, gender, education) between suicide attempters and non-attempters, or between ideators and non-ideators.</p> <p>Temperament and character traits and suicide attempts: There was no association found between temperament and character traits and suicide attempts in individuals with ASD.</p>	<p>Depression was identified as a predictor for suicide ideation in adults with ASD.</p> <p>Both depression and Harm Avoidance were statistically significant factors in distinguishing between individuals with suicidal thoughts (ideators) and those without.</p>	Yes
Jachyra et al. (2022)	<p>100% admitted for ideation (selection criteria)</p>	<p>Demographics, Rumination</p>	<p>Challenges faced by autistic individuals in managing recurring thoughts of suicidal</p>	N/A	No

37% reported it as a new issue
62% reported it as a recurring issue

behaviour, often leading to emotional distress and fatigue
Co-occurring mental health conditions, particularly anxiety and depression, were commonly identified in autistic adults with STB. Substance use, including alcohol and various drugs, was also documented, emphasizing the importance of addressing these factors in managing STB.
93% had at least one co-occurring mental health condition noted in their chart

Jackson et al. (2018)

Ideation: 20%
Plan: 40%
Attempt: 14.6%
Some lifetime suicidal behaviour: 74.6%

Demographics,
Academic Experiences,
Mental Well-Being,
Depression

Desire for better services: Approximately 30.4% of the participants expressed a desire for better services at school.
Co-occurring psychiatric diagnoses: A significant proportion of participants (57.1%) had co-occurring psychiatric diagnoses. The most common diagnoses reported were depression (35.7%) and anxiety disorders (ranging from 33.9% to 26.8%).

Symptoms of depression were found to be significantly associated with lifetime suicidal behaviour.

Yes

Several factors were found to be associated with lifetime suicidal behaviour among individuals with ASD. These included feelings of loneliness, lack of friends, academic discomfort, and symptoms of depression, anxiety, and stress.

Kato et al. (2013)	Attempt: 100% (selection criteria) Attempt history: 23.3%	Socio-Demographics, Comorbidities, Major Psychiatric Disorders, Age, Gender, Depression	<p>Diagnosis rates of mood disorders: The study found that individuals with ASD had a lower diagnosis rate of mood disorders compared to other mental health conditions.</p> <p>Comorbidities and suicide attempts: Individuals with ASD who attempt suicide often have comorbidities, including mood disorders, anxiety disorders, adjustment disorders, and substance-related disorders.</p> <p>Age and suicide attempts: The mean age of individuals with ASD who attempt suicide tends to be younger. This suggests that suicide attempts may occur at an earlier age among individuals with</p>	18.6% of participants had mood disorders	No
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Kirby et al. (2019)	Cumulative incidence of suicide death (2013 – 2017): 0.17%	Sex, Birth Date, Death Date, Age at Death, Marital Status, Occupational Status, Socioeconomic Status, Method Of Suicide	<p>ASD compared to the general population.</p> <p>Gender differences: The study found that males with ASD are more likely to die by suicide compared to females.</p> <p>Age at suicide: Suicide cases among individuals with ASD occur at a significantly younger age compared to non-ASD individuals. The average age at suicide for individuals with ASD was 32.4 years, while it was 41.8 years for non-ASD individuals.</p> <p>Gender differences: Non-ASD males have a higher likelihood of dying by suicide compared to non-ASD females. However, the study found no significant difference in suicide risk between males and females with ASD.</p> <p>Method of suicide: Individuals with ASD are less likely to use firearms as a means of suicide compared to the non-ASD group.</p>	N/A	No
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Kölves et al. (2021)	<19 age group: 48,370 attempts (0.5% among adult individuals with ASD)	Sex, Age Group, Marital/Cohabitational Status, Educational Level, Socioeconomic Status, And Age at ASD Diagnosis, As Well As Psychiatric Diagnoses	<p>Comorbid conditions: Over 90% of individuals with ASD who attempted or died by suicide had another comorbid condition.</p> <p>Depression and substance use disorders had the highest incidence rate ratios for suicide among individuals with ASD.</p> <p>Parental psychiatric disorder: Individuals with a parent who had a psychiatric disorder had a higher rate of suicide attempts, regardless of ASD.</p> <p>Gender differences: Females with ASD had a higher incidence rate of suicide attempts compared to males.</p> <p>Comorbid psychiatric disorders were found to be significantly associated with a higher rate of suicide attempts in individuals with ASD compared to those without any psychiatric disorders.</p>	N/A	No
Moseley et al. (2020)	Ideation: 35% Attempts: 28%	Demographics, Therapy Seeking and Experiences, Depression	<p>Gender and suicidality: The study found that gender does not significantly affect</p>	Differences observed between self-harming and non-self-harming participants could not	Yes

			suicidality within the self-harming group. Both males and females were equally represented in both the self-harmers and non-self-harmers groups.	be solely attributed to depression.	
Moseley et al. (2022a)	Attempts: 48.73%	Demographics, Depression	N/A	The effect of depression on habituation to NSSI was statistically significant, with a regression coefficient (b) of 0.18. Similarly, the effect of depression on acquired capability was statistically significant, with a regression coefficient (b) of 0.51.	Yes
Moseley et al. (2022b)	Ideation: 74.3% Lifetime attempts: 48.7%	Demographics, Anxiety, Depression	The study found that anxiety is not significantly related to suicidal ideation. The age at diagnosis of the participants did not show a significant relationship with anxiety, depression, thwarted belongingness, or burdensomeness. Gender and suicide attempts: Being male was associated with a higher likelihood of lifetime suicide attempts and a higher level of depression. However, after controlling for other variables, being	Depression was found to be significantly associated with suicide ideation and attempts in individuals with ASD.	No

			male was not significantly associated with suicide ideation or the constructs of the ITS.		
Moseley et al. (2023)	Ideation: 74.3% Lifetime attempts: 48.7%	Co-Occurring ADHD, Demographics, Depression	Co-occurring ADHD and mental health: Autistic participants with likely ADHD had poorer mental health outcomes, including higher levels of anxiety and depression Autistic participants with likely ADHD who reported higher rates of depression and perceived burdensomeness also had increased suicidal thoughts in the past year.	Depression was found to be significantly associated with past-year suicide ideation. Higher levels of depression were linked to a greater likelihood of experiencing suicidal thoughts.	Yes
Moxon-Emre et al. (2022)	Suicidal Ideation: 46.43% High Suicide Risk: 7.7% Moderate Suicide Risk: 38.5%	Co-Occurring Mental Health Conditions, Depression, Neurophysiological data	ASD SI+ participants had a higher NAA/Glu ratio compared to ASD SI- participants. The NAA/Glu ratio was a significant predictor of suicidal ideation and significantly differentiated between ASD SI+ and ASD SI- participants. NAA and Glu alone did not predict suicidal ideation. Participants in the SI+ group (endorsing suicidal	The SI+ group (participants with suicidal ideation) contained a higher proportion of individuals who were classified as depressed.	Yes

Ota et al. (2020)	N/A	Neurophysiological data	<p>thinking) had a higher prevalence of co-occurring mental health conditions compared to the SI- group (not endorsing suicidal thinking).</p> <p>The SI+ group had a greater number of participants with depression compared to the SI- group.</p> <p>Significant positive correlation between the current suicide risk score and the centroid value in the prefrontal region in the ASD group.</p> <p>The study suggests that the 24-channel NIRS (Near-Infrared Spectroscopy) system can be valuable in assessing suicide risk in individuals with ASD.</p> <p>There is a significant positive correlation between the current suicide risk score and the time-course of prefrontal hemodynamic activation in the ASD group</p>	N/A	No
Paquette-Smith et al. (2014)	36%	Demographic, Psychiatric History, Depression, ASD triats	Gender and suicide attempts: Females were slightly more likely to have attempted suicide	Individuals who attempted suicide were more likely to report problems with depression.	No

than males. However, the association between gender and suicide attempts was only marginally significant. Both suicide attempters and non-attempters reported receiving mental health services, with similar average numbers of services. Individuals who attempted suicide had higher AQ scores, indicating more severe autism symptomatology.

Pelton et al. (2023)

Suicidal behaviour: 95%
 Ideation: 17.7%
 Past plans: 41.8%
 Past attempt: 35.1%

Anxiety, Somatic Symptoms, Depression

Autistic adults experience more frequent anxiety and depression compared to non-autistic adults. Being autistic was directly associated with feelings of anxiety, restlessness, low mood
 Movement, specifically restlessness, is directly connected to suicidal thoughts in autistic adults. Gender differences: While gender differences were observed within the non-autistic group in relation to the analysed variables,

Autistic individuals reported higher scores PHQ-9 compared to non-autistic individuals. Connections from mood symptoms to somatic and thwarted belonging experiences were absent for autistic adults

No

			these differences were not observed within the autistic group. Feeling tired and like an outsider were found to be less interconnected for autistic adults compared to non-autistic adults. Autistic individuals reported higher scores GAD-7 compared to non-autistic individuals.		
Pelton et al. (2020)	Past ideation: 16.1% Past plans: 40.9% Past attempt: 38.3%	Demographics, Age, Gender, Mental Health, Autism Diagnoses, Presence of Other Neurodevelopmental Disorders, Depression, ASD traits	The study found no significant difference in reported lifetime suicidality between autistic women and men. Both autistic and non-autistic individuals showed a relationship between autistic traits and suicidality, mediated by the factors of burdensomeness and thwarted belonging.	N/A	No
Raja et al. (2011)	Death by suicide: 7.7% Attempts: 3.8% Ideation: 30.8%	Demographics, IQ, Psychiatric Comorbidity	There was no statistically significant difference in sociodemographic or clinical variables between patients with and without suicidality, except for anxiety.	Only 12% of patients had a reported psychiatric comorbidity of depression	No

Rydén et al. (2008)	Prevalence of ASD in suicidal sample: 15%	Comorbidities, Background Data, Clinic History, DSM-IV Diagnosis of Borderline, Personality Traits, And Self-Image	<p>Anxiety is more frequent in patients with suicidality compared to those without.</p> <p>In contrast, only 21.4% of patients without suicidality had anxiety.</p> <p>The study identified the presence of psychiatric symptoms, including delusions and hallucinations, in individuals with ASDs. These symptoms were particularly significant when they were associated with mood disorders or mood spectrum disorders that included psychotic signs.</p> <p>BPD was identified as a risk factor for suicide. The mean GAF score, which measures overall psychological and social functioning, was significantly lower in the group with ASD.</p>	BPD = mood disorder	No
Shtayermman (2007)	50%	Anxiety, Sociodemographics, Depression	<p>Current age was strongly positively correlated with certain aspects of peer victimization, indicating that as individuals' current age increases, they</p>	<p>20% of the participants in the study met the diagnostic criteria for Major Depressive Disorder.</p> <p>Bivariate correlation analysis revealed moderate to strong</p>	Yes

			<p>experience higher levels of peer victimization. The severity of AS symptomatology is negatively correlated with age at diagnosis, suggesting that individuals diagnosed at a younger age tend to have more severe AS symptoms. Age at diagnosis did not show a significant correlation with other variables mentioned in the study.</p> <p>There was a negative correlation between the severity of AS symptomatology and the level of suicidal ideation</p>	<p>correlations between suicidal ideation and depressive symptoms.</p>	
Shtayermman (2008)	50%	Comorbid Disorders, Generalized Anxiety Disorder.	<p>Moderate to strong correlations were observed between the level of suicidal ideation and current age and age at diagnosis.</p>	<p>Moderate to strong correlations were observed between the level of suicidal ideation and level of depressive symptoms.</p>	No
Shtayermman (2022)	Ideation: 22.76% Attempts: 17.4%	Mental Health Status, Sociodemographics, Depression	<p>Anxiety had a significant impact on the level of suicidal ideation experienced by both members of each sibling dyad.</p>	<p>The Beck Depression Inventory (BDI) 13.9% of participants had severe depression. The study revealed a significant association between higher levels of</p>	Yes

14.53% of participants had a potentially concerning level of anxiety.

depression and higher levels of suicidal ideation. Even after considering sociodemographic characteristics, the relationship between depression
 Across all models tested, the level of depression consistently impacted suicidal ideation.
 The findings suggest a positive correlation between depression levels and suicidal ideation among siblings.

Shtayermman & Fletcher (2022)

17.4%

Mental Health Status, Sociodemographics, Depression

Anxiety and sexual orientation, specifically non-heterosexual identification, are significant predictors of suicide attempts.
 Depression, age, gender, being a sibling of a person with ASD, marital status, education, employment status, social support, and income are not significantly associated with suicide attempts.
 Anxiety is significantly associated with a history of suicide attempts.

No significant association between depression and suicide attempts in the sample.

Yes

Takara & Kondo (2014)	Attempt: 24.3%	Mental Health Comorbidity, Patients' Backgrounds (Age, Gender, Educational Level, Marital Status, Employment, And Living Conditions), Depression	Comorbid pdd-nos, which includes atypical autism, was a significant risk factor for suicide attempts among first-visit patients with a major depressive episode. Suicide attempters were significantly younger, with a mean age of 35.6 years, compared to non-attempters with a mean age of 41.8 years. There was no significant difference in the proportion of females between suicide attempters and non-attempters among both ASD and non-ASD subjects. Hanging was the most prevalent method of suicide attempt among ASD attempters.	Suicide attempters had a significantly higher proportion of agitation during a depressive episode compared to non-attempters.	Yes
Weiner et al. (2019)	Single case	Sociodemographics, Co-Morbid Mental Health Issues.	N/A	Individual's suicidal thoughts and behaviours were not associated with a depressive episode. No other symptoms typically	No

associated with depression, such as reduced activity, low energy, mood, or anhedonia (loss of interest or pleasure), were reported.

The individual's score on the Beck Depression Inventory (BDI) was within the normal range

The only symptom reported on the BDI was a slight loss of appetite
