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Potential Mechanisms Underlying Suicidality in Autistic People with Attention Deficit/Hyperactivity Disorder: Testing Hypotheses from the Interpersonal Theory of Suicide

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Abstract

Background: Autistic people with co-occurring attention deficit/hyperactivity disorder (ADHD) appear to be at heightened risk of suicide. To understand why, we explored two explanatory mechanisms from the interpersonal theory of suicide: first, that co-occurring ADHD might be associated with greater risk through greater thwarted belongingness and perceived burdensomeness and, secondly, that hyperactive/impulsive features might incur additional risk through their association with painful and provocative events, which are suggested to create “capability” for suicide.

Methods: Autistic adults ($n=314$) completed an online survey including measures of thwarted belongingness, perceived burdensomeness, painful and provocative events, acquired capability for suicide, and ADHD features. Creating an overall index of likely ADHD, we examined associations between likely ADHD, suicide ideation, and lifetime suicide attempts through the parallel mediators of thwarted belongingness, perceived burdensomeness, anxiety, and depression. In several models, we then examined hyperactive, impulsive, and inattentive features as predictors of exposure to painful and provocative events and subsequent capability for suicide, and examined whether these two variables, sequentially or individually, mediated an association with lifetime suicide attempts.

Results: Likely ADHD was associated with past-year suicide ideation through greater depression and perceived burdensomeness, which also mediated its association with more suicide attempts. Hyperactive and impulsive features were associated with exposure to painful and provocative events and through this acquired suicide capability. Both features were associated with more numerous suicide attempts through these two mediators sequentially, and through exposure to painful and provocative events alone.

Conclusions: These data suggest that suicidality in autistic people with ADHD may be partially related to perceived burdensomeness and to acquired suicide capability after exposure to painful and provocative events. However, as we observed a pathway to suicidality associated with painful and provocative events alone, it is likely that there are also other explanatory mechanisms for the influence of traumatic events on suicide risk.

Keywords: suicide, thwarted belongingness, perceived burdensomeness, acquired capability, ADHD

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Community Brief

Why is this an important issue?

Suicide is a leading cause of premature death in autistic people, but we still know little about why autistic people are at greater risk and how we can help. Recent findings suggest that autistic people with co-occurring attention deficit/hyperactivity disorder (ADHD) are at even higher risk, but we do not yet understand why.

What was the purpose of this study?

This research examined two potential explanations for higher risk of suicide in autistic people with co-occurring ADHD. First, we expected that because these individuals are often very isolated and struggle with independence and employment, they might be more vulnerable to two risk factors for suicide: “thwarted belongingness,” the feeling of being alienated from other people, and “perceived burdensomeness,” the feeling that one is a burden to others. We also expected that hyperactive/impulsive features associated with ADHD might make people more likely to experience painful and dangerous events. Exposure to events like this is suggested to make people less frightened of dying by suicide and more able to attempt to end their lives. This is called “acquiring capability” for suicide.

What did the researchers do?

We asked 314 autistic adults to complete an online survey including measures of thwarted belongingness, perceived burdensomeness, exposure to painful and dangerous events, and acquired capability for suicide. They also completed a scale measuring ADHD features, and symptoms of depression and anxiety. We then looked at which of these factors, if any, explained suicide risk in autistic people with co-occurring ADHD.

What were the results of the study?

Our data suggest that autistic people with co-occurring ADHD might be at greater risk of suicide ideation and attempts because they are more likely to experience depression and to feel like a burden to others. We also found that people with high degrees of hyperactive/impulsive features were more likely to experience painful and dangerous events, and, therefore, had greater capability for suicide—because of this, they were more likely to have attempted suicide more times in the past. Exposure to these kinds of traumatic events also increased the risk of suicide all by itself.

What do these findings add to what was already known?

Very little is known about why autistic people with co-occurring ADHD might be at even higher risk of suicide than people with either ADHD or autism alone. No studies have examined explanations for suicide in this subgroup.

What are potential weaknesses in the study?

Because this study looked at a snapshot of participants’ current states, we cannot be sure of the direction of relationships between variables. For example, it might be that experiences of surviving suicide attempts actually make people feel more depressed and more like a burden afterward, rather than these feelings being the risk factors that contributed to suicide attempts.

How will these findings help autistic adults now or in the future?

These findings indicate feelings and experiences that are relevant to suicide risk in autistic people with co-occurring ADHD, which might thus be important to target in interventions.

Introduction

SUICIDE IS A LEADING CAUSE of premature mortality in autistic people without intellectual disability, with suicide attempts and deaths considerably higher than those seen in the general population.^{1–5} One group who appear at particular risk within this demographic are autistic people with co-occurring attention deficit/hyperactivity disorder (ADHD), which has a lifetime prevalence of 40.2% in au-

tistic samples.⁶ ADHD is considered by many to be a neurological “cousin” of autism,⁷ a developmental condition with shared genetic heritability^{8,9} and an overlapping neurological profile.¹⁰

Despite some shared features that may challenge differential diagnosis,¹¹ ADHD possesses its own distinctive behavioral and neurological features that distinguish it from autism, and the appearance of ADHD and autistic features within an individual shows that the two can co-occur.^{10,12}

One study estimated the risk of suicide attempts in these individuals as threefold higher than the fourfold increase already seen within the autistic community¹³; in the same cohort, suicide deaths were increased fivefold on top of the eightfold increase seen in individuals with autism alone. With similar findings corroborated in ADHD samples,¹⁴ this heightened risk in autistic people with ADHD is importantly independent of psychiatric conditions such as anxiety, depression, and substance abuse,¹³ which are also more common in this cohort^{15,16} and a major correlate and risk factor for suicidality, in and of themselves, in both autistic and ADHD populations.^{2,17,18}

Similarly, a number of studies report an association between ADHD and suicidality^{14,19–21} that is separate from these confounds and seemingly reflects something about living in the world as an ADHD individual.²² These concerning findings highlight the need to examine the role of co-occurring ADHD in autistic suicidality and to identify the mechanisms through which these individuals might be at greater risk.

Recent efforts to comprehend suicidality in autistic people have drawn on theoretical frameworks in an attempt to integrate and explain seemingly disparate risk factors. To date, the dominant paradigm in suicidology is the Interpersonal Theory of Suicide (ITS),^{23–25} which holds that suicide ideation and suicide attempts are distinct phenomena dependent on specific proximal risk factors. The theory suggests that the desire to die by suicide arises from the confluence of “thwarted belongingness” (a state of loneliness and the absence of reciprocal caring relationships) and “perceived burdensomeness” (feelings of self-hate and worthlessness, beliefs that one is a liability to others).

The ITS holds that suicide attempts and deaths occur in people in whom suicide ideation converges with the *capability* to enact lethal self-injury. Such capability can be “acquired” through exposure to physically painful and emotionally provocative or triggering experiences. Although events of this nature include exposure to traumatic events (e.g., violent victimization, accidents, and combat experience), engagement in nonsuicidal self-injury (NSSI), or intravenous drug use, they also include a range of behaviors associated with thrill seeking or extreme sports (e.g., skydiving, rock climbing, getting a tattoo, and riding a motorbike): essentially, experiences in which individuals are exposed to pain and fear of pain and death, and can become habituated to the same.^{26,27}

The explanatory power of the ITS lies partly in its recognition of overarching psychological constructs that incorporate individual correlates of suicidality (e.g., unemployment and family conflict), with life events and experiences. Many varied factors associated with suicidality in autistic people—for instance, loneliness and unmet support needs,^{17,28,29} camouflaging,¹⁷ low self-worth,³⁰ and NSSI^{17,31}—may, if the theory is applicable in this group, be understood in terms of a small number of shared psychological constructs.

Recent investigations support the relevance of thwarted belongingness, perceived burdensomeness, and acquired capability to suicidality in autistic people,^{32,33} although they suggest that factors traditionally associated with suicidal ideation in the ITS might also contribute to suicide attempts in autistic people. Perceived burdensomeness appeared to be a particularly potent predictor of both outcomes, and mediated the higher rates of suicide ideation seen in autistic people

who were single.³³ In the same vein, in the general population, perceived burdensomeness and thwarted belongingness mediated the association between camouflaging autistic traits and suicidality.³⁴

In considering suicide risk associated with ADHD through the lens of the ITS, it may be significant that nonautistic people with ADHD struggle with loneliness, low self-worth, feelings of inferiority and difference from others, and may engage in camouflaging as they “strive to be normal.”^{35–39} They are more likely to experience academic underachievement and/or exclusion, unemployment, difficulty sustaining employment, and to find themselves in financial arrears or dependent on family.⁴⁰ Financial distress, which is suggested by the ITS as a likely antecedent of perceived burdensomeness,²⁴ has actually been linked to psychological distress and suicide in this population.¹⁹

Although little research has explored ITS constructs as predictors of suicidality in ADHD, recent studies in the general population have indeed suggested a mediating role for perceived burdensomeness and thwarted belongingness in the association between ADHD traits and suicide ideation.⁴¹ With both states (particularly perceived burdensomeness) associated with suicidality in autistic people,^{32,33} it is possible that the higher risk of suicide ideation in autistic people with ADHD might also be mediated by greater likelihood of experiencing these states.

As children and adolescents, these individuals tend to score more poorly than young people with either condition alone on standardized measures of adaptive and executive function, experience more mental health conditions, and struggle more with the social and academic pressures of school.^{16,42–45} There are few studies examining the welfare of autistic adults with co-occurring ADHD, but those that exist suggest that with greater degrees of ADHD features, autistic people rate their quality of life as poorer (including in relation to physical and mental health) and may be more isolated, with lower likelihood of employment and independence.^{46,47}

Although we might hypothesize that high states of thwarted belongingness and perceived burdensomeness, if present, would be associated with a strong desire for death, two additional mechanisms may be relevant in explaining the high rates of suicide attempts and deaths in autistic people with ADHD. First, there is some suggestion that mental rehearsal of suicide plans, a behavior associated with suicide ideation *and* subsequent attempts, is a unique facet of the acquired capability construct that both reinforces suicide ideation *and* contributes to the erosion of fear of death.⁴⁸

In this way, prolonged periods of intense suicide ideation with mental rehearsal of suicide plans, which are suggested by heightened rates of suicide ideation in neurodivergent people,^{4,49–51} may habituate individuals to the thought of suicide and actually enable them to act on suicidal thoughts. Second, an additional pathway to suicidality in ADHD is indicated by one of its core feature domains,* that of hyperactive/impulsive features.

*DSM-5 conceptualizes ADHD as comprising two domains, namely inattentive and hyperactive/impulsive features. Although previous versions allowed diagnosis of attention deficit disorder without hyperactivity (DSM-III), and then hyperactive and inattentive “subtypes” (DSM-IV), the present single diagnostic entity recognizes that both types of features present in varying degrees across the lifespan (Epstein and Loren, 2013).¹²³

Although trait impulsivity is not a reliable predictor of suicide attempts,⁵² impulsivity is considered an indirect and distal risk factor because it increases the likelihood that an individual will be drawn and/or exposed to the painful and provocative events that increase suicide capability.^{53,54} Unfortunately, although a number of studies report associations between ADHD and suicidality,^{19,21,55} NSSI,⁵⁶ and violent and traumatic events,^{57–59} few examined these associations in relation to specific features.

Several studies implicate hyperactive/impulsive features in self-injurious behavior,^{60,61} but neither examined the specificity of this association to hyperactive/impulsive features or looked at subsequent effects on acquired capability and later suicidality. Although one study did support a link between ADHD and suicidality in relation to victimization trauma,⁶² these authors did not examine whether acquired capability mediated an association between exposure to this type of provocative event and suicide attempts, or consider differential effects of ADHD features.

In light of the apparent greater risk of suicidality suggested in autistic people with ADHD,^{13,14} this study aimed to examine associations between co-occurring ADHD, suicide ideation, and suicide attempts in light of two hypothesized pathways based on the ITS and previous autism literature. Our first analyses focused on thwarted belongingness and perceived burdensomeness, which we hypothesized might occur at higher levels in autistic people with ADHD due to the deleterious academic, occupational, social, and emotional correlates of co-occurring autism and ADHD.^{46,63,64}

In the general public, the association between these constructs and ADHD features mediated their association with suicide ideation,⁴¹ consistent with the assertions of the ITS. We hypothesized a similar mediating role of these constructs between co-occurring ADHD and suicide ideation in our autistic sample, but given that thwarted belongingness and perceived burdensomeness may be relevant to suicide attempts in autistic people,³² we also examined their role in the association between co-occurring ADHD and suicide attempts.

Our second analyses focused on acquired capability, which is understood to accrue from exposure to painful and provocative events.²⁶ We hypothesized that hyperactive/impulsive features, in particular, would be associated with higher incidence of painful and provocative events and henceforth greater acquired capability for suicide, and that these two variables would mediate an association between this specific feature domain and suicide attempts.

Methods

Participants

These analyses were performed using data from the same autistic sample ($n = 314$) described in Moseley et al.³³ These volunteers responded to online advertisements on social media and to adverts distributed to the Autistica Research Network and the Cambridge Research Database. The majority (95.8%) lived in the United Kingdom, with 1.3% living in the United States and the remainder within South America and the European Union. Fifty-four of the sample (11 of those who reported their sex as male, 43 who reported their sex as female) had been formally diagnosed as having ADHD (unfortunately, we did not enquire when these diagnoses were made). Further

demographic information about the sample is displayed in Table 1, along with their scores to major study variables.

Materials and procedure

The science and technology faculty ethics panel at Bournemouth University reviewed and approved this study; measures taken for the safety and comfort of participants are listed in full in a previous publication.³³ Participants completed an online survey (hosted on Qualtrics) that included measures of co-occurring ADHD, ITS constructs, suicide ideation, and attempts, along with depressive and anxious symptoms. Internal consistency was high for each measure in this sample (Table 1).

Independent variables: co-occurring ADHD and feature domains. As it has only recently become possible for individuals to be diagnosed with both autism and ADHD and women are particularly under-recognised,^{12,65} we deemed it highly likely that more participants might exhibit ADHD features than just those who had received official ADHD diagnoses. The Connors Adult ADHD Rating Scale self-report short version (CAARS-S:S⁶⁶) includes 26 items that correspond to subscales inattention/memory problems, hyperactivity/restlessness, impulsivity/emotional lability, and problems with self-concept.

We transformed these raw scores for each subscale into t -scores for comparison with standardized age-appropriate norms for males and females, and used the t -scores for inattention/memory, hyperactivity/restlessness, and impulsivity/emotional lability as continuous measures in our analysis.

An additional subscale of the CAARS-S:S, the ADHD index, constitutes 12 items that are most strongly indicative of likely ADHD. In the general population, t -scores of 70 in the ADHD index are highly indicative of likely ADHD. Standardized scores do not, to our knowledge, exist for autistic adults, but in our sample, 142 participants (45.2%) scored above 70 on the ADHD index (108 females and 34 males, a subset that included the 54 participants with official ADHD diagnoses). Using this, we created a binary index indicative of likely ADHD (participants coded 1 if their ADHD index t -score was 70 or above).

Mediators: ITS constructs

The Interpersonal Needs Questionnaire-15. The Interpersonal Needs Questionnaire-15 (INQ-15)⁶⁷ includes nine statements related to thwarted belongingness and six to perceived burdensomeness. Participants responded to items on a scale from 1 to 7, with higher scores indicating greater thwarted belongingness and perceived burdensomeness.

The Acquired Capability with Rehearsal for Suicide Scale. The Acquired Capability with Rehearsal for Suicide Scale (ACWRSS)⁴⁸ is a brief 7-item measure wherein higher scores reflect greater acquired capability. Although the scale comprises items assessing fear of death, pain tolerance, and mental rehearsal, only the total score was used here.

Painful and Provocative Events Scale. The 26-item version of the Painful and Provocative Events Scale (PPES)²⁶ includes a list of experiences (e.g., “have you gone skydiving” and

TABLE 1. SAMPLE DEMOGRAPHIC INFORMATION AND SCORES IN MAJOR STUDY VARIABLES

<i>Sample characteristics (n = 314)</i>			
Average age	41.9 years (SD: 13.4, range: 18–72)		
Average age at autism diagnosis	34.6 years (SD: 14.8, range: 2–67)		
Sex	Male: 26.8%	Female: 72.9%	Other: 3%
Gender identity [†]	Cisgender male: 25.2%	Cisgender female: 57.3%	
	Nonbinary (including agender, genderqueer, and other identities): 14.6%	Transgender (male, female, and nonbinary transgender identities): 2.9%	
Ethnicity	Caucasian/White: 79.9%	Black: 1.6%	Mixed race: 5.4%
	Other ethnicities: 4.3%	No response: 8.8%	
Educational attainment	GCSEs, high school diploma or equivalent: 94.9%		
	Bachelors degree: 70.1%		
	Postgraduate qualifications: 35.7%		
<i>Average scores in major study variables (SD), range in italics</i>			
<i>ADHD index t-scores (CAARS-S:S)</i>	<i>Inattention/memory t-scores (CAARS-S:S)</i>	<i>Hyperactivity/restlessness t-scores (CAARS-S:S)</i>	<i>Impulsivity/emotional lability t-scores (CAARS-S:S)</i>
66.8 (12.9), 34–90 $\alpha = 0.84$	65.1 (13.7), 35–90 $\alpha = 0.84$	55 (11.6), 33–82 $\alpha = 0.80$	60.3 (13.2), 37–90 $\alpha = 0.78$
<i>Thwarted belongingness (INQ-15)</i>	<i>Perceived burdensomeness (INQ-15)</i>	<i>Acquired capability (ACWRSS)</i>	<i>Painful and provocative events (PPES)</i>
38 (9.2), 10–63 $\alpha = 0.87$	17.1 (9.6), 6–42 $\alpha = 0.93$	29.9 (13.2), 0–56	46.4 (10.7), 26–78
<i>Depression (PHQ-9)</i>		<i>Anxiety (GAD-7)</i>	
13 (7.2), 0–27 $\alpha = 0.90$		11 (5.9), 0–21 $\alpha = 0.91$	

Note: Demographic information and average sample scores on scales used in this analysis. ADHD variables are derived from the CAARS-S:S; thwarted belongingness and perceived burdensomeness from the INQ-15; acquired capability from the ACWRSS; painful and provocative events from the PPES; and depression and anxiety from the PHQ-9 and GAD-7, respectively. Internal consistency is provided for those scales assessing reflective constructs (whose items indicate one or more latent variables).

ACWRSS, Acquired Capability with Rehearsal for Suicide Scale; ADHD, attention deficit/hyperactivity disorder; CAARS-S:S, Connors Adult ADHD Rating Scale self-report short version; GAD-7, generalized anxiety disorder-7; GCSEs, General Certificate of Secondary Education; INQ-15, Interpersonal Needs Questionnaire-15; PHQ-9, Patient Health Questionnaire-9; PPES, Painful and Provocative Events Scale; SD, standard deviation.

“did you get a tattoo?”). Participants responded to each item with “never” (scored 1), “once” (2), “2–3 times” (3), “4–20 times” (4), or “more than 20 times” (5).

Dependent variables: suicide ideation and attempts. We created a continuous composite item reflecting the frequency and intensity of suicide ideation over the past 12 months, based on the sum of scores to two correlated items ($r = 0.55$,

$p < 0.001$) in the Self-Injurious Thoughts and Behaviours Interview short form (SITBI⁶⁸). More details were originally reported in Moseley et al.³³ The composite score ranged between 0 (no suicide ideation within the past year) and an integer between 2 and 12: low scores reflected rare or brief incidents of suicide ideation, whereas higher scores indicated the presence of suicide ideation that was frequent and/or intense.

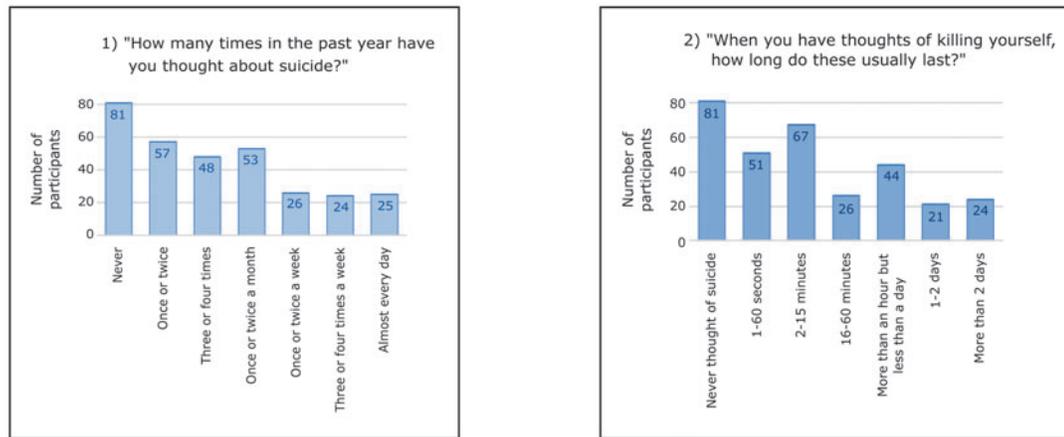
For an ordinal index of lifetime suicide attempts, we used the SITBI item, “How many times in your lifetime have you made an actual attempt to kill yourself, in which you had at least some intent to die?” Participants could respond with “never” (scored 0), “once” (1), “twice” (2), “three or four times” (3), or “five or more times” (4). Frequency of participant responses to the two SITBI items, the suicide ideation composite, and number of lifetime suicide attempts are shown in Figure 1.

Covariates and additional mediators: depressive and anxious symptoms

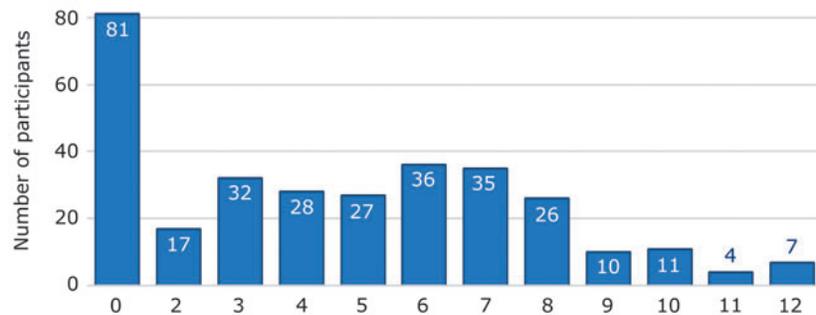
As additional variables relevant to suicidality, we included depression and anxiety as covariates and extra mediators in

[†]Unfortunately, the wording of our survey (based on our awareness at the time of design) was flawed. As we included a single selectable item for transgender identities (not allowing participants to pick male, female, or other options within this category, although some chose to enter free text), we cannot ascertain the number of trans people with different identities within this survey. “Sex” and “gender,” as labeled here, presented in the survey as follows: “When you were born, what sex were you assigned to?” (options: male, female, other); “Often-times, people’s gender identity matches the sex they were assigned at birth, but this is not always the case. Can we ask how you would describe your gender identity? You can choose more than one option, or write something in.” (options: male, female, genderqueer, agender, transgender, cisgender, a gender not listed here [free text entry]).

A Frequency of responses to SITBI items on past-year frequency and intensity of suicide ideation



B Frequency of scores on suicide ideation composite, derived from the sum of above SITBI items



C Number of lifetime suicide attempts

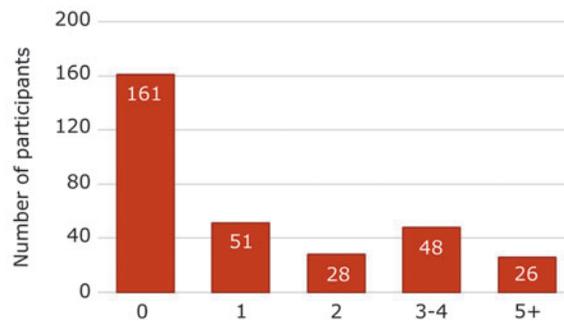


FIG. 1. Past-year suicide ideation and lifetime suicide attempts in the sample. *Note:* Figure reproduced with permission from Moseley et al.³³ Part (A) displays responses to two items from the SITBI, the sum of which comprises our past-year suicide ideation composite score (Part B). Part (C) shows number of lifetime suicide attempts reported in our sample. SITBI, Self-Injurious Thoughts and Behaviours Interview short form.

our analyses. These were measured with the Patient Health Questionnaire-9⁶⁹ and the generalized anxiety disorder-7⁷⁰, respectively.

Analysis

First, we examined the data for each variable and outcome measure for outliers, normality, autocorrelations, and ho-

moscedasticity, and normal distribution of residuals. We then performed mediation analyses using PROCESS for SPSS (version 3),⁷¹ a macro based on ordinary least squares regression with bootstrapping (5000 samples). In each instance, we set confidence intervals (CIs) at 95%, and controlled for age and sex as covariates.

Data were standardized for all analyses with PROCESS, though CIs are generated in unstandardized form; as such, we

present both standardized and unstandardized coefficients for each model. Our first set of analyses focused on thwarted belongingness and perceived burdensomeness. We used our binary measure of likely ADHD in two mediation analyses (adjusting alpha levels, $p=0.025$): in these, we examined indirect effects of this binary predictor on past-year suicide ideation and then lifetime suicide attempts.

Thwarted belongingness, perceived burdensomeness, depression, and anxiety were included as parallel mediators in this model (Model 4 in PROCESS). Indirect effects and their CIs are presented in unstandardized and in partially standardized form (full standardization is not possible or indeed recommended for dichotomous predictors).⁷¹

Our second set of analyses, focusing on pathways to acquired capability through painful and provocative events, used the sequential mediation model (Model 6). Controlling for all the variables in the previous analyses (anxiety, depression, thwarted belongingness, and perceived burdensomeness) in addition to age and sex, we examined distinct pathways between ADHD feature domains and lifetime suicide attempts through exposure to painful and provocative events (first mediator) and then acquired capability total score (second mediator).

We hypothesized that this pathway would be specific for hyperactivity/restlessness and impulsivity/emotional lability (henceforth hyperactivity and impulsivity) features, but to confirm this specificity, the analysis was also performed for the inattention/memory domain (henceforth inattention). Alpha levels for these three analyses were corrected to $p=0.017$. Indirect effects and their CIs are presented in unstandardized and standardized form, along with the epsilon statistic as a reflection of effect size.⁷²

Results

Co-occurring ADHD, thwarted belongingness, and perceived burdensomeness

Our binary index of likely ADHD was associated with greater anxiety ($b=4.60$ [$\beta=0.78$], $p<0.001$, CI: 3.38 to 5.82), depression ($b=5.47$ [$\beta=0.76$], $p<0.001$, CI: 3.98 to 6.96), and perceived burdensomeness ($b=4.58$ [$\beta=0.48$], $p<0.001$, CI: 2.50 to 6.30), though *not* thwarted belongingness ($b=1.37$ [$\beta=0.15$], $p=0.1920$, CI: -0.69 to 3.43). Perceived burdensomeness ($b=0.13$ [$\beta=0.37$], $p<0.001$, CI: 0.09 to 0.17), depression ($b=0.19$ [$\beta=0.41$], $p<0.001$, CI: 0.13 to 0.25), and sex (with being female associated with greater likelihood of suicide ideation: $b=-0.82$ [$\beta=-0.11$], $p=0.0128$, CI: -1.47 to -0.18) all contributed to the model for past-year suicide ideation ($R^2=0.46$, F [7, 306]=37.71, $p<0.001$), though anxiety ($b=-0.04$ [$\beta=-0.06$], $p=0.3011$, CI: -0.11 to 0.03) and thwarted belongingness ($b=0.01$ [$\beta=0.03$], $p=0.5302$, CI: -0.02 to 0.04) did not.

Likely ADHD did not directly predict greater suicide ideation ($b=0.15$ [$\beta=0.04$], $p=0.6399$, CI: -0.47 to 0.76), but a significant total effect ($b=1.62$ [$\beta=0.48$], $p<0.001$, CI: 0.89 to 2.35) reflected that mediation was occurring. In this way, likely ADHD was associated with suicide ideation through greater depression (unstandardized effect $b=1.04$ [bootSE=0.24], bootstrapped CI: 0.60 to 1.54; when partially standardized, $b=0.31$ [bootSE=0.07], bootstrapped CI: 0.18 to 0.45) and stronger feelings of burdensomeness (unstandardized effect $b=0.60$ [bootSE=0.17], bootstrapped

CI: 0.29 to 0.95; when partially standardized, $b=0.18$ [bootSE=0.05], bootstrapped CI: 0.09 to 0.28). Relationships between variables (unstandardized) are depicted in Figure 2, part A.

Only perceived burdensomeness ($b=0.04$ [$\beta=0.31$], $p<0.001$, CI: 0.02 to 0.06) and female sex ($b=-0.50$ [$\beta=-0.16$], $p=0.0041$, CI: -0.84 to -0.16) were directly predictive of lifetime suicide attempts ($R^2=0.15$, F [7, 296]=7.44, $p<0.001$), when this outcome was modeled as the dependent variable.

Although not predicting lifetime suicide attempts directly ($b=0.17$ [$\beta=0.12$], $p=0.2988$, CI: -0.15 to 0.49), a significant total effect of likely ADHD ($b=0.36$ [$\beta=0.26$], $p=0.0206$, CI: 0.06 to 0.67) reflected an indirect relationship where likely ADHD was associated with more numerous suicide attempts through its association with greater feelings of burdensomeness (unstandardized effect $b=0.20$ [bootSE=0.07], bootstrapped CI: 0.08 to 0.36; when partially standardized, $b=0.15$ [bootSE=0.05], bootstrapped CI: 0.06 to 0.26) (Fig. 2, part B).

ADHD feature domains, painful and provocative events, and acquired capability

With three analyses, we then examined effects of hyperactivity, impulsivity, and inattention as predictors of painful and provocative events, acquired capability and lifetime suicide attempts sequentially (Fig. 3 depict unstandardized coefficients reflecting relationships between variables). Hyperactivity was significantly associated with painful and provocative events as the first mediator ($b=0.31$ [$\beta=0.34$], $p<0.001$, CI: 0.21 to 0.42; $R^2=0.23$, F [7, 304]=12.71, $p<0.001$). It was not directly associated with acquired capability ($b=-0.07$ [$\beta=-0.07$], $p=0.2596$, CI: -0.21 to 0.06), which was predicted by PPES scores ($b=0.42$ [$\beta=0.34$], $p<0.001$, CI: 0.29 to 0.55; $R^2=0.29$, F (8, 303)=15.20, $p<0.001$).

Both PPES scores ($b=0.02$ [$\beta=0.16$], $p=0.0087$, CI: 0.01 to 0.04) and acquired capability ($b=0.03$ [$\beta=0.26$], $p<0.001$, CI: 0.01 to 0.04) contributed to the model for lifetime suicide attempts ($R^2=0.24$, F (9, 302)=10.62, $p<0.001$). Hyperactivity did not directly predict lifetime suicide attempts ($b=0.001$ [$\beta=0.001$], $p=0.8777$, CI: -0.01 to 0.02), but was associated with this outcome through two indirect pathways. First, hyperactivity was associated with increased exposure to painful and provocative events, which in itself predicted more numerous suicide attempts (unstandardized $b=0.001$ [bootSE=0.003], bootstrapped CI: 0.001 to 0.01; standardized $\beta=0.05$ [bootSE=0.03], bootstrapped CI: 0.01 to 0.11; $v=0.003$).

Second, in a sequential mediation effect, hyperactivity was associated with increased exposure to provocative events, with greater acquired capability, and through these with more numerous suicide attempts (unstandardized $b=0.001$ [bootSE=0.001], bootstrapped CI: 0.001 to 0.006; standardized $\beta=0.03$ [bootSE=0.01], bootstrapped CI: 0.01 to 0.05; $v=0.001$).

Impulsivity functioned entirely similarly to hyperactivity, being associated with painful and provocative events directly and being indirectly associated with lifetime suicide attempts through the same two indirect pathways (see Supplementary Data for statistical notations and for covariate effects that

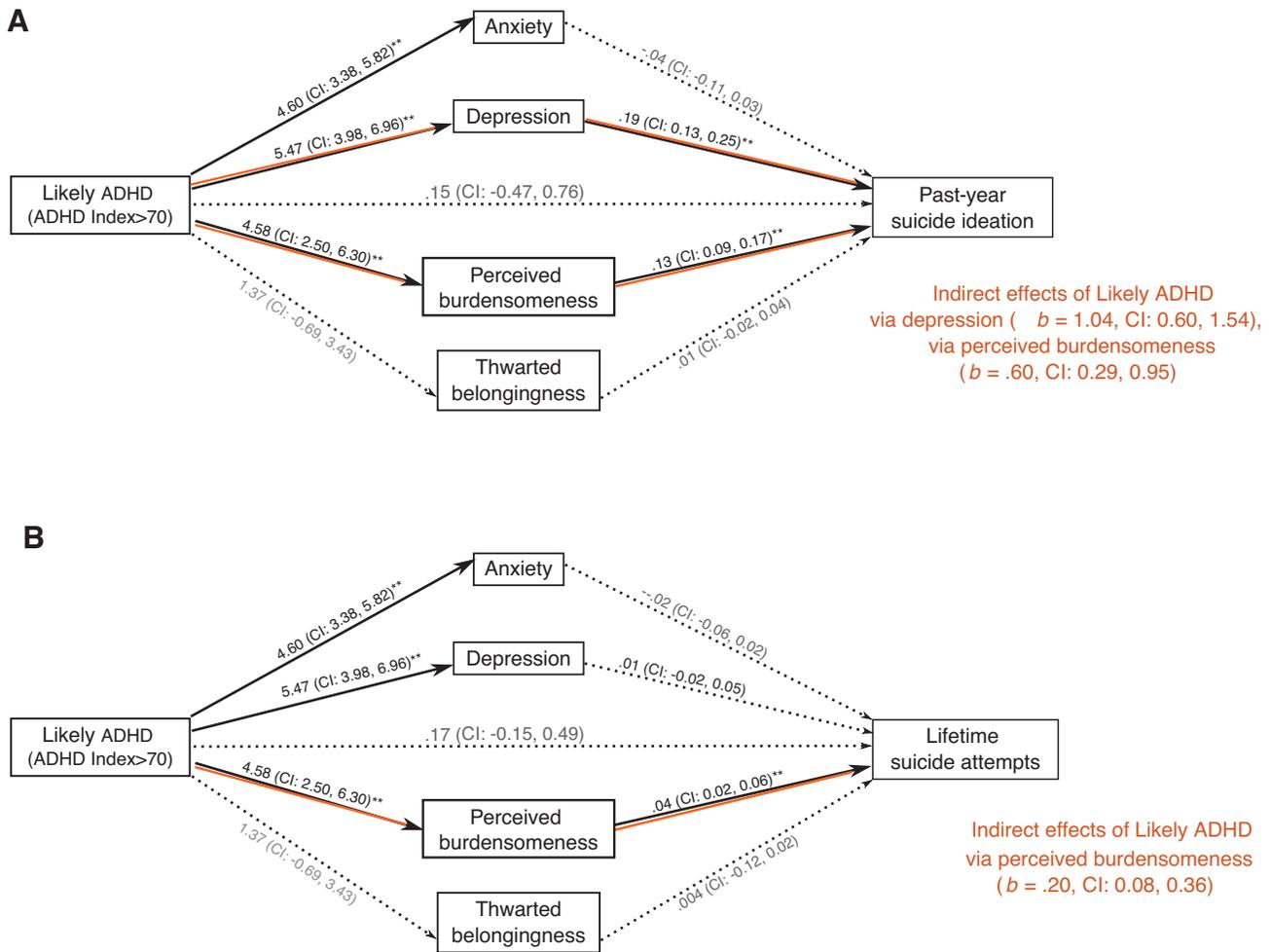


FIG. 2. Associations between co-occurring ADHD, thwarted belongingness, burdensomeness, and suicidality. *Note:* Part (A) depicts associations between likely ADHD (predictor), anxiety, depression, perceived burdensomeness, and thwarted belongingness (mediators), and past-year suicide ideation (outcome); Part (B) depicts the same variables but lifetime suicide attempts as the outcome variable. Unstandardized coefficients for significant associations are marked in bold lines with double asterisks (**) reflecting associations significant at $p < 0.001$, and dotted lines reflect relationships that were non-significant. Indirect effects (coefficients and CIs) are unstandardized. ADHD, attention deficit/hyperactivity disorder; CI, confidence interval.

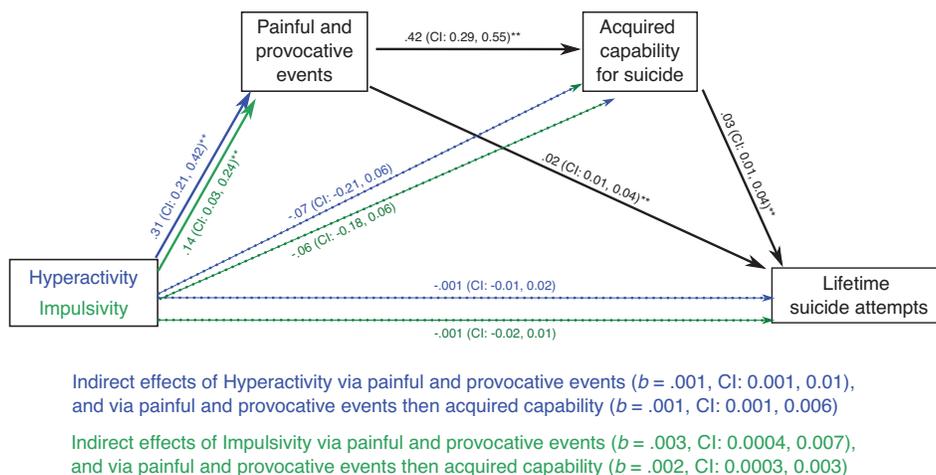


FIG. 3. Associations between ADHD feature domains and lifetime suicide attempts. *Note:* Figure 2 depicts two separate mediation analyses, one with hyperactivity (blue) as the predictor, the other with impulsivity (green) as the predictor. Lines in black reflect relationships between painful and provocative events, acquired capability, and lifetime suicide attempts with coefficients from the hyperactivity analysis. Double asterisks (**) represent unstandardized coefficients significant at $p < 0.001$. Indirect effects (coefficients and CIs) are unstandardized.

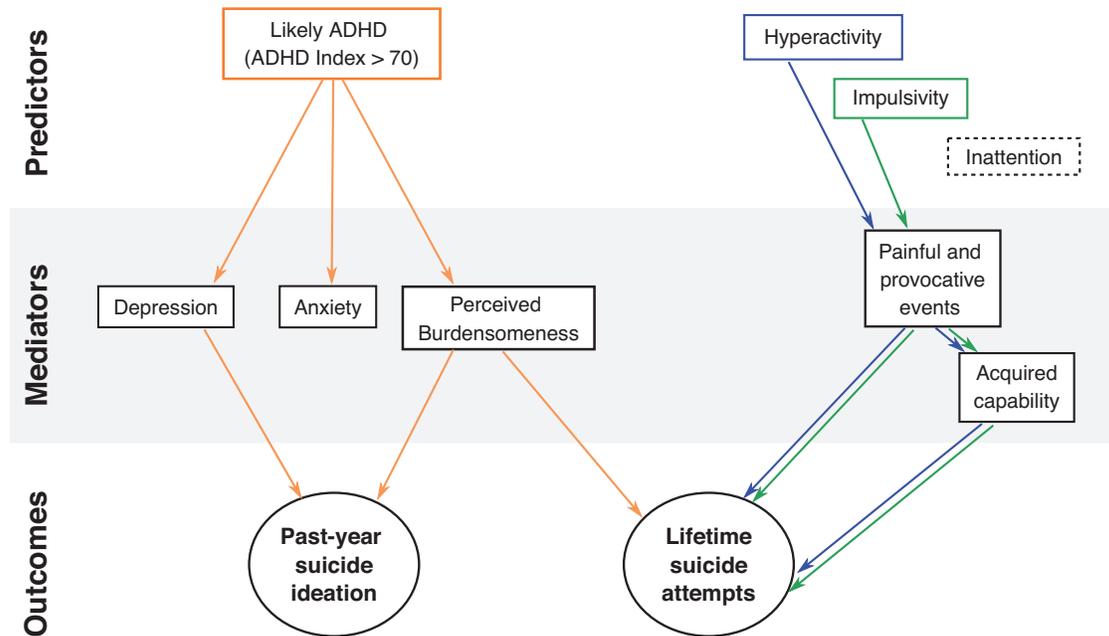


FIG. 4. Summarized analyses of relationships between ADHD and suicidality. *Note:* Relationships between variables are summarized in Figure 3. Likely ADHD was positively associated with suicide ideation through perceived burdensomeness and depression; perceived burdensomeness also connected ADHD co-occurrence to lifetime suicide attempts. Finally, hyperactivity and impulsivity were associated with lifetime suicide attempts through increased exposure to painful and provocative events, and through this exposure and increased capability for suicide.

were not the focus of this analysis). Inattention was not associated with painful and provocative events ($b=0.05$ [$\beta=0.07$], $p=0.2287$) or acquired capability ($b=-0.06$ [$\beta=-0.07$], $p=0.2107$), and was not directly or indirectly associated with lifetime suicide attempts.

Our analyses focusing on relationships between suicidality, co-occurring ADHD, and ADHD feature domains are summarized in Figure 4.

Discussion

Suicide is devastating for individuals and their families and community. There is a critical need for psychological theory to identify a parsimonious set of explanatory principles with clear implications for prevention and intervention.⁷³ In line with previous efforts to test the relevance of ITS constructs to autistic suicidality,^{32,33} this study considered theory-derived hypotheses in relation to the heightened risk observed in autistic people with ADHD.^{13,14} We primarily hypothesized a mediating role for thwarted belongingness and perceived burdensomeness in associations between likely co-occurring ADHD, suicide ideation, and suicide attempts. Second, we considered an effect of hyperactive/impulsive features on painful and provocative events, acquired capability, and through these, lifetime suicide attempts.

Our first hypothesis was partially supported in so far as our binary index of likely ADHD was associated with greater anxiety, depression, and perceived burdensomeness; it was indirectly associated with greater likelihood of suicide ideation through its effects on depression and perceived burdensomeness, and indirectly associated with more numerous lifetime suicide attempts through perceived burdensomeness.

The relationship between likely ADHD, anxiety, depression, and perceived burdensomeness corroborates extant literature purporting poorer mental health, social, and occupational outcomes in autistic people with ADHD.^{16,46}

In relation to suicidality, studies in nonautistic people with ADHD suggested that the deleterious outcomes associated with ADHD might give rise to negative affect, and through this, suicide ideation.⁷⁴ A single study in the general population examined this association in relation to the ITS, showing that the association between ADHD traits and suicide ideation was indeed mediated by higher scores in thwarted belongingness and perceived burdensomeness.⁴¹

Although this study supports a mediating role for perceived burdensomeness, the apparent irrelevance of thwarted belongingness stands in contrast to these previous findings and those of Pelton et al.,³² who previously found associations between these constructs and both suicide ideation and attempts. Notably, as those authors did not control for depression, the effect of thwarted belongingness they observed could have been confounded by depression.

They do note, however, that autistic and nonautistic people differ in the way they interpret a couple of items from the INQ, such that the test may not work entirely similarly in these two groups; furthermore, apparently pathological scores in thwarted belongingness may be sadly less remarkable in autistic people,⁷⁵ given their typically smaller social networks. This may explain why thwarted belongingness was not especially associated with suicidality in the sample reflected herein and in Moseley et al.,³³ and highlights the importance of developing adapted tools for testing hypotheses around suicidality in neurodivergent groups.

Our second hypothesis concerned with likely ADHD pertained to the association between impulsivity and painful and

provocative events,^{53,54} which are suggested to play an important role in the development of acquired suicide capability. This expectation was borne out, as both hyperactive and impulsive features were associated with acquired capability only through painful and provocative experiences; part of their indirect association with lifetime suicide attempts was realized through this sequential pathway.

Though previous research is scarce in relation to the mechanisms that might underpin an association between ADHD feature domains and suicidality, these findings corroborate the relationship between hyperactive/impulsive features and a range of behaviors and outcomes that might serve to desensitize individuals to pain and fear of death, including NSSI,⁵⁷⁻⁵⁹ abusing substances and other risky behaviors,⁷⁶ getting accidentally injured or involved in accidents.^{77,78}

Although we did not predict significant associations between inattentive features and our mediators, it is important to note that these features are, in fact, also associated with risky behavior, accident and injury, and suicide itself in people with ADHD.^{20,78,79} It is likely that this association is underpinned by different mechanisms, such as difficulties with cognitive control as opposed to sensation seeking. In that the PPES includes many events that are “actively approached rather than passively experienced” and that these items are associated with sensation seeking,⁸⁰ it is possible that hyperactive/impulsive features of ADHD were more likely to correlate with this instrument, despite rates of real-life accidents and injuries associated with inattentive features.

It is possible that the different means through which autistic and nonautistic people with ADHD experience painful and provocative events also bear relevance to the impact of the same on acquired capability for suicide, but this query requires further more extensive investigation.

Interestingly, although hyperactivity and impulsivity were associated with lifetime suicide attempts through painful and provocative events and acquired capability sequentially, they also exerted an indirect effect on lifetime suicide attempts through exposure to painful and provocative events alone. An intriguing parallel with this finding comes from Pelton et al.,³² who observed an indirect effect of lifetime trauma on lifetime suicidality through acquired capability and a direct effect of lifetime trauma on suicidality. The consistency of this association across measurement tools—Pelton et al.³² used the vulnerability experience quotient,⁸¹ which is validated in autistic people—highlights the significance of this association, the mechanisms of which are still unknown.

In this analysis, depression and anxiety were controlled for as covariates, but exposure to painful and provocative events might plausibly be associated with lifetime suicide attempts through their impact on psychiatric health. Recent studies have examined the apparent elevation of PTSD or complex PTSD in autistic people, finding that post-trauma symptoms are associated with a wider range of events than those traditionally associated with PTSD.⁸²⁻⁸⁴ Indeed, autistic and nonautistic authors are increasingly recognizing the damage incurred by aspects of “simply” living in the world as a neurodivergent person, including the chronic stress associated with victimization, social marginalization, and sensory discomfort and/or pain.^{85,86}

Trauma and rumination have indeed been purported as the mediators of relationships between autistic traits and mood disorder in the general population⁸⁷; the same research group

reported an association between lifetime suicidality, depression, and rumination.⁸⁸ The autistic community has highlighted research around the impact of stressful and traumatic life events as a priority,⁸⁹ and this is corroborated by the association between painful and provocative events and lifetime suicide attempts in our data, over and above effects through acquired capability.

As this finding cannot be clearly understood in light of the ITS, it is important to recognize that this is but one theoretical approach to suicidality, and future studies may benefit from consideration of a wider constellation of dynamic and stable factors.^{90,91} One alternative, for instance, places greater emphasis on the balance between factors that “push” individuals toward suicide, chiefly pain (psychological and otherwise) and hopelessness, and factors that “pull” or anchor individuals to life, chiefly connections to friends and family, communities, and other valued things, roles, or purposes.⁹²

This and other approaches provide testable hypotheses that, compared, could shed light on mechanisms underpinning suicidality in autistic people; more broadly, though, this kind of consideration of factors that make life unbearable and their relationship and relative weighting against the factors that make life worth living for autistic people may be of great clinical value. It is however important, as noted by Mitchell et al.,⁹³ to recognize the tendency of such models to focus principally on *intrapersonal* factors, which could divert attention from the very real damage incurred on the individual by systemic disadvantages and societal prejudices toward neurodivergent people.

In that sense, interventions with such goals of supporting connectedness and reducing feelings of thwarted belongingness and perceived burdensomeness in the individual may be ineffectual without commitment to meaningful change at a societal level.

Limitations and future directions

The primary limitation on conclusions drawn from these data rests on their cross-sectional nature, which disallows directional relationships to be inferred between our variables of interest. Mediation models are by nature suggestive of causality and the hypotheses derived from the ITS likewise assume directional relationships between variables, but cross-sectional designs do not allow us to affirm causal relationships between any of the variables as modeled herein.⁹⁴ This is particularly notable in light of the fact that nonfatal suicide attempts, themselves, are recognized as a potent means of accruing capability for future attempts.^{24,95}

As such, although associations between hyperactive/impulsive features, painful and provocative events, and acquired capability appear compatible with ITS hypotheses, we cannot ascertain when suicide attempts occurred during the lifetime, and how these affected scores in these variables. Likewise, we cannot ascertain that thwarted belongingness and perceived burdensomeness preceded suicide ideation; sadly, experiences of suicide ideation and nonfatal attempts themselves affect social relationships, with some individuals experiencing alienation and shame,^{96,97} which could, themselves, contribute to these apparently suicidogenic states.

Although cross-sectional studies can assist with preliminary hypothesis testing and highlighting areas of potential relevance, longitudinal designs are imperative to understand

the development of these cognitive-affective states and their relationship with suicidality, and the development of suicide capability in response to real-life events.

The present findings come from the same sample described in Moseley et al.,³³ and the same limitations of our sample are true. In that the sample was mainly British and largely Caucasian, the findings cannot be presumed to generalize to autistic people from other cultures and racial/ethnic groups. Similarly, as the sample primarily comprised cisgender autistic women with only a small proportion of autistic men (a smaller proportion of whom scored above cutoff on the CAARS-S:S), effects of sex in this study may be spurious and further research is needed to generalize findings to cisgender men more broadly.

Transgender men, transgender women, and people with nonbinary and broader identities were likewise under-represented, and notably our survey (based on our limited awareness at the time of design) did not adequately differentiate between different transgender identities, such that the numbers presented do not adequately reflect different transgender identities—this is especially important to attend to in future studies, given that suicide risk may be even higher in neurodivergent trans and nonbinary communities.⁹⁸ Other potentially marginalized aspects of identity, such as sexual orientation, are also important to measure and examine in future research.

Other groups un- or under-represented here include autistic people with severe intellectual disability, as the study was accessible only to those able to respond to an online advertisement and complete an hour-long (approximately) online survey; for the same reason, those with lower literacy and computer literacy skills were less likely to participate. Self-reported diagnoses were not validated by the researchers. Furthermore, although our advertisement did not mention ADHD specifically, the study may have been especially salient to individuals with experience of mental ill-health and suicidality, such that there may be a self-selection bias at play.

Limitations of our measures include our use of normative assessment tools for ITS constructs. Unfortunately, autism-adapted versions of these measures do not exist, so we cannot be sure that the present measures used in autistic populations actually capture the constructs intended by the original authors.⁷⁵ Even in the general population, there is a broader conceptual confusion around the nature and optimal assessment of certain constructs, such as acquired capability.^{99,100} Although we employed total ACWRSS scores as indicative of suicide capability in our sample, it is highly possible that the scope of this construct differs in neurodivergent people.

The deeper meaning of constructs such as perceived burdensomeness, thwarted belongingness, and acquired capability as perceived and experienced by autistic adults, and whether autistic people themselves perceive these concepts as relevant and important to suicidality, is an important target for future research.

Our investigation operationalized “likely ADHD” by way of CAARS-S:S scores, but this tool was likewise not designed for use in autistic people, or to differentiate between the cognitive and emotional profiles associated with ADHD and autism. Other studies suggest that autistic people (without ADHD) tend to score more highly than neurotypical people on the CAARS-S:S family of tests, though their scores are still significantly lower than those of nonautistic individuals

with ADHD.^{101,102} Nevertheless, the suggested ADHD index cutoff was based on general population norms and has not been ratified for use in autistic people.

Although it is highly likely that some participants had undiagnosed ADHD, we cannot ascertain whether participants above ADHD index cutoffs would actually have met diagnostic criteria for ADHD. Future investigations should validate this co-occurrence with formal diagnostic tools, but if using screening tools, might consider those whose items map directly onto DSM criteria,¹⁰³ such that “likely ADHD” could be classified on the basis of meeting a sufficient number of diagnostic criteria. In addition, future research would benefit from including a comparison group of nonautistic people with ADHD to examine shared mechanisms for suicidality alongside additive effects of co-occurring ADHD and autism.

Future research would also benefit from greater scrutiny of variables common to both people with ADHD and autistic people—such as broader psychopathology and substance abuse,^{2,17,18} socioeconomic, and educational disadvantage^{104,105}—all of which have relevance to everyday difficulties faced by autistic and nonautistic people with ADHD,^{106–109} to suicidality and interpersonal and intrapersonal constructs fundamental to the ITS.^{110–112} As we lacked control groups and more extensive consideration of such extraneous variables, we cannot confirm that the associations we observed are indeed particular to co-occurring ADHD within the autistic population, or delineate whether these effects are associated with intrapersonal features or other consequences of living as an autistic person with ADHD.

Finally, although our analysis focused mainly on mechanisms associated with hyperactive/impulsive feature domains, future investigations should explore the explanatory pathways between inattentive features and suicidality in autistic and nonautistic people with ADHD. There is a potential intersection of interest here in relation to sex and late diagnosis, both variables of significance to suicidality (see, e.g., recent literature^{1,13,113}). In nonautistic people with ADHD, cisgender women and girls are more likely to present with primarily inattentive features,¹¹⁴ a profile that, aside from sex, is associated with longer duration of ADHD going unrecognized,¹¹⁵ often to the detriment of the individual.^{35,116,117}

There is some suggestion that autistic people are more likely to show a combination of hyperactive/impulsive and inattentive features,^{118,119} though it is entirely possible that inattentive features are likewise under-recognized in autistic girls, women, and people assigned female at birth (AFAB). In relation to suicidality, we know that the girls, women, and people AFAB who receive a diagnosis of autism or ADHD are more likely to exhibit psychiatric conditions and visibly severe difficulties.^{120–122}

As we controlled for sex and used CAARS-S:S scores as indicative of co-occurring ADHD, this study cannot speak of this issue, but as other studies have reported that suicide attempts are higher in autistic women with ADHD than any other group,¹³ the intersectionality of age at diagnosis, feature profile, and sex and gender may be important for future study.

Conclusion

Our findings suggest that constructs from the ITS may bear partial relevance to heightened suicidality in autistic people

with co-occurring ADHD. Most particularly, we found that perceived burdensomeness mediated the association between suicide ideation, suicide attempts, and our binary indication of co-occurring ADHD. Furthermore, a relationship between hyperactive/impulsive features and lifetime suicide attempts was mediated by greater exposure to painful and provocative events and acquired capability sequentially.

In that ITS constructs appear relevant to suicide in autistic people, future investigations should validate how these constructs are experienced and how they can be accurately assessed within longitudinal designs. However, the nature of a relationship between hyperactive/impulsive features through painful and provocative events alone also supports the importance of investigating other theoretical approaches, and pathways between traumatic events and suicidality.

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Authors' Contributions

Quantitative data were collected and analyzed by Dr. Moseley, the primary author of the article, with support for recruitment from Ms. Smith, Dr. Allison, and Professor Baron-Cohen through the Cambridge Autism Research Database (CARD). All authors contributed to analysis decisions and preparing the article for submission.

Author Disclosure Statement

The authors declare that they have no conflicts of interest.

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Supplementary Material

Supplementary Data

References

- Hirvikoski T, Mittendorfer-Rutz E, Boman M, Larsson H, Lichtenstein P, Bölte S. Premature mortality in autism spectrum disorder. *Br J Psychiatry*. 2016;208(3):232–238.
- Kolves K, Fitzgerald C, Nordentoft M, Wood SJ, Erlangsen A. Assessment of suicidal behaviors among individuals with autism spectrum disorder in Denmark. *JAMA Netw Open*. 2021;4(1):e2033565.
- Kirby AV, Bakian AV, Zhang Y, Bilder DA, Keshin BR, Coon H. A 20-year study of suicide death in a statewide autism population. *Autism Res*. 2019;12(4):658–666.
- Cassidy S, Bradley P, Robinson J, Allison C, McHugh M, Baron-Cohen S. Suicidal ideation and suicide plans or attempts in adults with asperger's syndrome attending a specialist diagnostic clinic: A clinical cohort study. *Lancet Psychiatry*. 2014;1(2):142–147.
- Santomauro DF, Hedley D, Sahin E, Ferrari AJ, Stokes MA. The global burden of suicide among people on the autism spectrum. Paper presented at: ASfAR Mental Wellbeing and Suicide Prevention in Autism: Bringing Autistic People, Researchers and Health Professionals Together; September 12, 2021; Melbourne.
- Rong Y, Yang C-J, Jin Y, Wang Y. Prevalence of attention-deficit/hyperactivity disorder in individuals with autism spectrum disorder: A meta-analysis. *Res Autism Spectr Disord*. 2021;83:101759.
- Antshel KM, Russo N. Autism spectrum disorders and ADHD: Overlapping phenomenology, diagnostic issues, and treatment considerations. *Cur Psychiatry Rep*. 2019; 21(5):1–11.
- Miller M, Musser ED, Young GS, Olson B, Steiner RD, Nigg JT. Sibling recurrence risk and cross-aggregation of attention-deficit/hyperactivity disorder and autism spectrum disorder. *JAMA Pediatrics*. 2019;173(2):147–152.
- Stergiakouli E, Davey Smith G, Martin J, et al. Shared genetic influences between dimensional ASD and ADHD symptoms during child and adolescent development. *Mol Autism*. 2017;8(1):1–13.
- Hoogman M, Van Rooij D, Klein M, et al. Consortium neuroscience of attention deficit/hyperactivity disorder and autism spectrum disorder: The ENIGMA adventure. *Hum Brain Mapp*. 2022;43(1):37–55.
- Krakowski AD, Cost KT, Anagnostou E, et al. Inattention and hyperactive/impulsive component scores do not differentiate between autism spectrum disorder and attention-deficit/hyperactivity disorder in a clinical sample. *Mol Autism*. 2020;11(1):1–13.
- Young S, Hollingdale J, Absoud M, et al. Guidance for identification and treatment of individuals with attention deficit/hyperactivity disorder and autism spectrum disorder based upon expert consensus. *BMC Med*. 2020;18: 1–29.
- Hirvikoski T, Boman M, Chen Q, et al. Individual risk and familial liability for suicide attempt and suicide in autism: A population-based study. *Psychol Med*. 2020;50(9): 1463–1474.

14. Fitzgerald C, Dalsgaard S, Nordentoft M, Erlangsen A. Suicidal behaviour among persons with attention-deficit hyperactivity disorder. *Br J Psychiatry*. 2019;215(4):615–620.
15. Pehlivanidis A, Papanikolaou K, Mantas V, et al. Lifetime co-occurring psychiatric disorders in newly diagnosed adults with attention deficit hyperactivity disorder (ADHD) or/and autism spectrum disorder (ASD). *BMC Psychiatry*. 2020;20(1):1–12.
16. Rosello R, Martinez-Raga J, Mira A, Pastor JC, Solmi M, Cortese S. Cognitive, social, and behavioral manifestations of the co-occurrence of autism spectrum disorder and attention-deficit/hyperactivity disorder: A systematic review. *Autism*. 2021;26(4):743–760.
17. Cassidy S, Bradley L, Shaw R, Baron-Cohen S. Risk markers for suicidality in autistic adults. *Mol Autism*. 2018;9(1):1–14.
18. Brown N, McLafferty M, O'Neill SM, et al. The mediating roles of mental health and substance use on suicidal behavior among undergraduate students with ADHD. *J Att Disord*. 2022;26(1):1437–1451.
19. Beauchaine TP, Ben-David I, Bos M. ADHD, financial distress, and suicide in adulthood: A population study. *Sci Adv*. 2020;6(40):eaba1551.
20. Shen Y, Chan BSM, Huang C, et al. Suicidal behaviors and attention deficit hyperactivity disorder (ADHD): A cross-sectional study among Chinese medical college students. *BMC Psychiatry*. 2021;21(1):1–9.
21. Eddy LD, Eadeh H-M, Breaux R, Langberg JM. Prevalence and predictors of suicidal ideation, plan, and attempts, in first-year college students with ADHD. *J Am Coll Health*. 2020;68(3):313–319.
22. Septier M, Stordeur C, Zhang J, Delorme R, Cortese S. Association between suicidal spectrum behaviors and Attention-Deficit/Hyperactivity Disorder: A systematic review and meta-analysis. *Neurosci Biobehav Rev*. 2019;103:109–118.
23. Joiner TE. *Why People Die by Suicide*. Cambridge, Massachusetts: Harvard University Press; 2005.
24. Van Orden KA, Witte TK, Cukrowicz KC, Braithwaite SR, Selby EA, Joiner TE. The interpersonal theory of suicide. *Psychol Rev*. 2010;117(2):575–600.
25. Chu C, Buchman-Schmitt JM, Stanley IH, et al. The interpersonal theory of suicide: A systematic review and meta-analysis of a decade of cross-national research. *Psychol Bull*. 2017;143(12):1313–1345.
26. Bender TW, Gordon KH, Bresin K, Joiner TE. Impulsivity and suicidality: The mediating role of painful and provocative experiences. *J Affect Disord*. 2011;129(1–3):301–307.
27. Bond AE, Bandel SL, Daruwala SE, Anestis MD. Painful and provocative events: Determining which events are associated with increased odds of attempting suicide. *Suicide Life Threat Behav*. 2021;51(5):961–968.
28. Hedley D, Uljarević M, Wilmot M, Richdale A, Dissanayake C. Brief report: Social support, depression and suicidal ideation in adults with autism spectrum disorder. *J Autism Dev Disord*. 2017;47:3669–3677.
29. Hedley D, Uljarević M, Foley KR, Richdale A, Trollor J. Risk and protective factors underlying depression and suicidal ideation in Autism Spectrum Disorder. *Depress Anxiety*. 2018;35(7):648–657.
30. Arwert TG, Sizoo BB. Self-reported suicidality in male and female adults with autism spectrum disorders: Rumination and self-esteem. *J Autism Dev Disord*. 2020;50(10):3598–3605.
31. Moseley RL, Gregory NJ, Smith P, Allison C, Baron-Cohen S. Links between self-injury and suicidality in autism. *Mol Autism*. 2020;11(1):1–15.
32. Pelton MK, Crawford H, Robertson AE, Rodgers J, Baron-Cohen S, Cassidy S. Understanding suicide risk in autistic adults: Comparing the interpersonal theory of suicide in autistic and non-autistic samples. *J Autism Dev Disord*. 2020;50(10):3620–3637.
33. Moseley R, Gregory NJ, Smith P, Allison C, Cassidy S, Baron-Cohen S. The relevance of the interpersonal theory of suicide for predicting past-year and lifetime suicidality in autistic adults. *Mol Autism*. 2022;13(1):1–17.
34. Cassidy S, Gould K, Townsend E, Pelton M, Robertson A, Rodgers J. Is camouflaging autistic traits associated with suicidal thoughts and behaviours? Expanding the interpersonal psychological theory of suicide in an undergraduate student sample. *J Autism Dev Disord*. 2020;50(10):3638–3648.
35. Nyström A, Petersson K, Janlöv A-C. Being different but striving to seem normal: The lived experiences of people aged 50+ with ADHD. *Issues Ment Health Nurs*. 2020;41(6):476–485.
36. Michielsen M, de Kruif JTC, Comijs HC, et al. The burden of ADHD in older adults: A qualitative study. *J Att Disord*. 2018;22(6):591–600.
37. Schrevel SJ, Dedding C, van Aken JA, Broerse JE. “Do I need to become someone else?” A qualitative exploratory study into the experiences and needs of adults with ADHD. *Health Expect*. 2016;19(1):39–48.
38. Newark PE, Stieglitz R-D. Therapy-relevant factors in adult ADHD from a cognitive behavioural perspective. *Atten Defic Hyperact Disord*. 2010;2(2):59–72.
39. Harpin V, Mazzone L, Raynaud J, Kahle J, Hodgkins P. Long-term outcomes of ADHD: A systematic review of self-esteem and social function. *J Att Disord*. 2016;20(4):295–305.
40. Hechtman L, Swanson JM, Sibley MH, et al. Functional adult outcomes 16 years after childhood diagnosis of attention-deficit/hyperactivity disorder: MTA results. *J Am Acad Child Adolesc Psychiatry*. 2016;55(11):945–952.
41. Triece PA, Oddo LE, Hill RM, Pettit JW, Meinzer MC. Investigation of the interpersonal theory of suicide in the context of attention-deficit/hyperactivity disorder symptomatology and suicide ideation. *Suicide Life Threat Behav*. 2020;50(6):1198–1204.
42. Zachor DA, Ben-Itzhak E. From toddlerhood to adolescence: Which characteristics among toddlers with autism spectrum disorder predict adolescent attention deficit/hyperactivity symptom severity? A long-term follow-up study. *J Autism Dev Disord*. 2019;49(8):3191–3202.
43. Ward AR, Pratt M, Lane DM, et al. Adaptive behavior function in autism: Association with ADHD and ASD symptoms. *J Dev Phys Disabil*. 2022;34:919–935.
44. Liu Y, Wang L, Xie S, et al. Attention deficit/hyperactivity disorder symptoms impair adaptive and social function in children with autism spectrum disorder. *Front Psychiatry*. 2021;12:654485.
45. Yerys BE, Bertollo JR, Pandey J, Guy L, Schultz RTJJo-tAAoC, Psychiatry A. Attention-deficit/hyperactivity disorder symptoms are associated with lower adaptive behavior skills in children with autism. *J Am Acad Child Adolesc Psychiatry*. 2019;58(5):525–533.
46. McCauley JB, Elias R, Lord C. Trajectories of co-occurring psychopathology symptoms in autism from late

- childhood to adulthood. *Dev Psychopathol.* 2020;32(4):1287–1302.
47. Yerys BE, McQuaid GA, Lee NR, Wallace GL. Co-occurring ADHD symptoms in autistic adults are associated with less independence in daily living activities and lower subjective quality of life. *Autism Adulthood.* 2022; 26(8):2188–2195.
 48. George SE, Page AC, Hooke GR, Stritzke WGK. Multifacet assessment of capability for suicide: Development and prospective validation of the acquired capability with rehearsal for suicide scale. *Psychol Assess.* 2016;28(11):1452–1452.
 49. Kakuszi B, Bitter I, Czobor P. Suicidal ideation in adult ADHD: Gender difference with a specific psychopathological profile. *Compr Psychiatry.* 2018;85:23–29.
 50. South M, Beck J, Lundwall R, et al. Unrelenting depression and suicidality in women with autistic traits. *J Autism Dev Disord.* 2020;50(10):3606–3619.
 51. Arsandaux J, Orri M, Tournier M, et al. Pathways from ADHD symptoms to suicidal ideation during college years: A longitudinal study on the i-share cohort. *J Att Disord.* 2021;25(11):1534–1543.
 52. Millner AJ, Lee MD, Hoyt K, Buckholtz JW, Auerbach RP, Nock MK. Are suicide attempters more impulsive than suicide ideators? *Gen Hosp Psychiatry.* 2020;63:103–110.
 53. Anestis MD, Soberay KA, Gutierrez PM, Hernández TD, Joiner TE. Reconsidering the link between impulsivity and suicidal behavior. *Pers Soc Psychol Rev.* 2014;18(4):366–386.
 54. Jordan JT, Samuelson KW, Tiet QQ. Impulsivity, painful and provocative events, and suicide intent: Testing the interpersonal theory of suicide. *Suicide Life Threat Behav.* 2019;49(4):1187–1195.
 55. Stickley A, Koyanagi A, Ruchkin V, Kamio Y. Attention-deficit/hyperactivity disorder symptoms and suicide ideation and attempts: findings from the Adult Psychiatric Morbidity Survey 2007. *J Affect Disord.* 2016;189:321–328.
 56. Allely CS. The association of ADHD symptoms to self-harm behaviours: A systematic PRISMA review. *BMC Psychiatry.* 2014;14(1):1–13.
 57. Lugo-Candelas C, Corbeil T, Wall M, et al. ADHD and risk for subsequent adverse childhood experiences: Understanding the cycle of adversity. *J Child Psychol Psychiatry.* 2021;62(8):971–978.
 58. Wymbs BT, Dawson AE, Suhr JA, Bunford N, Gidycz CA. ADHD symptoms as risk factors for intimate partner violence perpetration and victimization. *J Interpers Violence.* 2017;32(5):659–681.
 59. Ghirardi L, Kuja-Halkola R, Pettersson E, et al. Neurodevelopmental disorders and subsequent risk of violent victimization: Exploring sex differences and mechanisms. *Psychol Med.* 2023;53(4):1510–1517.
 60. Ward JH, Curran S. Self-harm as the first presentation of attention deficit hyperactivity disorder in adolescents. *Child Adolesc Ment Health.* 2021;26(4):303–309.
 61. Evald TA, Møhl B. Before the damage is done: Early childhood hyperactivity difficulties in adolescents with deliberate self-harm—findings from the DALSC cohort. *Scand J Child Adolesc Psychiatr Psychol.* 2020;8(1):176–181.
 62. Daviss WB, Diler RS. Suicidal behaviors in adolescents with ADHD: Associations with depressive and other comorbidity, parent-child conflict, trauma exposure, and impairment. *J Att Disord.* 2014;18(8):680–690.
 63. Mansour R, Dovi AT, Lane DM, Loveland KA, Pearson DA. ADHD severity as it relates to comorbid psychiatric symptomatology in children with Autism Spectrum Disorders (ASD). *Res Dev Disabil.* 2017;60:52–64.
 64. Mansour R, Ward AR, Lane DM, et al. ADHD severity as a predictor of cognitive task performance in children with Autism Spectrum Disorder (ASD). *Res Dev Disabil.* 2021; 111:103882.
 65. Young S, Adamo N, Ásgeirsdóttir BB, et al. Females with ADHD: An expert consensus statement taking a lifespan approach providing guidance for the identification and treatment of attention-deficit/hyperactivity disorder in girls and women. *BMC Psychiatry.* 2020;20(1):1–27.
 66. Connors C, Erhardt D, Sparrow E. *Conners Adult ADHD Rating Scales.* Tonawanda, New York: Multi-Health Systems Inc; 1999.
 67. Van Orden KA, Cukrowicz KC, Witte TK, Joiner TE. Thwarted belongingness and perceived burdensomeness: Construct validity and psychometric properties of the Interpersonal Needs Questionnaire. *Psychol Assess.* 2012; 24(1):197–215.
 68. Nock MK, Holmberg EB, Photos VI, Michel BD. Self-injurious thoughts and behaviors interview: Development, reliability, and validity in an adolescent sample. *Psychol Assess.* 2007;19(3):309–317.
 69. Kroenke K, Spitzer RL. The PHQ-9: A new depression diagnostic and severity measure. *Psychiatr Ann.* 2002; 32(9):509–515.
 70. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: The GAD-7. *Arch Intern Med.* 2006;166(10):1092–1097.
 71. Hayes AF. *An Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-based Approach (Second Edition).* New York: Guilford Press; 2017.
 72. Lachowicz MJ, Preacher KJ, Kelley K. A novel measure of effect size for mediation analysis. *Psychol Methods.* 2018;23(2):244–261.
 73. Klonsky ED. The role of theory for understanding and preventing suicide (but not predicting it): A commentary on Hjelmeland and Knizek. *Death Stud.* 2019;44(2):459–462.
 74. Bauer BW, Gustafsson HC, Nigg J, Karalunas SL. Working memory mediates increased negative affect and suicidal ideation in childhood attention-deficit/hyperactivity disorder. *J Psychopathol Behav Assess.* 2018;40(2):180–193.
 75. Pelton MK, Crawford H, Robertson AE, Rodgers J, Baron-Cohen S, Cassidy S. A measurement invariance analysis of the interpersonal needs questionnaire and acquired capability for suicide scale in autistic and non-autistic adults. *Autism Adulthood.* 2020;2(3):193–203.
 76. Egan TE, Dawson AE, Wymbs BT. Substance use in undergraduate students with histories of attention-deficit/hyperactivity disorder (ADHD): The role of impulsivity. *Subst Use Misuse.* 2017;52(10):1375–1386.
 77. Sadeghpour A, Sadeghi-Bazargani H, Ghaffari-Fam S, et al. Adult ADHD screening scores and hospitalization due to pedestrian injuries: A case-control study. *BMC Psychiatry.* 2020;20(1):1–12.
 78. Brunkhorst-Kanaan N, Libutzki B, Reif A, Larsson H, McNeill RV, Kittel-Schneider S. ADHD and accidents over the life span—A systematic review. *Neurosci Biobehav Rev.* 2021;125:582–591.
 79. Graziano PA, Reid A, Slavec J, Paneto A, McNamara JP, Geffken GR. ADHD symptomatology and risky health,

- driving, and financial behaviors in college: The mediating role of sensation seeking and effortful control. *J Att Disord.* 2015;19(3):179–190.
80. Teismann T, Forkmann T, Wachtel S, Edel M-A, Nyhuis P, Glaesmer H. The German version of the Painful and Provocative Events Scale: A psychometric investigation. *Psychiatry Res.* 2015;226(1):264–272.
 81. Griffiths S, Allison C, Kenny R, Holt R, Smith P, Baron-Cohen S. The Vulnerability Experiences Quotient (VEQ): A study of vulnerability, mental health and life satisfaction in autistic adults. *Autism Res.* 2019;12:1516–1528.
 82. Rumball F, Happé F, Grey N. Experience of trauma and PTSD symptoms in autistic adults: Risk of PTSD development following DSM-5 and non-DSM-5 traumatic life events. *Autism Res.* 2020;13(2):2122–2132.
 83. Haruvi-Lamdan N, Horesh D, Zohar S, Kraus M, Golan O. Autism spectrum disorder and post-traumatic stress disorder: An unexplored co-occurrence of conditions. *Autism.* 2020;24(4):884–898.
 84. Kildahl AN, Bakken TL, Iversen TE, Helverschou SB. Identification of post-traumatic stress disorder in individuals with autism spectrum disorder and intellectual disability: A systematic review. *J Ment Health Res Intellect Disabil.* 2019;12(1–2):1–25.
 85. Kerns CM, Lankenau S, Shattuck PT, Robins DL, Newschaffer CJ, Berkowitz SJ. Exploring potential sources of childhood trauma: A qualitative study with autistic adults and caregivers. *Autism.* 2022;26(8):1987–1998.
 86. Fulton R, Reardon E, Kate R, Jones R. Sensory trauma: Autism, sensory difference and the daily experience of fear. 2020. https://www.researchgate.net/profile/Emma_Reardon2/publication/351918786_Sensory_Trauma_-_autism_sensory_difference_and_the_daily_experience_of_fear/links/60b002e6a6fdcc647ee3367f/Sensory-Trauma-autism-sensory-difference-and-the-daily-experience-of-fear.pdf Accessed February 22, 2022.
 87. Dell’Osso L, Carpita B, Cremona IM, et al. The mediating effect of trauma and stressor related symptoms and ruminations on the relationship between autistic traits and mood spectrum. *Psychiatry Res.* 2019;279:123–129.
 88. Dell’Osso L, Carpita B, Muti D, et al. Mood symptoms and suicidality across the autism spectrum. *Compr Psychiatry.* 2019;91:34–38.
 89. Benevides TW, Shore SM, Palmer K, et al. Listening to the autistic voice: Mental health priorities to guide research and practice in autism from a stakeholder-driven project. *Autism.* 2020;24(4):822–833.
 90. Klonsky ED, Saffer BY, Bryan CJ. Ideation-to-action theories of suicide: A conceptual and empirical update. *Curr Opin Psychol.* 2018;22:38–43.
 91. Bryan CJ, Butner JE, May AM, et al. Nonlinear change processes and the emergence of suicidal behavior: A conceptual model based on the fluid vulnerability theory of suicide. *New Ideas Psychol.* 2020;57:100758.
 92. Klonsky ED, Pachkowski MC, Shahnaz A, May AM. The three-step theory of suicide: description, evidence, and some useful points of clarification. *Prev Med.* 2021;152:106549.
 93. Mitchell P, Sheppard E, Cassidy S. Autism and the double empathy problem: Implications for development and mental health. *Br J Dev Psychol.* 2021;39(1):1–18.
 94. Rohrer JM, Hünermund P, Arslan RC, Elson M. That’s a lot to PROCESS! Pitfalls of popular path models. *Adv Meth Pract Psychol Sci.* 2022;5(2):25152459221095827.
 95. Gauthier JM, Hollingsworth DW, Bagge CL. Number and violence of suicide attempt methods: A preliminary investigation of the associations with fearlessness of suicide and fearlessness about death. *Psychiatry Res.* 2018;265:183–189.
 96. Corrigan PW, Sheehan L, Al-Khouja MA, et al. Insight into the stigma of suicide loss survivors: Factor analyses of family stereotypes, prejudices, and discriminations. *Arch Suicide Res.* 2018;22(1):57–66.
 97. Tong B, Kashdan TB, Joiner T, Rottenberg J. Future well-being among people who attempt suicide and survive: Research recommendations. *Behav Ther.* 2021;52(5):1213–1225.
 98. Strauss P, Cook A, Watson V, et al. Mental health difficulties among trans and gender diverse young people with an autism spectrum disorder (ASD): Findings from Trans Pathways. *J Psychiatr Res.* 2021;137:360–367.
 99. Shahnaz A, Bauer BW, Daruwala SE, Klonsky ED. Exploring the scope and structure of suicide capability. *Suicide Life Threat Behav.* 2020;50:1230–1240.
 100. Rogers ML, Bauer BW, Gai AR, Duffy ME, Joiner TE. Examination of measurement invariance of the Acquired Capability for Suicide Scale. *Psychol Assess.* 2021;33(5):464–470.
 101. Groom MJ, Young Z, Hall CL, Gillott A, Hollis C. The incremental validity of a computerised assessment added to clinical rating scales to differentiate adult ADHD from autism spectrum disorder. *Psychiatry Res.* 2016;243:168–173.
 102. Nakagawa A, Hayashi W, Nishio T, et al. Similarity of subjective symptoms between autism spectrum disorder and attention-deficit/hyperactivity disorder in adults: Preliminary findings. *Neuropsychopharmacol Rep.* 2021;41(2):237–241.
 103. Kessler RC, Adler L, Ames M, et al. The World Health Organization Adult ADHD Self-Report Scale (ASRS): A short screening scale for use in the general population. *Psychol Med.* 2005;35(2):245–256.
 104. Nicholas DB, Hedley D, Randolph JK, Raymaker DM, Robertson SM, Vincent J. An expert discussion on employment in autism. *Autism Adulthood.* 2019;1(3):162–169.
 105. Hire AJ, Ashcroft DM, Springate DA, Steinke DT. ADHD in the United Kingdom: Regional and socioeconomic variations in incidence rates amongst children and adolescents (2004–2013). *J Att Disord.* 2018;22(2):134–142.
 106. Flouri E, Midouhas E, Ruddy A, Moulton V. The role of socio-economic disadvantage in the development of comorbid emotional and conduct problems in children with ADHD. *Eur Child Adolesc Psychiatry.* 2017;26(6):723–732.
 107. Rosa M, Puig O, Lázaro L, Calvo R. Socioeconomic status and intelligence quotient as predictors of psychiatric disorders in children and adolescents with high-functioning autism spectrum disorder and in their siblings. *Autism.* 2016;20(8):963–972.
 108. Mason D, McConachie H, Garland D, Petrou A, Rodgers J, Parr JR. Predictors of quality of life for autistic adults. *Autism Res.* 2018;11(8):1138–1147.
 109. Björk A, Rönngren Y, Selander J, Vinberg S, Hellzen O. Perspectives on everyday suffering among people with adult attention deficit hyperactivity disorder and concurrent mental disorders. *Open J Nurs.* 2017;7(5):583–598.
 110. Batterham PJ, Calear AL. Incorporating psychopathology into the interpersonal-psychological theory of suicidal behavior (IPTs). *Suicide Life Threat Behav.* 2020;51(3):482–491.

111. Opara I, Assan MA, Pierre K, et al. Suicide among Black children: An integrated model of the interpersonal-psychological theory of suicide and intersectionality theory for researchers and clinicians. *J Black Stud.* 2020; 51(6):611–631.
112. Kim JL, Kim JM, Choi Y, Lee TH, Park EC. Effect of socioeconomic status on the linkage between suicidal ideation and suicide attempts. *Suicide Life Threat Behav.* 2016;46(5):588–597.
113. Hosozawa M, Sacker A, Cable N. Timing of diagnosis, depression and self-harm in adolescents with autism spectrum disorder. *Autism.* 2020;25(1):70–78.
114. Hinshaw SP, Nguyen PT, O’Grady SM, Rosenthal EA. Annual Research Review: Attention-deficit/hyperactivity disorder in girls and women: underrepresentation, longitudinal processes, and key directions. *J Child Psychol Psychiatry.* 2021;63(4):484–496.
115. Oliva F, Malandrone F, Mirabella S, Ferreri P, di Girolamo G, Maina G. Diagnostic delay in ADHD: Duration of untreated illness and its socio-demographic and clinical predictors in a sample of adult outpatients. *Early Interv Psychiatry.* 2021;15(4):957–965.
116. Leedham A, Thompson A, Smith R, Freeth M. “I was exhausted trying to figure it out”: The experiences of females receiving an autism diagnosis in middle to late adulthood. *Autism.* 2019; 24(1):135–146.
117. Moseley RL, Druce T, Turner-Cobb J. “When my autism broke”: A qualitative study spotlighting autistic voices on menopause. *Autism.* 2020;24(6):1423–1437.
118. Rau S, Skapek MF, Tiplady K, et al. Identifying comorbid ADHD in autism: Attending to the inattentive presentation. *Res Autism Spectr Disord.* 2020;69:101468.
119. Joshi G, Faraone SV, Wozniak J, et al. Symptom profile of ADHD in youth with high-functioning autism spectrum disorder: a comparative study in psychiatrically referred populations. *J Att Disord.* 2017;21(10):846–855.
120. Ottosen C, Larsen JT, Faraone SV, et al. Sex differences in comorbidity patterns of attention-deficit/hyperactivity disorder. *J Am Acad Child Adolesc Psychiatry.* 2019; 58(4):412–422.
121. Angell AM, Deavenport-Saman A, Yin L, et al. Sex differences in co-occurring conditions among autistic children and youth in Florida: A retrospective cohort study (2012–2019). *J Autism Dev Disord.* 2021;51(10):3759–3765.
122. Rødgaard EM, Jensen K, Miskowiak KW, Mottron L. Autism comorbidities show elevated female-to-male odds ratios and are associated with the age of first autism diagnosis. *Acta Psychiatr Scand.* 2021;144(5):475–486.
123. Epstein JN, Loren RE. Changes in the definition of ADHD in DSM-5: Subtle but important. *Neuropsychiatry.* 2013; 3(5):455.

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