



Depression and Employment Outcomes in Autistic Adults: A Systematic Review

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Abstract

Autistic adults face elevated risks for depression and unemployment, yet a systematic review of studies on the intersection of depression and employment in autism is needed to inform research and clinical efforts. The present review synthesizes findings from studies that (1) measure both depression and employment in autistic adults, and (2) empirically test associations between these constructs. Results support other work indicating elevated prevalence rates of depression and unemployment in autism with new information on the complex associations between constructs. Insights from the present review were used to (1) discuss associations between depression and employment in autism, (2) identify current challenges to understanding the intersection of depression and employment in autism, (3) propose future lines of research, and (4) suggest clinical applications for providers (e.g., mental health clinicians, vocational rehabilitation practitioners) working with autistic adults.

Keywords Autism spectrum disorder · Depression · Employment · Adults · Measurement

Depression is more prevalent among autistic¹ adults than non-autistic adults (Hollocks et al., 2019) and associated with a reduced quality of life (Elinson et al., 2004; Lerner & Henke, 2008). Similarly, prevalence rates of unemployment and underemployment (i.e., working in jobs that do not utilize an employee's full potential) are higher among autistic adults than the general population (Shattuck et al., 2012) and also associated with a reduced quality of life. The relationship between depression and employment has been studied in the general population, yet associations between these risk constructs have not been systematically investigated in the context of autism. As prevalence rates of depression and un/underemployment are elevated in autistic adults, a concerted

effort to understand the intersection of these constructs in autism may guide research and intervention efforts.

Depression and Employment in the General Population

Meaningful employment is an important functional outcome with positive effects over time (e.g., personal achievement, financial security, meaningful life goals; Dodu, 2005). Employment has been associated with enhanced independence and identity formation (Luyckx et al., 2008; Waddell and Burton, 2006), financial security (Lerner & Henke, 2008), increased self-esteem (Waters & Moore, 2002), and greater social connection (Saavedra et al., 2016). In the general population, employment is one protective factor against depression and other mental health disorders (Van Der Noordt et al., 2014); however, the relationship between depression and employment in autism is less clear.

With limited investigations of depression and employment in autism, efforts may be guided by a larger body of research in the general population: Active employment may protect against depression; inversely, depression interferes

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¹ We used identity-first language (e.g., autistic adults) in this paper as it is the preference of most autistic people (Kenny et al., 2016) and supported by recent research (Bottema-Beutel et al., 2021).

with employment in various ways. For adults hoping to enter the workforce, depression is a significant hindrance associated with higher rates of unemployment and underemployment (i.e., working in jobs that do not utilize an employee's full potential; Dooley et al., 1994; Lerner et al., 2004). Once employed, depression may lead to missed work days, reduced productivity, and missed deadlines (Greenberg et al., 2003, 2015). Within the workplace, depression has been linked to diminished quality of life and social functioning (Elinson et al., 2004; Lerner & Henke, 2008). Given this, adults with depression are more likely to be terminated prematurely than adults without depression (Amos et al., 2018). Termination may exacerbate pre-existing depression, which in turn, makes it more difficult to re-enter the workforce and obtain new employment (Amos et al., 2018; Dooley et al., 1994). In essence, depression fosters a vicious cycle that is concerning for employers and employees alike. To frame an exploration of the intersection of depression and unemployment in autism, a review of depression and employment literatures is needed.

Depression in Autism

One in four autistic adults experience depression, which is a prevalence rate three-to-four times higher than that observed in the general population (Smith & White, 2020). Specifically, lifetime prevalence rates of depression in autistic adults range from 37 to 48.6%, per self-report (Hollocks et al., 2019; Hudson et al., 2019). Depression in autistic adults has been linked to higher rates of suicide attempts (Cassidy & Rodgers, 2017) and regressions in daily functioning (Magnuson & Constantino, 2011). Although investigations into depression in autism are ongoing, several risk factors have been identified: female sex (Schwartzman et al., 2021; Uljarević et al., 2020), emotion dysregulation (Bruggink et al., 2016; Mazefsky et al., 2013), higher autistic traits (i.e., social communication difficulties and presence of restricted, repetitive behaviors and/or interests; Hallett et al., 2010; Mayes et al., 2011), and cognitive rigidity and rumination (Gotham et al., 2014). The literature is mixed regarding associations between intellectual functioning and depression in autism (De-la-Iglesia & Olivar, 2015; Hudson et al., 2019; Mayes et al., 2011). It is also challenging to measure depressive symptoms in autistic adults with low cognitive and verbal abilities given a dearth of validated instruments. For autistic adults with average to above-average cognitive and verbal abilities, the Beck Depression Inventory (Beck et al., 1996) and Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001) may reliably measure the severity of depressive symptoms as these instruments were recently validated for use in autistic adults without intellectual disability (Arnold et al., 2020; Williams, Everaert, & Gotham,

2021). Though depression interferes with employment in the general population, the extent to which depression may or may not interfere with employment in autistic adults remains unclear.

Employment in Autism

A wealth of research indicates that autistic adults experience greater challenges in securing and maintaining competitive employment than non-autistic adults (Hendricks, 2010). Specifically, autistic adults face the lowest rates of participation in employment compared to adults with speech/language impairments, learning disabilities, or intellectual disability (Shattuck et al., 2012). Many factors are linked to higher rates of unemployment and underemployment in autistic adults including higher autistic traits (i.e., social communication difficulties and presence of restricted, repetitive behaviors and/or interests; Hendricks, 2010; Shattuck et al., 2012), fewer years of education (Ohl et al., 2017), lower independent daily living skills (Chan et al., 2018; Taylor & Mailick, 2014), higher social communication difficulties (Giarelli et al., 2013), and lower vocational skills (Seaman & Cannella-Malone, 2016). These findings are concerning given that meaningful employment is an important functional outcome in adulthood and associated with enhanced well-being. Therefore, it is essential to identify barriers to successful, continuous employment for autistic adults, including the role of depression. A synthesis of studies on both depression and employment in autistic adults may provide important insights on associations between constructs to guide screening and intervention efforts.

To date, several studies have explored depression and employment among autistic adults, but definitive findings are limited by self-reported presence/absence of depression diagnosis (i.e., no standardized measure of depression) or studies that collapsed depression with other disorders into a "psychiatric diagnosis" category (i.e., cannot isolate the effects of depression specifically; Taylor & Seltzer, 2011; Taylor et al., 2014). This reduces opportunities to understand how depression specifically may or may not relate to employment in autistic adults, or vice versa. Furthermore, these limitations may prevent studies from being included in systematic or meta-analytic reviews, such as the present review. Nevertheless, it is important to highlight some of this work to provide a background for potential relationships between constructs in autistic adults. One study reported that higher vocational independence was related to lower autistic traits and maladaptive behaviors (e.g., internalized, externalized, and asocial behaviors) in a sample of adults in which 26.8% endorsed a major depressive disorder; however, a depression measure was not utilized and an association between depression and employment was not tested (Taylor

et al., 2014). Another study reported significant declines in vocational/educational independence over a 10-year period among autistic adults, regardless of maladaptive behaviors (i.e., internalized, externalized, and asocial behaviors; Taylor & Mailick, 2014). In another study, employment activity did not differ between autistic adults with or without a comorbid psychiatric diagnosis (i.e., diagnoses collapsed together; Taylor & Seltzer, 2011). Despite this finding, Taylor and Seltzer (2011) suggested that psychiatric symptoms may still be an important barrier to employment for autistic adults. Sustained vocational independence is an important area to address for autistic adults, yet the role of depression has not been explored. Additional insights on the relationships between depression and employment may be helpful for autistic adults to inform treatment planning and service coordination.

Present Review

The goal of this systematic review was to synthesize findings from studies measuring both depression and employment in autistic adults. Specifically, this review aimed to understand: (1) general findings of depression and employment outcomes in autistic adults without intellectual disability, (2) insights on depression and employment in autism by study type (i.e., intervention, observational, comparison), and (3) empirical associations between depression and employment in autism. It is the first review to (1) examine studies that tested associations between these constructs, (2) propose ways to advance research efforts, and (3) suggest clinical applications for providers (e.g., mental health, vocational rehabilitation).

Methods

Search Methods

This systematic review followed the PRISMA guidelines (Moher et al., 2009). Inclusion criteria for article type were as follows: (1) peer-reviewed publications, (2) published in English, (3) comprised of at least one group of adults diagnosed with autism based on *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; DSM-IV-TR; American Psychiatric Association, 2000) or *Diagnostic and Statistical Manual of Mental Disorders* (5th ed; DSM-5; American Psychiatric Association, 2013) criteria in order to investigate relationships between depression and employment in autistic adults, (4) had adult samples (i.e., 18 years and older), (5) without intellectual disability (i.e., FSIQ \geq 70), (6) measured depressive symptoms with at least one standardized measure (i.e., self-report, clinician rating), and (7) measured

employment outcomes (i.e., employment status, employment questionnaire). In alignment with PRISMA guidelines, we excluded dissertations, theses, conference presentations, case studies, or review articles. Date restrictions were not applied to studies in the present review, but searches were limited to articles available on large search engines (e.g., PubMed, PsychINFO, Google Scholar). To gain a better understanding of depression and employment in autism, and due to limited studies on this topic, we did not apply an exclusion criterion related to the quality of the study.

Acceptable assessment methods of depressive symptoms included standardized questionnaires (self-, caregiver-, clinician-report) or structured or semi-structured interviews that were depression-focused or included a subscale measuring symptoms. However, meta-analytic and systematic review articles were examined for potential articles to include in the present review. Two studies (Cassidy et al., 2018; Moseley et al., 2019) employed measures of suicidal thoughts and behaviors (STBs) and non-suicidal self-injury (NSSI) and were retained in the present review given associations between STBs, NSSI, and depression. Acceptable assessment methods of employment included questionnaires (self-, caregiver-, clinician-report) assessing employment status, satisfaction, work days, or other indicators of vocational engagement.

Prominent search engines — PubMed and PsychINFO — were used to identify studies with the following terms: (autis* OR asperger* OR PDD*-NOS OR pervasive development* disorder) AND (depress* OR dysthym*) AND (employment* OR work* OR vocation* OR job*). The first author screened studies by title and abstract to exclude unrelated articles, and then evaluated full texts to determine eligibility. To maximize inclusion of all possible articles, a “snowball search” (Greenhalgh & Peacock, 2005) was implemented on Google Scholar and articles were again screened by title and article first before full-text analysis.

Included Studies and Data Extraction

Study Type

Search methods resulted in three types of studies on depression and employment in autistic adults: observational, intervention, and comparison. *Observational studies* were operationally defined as studies that measured depression and employment indices in an autistic-only sample, including cross-sectional and/or longitudinal designs. *Intervention studies* examined the efficacy of interventions for autistic adults that measured both depression and employment as outcomes. *Comparison studies* examined depression and employment indices between diagnostic groups (e.g., autism, depression, schizophrenia). Included studies were classified

by authors, year of publication, country, and study type (i.e., observational, intervention, comparison).

Sample Characteristics

Table 1 includes the following study information: (1) country/region of investigation, (2) sample size and size of autistic subsample (if applicable), (3) age of participants (mean, standard deviation), (4) proportion of males, (5) depression measure, (6) proportion of sample with elevated depressive symptoms, if reported, (7) employment measure, and (8) findings regarding employment.

Depressive Symptoms

The measure of depressive symptoms used in each study was coded, as well as the proportion of adults with scores above clinical cutoffs. For comparison studies, the type of control group (e.g., chronic depression, psychosis, bipolar) was recorded, as well as the proportion of those adults with scores above the clinical cutoffs. Significant differences in [depressive symptoms](#) across diagnostic groups were noted. For intervention studies, the study design (e.g., waitlist control, quasi experimental), intervention type (e.g., depression- or employment-focused), and treatment outcomes were recorded.

Employment and Related Constructs

The most common index of employment across studies was employment status and the proportion of adults across different employment categories (e.g., employed full-time, employed part-time, student/volunteer, retired, unemployed) was recorded. A limited number of studies utilized other indices of employment (e.g., vocational satisfaction, workplace performance), which were coded and means and standard deviations recorded when provided. Studies were coded dichotomously as to whether they empirically tested an association between depression and employment, and significant relationships were noted.

Results

Initial searches on PubMed and PsychINFO occurred in October 2020 and resulted in 3084 total hits. An updated search, including a snowball search on Google Scholar, was conducted in April 2021 and identified an additional 1235 studies. From this, duplicate records were removed and a total pool of 583 records remained. Following screening by title and abstract, 139 records were retained for full-text examination and 444 were excluded. The full

texts of the remaining 139 records were analyzed and 21 studies met full inclusion criteria. The second author screened 10% of the 583 pooled records and screened another 10% of the 139 records retained for full-text examination. Any disagreements were resolved by discussion and consensus and final agreement on full-text screens was 100%. In addition, the second author screened 10% of the 21 included studies to verify prevalence rates, findings, and other information extracted from these studies by the first author. Authors reached 100% agreement on extraction of data from the 21 included studies.

Overview of Studies

A PRISMA flow diagram illustrates the process for screening articles (Fig. 1). Of the 21 eligible and included studies, the majority were published in the last 5–6 years and occurred in Australia, the UK, and the USA. For access to coding schemes, please see supplementary materials.

Study Type Of the 21 included studies, 10 were observational, 5 were intervention, and 6 were comparison studies.

Sample Characteristics A total of 4378 participants were described across the 21 included studies and of this total sample, 2598 autistic adults were included (see Table 1). Within-sample means were calculated for the age ($M = 34.6$ years old; range 20.4–61.5 years old) and sex ($M = 60.85\%$ male; range 27–96% male) of autistic adults.

Characterization Measures Approximately half the studies utilized a standardized assessment of intellectual functioning to characterize participants, with versions of the Wechsler Intelligence Scale (e.g., Wechsler Abbreviated Scale of Intelligence) as the most commonly utilized measure. To measure autistic traits, over half of the studies utilized a version of the Autism Quotient (AQ; Baron-Cohen et al., 2001), and five studies administered the Autism Diagnostic Observation Schedule, Second Edition (ADOS-2; Lord et al., 2012).

Depression Measures The majority of studies (86%) used self-report measures of depressive symptoms, specifically the Patient Health Questionnaire-9 (PHQ-9; Kroenke et al., 2001) and the Beck Depression Inventory, Second Edition (BDI-II; Beck et al., 1996).

Employment Measures The majority (76%) of studies utilized self-reported employment status, while other indices of employment (e.g., job satisfaction, mock interview performance) were most often used in [intervention studies](#).

Table 1 Characteristics of all included studies

Author(s) and year	Country	N	Age (years)	% male	Depression measure	Proportion with significant depression	Employment measure	Employment findings
Observational studies								
Cage et al. (2018)	UK	111 ASD	36.4 (12.0)	27	DASS-21 ^a	51%	Employment status	37% employed
Hedley et al. (2017)	Australia	76 ASD	25.15 (7.74)	90.7	PHQ-9 ^b	36.8%	Employment status	55.3% employed
Hedley et al. (2018)	Australia	71 ASD	26.14 (8.20)	88.7	PHQ-9 ^b	26.8%	Employment status	52.1% employed
Hedley et al. (2018)	Australia	185 ASD	36.69 (15.6)	45	PHQ-9 ^b	48.6%	Employment status	49.7% employed
Lugnegård et al. (2011)	Sweden	54 ASD	27.0 (3.9)	48	SCID ^c	50%	Employment status	28% sheltered employment 20% support or regular employment
Mason et al. (2019)	UK	69 ASD	61.5 (5.27)	69.5	HADS ^d	37.6%	Employment status WHOQoL ^f -BREF ^e	21.7% unemployed
Moseley et al. (2019)	UK	103 ASD	43.0 (13.6)	32	BDI-II ^g NSSI-AT ^h	73%	Employment status	52% employed
Roy et al. (2015)	Germany	50 ASD	36.46	68	SCID ^c	72%	Employment status	26% employed
Uljarević et al. (2020)	Australia	255 ASD	33.52 (14.98)	59.2	PHQ-9 ^b	40.4%	Employment status	47.6% employed
Zheng et al. (2021)	USA	315 ASD	26.33 (4.64)	51.8	BDI-II ^g DASS-21 ^a	46.7%	Employment status	51.5% employed
Intervention studies								
Connor et al. (2020)	USA	26 ASD	20.4 (1.5)	80.8	PHQ-9 ^b	15%	Employment status GSES ⁿ	Improvement in self-efficacy
Hedley et al. (2019)	Australia	43 ASD	27.5 (9.6)	90	PHQ-9 ^b		MSQ-SF ^o	Improvement in employment satisfaction
Hillier et al. (2011)	USA	49 ASD	21.0	85.7	BDI-II ^g		IPR ^p	Improvement in peer relations
Morgan et al. (2014)	USA	28 ASD	24.5 (5.2)	96	PHQ-9 ^b		Mock Interviews SPS ^q	Improvement in mock interview scores
Pahnke et al. (2019)	Sweden	10 ASD	49.0 (12.0)	50	BDI-II ^g MINI ^r	40%	Employment status SDS ^s	30% employed No SDS ^s improvement
Comparison studies								
Cassidy et al. (2018)	UK	333 (ASD 164)	41.5 (11.7)	ASD: 40 NT ^t : 32	SBQ-R ^j	79% ASD > 44% NT ^t	Employment status	79% NT ^t > 49% ASD employed
Griffiths et al. (2019)	UK	694 (ASD 426)	47.5 (14.3)	ASD: 40 NT ^t : 26	PHQ-9 ^b	64% ASD > 23% NT ^t	Employment status VEQ ^k	47% NT ^t > 40% ASD employed
Lawson et al. (2020)	Australia	389 (ASD 224)	35.4	ASD: 41.7 NT ^t : 27.6	PHQ-9 ^b	ASD > NT ^t	Employment status	71% NT ^t > 50% ASD employed

Table 1 (continued)

Author(s) and year	Country	<i>N</i>	Age (years)	% male	Depression measure	Proportion with significant depression	Employment measure	Employment findings
Lever and Geurts (2016)	Netherlands	388 (ASD 216)	46.7	ASD: 67 NT ^l : 56	SCL-90-R ¹	40.7% ASD > 2.9% NT ^l	Employment status	66% NT ^l > 53% ASD employed
Park et al. (2019)	Australia	1040 (ASD 96)	22.0	ASD: 68.7 MDD ^u : 34	DASS-21 ^a	MDD ^u > ASD > Psychosis, Bipolar, Anxiety	WHODAS-II ^m	WHODAS-II ^m functional impairment: Bipolar > psychosis > ASD > MDD ^u
Radtke et al. (2019)	Germany	89 (ASD 27)	46.08 (10.06)	ASD: 44.4 MDD ^u : 38.7 NT ^l : 38.7	BDI-II ^g	MDD ^u > ASD > NT ^l	Employment status	NT ^l > ASD > MDD ^u employed

^aDepression Anxiety Stress Scale; ^bPatient Health Questionnaire-9; ^cStructured Clinical Interview for DSM Disorders; ^dHospital Anxiety and Depression Scale; ^eWorld Health Organization Quality of Life Brief Questionnaire; ^fQuality of life; ^gBeck Depression Inventory, Second Edition; ^hNon-suicidal Self-injury Assessment Tool; ⁱNon-suicidal Self-injury; ^jSuicide Behaviors Questionnaire-Revised; ^kVocational Experiences Questionnaire; ^lSymptom Checklist-90-Revised; ^mWorld Health Organization Disability Assessment Scale, Second Edition; ⁿGeneral Self-Efficacy Scale; ^oMinnesota Satisfaction Questionnaire, Short Form; ^pInterpersonal Relations Scale; ^qSocial Pragmatic Scale; ^rMini-International Neuropsychiatric Interview; ^sSheehan Disability Scale; ^tNeurotypical/non-autistic; ^uMajor Depressive Disorder

Aim 1: General Findings on Depression and Employment in Autism

Across all 21 studies, the proportion of autistic adults with clinically significant depressive symptoms ranged from 15 to 73%, and the proportion of autistic adults with active employment ranged 20 to 55.3% (see Table 1). Within-sample means were calculated for the proportion of autistic adults with clinically significant depressive symptoms ($M = 44\%$; range 15–73%).

Aim 2: Insights on Depression and Employment in Autism by Study Type

Observational Studies As noted, 10 of the 21 studies included were categorized as observational studies and provided estimates of depression and employment in samples of only autistic adults. Clinically-significant depressive symptoms were frequently reported by autistic adults (27–73% of adults) across all 10 studies, while active employment was less frequent (26–55% of adults employed in some capacity).

Intervention Studies Only five studies to date measured changes in both employment and depressive symptoms following participation in an intervention (see Supplemental Table 1). Four of five studies investigated the efficacy of employment-focused interventions (Connor et al., 2020; Hedley et al., 2019; Hillier et al., 2011; Morgan et al., 2014), while one study investigated the efficacy of a depression-focused intervention (Pahnke et al., 2019). Of the four employment-focused intervention studies, three reported no significant changes in depressive symptoms following intervention (Connor et al., 2020; Hedley et al., 2019;

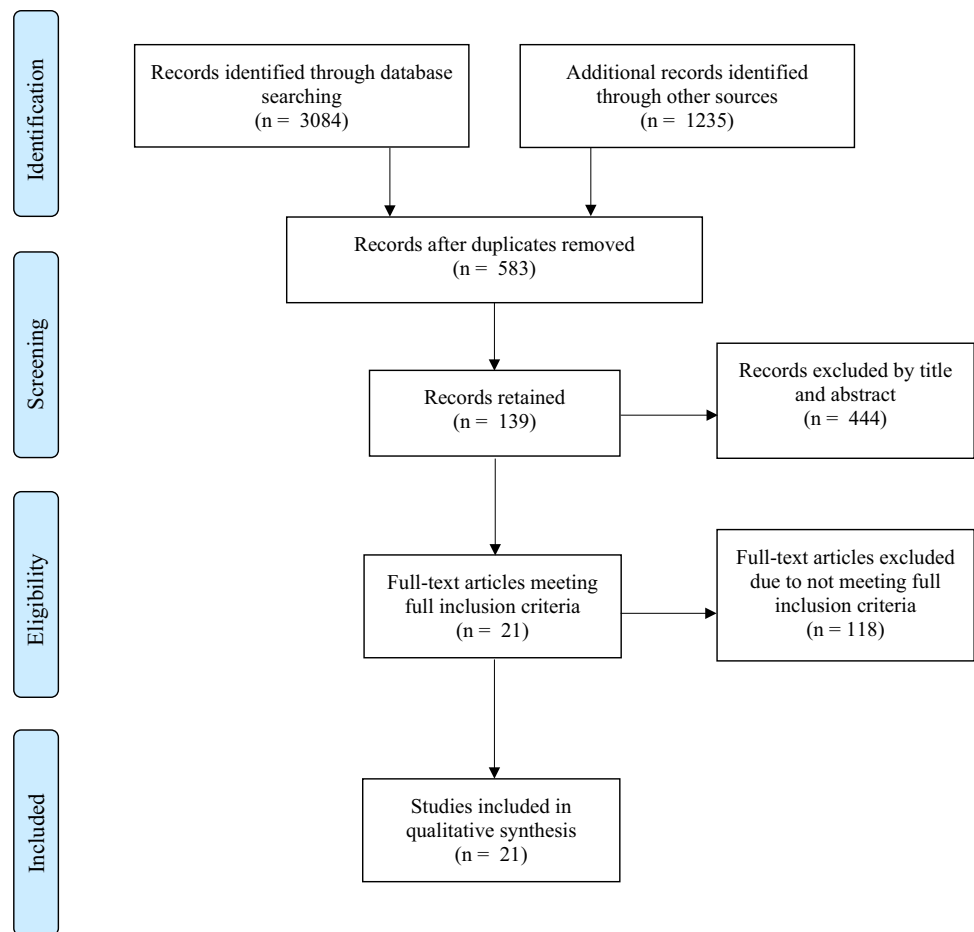
Morgan et al., 2014). Investigators acknowledged the following limitations: small samples (i.e., insufficient power), low variability of depressive scores before intervention, and lack of random assignment (apart from Morgan et al., 2014). A fourth study by Hillier and colleagues (2011) observed significant reductions in depressive symptoms and anxiety in 49 autistic adults following participation in a social and vocational skills training program.

As noted, one study (Pahnke et al., 2019) reported significant reductions in depressive symptoms in 10 autistic adults following participation in Acceptance and Commitment Therapy (ACT; Hayes et al., 2006); however, employment changes following intervention were not observed.

Comparison Studies Six studies were categorized as comparison studies (Table 1) as investigators compared depression and employment outcomes between autistic and non-autistic adults. Across all comparison studies, the proportion of autistic adults with clinically-significant depressive symptoms (15.7–79%) was higher than non-autistic comparison groups (2.9–44%). In terms of employment, non-autistic adults were more likely to report active employment than autistic adults. However, in two studies (Park et al., 2019; Radtke et al., 2019), non-autistic adults with major depressive disorder (MDD) exhibited the worst outcomes (i.e., highest depression, lowest employment) of all adult cohorts.

Aim 3: Associations Between Depression and Employment in Autism

Of the 21 included studies, 10 empirically tested associations between depression and employment in autistic

Fig. 1 PRISMA flow diagram of included studies

adults (see Table 2). Seven studies employed correlation and regression analyses to investigate relationships between employment status (i.e., predictor variable) and depression and/or suicidality (i.e., outcome variables). Employment status and depression and/or suicidality were *not correlated* in any of these studies, and regression analyses showed that employment status was *not* an independent predictor of depression and/or suicidality. Though employment rates were low (31–52%) across studies, autistic adults with current self-harm and/or depression reported similar employment rates as autistic adults without current self-harm and/or depression.

The remaining three studies used correlation and regression analyses to investigate relationships between depression (i.e., predictor variable) and employment (i.e., outcome variable) in autistic adults. Depression was associated with employment difficulties, workday interference, number of work loss days, and reduced quality of life in autistic adults across these studies. Findings from qualitative interviews suggested that depression and/or self-harm behaviors interfered with work obligations or employment retention for some,

but not all, autistic adults (Mason et al., 2019; Moseley et al., 2019).

Discussion

The current review synthesized literature on depression and employment in autistic adults and across studies, clinically-significant depressive symptoms were frequently reported by autistic adults (within-sample mean of 44% autistic adults with elevated scores), while active employment was less frequently reported (26–55% of adults employed in some capacity). Severe depression and/or suicidality were more common in autistic adults than non-autistic adults, while full-time employment was less common in autistic adults, mirroring findings in the literature on elevated prevalence rates of depression (Hollocks et al., 2019) and unemployment in autism (Shattuck et al., 2012). Of the 10 studies that empirically tested associations between depression and employment, findings suggest that employment does *not* predict depression and/or suicidality. However, depression may interfere with employment retention and quality of life for some autistic adults. Employment may not serve as a

Table 2 Findings of studies that empirically tested associations between depression and employment in autistic adults

Author(s) and year	<i>N</i> Autistic adults	Summary of findings
		Employment as a predictor of depression/suicidality
Cassidy et al. (2018)	164	Employment status was not an independent predictor of suicidality ($\beta = -0.033, p > .05$) Depression ($r = -0.143, p > .05$) and suicidality ($r = -0.114, p > .05$) were not significantly correlated with employment status
Lawson et al. (2020)	224	Employment status was not an independent predictor of physical, psychological, social, nor environmental quality of life Depression was an independent predictor of physical, psychological, and environmental quality of life. Mental health status significantly predicted all four types of quality of life ($F = 7.502-44.596, p < .001$)
Lever and Geurts (2016)	216	Employment status did not predict current depressive symptoms ($B = 0.05, p > .05$) nor diagnosis of mood disorder ($B = -0.14, p > .05$)
Lugnegård et al. (2011)	54	Autistic adults with active employment or with disability pension/social services (i.e., unemployment) exhibited similar rates of lifetime mood disorders ($p > .05$)
Moseley et al. (2019)	103	Employment status did not predict non-suicidal self-injurious behaviors and was not significantly different across the self-harm groups ($X^2 = 4.341, p = 0.114$) Of autistic adults with current self-harm ($n = 49$), 29% stated that non-suicidal self-injurious behaviors interfered with work obligations
Uljarević et al. (2020)	255	Employment status was not significantly correlated with depression ($r = 0.02, p > .05$)
Zheng et al. (2021)	315	Among autistic adults with depression, employment status was not a significant predictor of depression treatment utilization (adjusted odds ratio = 0.63, $p = 0.231$) Education level (adjusted odds ratio = 3.03, $p = 0.007$) and formal depression diagnosis (adjusted odds ratio = 17.76, $p < .0001$) were significant predictors of depression treatment utilization Employment status was similar between autistic adults with and without depression ($p > .05$)
Author(s) and year	<i>N</i>	Summary of findings: depression as a predictor of employment
Griffiths et al. (2019)	426	Depression, anxiety, or mental health concerns interfered with employment more frequently in autistic than non-autistic adults ($X^2 = 51.52, p < .001$; odds ratio = 4.32)
Mason et al. (2019)	69	Depression was significantly associated with reduced quality of life ($F = 6.171, p < .001$) Depression significantly predicted reduced psychological quality of life ($\eta^2 p = 0.411, p < .01$) Qualitative data ($n = 8$ adults) implicated depression and anxiety as risk factors to employment engagement and outcomes
Park et al. (2019)	96	Depression was significantly and positively correlated with employment difficulties overall ($r = 0.25, p < .05$) and number of work loss days ($r = 0.49, p < .001$) Depression was not an independent predictor of employment difficulties ($\beta = 0.09, p > .05$) Depression significantly predicted work loss days ($\beta = 0.45, p < .01$)

protective factor against depression in autism, but depression may constitute a key risk factor to employment.

General Findings of Depression and Employment in Autism

Across the 10 observational studies of autistic adult samples, depression and suicidality were more likely to be reported than active, full-time employment, which adds to the growing literature on significant depression (Hollocks et al., 2019) and employment challenges (Shattuck et al., 2012) facing this population. Depression is a common mental illness affecting 3.8% of the general population worldwide (World Health Organization, 2022), and findings from the present review highlight the vulnerability of autistic adults as 44% of autistic adults on average reported clinically-significant depressive symptoms. Unfortunately, many autistic adults report challenges in

accessing and engaging in mental health services (Maddox et al., 2018) despite elevated risks for depression and suicidality. Untreated depression is associated with adverse outcomes (e.g., diminished physical health, safety concerns; Ghio et al., 2014), while unemployment is linked to reduced quality of life (Amos et al., 2018; Dooley et al., 1994) — these constitute significant intervention areas for autistic adults. In light of higher risks for both depression and unemployment in autism, it may be important to understand a potential additive effect on outcomes and quality of life for autistic adults — a critical area of future investigation.

The majority of autistic adults sampled were predominantly male ($M_{sex} = 60.85\%$ male) and thus, conclusions regarding depression and employment cannot be fully understood among autistic adults with other gender identities (e.g., cisgender female, gender non-binary, etc.). Depression and unemployment are more common among cisgender female

and gender diverse adults in the general population (Malkiel & Malkiel, 1973; Strauss et al., 2017) and may place cisgender female and/or gender diverse autistic adults at higher risks for depression and unemployment than their cisgender male peers. However, continued investigations with larger and more gender diverse samples are needed to understand the intersection of depression and employment in the context of autism.

Intervention Studies Though intervention studies targeting employment and/or depression among autistic adults are on the rise, only five studies to date have measured both depression and employment as indices of treatment outcome. The majority of these studies were underpowered, which limits conclusions about the extent to which interventions may contribute to gains in employment or reductions in depression. Although underpowered, three studies reported nonsignificant reductions in depressive symptoms among autistic adults following participation in employment interventions (Connor et al., 2020; Hillier et al., 2011; Morgan et al., 2014). This may add to the observation that employment may not affect depression in autistic adults. In a larger study utilizing both social and vocational intervention strategies, autistic adults reported significant reductions in depression symptoms (Hillier et al., 2011), which may point to the importance of integrated approaches. Findings from this review may encourage investigators to utilize measures of both depression and employment in intervention studies for autistic adults to examine direct and/or indirect benefits associated with participation. With regard to employment-based outcomes, findings across the five intervention studies appear mixed with some studies reporting improvements (Connor et al., 2020; Hedley et al., 2019; Morgan et al., 2014), and others reporting nonsignificant change over time (Hillier et al., 2011; Pahnke et al., 2019). Drawing conclusions regarding the efficacy of these interventions on employment-based outcomes is hampered by small samples, different measures utilized across studies, and only one randomized controlled trial. It is also important to highlight that the present review only included studies that measured both depression and employment, and thus, some employment studies were not included that may better inform efforts to develop these interventions.

Comparison Studies Compared to non-autistic adults, autistic adults were more likely to endorse clinically-significant depressive symptoms and underemployment/unemployment across the six comparison studies. Therefore, access to mental health and vocational services are critical supports for autistic adults that should be the continued focus of community, clinical, and research efforts. Of note, non-autistic adults with major depressive disorder (MDD) endorsed more

severe depression and higher unemployment than autistic adults in two studies (Park et al., 2019; Radtke et al., 2019). Similar results across these two studies imply that chronic depression may be a more substantial barrier to employment than autism alone (Park et al., 2019; Radtke et al., 2019). This adds to the possibility that the effects of both depression and autism may be additive in complicating efforts to meaningful employment. However, these are the only two studies to compare autistic adults to non-autistic adults with MDD and thus, additional large-scale investigations are needed to understand associations between depression, employment, and autism.

Empirical Associations Between Depression and Employment in Autism

Findings from studies testing the role of employment status on depression in autistic adults did *not support* an association between these constructs as employment status did not independently predict depression. Though employment may buffer against depression in the general population (Dodu, 2005), employment may *not* be a protective factor against depression in autistic adults. Active, meaningful employment remains a critical need for autistic adults, but employment may have additional costs (e.g., interpersonal challenges, etc.) to autistic adults that weaken its buffering effect against depression. For autistic adults, research and clinical efforts may shift focus to alternative protective factors (e.g., social inclusion, communal equity, etc.) as these may be more effective in buffering against depression in this at-risk population. Unemployment is a prominent challenge facing autistic adults and their families that is associated with adverse outcomes (e.g., greater financial burden; Shattuck et al., 2012), yet it may not alter an adults' experience with depression and/or suicidality. It may be that active employment contributes to alternative mental health effects (e.g., increased self-esteem, adaptive functioning, quality of life, etc.).

Three studies investigated the role of depression in employment outcomes among autistic adults and preliminary findings suggest that depression may be associated with workday interference, number of work loss days, and reduced quality of life. A similar pattern is observed in the general population and may suggest that depression, suicidality, and NSSI negatively affect employment retention for some autistic adults. It would be important to investigate individual differences that may explain why some autistic adults with current self-harm do not experience workplace difficulties, while other adults with current self-harm do.

In contrast to the nonsignificant employment-depression relationship, it appears that depression may negatively affect workplace performance among some autistic adults and thus,

depression and self-harm may be risk factors to workplace performance. The potential depression-employment association requires continued investigation in larger, more diverse samples.

Future Research Directions

Methodologies Several methodological recommendations are provided to guide future research efforts into the intersection of depression and employment in autism. First, many operational definitions of employment emerged across studies as some separated full-time employment from part-time, while others grouped students/volunteers with full-time paid employees. An overarching framework to define employment may enhance the ability to draw more definitive conclusions about the potential influence of depression or other factors (e.g., sex, race/ethnicity, autistic traits) on employment, and vice versa. Second, employment status was the most common index of employment across studies, yet it is a dichotomous estimate of functioning that does not afford insights into other meaningful indices (e.g., job satisfaction, workplace relations, task productivity, daily functioning at work, etc.). Quantitative and qualitative methods may elucidate barriers to obtaining, sustaining, and even enjoying employment for autistic adults. Third, the majority of studies included male-dominant samples, which limits generalizability to adults of different genders. Given robust evidence of sex-based differences in employment in the general population (Hasin et al., 2018), it would be important to understand the roles of sex and gender within the context of autism. Lastly, no studies have employed moderator and/or mediator analyses to identify factors related to depression and employment in autism, which may highlight mechanistic pathways and intervention targets.

Potential Lines of Research A critical line of research to extend these findings is building upon the two studies comparing employment outcomes between autistic adults and non-autistic adults with depression (Park et al., 2019; Radtke et al., 2019). Specifically, a comparison of employment outcomes across four cohorts: autistic adults with and without depression, and non-autistic adults with and without depression. If hypotheses are rigorously measured (i.e., standardized, validated assessments), findings may clarify the roles of depression severity and autistic traits on employment outcomes (e.g., job satisfaction, daily functioning at work, etc.). In addition, an investigation of daily workplace activities, or lack thereof, among autistic adults using various measures (e.g., ecological momentary assessment, daily activities log, etc.) and associations with depressive symptoms would afford rich insights into the role of depression in employment. Another productive investigation may be

to investigate specific depressive symptoms (e.g., anhedonia, somatic-vegetative symptoms, suicidal ideation, etc.) that may or may not interfere with employment outcomes in autistic adults to guide treatment planning.

Next, to extend cross-sectional findings, longitudinal studies are needed to monitor depression, employment, and their interaction over time. Longitudinal studies of depression and employment among non-autistic adults suggest a complex, interconnected relationship in which reductions in employment (e.g., job loss, inability to obtain job) were associated with increases in depression, while increased depression predicted higher risk of unemployment (Dooley et al., 2000). Though some studies in autistic adults support an inverse relationship between employment and psychiatric comorbidities over time (Goldfarb et al., 2021; Taylor et al., 2015), the relationship between depression and employment has not been investigated in a longitudinal study. Advancing this line of research, with a specific focus on depression, may identify barriers to securing, maintaining, and enjoying work for autistic adults.

In terms of intervention research, randomized controlled trials (RCTs) with larger samples are needed to examine the efficacy of employment and depression interventions. Collecting follow-up data (i.e., 6 or 12 months after intervention) would illustrate barriers to and successes in employment over time, and perhaps, the role of fluctuating depressive symptoms. This line of work may be supported by findings from the four studies identified in this review that reported nonsignificant reductions in [depressive symptoms](#) following participation in employment-focused interventions, all of which were underpowered. In addition to low power, investigators noted that limited variability in [depressive symptoms](#) among participants likely contributed to nonsignificant findings and thus, an important next step may be to conduct intervention studies with autistic adults with and without depression.

Clinical Applications

Providers who focus on depression (e.g., psychologists, social workers, etc.) and employment (e.g., vocational rehabilitation specialists, etc.) both have important roles as autistic adults are at risk for depression and unemployment. Mental health providers could discuss the ways in which depression may or may not interfere with daily productivity, attempts to obtain employment, and/or workplace interpersonal interactions for some autistic adults. Mental health interventions in the workplace for non-autistic adults have demonstrated efficacy in reducing depression or other psychiatric symptoms and increasing workplace productivity (Czabala et al., 2011). Extending this line of intervention

research to autistic adults may be critical. Given that employment may not predict depression in autism, providers may focus on other factors that reduce depression risk (e.g., social engagement, interpersonal efficacy, etc.). Conversely, vocational rehabilitation (VR) specialists or other employment counselors may benefit from education about signs of depression in autism, high prevalence rates, sex differences, and ways to quickly screen for elevated symptoms. A recent study found that VR counselors did not view themselves as competent in suicide assessment and intervention for adults with disabilities despite the fact that nearly a quarter of providers worked with suicidal clients once a month and more than half of providers saw suicidal clients at least once a year (Lund et al., 2017). Lund and colleagues (2017) advocated for more clinical training in suicide assessment and intervention for VR counselors to adequately support adults with disabilities in the workforce.

Limitations

Though this is the first attempt to synthesize literature on both depression and employment in autistic adults, there are several limitations that warrant discussion. First, findings from the present study are restricted to studies that measured both depression and employment, and thus, may not be fully representative of all depression and employment research in autism. This was done to explicitly explore a relationship between depression and employment, which necessitated the inclusion of studies that measured both constructs. Second, to streamline the focus of this review on depression, the extent to which other psychiatric conditions may influence employment, and vice versa, was not examined. As mentioned by Smith and White (2020), numerous studies on psychiatric comorbidity in autism exist that extend beyond the scope of this work and may render the information clinically uninformative. Third, it is possible that some studies on depression and employment in autism were not included in this review despite significant efforts to search for all potential studies. Fourth, the quality/rigor of reviewed studies was not included in the inclusion/exclusion of the present review, which may impact findings. Lastly, the reviewed studies include their own limitations and there is a potential for missing information in these studies.

Conclusion

Depression and unemployment in the context of autism may have substantial influences on quality of life for adults (Mason et al., 2018; Smith & White, 2020), yet investigations into associations between these constructs are ongoing and represent a critical line of research. Employment

status may not predict depression in autism, yet depression may interfere with employment retention for some autistic adults. Some suggestions for future research and clinical applications for providers working with autistic adults were provided. As research on the intersection of depression and employment in autism continues, findings may elucidate relationships between constructs and inform screening and intervention efforts.

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Declarations

Competing Interests Blythe A. Corbett is the founder of SENSE Theatre ® but derives no financial compensation from the non-profit 501©(3) entity. Jessica M. Schwartzman does not have any non-financial interests to declare.

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