

Supporting Autistic Adults in Postsecondary Settings: A Systematic Review of Peer Mentorship Programs

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Abstract

Background: The number of autistic individuals attending college or university is increasing, yet graduation rates are low as postsecondary environments often fail to support autistic students' individual needs. Peer mentorship programs are emerging as a promising approach for providing individualized, one-on-one support to meet this service gap for autistic postsecondary students. However, no literature has systematically described these programs.

Methods: We conducted a systematic review that described existing peer mentorship programs for autistic students in postsecondary education as well as their effectiveness.

Results: Our search of five databases found nine unique programs that were evaluated in 11 peer-reviewed articles. Programs reported positive outcomes in various domains, which included social skills, academic performance, and sense of belonging. The evidence for these programs was primarily qualitative, sample sizes were small, and there was considerable heterogeneity in the format, provision, and goals of these programs, as well as the evaluation methods used.

Conclusions: Overall, the state of the research related to the efficacy of peer mentorship programs for autistic students remains in its infancy, and further research is needed to quantify effectiveness and enable program comparisons.

Keywords: autism, peer mentorship programs, university, college, adults

Lay Summary

Why was this review done?

The number of autistic individuals attending college or university is increasing, yet graduation rates are low as most colleges and universities do not have the necessary accommodations to support this population. Several peer mentorship programs now exist to provide individualized, one-on-one support for autistic students at college or university.

What was the purpose of the review?

While several programs exist, it is unknown how effective these programs are in improving the academic experience for autistic students.

What did the researchers do?

We systematically reviewed research describing existing peer mentorship programs for autistic university/college students and their effectiveness. Our search of five databases revealed nine unique programs that were evaluated in 11 peer-reviewed articles.

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What were the results of the review?

Most peer mentorship programs reported positive outcomes in various areas, including social skills, academic performance, and a sense of belonging. However, many of the studies were quite different in their approach and how they evaluated success, thus making it challenging to compare the programs with one another.

What do these findings add to what was already known?

The findings from our systematic review highlight that only a few studies related to peer mentorship programs exist. We need more research to quantify the effectiveness of peer mentoring programs for autistic college/university students.

What are potential weaknesses of this review?

There were evident inconsistencies between evaluation methods and types of measurement across studies, and studies often had a small number of participants, which limited our ability to make conclusions about the impact of such programs.

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

This article provides a summary of the kinds of supports available to autistic adults within postsecondary settings, which may help autistic adults explore options for their own education. Advancing research in this area may improve the college/university experience for autistic adults in the future.

Introduction

THE NUMBER OF AUTISTIC STUDENTS attending postsecondary education is increasing; however, graduation rates among these students are low.¹ Approximately 39% of autistic students graduating in 8 years compared with ~60% of non-autistic students graduating in 6 years,^{2,3} highlighting the significant need for programs to support autistic postsecondary students to succeed in college or university. Autism is characterized by differences in social communication and interaction, and restrictive, recurring patterns of behavior and interests.⁴ Autistic individuals have many strengths and abilities to succeed in postsecondary settings, including personal strengths (e.g., sincerity, fairness, and willingness to listen to others), as well as academic strengths, such as memory skills, detail oriented, originality and creativity, passionate interests, desire for knowledge, adherence to rules, ability to work long hours, and ability to understand complex ideas.⁵⁻⁹

Social interaction and communication and cognitive processing differences, seen in varying degrees in autistic people,⁴ may impact autistic students' experience in postsecondary settings.¹⁰ Autistic students report difficulties adapting to the postsecondary environment, as the majority of individuals within these settings are not aware of or sensitive to the needs of autistic individuals. Autistic students also report challenges with adjusting to dormitory living, learning in larger classrooms, orienting to the campus environment and life,^{11,12} and navigating teaching and support staff hierarchies (i.e., counselors, teaching assistants, professors)¹³ in postsecondary settings. Evidence also suggests that autistic students are at an increased risk for bullying, marginalization, and loneliness compared with nonautistic peers, although this does not differ between postsecondary environments and other academic environments.^{14,15} Furthermore, autistic students report differences in social interaction that can lead to difficulties forming new social relationships and fitting into the campus community.^{14,16} Also, autistic students in higher education frequently

describe challenges with executive functioning, such as planning and cognitive flexibility.¹⁴ Autistic characteristics vary among individuals, and,⁴ consequently, creating universal, one-size-fits-all supports is unlikely to address the unique needs of autistic students.^{9,17,18}

Over the last decade or so, universities and colleges in different countries have created and implemented various programs to provide supports for autistic postsecondary students.¹⁹⁻²³ One-on-one peer mentorship is a promising method for engaging and supporting autistic postsecondary students. This systematic review describes existing peer mentorship programs and outlines preliminary evidence for their efficacy in supporting postsecondary autistic students.

Mentorship

Although a true definition of mentorship is often elusive, it is typically defined as "a relationship between a young person and an older, more experienced nonparental figure who provides guidance, support, and encouragement to the mentee."²⁴ Mentorship programs have been established for individuals in postsecondary education from a range of diverse backgrounds, including first-year students,²⁵ students with psychiatric disorders,²⁶ students with attention-deficit/hyperactivity disorder (ADHD),²⁷ and students with intellectual disability.²⁸ Generally, mentoring in different populations (e.g., college students from the general population, individuals diagnosed with mental health disorders, individuals with ADHD) is associated with positive outcomes in terms of academic and social integration,²⁹ comfort in the student role,²⁶ and improved grades and self-regulation skills.²⁷ Specific aspects of mentorship appear particularly important for how successful a mentee views the mentorship experience,^{30,31} and in some cases, enhances academic persistence,³² including personalization of the program, strengths-based approaches, and quality of relationships. It is unknown whether these components of mentorship apply equally to peer mentorship.

There are key aspects to mentoring in postsecondary education, all of which may predict a successful mentoring relationship.³³ First, mentorship relationships depend on psychological and emotional support.³³ This aspect is primarily relational and involves the extent to which mentors are good listeners and providers of a supportive and understanding relationship to their mentee. Second, mentorship relationships should address goal setting and career paths for their mentee, involving the mentor understanding their mentee's strengths and weaknesses.³³ These are then applied to practical tasks such as setting career goals and making important decisions about education (e.g., course selection). Third, it is theorized that mentors should provide subject knowledge support, that is, supporting a mentee's academic skills and knowledge, in addition to broader facets of classroom functioning (e.g., ability to work in groups, interact with professors).³³ Finally, mentors should be able to act as a role model for their mentee, allowing them to learn from the mentor's past and present successes and failures in their academic journey.³³ This model of postsecondary mentorship broadly conceptualizes the components of successful postsecondary mentorship. However, it primarily applies to postsecondary mentorship more broadly and fails to consider the needs of specific student groups, such as autistic students, or the specific role of peer mentors.

Peer mentorship, in particular, has been suggested to be an essential component for students to excel and flourish in the postsecondary environment.^{25,34-37} Peer mentorship is unique within the broader mentorship field, as it involves a person near in age, characteristics, and experiences providing guidance and support.³⁸ In the case of postsecondary education, it involves pairing less experienced students with more experienced students, as opposed to with service providers, faculty, or staff.³⁹ Reflecting on the previously outlined goals for postsecondary mentorship,³³ peer mentors are more or less able to support mentees in various areas. They may be particularly well-suited to act as role models, provide emotional support, and provide practical knowledge about postsecondary and classroom functioning, whereas providing advice on career paths may be outside of the scope of most peer mentoring relationships. Peer mentoring was initially developed and implemented to address a wide array of difficulties that undergraduates typically experience during their transition into postsecondary education (e.g., academic and adaptation difficulties). Since then, studies have shown that peer mentoring programs are associated with higher retention and graduation rates among both mentors and mentees,^{36,40} more positive integration into postsecondary settings,^{25,37} and higher academic achievement.³⁴ Participation in peer mentoring programs positively impacts both the mentor and mentee in various areas, including communication and interpersonal skills (i.e., patience and compassion), mental health (self-esteem and self-efficacy), academic abilities (i.e., time management skills),³³ and overall satisfaction with their academic institution and program.⁴¹

Recommendations for supporting postsecondary autistic students

Valuable recommendations for supporting autistic students can be informed by general theories of student persistence for postsecondary students, as well as specific

suggestions put forth for how to support autistic students.^{9,17,18} Tinto's model of student integration⁴² is a theory of student persistence that explicates the influence of the ecology of postsecondary institutions. According to this theory student integration into academic and social systems is essential to student persistence. This means that interventions that seek to increase student retention must seek at least, in part, to change the academic and social environment of the institution, as opposed to solely focusing on "deficits" within the student. There are also environmental "pull" factors outside of the university environment, such as financial pressures, family responsibilities, and work responsibilities, which can be barriers to student retention.³³ Student persistence needs to be conceptualized, in part, as a systemic, rather than solely individual, issue. Thus, mentorship programs that contribute to creating a more supportive postsecondary environment that makes appropriate accommodations for mentees may function to alter the institution's environment, and thus increase student retention and success.

Several researchers have focused on developing recommendations for how to best support student success among autistic people specifically. These come from surveys of a range of stakeholders, including professionals in community colleges and autistic students attending higher education in the United States, European countries and Australia, with the aim of developing a list of best practices and recommendations for supporting autistic students.^{9,17,18} Professionals in community colleges and postsecondary autistic students suggest that accommodations for autistic students need to be flexible and personalized, attending to the various needs within individuals such as social anxiety, sensory sensitivity and executive functioning.^{9,17,18} Relationship building is essential to effectively support the student,¹⁸ and taking a proactive approach (i.e., supporting students early in their educational journeys with selecting classes, and keeping in touch during challenging times) is much more effective than being reactive.¹⁸

Consistent with this, in a survey of autistic students at a postsecondary institution in the United States, 91% of respondents indicated that they most preferred academic coaching, which involved weekly check-ins with a coach to receive personalized support services.¹⁷ It is also recommended that services consider the functional needs of autistic students (e.g., conscious use of concrete language, provide a sensory break room in case students struggle with sensory overload, provide campus tours highlighting peaceful places).^{9,18,43} Autistic students stressed the importance of having one-on-one support to assist them with a range of difficulties (i.e., decision-making, study skills, daily living, and clarifying ambiguities), as well as the necessity of fostering support that extended beyond the postsecondary community (e.g., among family, friends, and counselors).^{9,44} Brown and Coomes¹⁸ investigated the use of groups for autistic students, and found that professionals felt that group learning for autistic students should focus on tasks and skill development rather than on disability or "deficits," and that providing group experiences that were purely social is essential.¹⁸ Autistic students also expressed the need for services to promote autism awareness among the broader campus community.⁴³

While the recommendations above provide guidance for how to support autistic students, they do not account for some of the realities that these students face such as fear of

disclosure of their diagnosis and subsequent stigmatization.⁵ This fear is not unfounded, as some autistic students report negative experiences with disability services.⁴⁴ Autistic students also note that while they are often offered academic support, they would prefer assistance with socioemotional and everyday living issues.⁵ Furthermore, there is evidence to suggest that the services provided by postsecondary institutions do not fit into an adaptive, student-centered model. Potential accommodations are often inflexible and not based on individual student needs, including extra time on examinations, use of separate testing locations, extended deadlines on assignments, oral examinations, and performing individual as opposed to group projects.^{5,13,44} Thus, it is clear that autistic students face significant challenges in receiving individualized, one-on-one support, despite ample evidence that autistic students believe such support would be beneficial.

The present systematic review

Autistic students have many strengths and abilities to succeed in a postsecondary setting,⁵⁻⁸ and they often face challenges due to postsecondary environments that fail to make appropriate accommodations or provide support where needed.¹²⁻¹⁴ Peer mentorship programs are emerging as a promising approach for providing personalized, one-on-one support to autistic postsecondary students.^{19,20,23} While several programs exist, it is unknown how these programs compare with each other in terms of approach or effectiveness. Thus, the current systematic review provides information on the effectiveness of existing peer mentorship programs for autistic students.

Method

Literature search

We conducted this review in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)⁴⁵ using the following electronic databases: PsycINFO, Medline, Embase, Scopus, and Web of Science. We included all past articles up to June 1, 2020, using search strategy key terms related to postsecondary mentorship programs for autistic individuals (i.e., autism* and mentor*). We did not restrict the date of article publication to ensure we could identify the maximum number of programs. Even that the present study was strictly a review of existing literature, IRB approval was not obtained.

Selection criteria

We used the following criteria to identify articles for review: (1) participants were pursuing postsecondary education; (2) participants either self-identified as autistic or had a diagnosis of autism according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR)⁴⁶ or *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* (DSM-5) criteria⁴; (3) programs were created for use with the autistic population; (4) programs involved peer mentorship of some kind; (5) programs underwent some form of evaluation; (6) published in English; and (7) published article in a peer-reviewed journal (versus a conference abstract or dissertation). We included articles with participants with co-occurring mental health conditions, due to the high prevalence within this population.⁴⁷ We excluded studies if the

program was (1) developed for use with another population (e.g., neurodevelopmental disabilities such as ADHD) that included autism; (2) involved nonpeer mentoring; (3) aimed at treating a symptom or presenting problem (e.g., learning difficulties, executive functioning); (4) focused on postsecondary transition/orientation; and (5) centered on school-to-work/job coaching. Although some peer mentorship programs have been developed for neurodivergent students more broadly and to address specific skills differences (e.g., executive functioning), this review aimed to describe the utility of peer mentorship programs specifically developed for autistic university students to ensure effective supports are being implemented at academic institutions.

Data extraction

Two authors (R.B./K.D.) independently carried out data extraction. They first screened titles and abstracts of articles for relevance. If an article was deemed appropriate at this stage, they conducted a full-text review according to the inclusion and exclusion criteria. When discrepancies occurred, the data extractors brought them to the senior authors (C.A.M./M.A.) for review. Articles included in this review had the following information extracted: name of the program (if provided), participant characteristics, number of participants, demographic information (e.g., gender, if provided), main program features, provision of program, form of evaluation, and evaluation findings.

Results

Systematic review

The database searches produced 443 articles (Fig. 1). Of this total, we identified 220 articles as duplicates. We then screened the titles and abstracts of the remaining 222 articles for inclusion, in which 194 were deemed inapplicable (e.g., mentorship programs for autistic students in secondary school or parents of autistic students). Of the remaining 28 articles, we excluded 17 articles for the following reasons: was a postsecondary transition/orientation program,⁴⁸⁻⁵⁰ program used but not designed for autistic students,^{21,51} lacked some form of program evaluation,⁵²⁻⁵⁷ and school-to-work/job coaching program.^{58,59} Upon full-text review, we excluded two dissertations.^{6,60} Of the 11 studies included in the qualitative syntheses, we identified a total of nine unique programs (Table 1). Several of the programs were described in more than one article (e.g., Specialist Peer Mentoring Project).^{52,61} A total of 11 articles included some form of program evaluation (Table 2), that is, evaluating specific outcomes of program participation versus solely describing the participants.

Description and commonalities of identified peer mentoring programs

Descriptions of the nine identified peer mentorship programs are summarized in Table 1. Programs spanned four different countries: Australia, Canada, the United States, and the United Kingdom. Requirements regarding documentation of autism diagnosis varied across programs and most were designed for undergraduate students. Seven programs (78%) involved both regular individual meetings with a peer mentor and group meetings. Programs varied with regard to whether group events were social in nature or skills/strategy based.

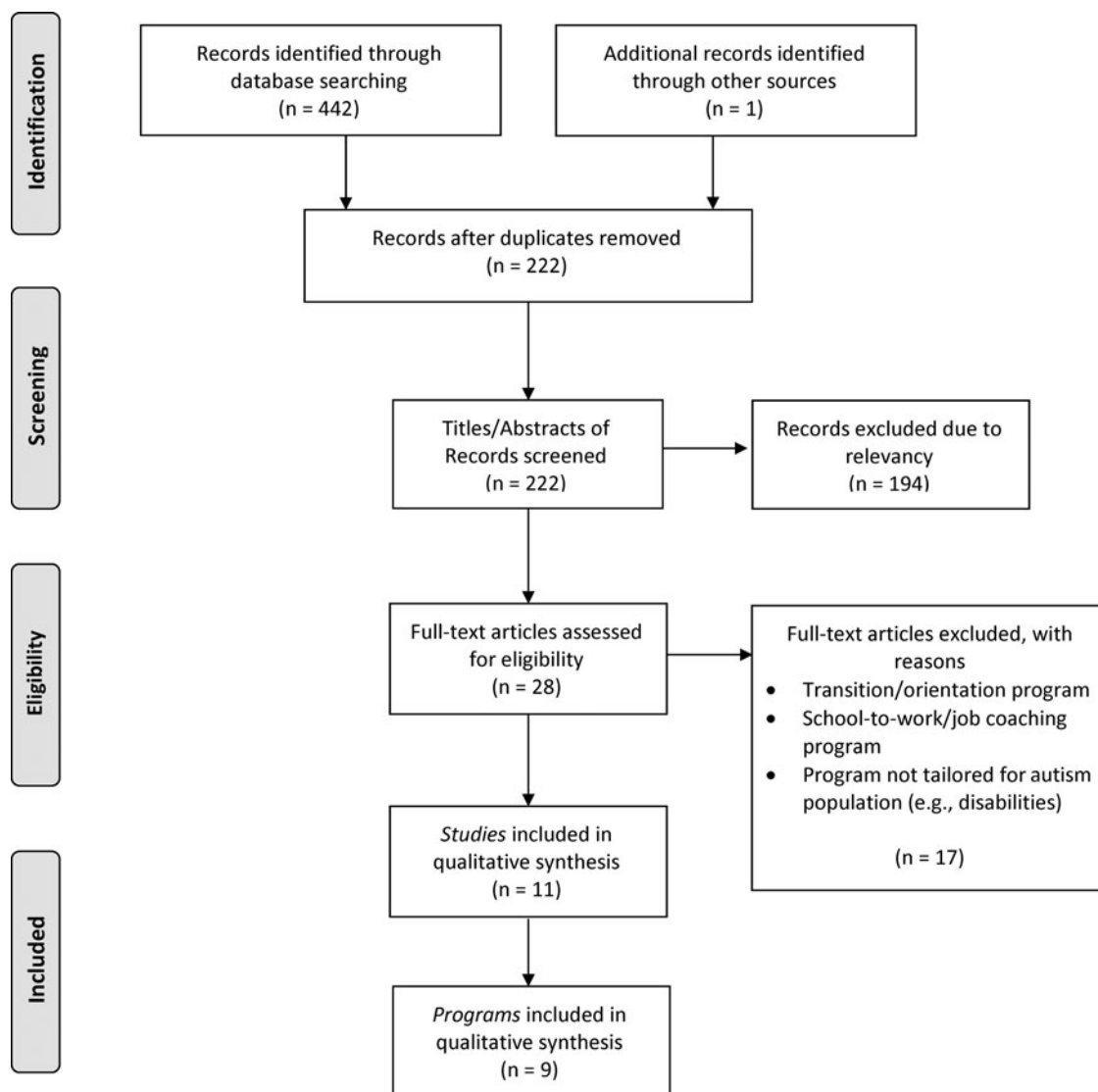


FIG. 1. PRISMA flow diagram for Autism Mentorship Programs. PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses. From Moher et al.⁷⁴ For more information, visit www.prisma-statement.org

For example, several programs noted group events were primarily social in nature,^{19,63,64} whereas the Building Bridges, Project REACH program primarily involved structured, standardized group meetings focused on skills building (i.e., advocacy, social skills).⁶⁷ One program from the United States provided intensive social planning interventions led by a clinician.⁶⁷ Although degree level of the peer mentors varied (i.e., undergraduate vs. graduate students), most programs provided training to mentors. Mentors were typically supervised and qualifications and disciplines of supervisors varied across programs.

Five programs (55%) included overarching goals of providing autistic students with individualized support and a sense of belonging and social integration within the academic community,^{19,22,62,64,67} whereas others were more specific in nature. For example, Ness'⁶⁹ Strategies for College Learning program targeted academic achievement and self-regulated learning and Todd et al.'s⁶⁸ intervention was targeted to increase physical activity levels among participants.

Effectiveness of identified peer mentoring programs

The 11 studies that involved some form of evaluation of the aforementioned peer mentorship programs are summarized in Table 2. The number of participants across evaluations ranged from 3 to 40, and the proportion of males was higher than females across studies. Most studies used a quantitative and qualitative mixed-methods design; only two were solely qualitative in nature,^{22,61} and two were solely quantitative in nature.^{63,67} Quantitative analyses included providing descriptive information,^{18,64,70} and pre/post analyses.^{67,70} Although constructs measured varied across studies, results for common assessments are described next.

Program satisfaction. Two programs evaluated participant satisfaction using unique 5-point Likert scales, with high ratings for each program: (1) the Autism Mentorship Program (AMP): $M=4.25$; $SD=0.75$ ¹⁹ and $M=4.22$; $SD=0.60$ ⁷⁰ and (2) the Curtin Specialist Mentoring Program (CSMP): $M=4.30$; $SD=0.50$.⁶⁴

TABLE 1. DESCRIPTION OF IDENTIFIED PEER-MENTORSHIP PROGRAMS

<i>Program name (if named)</i>	<i>Setting</i>	<i>Participants</i>	<i>Features</i>	<i>Provision</i>
AMI ²²	<ul style="list-style-type: none"> • Simon Fraser University • British Columbia, Canada 	<ul style="list-style-type: none"> • Undergraduates • Diagnosis of “high functioning” autism confirmed by documentation 	<ul style="list-style-type: none"> • Individual meetings with mentor • Social group component 	<ul style="list-style-type: none"> • Duration: full academic year • Mentors: trained senior undergraduate or graduate students • Supervision provided by clinical supervisor(s)
The AMP ^{19,70}	<ul style="list-style-type: none"> • York University • Ontario, Canada 	<ul style="list-style-type: none"> • Predominantly undergraduate students • Self-disclosed diagnosis of autism^a 	<ul style="list-style-type: none"> • Individually tailored meetings (e.g., biweekly) with mentor • Group events (e.g., workshops, social activities) • Manualized 	<ul style="list-style-type: none"> • Duration: full academic year • Mentors: trained graduate students in clinical developmental psychology • Supervision provided by clinical psychologist
Building Bridges, ⁵⁴ Project REACH	<ul style="list-style-type: none"> • College of Staten Island (CSI), City University of New York • New York, USA 	<ul style="list-style-type: none"> • Targeted undergraduates • Diagnostic criteria unspecified 	<ul style="list-style-type: none"> • Individual structured meetings with mentors • Group meetings with standardized curricula (i.e., advocacy, social skills) • Informed by universal design approach (Scott et al., 2003; McGuire and Scott, 2006)^{75,76} and participatory action research (Macaulay et al., 1999)⁷⁷ 	<ul style="list-style-type: none"> • Duration: two semesters • Mentors: trained undergraduate or graduate students • Supervision: provided by program coordinator
CSMP ⁶⁴	<ul style="list-style-type: none"> • Curtin University • Perth, Western Australia 	<ul style="list-style-type: none"> • Undergraduates • Self-reported diagnosis of autism 	<ul style="list-style-type: none"> • Pilot program • Individually tailored meetings • Social group component 	<ul style="list-style-type: none"> • Duration: one semester • Mentors: trained graduate students across several disciplines (e.g., psychology, speech pathology) • Supervision provided by program coordinators (i.e., educational specialist, psychologist)
IFIT ⁶⁹	<ul style="list-style-type: none"> • California State University, Northridge • Northridge, California 	<ul style="list-style-type: none"> • Undergraduates • ASD or Asperger’s syndrome diagnosis • Diagnostic criteria unspecified 	<ul style="list-style-type: none"> • Pilot program • Individual tailored sessions completed with peer mentor • Common meeting hour encouraged (reserved fitness space, snack provided, socialization opportunity, educational presentation and discussion) • Physical activity program to address inactivity • Informed by Self-Determination Theory⁷⁴ 	<ul style="list-style-type: none"> • Duration: 10 consecutive weeks • Mentors: trained kinesiology students (educational level not specified) • Supervision: unspecified

(continued)

TABLE 1. (CONTINUED)

<i>Program name (if named)</i>	<i>Setting</i>	<i>Participants</i>	<i>Features</i>	<i>Provision</i>
SPMP ^{63,64}	<ul style="list-style-type: none"> • Curtin University • University of Western Australia • Perth, Western Australia 	<ul style="list-style-type: none"> • Targeted undergraduates • Diagnosis of autism; identified with student disability services 	<ul style="list-style-type: none"> • Informed by CSMP pilot project (described above) • Individual meetings (tailored vs. structure unspecified) • Social group component • Manualized • Individual meetings with mentors • Targeted focus on academic achievement and self-regulated learning • Informed by Self-Regulation Empowerment Protocol⁷⁵ • Intensive social planning intervention sessions led by clinician • Social activities (e.g., organizational skills, social skills) supported by peer mentor 	<ul style="list-style-type: none"> • Duration: unspecified • Provision: similar to CSMP
SCL ⁶⁸	<ul style="list-style-type: none"> • Undisclosed public university 	<ul style="list-style-type: none"> • Undergraduates • Autism diagnosis • Identified as either failing or in danger of scholastic breakdown 	<ul style="list-style-type: none"> • Duration: one semester • Mentors: trained undergraduate and graduate students in communication sciences and disorders • Supervision: provided by program researcher • Duration: 10 weeks • Mentors: trained undergraduate students • Clinicians: doctoral-level graduate students • Supervision: provided by psychologist or speech-language pathologist 	<ul style="list-style-type: none"> • Duration: 24 social activities in total • Mentors: trained graduate students • Supervision: unspecified
No program name provided ⁶²	<ul style="list-style-type: none"> • Koegel Autism Center at the University of California • California, USA 	<ul style="list-style-type: none"> • Undergraduates • Autism diagnosis confirmed by outside agency 	<ul style="list-style-type: none"> • Individual meetings with mentor • Social activities • Peer mentor used as incentive to promote attendance to social activities • Randomized across phases (baseline [a], peer mentor [b], peer mentor + incentive program [b + c], peer mentor [b]) 	<ul style="list-style-type: none"> • Duration: 24 social activities in total • Mentors: trained graduate students • Supervision: unspecified
No program name provided ⁶⁵	<ul style="list-style-type: none"> • Undisclosed large university • Southeastern USA 	<ul style="list-style-type: none"> • Undergraduate and graduate students • Diagnosis of autism supported by documentation 	<ul style="list-style-type: none"> • Individual meetings with mentor • Social activities • Peer mentor used as incentive to promote attendance to social activities • Randomized across phases (baseline [a], peer mentor [b], peer mentor + incentive program [b + c], peer mentor [b]) 	<ul style="list-style-type: none"> • Duration: 24 social activities in total • Mentors: trained graduate students • Supervision: unspecified

^aAutism encompasses both DSM-IV-TR and DSM-5 definitions.

AML, Autism Mentorship Program; ASD, Autism spectrum disorder; CSMP, Curtin Specialist Mentoring Program; DSM-IV-TR, *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision*; DSM-5, *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*; IFT, Intro Fitness Together; SCL, Strategies for College Learning; SPMP, Specialist Peer Mentoring Program.

TABLE 2. SUMMARY OF PROGRAM EVALUATION INFORMATION FROM IDENTIFIED PROGRAMS

<i>Program name (if named)</i>	<i>Reference</i>	<i>Study participants</i>	<i>Procedure and analyses</i>	<i>Main results</i>
AMI	Roberts and Birmingham (2017) ²²	<ul style="list-style-type: none"> • Mentees: $n = 9$; 78% male • Mentors: $n = 9$; 11% male 	<ul style="list-style-type: none"> • Unstructured and semistructured interviews with mentors and mentees • Review of mentor progress notes and goal setting forms • Qualitative analyses embedded in grounded theory 	<ul style="list-style-type: none"> • Overarching theme of <i>mentee-centered approach</i> identified • Five additional interrelated main themes: <i>the natural progression of the relationship, the supportive mentor, the meeting process, identifying and implementing goals, and learning together</i> • Additional theme: <i>barriers to providing a mentee-centered approach</i> • High levels of overall program satisfaction ($M = 4.25$, $SD = 0.75$; $\max = 5$) • Higher satisfaction reported for individual meetings ($M = 4.25$, $SD = 0.97$) than group ($M = 3.75$, $SD = 0.89$) meetings • 80% of students reported program helped them to achieve their goals • High levels of overall program satisfaction ($M = 4.22$, $SD = 0.60$) • Development of social skills identified as common goal among autistic students • Pre/post changes in social support and friendship were not significant • Spring: significant pre/post declines in autistic symptoms and trait (but not state) anxiety • Fall: significant pre/post increases in social support and academic self-efficacy • Open-ended questions showed increases in self-advocacy
AMP	Ames et al. (2016) ¹⁹	$n = 23$; 65% male	<ul style="list-style-type: none"> • Year-end evaluations completed by mentees • Descriptive statistics • Mixed quantitative and qualitative analyses 	
AMP	Ncube et al. (2019) ⁷⁰	$n = 23$; 78% male	<ul style="list-style-type: none"> • Year-end evaluations completed by mentees • Descriptive statistics and pre/post analyses • Quantitative analyses • Assessments of social support, friendships, goals • Pre/post analyses • Needs assessment identifying skill areas to target in intervention, descriptive analyses • Assessments of social support, autistic symptoms, state-trait anxiety, and self-efficacy • Mixed quantitative and qualitative analyses 	
Building Bridges, Project REACH	Gillespie-Lynch et al. (2017) ⁵⁴	<ul style="list-style-type: none"> • Spring: $n = 12$ autism, 75% male; $n = 16$ not autism, 56% male • Fall: $n = 17$ autism, 82% male; $n = 13$ not autism, 39% male 		

(continued)

TABLE 2. (CONTINUED)

<i>Program name (if named)</i>	<i>Reference</i>	<i>Study participants</i>	<i>Procedure and analyses</i>	<i>Main results</i>
CSMP	Siew et al. (2017) ⁶⁴	<ul style="list-style-type: none"> • $n = 10$; 70% male 	<ul style="list-style-type: none"> • Descriptive statistics and pre/post analyses • Semistructured interviews and questionnaires with mentees • Assessments of anxiety, social support, aspects of communication, and program satisfaction • Mixed quantitative and qualitative analyses 	<ul style="list-style-type: none"> • High levels of overall program satisfaction ($M = 4.30$, $SD = 0.50$; $\max = 5$) • Significant pre/post improvements in social support and communication apprehension • Three identified positive program features: <i>provision of constant stable support, comfort of peer-to-peer support, and flexible and individualized support</i> • Program helpful for coaching, increased motivation, and provision of practical group, and emotional support • Positive outcomes included transition to university, managing academic work, communication for support, emotions, and socialization • Significant increase in mean cardiorespiratory fitness, upper body muscular endurance, and flexibility • Nonsignificant increase in mean core body endurance • Pre/post BMI relatively unchanged • Program adherence rate was 89% • Emergent themes were <i>gains in motor competence and knowledge of exercise, improved overall health, and a sense of belonging</i> • Context themes included <i>environmental conditions, university course demands, and aspects of autism</i> • Mechanism themes identified were <i>mentor, communication and social interaction, problem solving and training, and supervision</i> • Outcome themes included <i>identifying personal strengths, increased autonomy, achieving goals, relationships, and positive mentor outcomes</i>
IFit	Todd et al. (2019) ⁶⁸	<ul style="list-style-type: none"> • $n = 16$, 82% male 	<ul style="list-style-type: none"> • Pre/post fitness level analyses • Program adherence rates • Interviews and rating scales with mentees 	
SPMP	Thompson, et al. (2019) ⁶¹	<ul style="list-style-type: none"> • Mentees: $n = 23$, 74% male • Mentors: $n = 24$; 21% male 	<ul style="list-style-type: none"> • Semistructured interviews with mentors and mentees • Qualitative analyses embedded in realist evaluation framework 	

(continued)

TABLE 2. (CONTINUED)

<i>Program name (if named)</i>	<i>Reference</i>	<i>Study participants</i>	<i>Procedure and analyses</i>	<i>Main results</i>
SPMP	Thompson et al. (2020) ⁶²	<ul style="list-style-type: none"> • <i>n</i> = 30, 73% male 	<ul style="list-style-type: none"> • Pre/post analyses • Semistructured interviews and questionnaires with mentees • Assessments of autistic symptoms, anxiety, self-competence and efficacy, social support • Mixed quantitative and qualitative analyses 	<ul style="list-style-type: none"> • Significant pre/post improvements in social awareness, communication, and motivation (i.e., dimensions of social responsiveness) • Themes identified included <i>developing partnership and understanding, modeling and practicing communication, psychological support, and grading and planning skills</i>
SCL	Ness (2013) ⁶⁹	<ul style="list-style-type: none"> • <i>n</i> = 3, 67% male 	<ul style="list-style-type: none"> • Pre/post analyses • Semistructured interviews • Assessed cumulative GPA • Observational data measuring acquisition of SCL skills and strategies 	<ul style="list-style-type: none"> • Effect on participants' GPA was variable • Participants demonstrated acquisition of SCL skills and strategies • Participants reported program enhanced their academic experience, was effective and appropriate, and they felt connected to mentors
No name program provided	Ashbaugh et al. (2017) ⁶⁷	<ul style="list-style-type: none"> • <i>n</i> = 3, 67% male 	<ul style="list-style-type: none"> • Multiple baseline across participant design • Assessments of number of college and community-based activities attended, number of extracurricular activities, cumulative number of peers interacted with at activities, GPA, and social validation • Descriptive analyses 	<ul style="list-style-type: none"> • Improvements in social integration (i.e., increased number of social activities, extracurricular activities, and peer interactions) • Increases in GPA and satisfaction with college
No program name provided	Fairchild et al. (2020) ⁶³	<ul style="list-style-type: none"> • <i>n</i> = 40 • % male not reported 	<ul style="list-style-type: none"> • Measured number of students in attendance of each social event; randomized across phases (baseline [a], peer mentor [b], peer mentor + incentive program [b + c], peer mentor [b]) • Online survey on barriers to seeking services • Quantitative analyses 	<ul style="list-style-type: none"> • Peer mentor + incentive phase reported highest attendance • Students reported main barrier to attendance was perceived lack of time

BMI, body mass index; GPA, grade point average.

Autism traits. Two studies^{64,68} assessed whether participation in a peer mentorship program resulted in a change in autistic traits using the Social Responsiveness Scale.⁶⁵ Gillespie-Lynch et al.⁶⁶ reported reduction in the severity of autistic symptoms in the spring semester (2013), but not the fall semester (2013), data collection. Thompson et al.⁶³ reported significant improvements in social awareness, communication, and motivation (i.e., dimensions of social responsiveness) among participants.

Social support and integration. Five programs surveyed outcomes related to social support, feelings of belonging, and social integration. Findings related to social support are mixed as Ncube et al.⁷⁰ reported nonsignificant pre/post changes in social support; whereas Gillespie-Lynch et al.⁶⁸ reported increases in levels of social support pre/post intervention. Ashbaugh et al.⁶⁷ also reported increased involvement in extracurricular activities, community-based activities, and interactions with peers among their participants. Similarly, two studies using qualitative methods noted development in social relationships with peers and sense of belonging with autistic peers.^{62,68}

Academic outcomes. Three studies included outcomes related to academic success, including grade point average (GPA), self-regulated learning strategies, and academic self-efficacy. With regard to GPA, two studies reported improvements in student GPA following intervention; however, both were limited by small-sample case reports ($n = 3$ ⁶⁷; and $n = 3$ ⁷¹). Of note, five of the six students within these studies were on academic probation before intervention entry. Ness⁷¹ only reported improvement of GPA in one of the three identified students within the program. However, observational data supported improvements in self-regulated learning strategies (e.g., organization, studying). Gillespie-Lynch et al.⁶⁶ reported differences in outcomes dependent on spring (significant increases) versus fall (no change) assessments for academic self-efficacy.

Physical and mental health. With regard to mental health, anxiety was assessed in several of the identified studies with limited support for improvement postintervention. Gillespie-Lynch et al.⁶⁸ showed significant declines in trait (but not state) anxiety during the fall assessment; however, no changes in the spring assessment (i.e., neither trait nor state anxiety); consistent with others reporting no changes in assessments of anxiety pre/post interventions.^{62,64} Todd et al.⁶⁸ showed improvements in cardiorespiratory fitness, flexibility, and upper body muscular endurance as a result of participating in Into Fitness Together, a peer mentoring program focused on improving physical activity among autistic students.

Qualitative analyses. Qualitative analyses identified a number of themes depending on the study, with overarching common themes focusing on the importance and value of the peer/mentorship relationship.^{18,22,61,62,64,69} Students tended to express value in the individualized and flexible nature of the relationship. For example, students in the AMP noted that they enjoyed being able to openly and candidly discuss their concerns with their mentor.¹⁸ Other highlighted themes support the learning of academic

skills,^{22,67,69} achievement of individual student-led goals,^{18,22,57,64} and a sense of belonging within the academic community.^{18,68}

Discussion

Autistic students have many strengths to succeed in postsecondary education.⁵⁻⁹ Autistic students and those who work with them have identified different supports that would further support their success.^{9,17,18} This review focused on one form of support for autistic students in postsecondary education, peer mentorship. We found 9 peer mentorship programs represented in 11 articles. While heterogeneous in their goals for supporting autistic students, these programs tended to combine individual meetings and larger group gatherings. Several studies identified mentors as undergraduate or graduate students who received specialized training.^{19,22,64,68} All mentors were nonautistic, with the exception of the Building Bridges, Project REACH program.⁶⁶ This program was unique in its universal design and participatory action research approach. Within this model, students who were mentees progressed through the program, with the opportunity to become mentors. This is the only program where autistic voices were explicitly solicited during program development. Programs were predominantly evaluated using quantitative and qualitative mixed-methods designs. Pre/post assessment constructs were variable and spanned measures of social responsiveness, anxiety, social support, dimensions of communication, self-efficacy, and academic success (i.e., GPA).

The peer mentorship programs reviewed aligned with several of the support needs identified by autistic students and stakeholders. While most peer mentorship programs combined individual mentorship with larger group meetings for mentors and mentees, these programs differed in their goals, and thus their program content. Some peer mentorship relationships focused on goals identified by the autistic student,^{18,22,64} others had predetermined goals such as self-advocacy, social skills or social inclusion, or academic achievement.^{64,66,67,69} Notably, autistic students have identified a preference for adaptive and individualized services,^{9,17,18} suggesting that more open-ended, mentee-centered programs may be better suited to support this population. Several programs also had the option of providing socioemotional support rather than purely academic,^{18,64} which aligns with the types of support autistic students have identified as beneficial.^{9,43} Across programs, the regularly scheduled, one-on-one nature of peer mentorship also aligns with previously identified support needs of autistic students, who specify that proactive, ongoing services in which one can form a relationship are suitable.¹⁸ Autistic students have also identified a desire for group time that is purely social,¹⁸ which several peer mentorship programs included as a component of their program.^{63,64} Overall, the peer mentorship programs reviewed in this article allow for more flexibility in terms of focus and format than traditional postsecondary accommodations. Thus, it is clear that peer mentorship programs have the potential to meet several of the identified support needs of autistic postsecondary students.

The methods used to evaluate the peer mentorship programs reviewed in this article limit our ability to provide an overall assessment of the actual benefits of peer mentorship to autistic students, and to compare between programs. While

programs tended to use qualitative interviews, pre- and postprogram measures of functioning, or both, programs differed in the areas focused on in interviews and quantitative measures. This is not surprising given that programs differed in their overall objectives and goals. Most programs supplied some positive results, including student satisfaction with the program^{18,21,64,70} and positive mentor/mentee relationships.^{22,61,64,69} Positive changes in social responsiveness, aspects of communication, and social support were more consistent, whereas changes in GPA, anxiety, and self-efficacy were less clear. This could be due to differences in the focus of mentorship relationships, differences in the desire of autistic students to focus on these areas, or due to actual differences in the effectiveness of mentorship programs to result in significant changes in various areas. Overall, due to the variance in program content and evaluation methods, little can be concluded about the effectiveness of peer mentorship in supporting autistic students in various ways.

While peer mentoring programs meet some of the identified needs of autistic students, they fail to address several other needs. Most importantly, the existing peer mentorship programs over focus on helping autistic students adapt to postsecondary institutions, rather than assisting institutions to better adapt to autistic students. As highlighted in Tinto's model of student integration,⁴² student persistence needs to be conceptualized as both a systemic and individual issue. This is echoed by autistic student desire that awareness of autism be raised within campus communities as a whole, as well as by autistic student experiences of stigmatization and inappropriate provision of accommodations.^{5,43,44} While peer mentorship may help emotionally support students who experience insensitivity and teach students to advocate for themselves within these systems, none of the peer mentorship programs reviewed incorporated any systemic efforts to make postsecondary institutions more accessible for autistic students. The Building Bridges, Project REACH program did incorporate advocacy training into group meetings, which may allow students to advocate for systemic change.⁶⁸ Such efforts could potentially be incorporated into peer mentorship programs by, for example, working together to create educational materials or workshops for postsecondary faculty, staff, and/or nonautistic students, creating campus awareness campaigns, or advocating postsecondary administration for policies to better support appropriate accommodations for autistic students. Such efforts may bolster support outside of the mentor/mentee relationship and lessen stressors such as discrimination, thus promoting autistic student integration in a way that focuses on "fixing" the system, rather than "fixing" the student. Notably, advocacy activities are not typically included in the role of peer mentors or mentoring more broadly.^{33,38} Thus, while it may be appropriate to expand mentorship programs to include advocacy in light of autistic student concerns about systemic barriers,^{5,43,44} there is also a need for this work to be done in postsecondary communities more broadly.

Participatory action research is a useful approach to further the development of programs and efforts to support autistic postsecondary students, both individually and systemically. Participatory action research entails academic researchers becoming coresearchers along with community stakeholders.^{71,72} This means that stakeholders are involved in de-

signing the research, collecting the data, interpreting and disseminating the results. The "action" suggests the creation of a product (e.g., a program, event, or creative project) that addresses a problem within the community.⁷² Of the programs reviewed here, it is notable that, with one exception (Building Bridges, Project REACH), no programs meaningfully incorporated autistic voices into their design and implementation, instead often being designed by researchers and implemented by nonautistic mentors. Building Bridges: Project REACH made use of a participatory action research design.^{52,66} The ongoing development of this program was informed by autistic student feedback, mentor logs, and end-of-semester focus groups. This functioned both as an invaluable resource for further developing programming in line with student needs, and also provided students an opportunity to advocate for and empower themselves.⁵² Former mentees of this program have moved on to become mentors or researchers involved with the program. Future research may wish to follow this example, and expand further by incorporating autistic voices earlier in the program development, as well as more substantially in the interpretation and dissemination of results in line with the tenets of participatory action research.^{71,72}

Limitations and future directions

Several limitations exist in this review. First, this review focused on peer mentorship programs that solely had autistic postsecondary students as participants. A more expansive search may result in programs that focus on supporting autistic students with the transition from high school to postsecondary education, or on programs that included both autistic and nonautistic students as program participants. Notably, several programs not reviewed here combine transition support with ongoing peer mentorship support throughout the postsecondary education.⁴⁸ Second, this review was based exclusively on programs that have been reported on in the academic literature. There may be more peer mentorship programs for autistic postsecondary students that have not been the focus of academic research. Future research may survey postsecondary institutions to determine if other peer mentorship programs for autistic students exist. Third, all of the studies reviewed occurred in four predominantly white, English-speaking countries (the United Kingdom, Canada, the United States, and Australia). As such, it is unknown if similar results would be found in other contexts, or if this type of programming would be feasible and useful in other contexts.

While several promising peer mentorship programs for autistic students were reviewed, this literature remains in its infancy. Small sample sizes, heterogeneity in the program format, and limited forms of evaluation (i.e., qualitative and pre/post measures) make comparisons between programs, and statements about overall effectiveness, impossible at this time. Program evaluation for autistic student mentorship has inherent challenges going forward. The evidence that individualized and adaptive support is most beneficial for autistic students suggests that manualized programs with one-size-fits-all outcome targets are not advisable for this population.^{9,17,18} Thus, future research may aim to assess program effectiveness by monitoring progress made on individualized goals of the autistic student mentee, rather than providing overarching measures to all program participants that may or

may not capture what the mentee hoped to gain from participating. Such an approach may take some time to result in high-quality evidence, as the number of programs and program participants is small.

Conclusion

The present review examined the state of mentoring programs for autistic postsecondary students. To the authors' knowledge, this was the first time a systematic review has been conducted in this area. The majority of programs comprised a combination of individual meetings and larger group gatherings. Only one program included autistic individuals in program development and as mentors,⁶⁶ while the majority of programs included autistic individuals solely as mentees. Programs targeted diverse outcomes, and thus included different measures of evaluation, such as social support, academic outcomes, and physical and mental health. Because such different metrics were used and studies often had small sample sizes, no conclusions about the impact of programs can be made.

Mentorship programs in postsecondary education hold exciting potential for improving student success and creating more inclusive and connected postsecondary communities. Peer mentorship programs to date have attempted to address the support needs of autistic students, such as providing frequent individualized one-on-one support, including socioemotional support, as well as by providing social opportunities. While the literature on programs and supports for autistic postsecondary students is increasing, this field remains in its infancy. In the coming years, it will be important to perform thorough, individualized evaluations of programs for autistic students to determine how best to support this population. It will also be essential to expand the focus of programming and research to include autistic voices and improve accessibility of postsecondary institutions, rather than solely on providing support for students to adapt to the postsecondary environment.

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